

THIRUVALLUVAR UNIVERSITY

M. A. DEFENCE AND STRATEGIC STUDIES

Syllabus

(With effect from 2022-2023)

MISSION

To train the students for acquiring knowledge about Defence and Strategic Studies and its applications to enhance their employability.

VISION

To undertake scientific way of research in Defence and Strategic Studies for regional, national and global development and to create World peace through Diplomacy.

Programme Outcomes

1. Graduates are educated on critical analysis in National Security.
2. Enable graduates to possess deeper knowledge on strategic issues that influence India's foreign policy and national security.
3. To provide a platform to interact with military professionals to gain critical understanding on national security issues.
4. To gain an understanding on historical heritage on military history.
5. to keep abreast of the latest trends in international and regional security affairs.
6. To provide a platform for practical knowledge through facilitating internship Programme with stakeholders.
7. To develop their research writing skills with focus on multi-disciplinary approaches.
8. Educating on contemporary and evolving strategic aspects like cyber security and non-contact warfare.
9. To orient practical knowledge by way of providing scope for field visits to military institutions and establishments.
10. To empower graduates with sufficient knowledge on strategic affairs so as to enable them in policy making skills.

Programme Specific Outcomes

1. To equip graduates with in-depth knowledge on strategic affairs.
2. To gain understanding on Global Security issues.
3. To enable understanding on India's regional security dynamics.
4. To prepare graduates on Doctoral level research.
5. To enhance graduates with sense of Nationalism and Patriotic feelings.
6. Encourage graduates on the lines of inter-disciplinary research.
7. To instill quality of leadership through soft skill training.
8. To enable graduates tackle the crisis situation.
9. To hone higher order thinking skills.
10. To acquire graduates the capacity to join Indian Armed Forces at the officer level.

Programme Objectives

1. To provide conceptual clarity on various dimensions of National and International Security.
2. To develop skills on policy level research.
3. To enable philosophical understanding on qualitative and quantitative approaches in strategic research.
4. To facilitate graduates in confidence building through seminar presentation.
5. To provide scope for all-round development in defence and strategic studies.

Programme Educational Objective

1. Application of Research tools to solve issues related to National Security.
2. To provide Scope for developing policy perspective in strategic affairs.
3. To promote the spirit of National Unity and Integrity.
4. Orienting use of latest technology in teaching and learning process on a progressive basis at the International Level.
5. Preparing young graduates to join in the Indian Armed Forces and Think-Tanks.

(With effect from 2022-2023)

Sl. No.	Study Components		Ins. hrs /week	Credit	Title of the paper	Maximum Marks		
	Course title							
SEMESTER I						CIA	Uni Exam	Total
1.	Core	Paper 1	5	4	Introduction to International Relations	25	75	100
2.		Paper 2	5	4	War-Its Causes and Consequences	25	75	100
3.		Paper 3	5	4	Conceptual Aspect of Security	25	75	100
4.		Paper 4	5	4	India's National Security	25	75	100
Internal Elective for same major students								
5.	Core Elective	Paper 1	5	3	(to choose one out of 3) a) India's Security Policy b) Act East Policy c) India's policy towards USA	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								
6.	Open Elective	Paper 1	5	3	(to choose one out of 3) a) National Security b) Disaster Management c) Insurgency and Security	25	75	100
			30	22		150	450	600
SEMESTER II								
SEMESTER II						CIA	Uni Exam	Total
7.	Core	Paper 5	6	4	Theories of International Relations	25	75	100
8.		Paper 6	6	4	Introduction to International Law	25	75	100
9.		Paper 7	6	4	Strategic Thought	25	75	100
Internal Elective for same major students								
10.	Core Elective	Paper -2	4	3	(to choose one out of 3) a) Introduction to Peace Study b) Gandhian Studies c) Ambedkar's thoughts of Peace	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								

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25.	Core Elective	Paper -4	5	3	(to choose one out of 3) a) Area Studies –South Asia and Neighbours b) South East and West Asia c) Central Asia Responsibility	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								
26.	Open Elective	Paper -4	5	3	(to choose one out of 3) a) Introduction to Defence Journalism b) Management of Refugee crisis. c) Indian Ocean Studies	25	75	100
			30	23		150	450	600
			120	92				2600

SEMESTER-I

Course code

CORE

INTRODUCTION TO INTERNATIONAL RELATIONS

PAPER 1

Syllabus
Version 2022-23

Course Objectives:

The main objectives of this course are to acquire the knowledge of the International Relations.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | To recall the concept of important terminologies | K1 |
| 2 | Understand the power | K2 |
| 3 | Know the War theories | K3 |
| 4 | Compare various world politics | K4 |
| 5 | Develop student ability to understand the concept of international agencies | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1

Introduction–Nation, Nation- State, Nationalism - Narrow Nationalism- Internationalism - Evolution of Nation- State.

Unit:2

The Place of Power - Ideology & Ethics in International Relations.

Unit:3

Theories of war – Determinants of War.

Unit :4

World Order – Cold War and its effects on World Politics

Unit: 5

UNO-and its Specialized Agencies - Security Council -ICJ, IAEA, etc

REFERENCE BOOKS

1. Palmer, N.D., and H.C., International Relations, Boston: Houghton Mifflin, 1953.
2. Jackson, R. and G. Sorensen, Introduction to International Relations: Theory and
3. Frankel.J., International Relations in a Changing World, London: Oxford University Press,
4. Nicholson. M., International Relations: A Concise Introduction, New York:Palgrave, 2002.

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	M	L	L	S	M	L	L
CO2	S	L	M	S	S	L	M	L	L	L
CO3	S	M	L	M	S	L	M	L	L	L
CO4	S	L	L	S	L	S	L	L	L	L
CO5	S	L	L	S	L	L	L	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-I

Course
code

CORE

WAR- ITS CAUSES & CONSEQUENCES

PAPER 2

Syllabus
Version 2022-23

Course Objectives:

The main objectives of this course are to: understand the causes and consequences of the War.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Understand the basics of concept of war | K1 |
| 2 | Demonstrate the attempts to abolish war | K2 |
| 3 | Explain the strategies and tactics of war | K3 |
| 4 | Understand the warfare in Indian History | K4 |
| 5 | Know the wars in independent India | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1

Definition of War, Types of War, war as a Social Institution and its connection with and differences from other forms of social conflict

Unit:2

Theories of the Causes of war and Attempts to Abolish War.

Unit:3

. War – Strategy and Tactics Introduction to the meaning and Significance of war, Strategy and National security: Defence policy & Foreign Policy.

Unit:4

War in Ancient & Medieval India – A Brief Survey of – Mauryas, Rajputs, Mughals, Marathas and Presidency Armies.

Unit:5

Wars in modern India in the post 1945 era-with special reference to Indo-Pak Wars of 1947, 1965 and 1971 and Sino- Indian War of 1962

REFERENCE BOOKS

1. Majumdar, R.C., An Advanced History of India, New York: St. Martin, 1967.
2. Malleson, G.B., The Decisive Battles of India, London: W.H. Allen, 1885.
3. Philp, T.R., (ed), Roots of Strategy, 1943.
4. Michael Howard, (ed), The Theory and Practice of War, 1965.
5. D.G. Chandler, The Atlas of Military Strategy: the art, theory and practice of war (London,
6. Fuller, J.F.C., The Foundation of the Science of War (London, 1925).
7. Anjoli Nirmal, The Decisive Battles of Indian History, Jaipur: Pointer Publications, 1999.

8. Sarkar, Jadunath., Military History of India, Bombay: Orient Longmans, 1970.
9. Das, S.T., Indian Military: Its History and Development, Allahabad: Kitab Mahal, 1979.

Mapping with Programme Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	L	M	L	L	L
CO2	S	M	S	M	S	M	S	L	L	M
CO3	S	S	S	L	S	S	L	L	S	L
CO4	S	S	S	L	S	M	S	L	S	L
CO5	S	M	S	M	S	L	L	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-I

Course
code

CORE

CONCEPTUAL ASPECTS OF SECURITY

PAPER 3

Syllabus
Version 2022-23

Course Objectives:

The main objectives of this course are to: Giving a brief overview of concepts used in security aspects

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Understand the fundamentals of security concepts | K1 |
| 2 | Get an idea on national power | K2 |
| 3 | Develop necessary knowledge on international security model | K3 |
| 4 | Assess the kinds of threats | K4 |
| 5 | Comprehend the Defence policy over security | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1

Introduction – Concept of Security – National Security and International Security

Unit:2

. National Security with reference to the contemporary thinking – National Power & its Elements:
Power- Security Relationship

Unit:3

Models of International Security – Balance of Power, Collective Security, Collective Defence & Non – Alignment

Unit:4

Threats: Military and Non-Military Threats

Unit:5

Formulation of Security and Defence Policies–and Their Linkages.

REFERENCE BOOKS

1. Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983.
2. Dixit, J.N., Accross Borders: Fifty Years of India's Foreign Policy, New Delhi: Picus Books, 1998.
3. Sathish Kumar, (ed), Yearbook on India's foreign Policy, New Delhi: Deep & Deep, 1993.
4. Jayaramu, P.S., India's National Security and Foreign Policy, New Delhi: ABC Publishers 1978.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	L	S	S	S	L	M
CO2	S	S	S	L	L	S	S	S	M	L
CO3	S	S	L	S	M	M	S	L	S	M
CO4	S	S	S	L	L	M	S	S	L	L
CO5	S	M	S	L	L	M	S	S	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-I

Course code

CORE

INDIA'S NATIONAL SECURITY

PAPER 4

Syllabus
Version 2022-
23

Course Objectives:

The main objectives of this course are to: To inculcate knowledge on National Security of India

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Understanding basics of National Security | K1 |
| 2 | Understand the India's security relationship with Russia | K2 |
| 3 | Understand the India's security relationship with USA. | K3 |
| 4 | Understand the India's security problem with Pakistan | K4 |
| 5 | Understand the India's security problem with China | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1

Introduction – Concept and meaning of National Security and its Objectives

Unit:2

India's Security Relationship with Russia.

Unit:3

India's Security relationship with USA

Unit:4

India's Security Problems with Pakistan.

Unit:5

India's Security Problems and Policies with China.

REFERENCE BOOKS

1. Barry, Buzon, People, State and Fear: The National Security problems in International Relations, Sussex; Wheatsheaf of Books, 1983.
2. Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983.
3. Dixit, J.N., Across Borders: Fifty Years of India's Foreign Policy, New Delhi: Picus Books, 1998.
4. Sathish Kumar, (ed)., Yearbook on India's foreign Policy, New Delhi: Deep & Deep, 1993.
5. Barry, Buzon, People, State and Fear: The National Security problems in International Relations, Sussex; Wheatsheaf of Books, 1983.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	L	L	S	L	S	M
CO2	S	S	S	L	M	S	M	L	S	L
CO3	S	S	S	L	S	S	M	L	M	L
CO4	S	S	S	L	S	M	L	L	S	L
CO5	S	M	S	L	L	M	M	S	S	L

*S-Strong; M-Medium; L-Low

SEMESTER-I

Course
code

CORE ELECTIVE

A.INDIA'S SECURITY POLICY

PAPER-1

Syllabus
Version 2022-23

Course Objectives:

The main objectives of this course are to: To inculcate knowledge about the India's Security policy

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the security components | K1 |
| 2 | Understand the various threats | K2 |
| 3 | Understand the various doctrines and plans | K3 |
| 4 | Understand implementation of policy making | K4 |
| 5 | Understand the post independent security policies of India. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1

Components of Security Policy of India

Unit:2

Policy formulation-I: Assessment of threats - Internal and External threats

Unit:3

Policy Formulation-II: Doctrines, Plan and Resources.

Unit:4

Policy making and implementation

Unit:5

India's Defence and National Security Policies since Independence

REFERENCE BOOKS

1. Barry, Buzon, People, State and Fear: The National Security Problems in International Relations, Sussex; Wheatsheaf Books, 1983.
2. Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983.
3. Waltz, K., Man, the State, and War: A Theoretical Analysis, New York: Columbia University Press 1959.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	L	S	L	S	S	S	L	M
CO2	S	M	S	L	L	M	M	S	M	S
CO3	S	M	M	M	L	S	M	L	L	L
CO4	S	L	S	L	M	S	M	S	L	L
CO5	S	L	S	S	M	M	S	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-I

Course
code

CORE ELECTIVE

B. ACT EAST POLICY

PAPER-1

Syllabus
Version 2022-23

Course Objectives:

Highlighting the Importance of Act East Policy to India

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the important terminologies. | K1 |
| 2 | Understand the India's policy during cold war period | K2 |
| 3 | Understand the concept of regionalism | K3 |
| 4 | Analyze the difference in look east and act east policy | K4 |
| 5 | Create awareness on socio-economic impacts in east asia. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1

Introduction –National Interest - Foreign Policy – Principles an Objectives of India's Foreign policy – Its formulation – Major approaches to study foreign policy.

Unit:2

India's Foreign Policy Options – India's Policy towards its neighbors – Cold war period – Non – Alignment.

Unit:3

Policy towards Regionalism- International Organizations – Regional Organizations- ASEAN

Unit:4

Look East Policy – Meaning, Objectives, Challenges – Act East Policy – Differences between Look East and Act East Policy.

Unit:5

India's Engagement in East Asia, and China – Socio and Economic impact.

Reference Books:

1. Thongkholal Haokip, "India's Look East Policy: Its Evolution and Approach," South Asian Survey, Vol. 18, No. 2 (September 2011)
2. Jha, Pankaj (23 March 2019). "Vietnam's Salience in India's Act- East Policy". Oped Column Syndication.
3. Laskar, Rejaul (December 2013). "Promoting National Interest through Diplomacy".
4. Appadorai A. Appadorai A. Avoob Mohammad Balm R. B. Bandyopadhyaya J. National Interest and Non-Alignment, New Delhi, Kalinga Publications, 1999.

5. Domestic Roots of India's. Foreign Policy, New Delhi, Oxford University Press, 1981. India, Pakistan and Bangladesh, New Delhi, 1974. Globalization

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	S	M	L	M	M	L	L	L
CO2	S	M	S	S	M	S	S	L	L	L
CO3	S	L	S	S	L	L	M	L	S	L
CO4	S	L	S	S	M	L	M	L	L	L
CO5	S	L	L	L	L	S	S	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-I

Course
code

CORE ELECTIVE

C. INDIA'S POLICY TOWARDS USA

PAPER-1

Syllabus
Version 2022-23

Course Objectives:

The main objectives of this course are to: gain knowledge on India's policies with USA

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Understand the India's perspective on foreign policy | K1 |
| 2 | Understand the US perspective on foreign policy | K2 |
| 3 | Understand the relation of India and US during Cold War | K3 |
| 4 | Understand the relation of India and US post-Cold War | K4 |
| 5 | Understand the strategic environment of South Asia | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

India's Foreign Policy perspectives – Perceptions and Policies towards USA

Unit:2

USA's Foreign Policy Perspectives – Perceptions and Policies towards India

Unit:3

Indo – US relations during Cold war period

Unit:4

Indo -US relations in post-Cold War period

Unit:5

Strategic Environment – South Asia – USA's Interest in South Asian Region and Indian Ocean region.

Text Book(s)

1. S.S. Khera, "India's Security Problem"
2. L.J. Kavic, "India's Quest for Security"
3. Prasad, B., "Indian Foreign Policy"
4. R.P. Anand (ed), "Asian States and the Development of Universal International Law", Vikas Publications, Delhi 1972

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	L	S	L	L	L
CO2	S	M	M	S	L	M	S	L	L	L
CO3	S	S	S	S	M	L	M	L	L	L

C04	S	L	L	L	L	M	S	L	L	L
C05	S	L	L	M	M	L	S	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-1

Course
code

OPEN ELECTIVE

A. NATIONAL SECURITY

PAPER-1

Syllabus
Version 2022-23

Course Objectives:

The main objectives of this course are to: introduce the other discipline students on the importance National security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Explain the concept of security. | K1 |
| 2 | Understand classifications in security | K2 |
| 3 | Explain the types of threats | K3 |
| 4 | Understand the settlement of disputes | K4 |
| 5 | Understand the policy formulation | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Concept of Security – Nation State - Nationalism and Internationalism

Unit:2

Comprehensive Security – Environment Security - Threats – Classifications of Threat

Unit:3

Internal and External Threats

Unit:4

Settling the International Conflicts – Methods – Peaceful settlement of Disputes and Coercive methods

Unit:5

Formulation of National Security Policy – Strategic Doctrine – Policies

References:

1. Barry, Buzon., People, State and Fear : The National Security Problems in International Relations, Sussex; Wheatsheaf Books, 1983.
2. Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	L	S	L	L	L	L
CO2	S	L	L	L	L	M	S	L	L	L
CO3	S	L	L	L	L	L	S	L	L	L
CO4	S	L	S	M	M	L	S	L	L	L

CO5	S	S	M	S	L	L	M	S	L	M

*S-Strong; M-Medium; L-Low

SEMESTER-1

Course code

OPEN ELECTIVE

B. DISASTER MANAGEMENT

PAPER-1

**Syllabus
Version 2022-23**

Course Objectives:

The main objectives of this course are to: introduce the other discipline students on the importance of Disaster Management

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Demonstrate the Concepts of disaster | K1 |
| 2 | Demonstrate knowledge of Principles of Disaster Management | K2 |
| 3 | Understand the Role of Science & Technology | K3 |
| 4 | Gain knowledge on Preparation of Disaster Management Plans | K4 |
| 5 | Understand the issues comes during the management. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Disaster Management: Concepts of disaster; Types of disaster- natural and manmade: Cyclone, flood, land slide, land subsidence, fire and earthquake. Issues and concern for various causes of disasters.

Unit:2

Principles of Disaster Management, Natural Disasters, Hazards, Risks and Vulnerabilities. - Role of military and paramilitary forces during disaster. -

Unit:3

Role of Remote Sensing, Science & Technology - Assessment of Disaster Vulnerability of a location and vulnerable groups. Preparedness and Mitigation measures for various Disasters.

Unit:4

Preparation of Disaster Management Plans. - Post Disaster Relief & Logistics Management - Management of Relief Camp. -Voluntary Agencies & Community Participation at various stages of disaster management

Unit:5

Issues in Environmental Health, Water & Sanitation, Earthquake Mitigation, Floods, Fire, Landslides and other natural calamities - Emergency Support Functions and their coordination mechanism.

Reference Books:

1. Colonel (Retd) P.P. Marathe 'Concepts and Practices in Disaster Management' (Pune: Diamond Publications 2006).

2. Rajdeep Dasgupta 'Disaster Management and Rehabilitation' (New Delhi:Mittal Publicationsi 2007).
3. Kamal Taori 'Disaster Management through Panchayat Raj'(New Delhi: Concept Publishing Company 2005).
4. Reddy, A.V.S., Study Report on vision document for Creation of National Centre for Disaster Management (NCDM)/National Disaster Management Bureau.(NDMB

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	S	M	S	L	L	L	L	L
CO2	S	L	S	L	S	L	L	L	L	L
CO3	S	S	S	L	S	M	L	L	M	M
CO4	S	L	S	L	S	S	L	L	L	L
CO5	S	L	S	L	S	L	L	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-1

Course code

OPEN ELECTIVE

C. INSURGENCY AND SECURITY

PAPER-1

Syllabus
Version 2022-23

Course Objectives:

The main objectives of this course are to: introduce the other discipline students on the importance of security towards insurgencies

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Identify the concept of Guerrilla Warfare | K1 |
| 2 | Analyse the various thoughts by thinkers advocating the Guerrilla warfare | K2 |
| 3 | Understand the practice of Mao theory | K3 |
| 4 | Equip with the necessary inputs for counter insurgencies | K4 |
| 5 | Evaluate the Latin and Cuban insurgency | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Guerrilla Warfare: Definitions, Nature, Scope, Principles, Strategy and Tactics. 2. Characteristics and elements effecting Guerrilla warfare 3. Comparative Study of Revolution, Insurgency and Coup-d'état,

Unit:2

Concepts of Guerilla Warfare as advocated by: i. Sun Tzu ii. Marx and Lenin iii. Mao-Tsu-Tung iv. Che-Guevara

Unit:3

Practice of Mao's Theory in People's War of China. Practice and Applications of Guerrilla warfare in French-Indo-China war of Independence and causes of French defeat with special reference to the battle of Dien Bien Phu

Unit:4

Counter Insurgency measures – counter Insurgency in Malaya

Unit:5

A brief Study of Latin American Insurgencies and Cuban Revolution.

Reference Books:

1. Thompson R., 'War in Peace: Analysis of Warfare since 1945', Orbis Publishing Ltd., London, 1981.
2. Varma B., "Insurgency and Counter Insurgency", Uppal Publishing House,

3. Ansari Road, New Delhi, 1988 3. John Pimlott, “Guerrilla Warfare – 200 Years of Covert Resistance”, The Military Press, New York, Bison Books Corporation, 1985
4. Lawrence Freedman, “Atlas of Global Strategy”, Macmillan Ltd., London, 1985 5. Nasntion, Abdul Haris, “Fundamental of Guerilla Warfare”, Prager, New York,
5. George. C. Koh, “Dictionary of Wars Facts on File”, Publication, New York, Oxford, 1986. The facts on File Dictionalry of Military Science by JM Shafritz, T.J.A.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	S	M	S	L	L	L	L	L
CO2	S	L	S	L	S	L	M	L	L	L
CO3	S	L	L	L	S	L	L	L	L	S
CO4	S	S	S	L	S	L	S	L	M	L
CO5	S	S	S	L	S	L	S	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER II

Course
code

THEORIES OF INTERNATIONAL RELATIONS

CORE

PAPER-5

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are to attain knowledge about the International Relations Theories

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|-------------------------------------|----|
| 1 | Remember the various basic theories | K1 |
| 2 | Understand the power in IR. | K2 |
| 3 | Understand the types of warfare | K3 |
| 4 | Understand the national interest | K4 |
| 5 | Analyse the law of war and peace. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Theories of International Relations: Idealistic, Realistic, Systemic approaches and Game theory, bargaining theory and Morgenthau's theory - six principles of political realism

Unit:2

The Place of Power – Ideology & Ethics in International Relations. Definition and elements of power, types of ideology, meaning of ethics and Place and role in international relations

Unit:3

Theories of war: just war theory, concepts of total war, conventional and Unconventional war; Land, Air, Sea and Space warfare

Unit:4

National Interest - Public opinion

Unit:5

International Law: Laws of war and peace.

Reference Books

1. Frankel.J., International Relations in a Changing World, London: Oxford University Press, 1977.
2. Nicholson. M., International Relations: A Concise Introduction, New York: Palgrave, 2002.
3. Chatterjee, Aneek, International Relations Today: Concept and Applications, New Delhi: Pearson, 2010.
4. Johari, J.C., International Relations and Politics, New Delhi: Sterling Publishers, 1985.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	L	L	S	L	L
CO2	S	L	L	S	L	L	L	L	L	L
CO3	S	L	L	S	L	M	S	M	L	L
CO4	S	L	L	M	L	L	S	M	L	L
CO5	S	L	L	M	S	L	S	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course code

CORE
PAPER – 6

INTRODUCTION TO INTERNATIONAL LAW

**Syllabus 2022-
Version 23**

Course Objectives:

The main objectives of this course are To introduce the International Law

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the various concepts of International law | K1 |
| 2 | Understand the meaning, nature and scope | K2 |
| 3 | Knows the concept of treaties, | K3 |
| 4 | Analyse rights and duties of states. | K4 |
| 5 | Evaluate the various weapons used. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create

Unit:1

Concept of International law – Municipal law and International law Nationality- Extradition – Asylum – Neutrality

Unit:2

Brief Introduction to International Law: Definition, Nature and Sources of International law.

Unit:3

Bi-lateral and multi-lateral treaties, international conventions, general principles of law, judicial decisions, legal advises and proceeding of international conferences etc.

Unit:4

International Law - Laws of Peace and Neutrality: Meaning and nature – rights and duties of states – recognition of state and government –state succession: Neutrality under League of Nation and UNO.

Unit:5

International Law: Laws of war – Legal aspects of war, combatants and non – combatants, use of Rues and weapons, Laws of Land, Aerial and Naval warfare and termination of War.

Reference Books

1. Frankel.J., International Relations in a Changing World, London: Oxford University Press, 1977.
2. Nicholson. M., International Relations: A Concise Introduction, New York: Palgrave, 2002.
3. Johari, J.C., International Relations and Politics, New Delhi: Sterling Publishers, 1985

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	M	L	M	M	S	L	L
CO2	S	M	S	L	S	L	M	M	L	L
CO3	S	L	S	M	S	L	M	L	L	L
CO4	S	L	S	M	S	L	M	L	L	L
CO5	S	L	L	S	L	L	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course code

CORE PAPER – 7

STRATEGIC THOUGHT

Syllabus 2022-
Version 23

Course Objectives:

The main objectives of this course are To help the students understand the various strategic thoughts that used in history

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Understand the thoughts by Asian strategic thinkers | K1 |
| 2 | Understand the thoughts by Western strategic thinkers. | K2 |
| 3 | Able to apply the revolution concepts in Guerrilla Warfare | K3 |
| 4 | Able to understand the concept of Sea Power | K4 |
| 5 | Able to understand the concept of Air Power | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Kautilaya's Philosophy of war. - Sun Tzu- The Art of war

Unit:2

Clausewitz's theories on war - J.F.C. Fuller and Liddell Hart views on warfare

Unit:3

Mao-Tse-Tung's views on Guerrilla warfare - Cuban revolution

Unit:4

Mahan's Views on Sea Power and Naval Warfare

Unit:5

Douhet and Mitchell: Their views on the Role of Air Power in Modern

Reference Books

1. Beaufre Andre ., (1965) Deterrence and Strategy, Faber & Faber, London
2. Dass, S.T., (1987) An Introduction to the art of war, Sagar Publishers, New Delhi
3. Duffy, Christopher., (1987) Siege Warfare, Routledge & Kegan Paul, UK
4. Earl, E.M., (1943) Makers of Modern Strategy, Princeton University Press
5. Fuller, J.F.C., (1992) The Conduct of war A Study of the Impact o French,Industrial, and Russian Revolutions on War and Its Conduct, Da Capo Press, New York
6. Fuller, J.F.C., (1998) Armament and History:The Influence of Armament on History from the Dawn of Classical Warfare to the End of the Second World War, Da Capo Press, New York

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	S	L	M	L	L	L	S	L
CO2	S	L	S	L	S	L	L	L	S	L
CO3	S	M	S	L	S	L	M	L	S	L
CO4	S	L	S	L	S	L	L	L	S	L
CO5	S	L	S	L	S	L	L	L	S	L

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course code

CORE ELECTIVE PAPER-2

A. INTRODUCTION TO PEACE STUDIES

Syllabus 2022-
Version 23

Course Objectives:

The main objectives of this course are To know about the importance of Peace

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Abe to understand the concept of Peace. | K1 |
| 2 | Explain the concept of Peace movement. | K2 |
| 3 | Understand role Peace Movements | K3 |
| 4 | Analyze various Peace Organization | K4 |
| 5 | Research in Peace Education | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1 Concept of Peace

Meaning, Definition, Typology of Peace and Violence

Unit:2 Peace Movements

Concept and practice, History; Types and kinds, peace programmes in India and in the world; International National, Individual and group actions for Peace Movements

Unit:3 Role of Peace Movement

The modern technology for Peace, Role of Govt and Non- Govt organizations agencies, role of Leaders Mahatma Gandhi, Ambetkar, Nelson Mandale, Martin Luther King

Unit:4 Peace Organizations

Gandhi peace Foundation in India, Amnesty International Stockholm International Peace Research Institute, and other International Peace Research Institutes and the role.

Unit:5 Peace Education

General Goals of Peace Education and peace research

Reference Books

1. Gualtung, Johan, The Struggle for Peace, Gujarat Vidhyapeeth, Ahmedabad
2. International Peace Research and Analysis, New Delhi
3. SIPRI, Year Book

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	M	S	M	L	L
CO2	S	L	L	L	L	S	S	M	L	L
CO3	S	L	L	S	L	M	M	L	L	L
CO4	S	M	M	L	L	S	M	L	M	L
CO5	S	L	L	S	L	M	L	L	L	M

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course
code

CORE ELECTIVE

B. GANDHIAN STUDIES

PAPER-2

Syllabus 2022-
Version 23

Course Objectives:

The main objectives of this course are to: give learner proper knowledge about Gandhian thought on Peace

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Know the concepts of Gandhian Peace | K1 |
| 2 | Understand the concept of Non-Violence | K2 |
| 3 | Attain the knowledge of Gandhian Ethics. | K3 |
| 4 | Realize the importance of Ideal society | K4 |
| 5 | Recognize the importance of state policy | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1 Concept of Gandhian Peace

Socio – religions and political context of Gandhi's advent – early influences: (a) parental (b) religions (c) sages and seers – delving the depth of religions – equality of religions (sarvadharmā Samābhava) –self – realization the ultimate goal of life

Unit:2 Weapons of Non-violence

Non-Violence – Ahimsa – meaning and conceptual framework – non-violence as the law of (a) our being (b) our species and as the dynamics of history – Types of non-violence – nonviolence as the basis of personal life and as technique of social transformation

Unit:3 Gandhian Ethics

Gandhian ethics – concept of human nature – Ends and Means – yajna, rights and duties – vows and their significance – personal formation and social transformation – Gandhian life – style

Unit: 4

Ideal Society – Sarvodaya – its structure – The Gandhian technique of establishing the ideal order – Resistance (Satyagraha) and Reconstruction (through constructive programme).

Unit:5

Directive Principles of State policy

Reference Books

1. Gualtung, Johan, The Struggle for Peace, Gujarat Vidhyapeeth, Ahmedabad,
2. International Peace Research and Analysis, New Delhi.
3. Gene Sharp, Weilding the weapon of Moral Power, University of Oxford.
4. J.B. Kripalani (2011) Gandhi His Life and Thought, BiblioBazaar
5. R R. Diwakar (1969) The Saga of Satyagraha, Gandhi Peace Foundation

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	S	L	L	L	S	L	L
CO2	S	L	L	M	L	L	M	L	L	L
CO3	S	L	L	M	L	L	M	L	L	L
CO4	S	L	L	S	L	L	L	L	L	L
CO5	S	L	L	M	L	L	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course code

CORE ELECTIVE

C. AMBEDKAR'S THOUGHTS ON PEACE

PAPER-2

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are to: give learner proper knowledge about Ambedkar's thought on Peace

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Understand the concept of Ambedkar Peace | K1 |
| 2 | Understand the concept of Ambedkar on Economics | K2 |
| 3 | Understand the concept of Ambedkar on Religions | K3 |
| 4 | Understand the concept of Ambedkar Thought on Democracy | K4 |
| 5 | Understand the concept of Ambedkar view on international peace | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1 Concept of Ambedkar Peace

Fundamentals of Ambedkar thought. - Social Change, Equality and Justice

Unit:2 Dr. Babasaheb Ambedkar on Economics

(i)East India Company: Administration and Finance (ii) The Evolution of Provincial Finance in British India (iii) The Problem of Rupee: Its Origin and Solution

Unit:3 Dr. Babasaheb Ambedkar on Religions

What is Religion? & what should be the religion. II. Tenets of Buddhism: Philosophy, Principles, Engaged Buddhism

Unit:4 Thought on Democracy

1. Parliamentary Democracy, Economic Democracy, and Social Democracy. 2. Caste system and Democracy. 3. Indian Caste system and security and Development of India. 4. Social and Political Participation of citizen in the views of Dr. Babasaheb Ambedkar

Unit:5

Ambedkar's view on International Peace and Cooperation

Reference Books

1. Dwarkin, Ronald - What is Equality? Philosophy & Public Affairs, 1981
2. Hans Kelsen - What is Justice? University of California Press.
3. Purohit & Joshi - (eds) Social Justice in India Rawat Publications,

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	S	M	M	S	L	L	L

C02	S	L	L	S	M	M	S	L	L	L
C03	S	L	L	S	M	M	S	L	L	L
C04	S	L	L	S	M	M	S	L	L	L
C05	S	L	L	S	M	M	S	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course code

OPEN ELECTIVE

A. MARITIME SECURITY

PAPER-2

Syllabus 2022-
Version 23

Course Objectives:

The main objectives of this course are To obtain knowledge on the Maritime Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Understand the Marine Environment | K1 |
| 2 | Understand the Maritime Assets | K2 |
| 3 | Understand the Navy and its Role | K3 |
| 4 | Understand the Coast Guard and its Role | K4 |
| 5 | Understand the Merchant Navy and its Role | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Marine Environment: Brief history of oceans; Maritime boundaries; Maritime Zones, 1976 Act; Territorial Sea, Contiguous Zone, Continental Shelf, Legal Continental Shelf, Exclusive Economic Zone, High Seas; Rights and duties of the coastal states in various zones; The Law of the Sea Convention; Marine Pollution and its protection.

Unit:2

Maritime Assets: Fixed Assets, ports and infrastructure therein, naval bases and infrastructure therein, oil rigs and exploration platforms, light houses, navigational aids; Moveable Assets, warships, merchant ships, fishing vessels and crafts, dredgers, underwater pipelines etc.

Unit:3

Navy and its Role: Historical backdrop as to its need; Mahanian postulation; Types of warships including aircraft carriers and submarines both conventional and nuclear; Weapons including missiles and anti-missiles; Post Independence historical naval operations including 1971 operations; Navy's role both defensive and offensive; Global Scenario particularly the US navy, Royal Navy, the Chinese navy and the Pakistan navy etc

Unit:4		
Coast Guard and its Role: Its origin and need; Functions including SAR, anti-smuggling and anti-poaching roles, protection of marine environment. Its role in times of war and during emergencies such as massive oil pollution etc.		
Unit:5		
Merchant Navy and its Role: Types of ships including gas carriers and containerships etc, its role in the economy of the country etc. Maritime Threats: Dimensions of Maritime Security		
Recommended Books:		

1. Thematic Network on Maritime Education, Training and Mobility of Seafarers website: http://www.metnet.info , 2003
2. Cole, C., Trenkner, P.: METNET — The Thematic Network on Maritime Education, Training and Mobility of Seafarers. In: Proceedings of WOME 11th IMLA Workshop on Maritime English. Varna: IMLA, 2001

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	L	M	M	L	L
CO2	S	S	L	L	L	S	L	L	L	L
CO3	S	L	S	L	S	L	S	L	M	L
CO4	S	L	L	S	L	L	S	S	L	L
CO5	S	S	M	L	L	S	L	L	S	S

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course code

OPEN ELECTIVE

B. CYBER SECURITY

PAPER – 2

**Syllabus 2022-
Version 23**

Course Objectives:

The main objectives of this course are To obtain knowledge on the Cyber Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Understand the concept of Cyber Technology | K1 |
| 2 | Understand function of Hacking. | K2 |
| 3 | Understand Impact of Cyber Crime | K3 |
| 4 | Analyse the Detection and Preventions | K4 |
| 5 | Highlight the Indian Cyber Law | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Introduction to Cyber Technologies Information Systems - Networks/LAN/WAN - Military Sensors.

Unit:2

Types of Cyber Crime Hacking - Password Cracking - Insecure Network Connection – Theft at Tele Communication Services

Unit:3

Impact of Cyber Crime on National Security Impact on Armed Forces & Law enforcement Agencies' Information Systems - Impact on National Economy/Market - Impact on Citizen Security

Unit:4

Detection and Prevention methodologies Risk Identification - Levels of Protection - Cyber Defensive Measures Unity V: Cyber Laws Overview of General Laws and Procedures in India

Unit:5

Introduction to Indian Cyber Law - Cyber Crime and Digital Evidence- Indian Perspective

BOOKS RECOMMENDED

1. Cyber Security – the Essential body of knowledge by Dan Shoemaker and Wm Arthur Conklin, published by Cengage Learning – ISBN – 978 – 1 – 4354 – 8169 – 5 44
3. Cyber Security and Homeland Security – edited by Lin V Choi – ISBN – 1 – 59454 – 7289
4. Cyber Security – Public Sector threats and responses edited by Kim

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	M	L	L	S	M	L	L
CO2	S	L	L	M	M	L	M	L	L	L
CO3	S	L	M	L	S	L	S	L	L	L
CO4	S	L	S	M	S	L	S	L	L	L
CO5	S	L	L	M	L	L	L	L	S	L

*S-Strong; M-Medium; L-Low

SEMESTER-II

Course code

OPEN ELECTIVE

C. ISLAND SECURITY

PAPER-2

Syllabus 2022-
Version 23

Course Objectives:

The main objectives of this course are To obtain knowledge on the Island Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Understand the Britain's Geo Strategy | K1 |
| 2 | Understand the Maritime power Evolution | K2 |
| 3 | Understand the Maritime power Elements | K3 |
| 4 | Understand the Significance of it. | K4 |
| 5 | Understand the Current trends in the world | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Geo Strategic significance of Island states with special reference to Great Britain

Unit:2

Maritime environment and Evolution of Maritime power

Unit:3

Elements of Maritime power - Role of Maritime power

Unit:4

Significance of Maritime power

Unit:5

Current trends in Maritime power and its Influence on world Order

Recommended Books

1. Cyber Security and Homeland Security – edited by Lin V Choi – ISBN – 1 – 59454 – 7289
2. Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	S	L	L	L	S	M	L	L
CO2	S	L	S	L	S	M	S	L	L	L
CO3	S	L	M	S	L	S	L	L	L	L
CO4	S	L	L	M	L	L	S	L	L	L
CO5	S	L	L	S	L	L	S	M	L	L

*S-Strong; M-Medium; L-Low

SEMESTER III

Course
code

CORE

GEO POLITICS

PAPER-9

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on the importance of Geopolitics

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the Scope & Content of Geopolitics | K1 |
| 2 | Understand the concepts of factors of Geopolitics | K2 |
| 3 | Describe the Maritime Boundaries | K3 |
| 4 | Explain the concepts of Land locked states | K4 |
| 5 | Understand the various theories in Geopolitics | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Geopolitics – Concepts Definition & Scope Military Geography – Scope & Content

Unit:2

Geographical and Geo – Political factors in National Security – Frontiers & Boundaries and Buffer Zones

Unit:3

Maritime Boundaries – the Concept of Territorial Waters, continental shelf and Exclusive Economic Zones, IMBL etc

Unit:4

Land locked states – the problem of access to the seas India's Geographical Frontiers.

Unit:5

Introduction to Geo- Politics: Geo – Political thoughts of Haushofer, Mackinder and Spike Man. Theory of Heartland, Lebarsarum & Autarchy, Pivot theory

Reference Books

27. Das, S.T., Geo-Strategies, Allahabad: Kitab Mahal, 1985
28. Black, Jeremy, Cambridge Illustrated Atlas, Warfare, Renaissance to Revolution: 1492 -1792, (Cambridge: Cambridge University Press, 1996).
29. William D. Puleston, The Life and Work of Alfred Thayer Mahan, U.N.S. (New
30. Haven) CT, 1939)
31. Earl Meade, Edwar, Makers of Modern Strategy: Military Thought from Machiavelli to Hitler, 1948. New Delhi

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	M	L	M	L	M	L	L
CO2	S	L	L	L	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	L	M	L	M	L	L	L	L
CO5	S	L	L	M	L	M	L	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

CORE

DEFENCE ECONOMICS

PAPER-10

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Defence Economics

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the concept of Basic Economic Theories | K1 |
| 2 | Understand the concepts of Defence Management | K2 |
| 3 | Describe the Resources for Defence | K3 |
| 4 | Explain the concepts of War Time Management | K4 |
| 5 | Understand the Effects of war | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Brief Review of Basic Economic Theories

Unit:2

Defence Management

Definition, Levels & Principles of Management, Military Management at National Security level

Unit:3

Management & Resources for Defence

Defence Planning – Analysis of Defence Expenditure – Defence Production; Role of Public & Private Sectors

Unit:4

War Time Management of Resources

Priority in Management of Resources: Techniques of Control.

Unit:5

Effects of war on National Economy

Inflationary Economy: Problems of Balance of Payment and Depletion of Economic Resources

Reference Books

1. Subramaniam, K., Defence and Development, Calcutta: Minerva, 1973.
2. Kennedy, Gavin, the Military in Third World, New York: S. Cribners, 1974.
3. Military Expenditure in the Third World: The Economy Effects, London: Rutledge, 1986.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	S	L	L	L	S	L	L
CO2	S	L	L	M	L	L	M	L	L	L
CO3	S	L	L	M	L	L	M	L	L	L
CO4	S	L	L	S	L	L	L	L	L	L
CO5	S	L	L	M	L	L	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

CORE

LOW INTENSITY CONFLICTS

PAPER-11

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Low Intensity Conflicts

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the concept of Low Intensity of Conflict | K1 |
| 2 | Understand the causes of Terrorism | K2 |
| 3 | Describe the Religious Fundamentalism | K3 |
| 4 | Explain the concepts of State Actors | K4 |
| 5 | Understand the methods of Counter Terrorism | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Concept of Low Intensity of Conflict, Types and forms: Extremism Militancy Insurgency and Naxalite movements

Unit:2

Terrorism: Causes, Types and Manifestations

Unit:3

Religious Fundamentalism: Meaning, Concept and Manifestations

Unit:4

State and Non -State Actors: Meaning, Concept and Manifestations.

Unit:5

Counter Terrorism: Means and Methods

Reference Books

1. Fraser, T.G., The Arab – Israeli Conflict (London:1995).
2. Maj. Sitaram Johri, The Indo – Pakistan Conflict of 1965, Lucknow : Himalayas, 1967.
3. Weller, Jac, Weapons and Tactics (London, 1966).
4. Kennedy, Gavin, The Military in Third World, New York: S. Cribners, 1974

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L

C04	S	L	M	L	L	M	L	L	L	L
C05	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

CORE

CONTEMPORARY INTERNATIONAL SECURITY

PAPER-12

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Contemporary International Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the concept of Military Blocs | K1 |
| 2 | Understand the concepts of Ideologies | K2 |
| 3 | Describe the Impact of having Nuclear Weapons | K3 |
| 4 | Explain the World Order | K4 |
| 5 | Understand the Globalization. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Cold war, Alliances and Military Blocs-NATO, CENTO, SEATO, ANZUS etc.

Unit:2

Contemporary Ideologies-Communism, Liberal Democracy, Socialism, Non-Alignment and Neutrality

Unit:3

The Nuclear Weapons and Impact on International Relations

Unit:4

Post-Cold War Era and New World Order

Unit:5

Globalization and New Economic Order

Reference Books

1. SIPRI-World armament and Disarmament Year Books
2. Appadurai.A-Force in International Relations, New Delhi.
3. Huntinton, S.P-Changing Patterns of Military Politics, New Delhi.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L

CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

CORE ELECTIVE

A. COMPREHENSIVE SECURITY

PAPER -3

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Comprehensive Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the concept of Comprehensive Security | K1 |
| 2 | Understand the concepts of Rights and Duties | K2 |
| 3 | Describe the Economic Security | K3 |
| 4 | Explain the concepts of Social Security | K4 |
| 5 | Understand the Environmental Security | K5 |

K1 – Remember; **K2** – Understand; **K3** – Apply; **K4** – Analyze; **K5** – Evaluate; **K6** – Create

Unit:1

Comprehensive Security: Concept, Meaning, Definition & Components

Unit:2

Political Security Concept and Meaning: State and Individual, Rights and Duties and constitutional guarantee and remedies

Unit:3

Economic Security: Financial, Property land and livelihood, Job security, Opportunities in Private Sectors, Pension and terminal benefits

Unit:4

Social Security: Human Security Assessment of basic needs-Food and water security – Dignity of life, Woman Security, Security of Children Elders and Orphans.

Unit:5

Environmental Security: Natural Calamities and Disaster Management during war, Earth Quack, Tsunami, Floods, Cloud-burst, Rain-Havoc etc

Reference Books

1. Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983.
2. Barry buzan, Environmental Security, New Delhi
3. Anantharama Rao.k, Vision 21st century, Vidya Publishing House, Karnataka India, 2000

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

CORE ELECTIVE

B. ENVIRONMENTAL SECURITY

PAPER -3

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Environmental Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the concept of environmental security | K1 |
| 2 | Understand the concepts of issues impacts | K2 |
| 3 | Describe the Environmental Peace Building | K3 |
| 4 | Explain the concepts of complex ecosystems | K4 |
| 5 | Understand the impact of Globalization | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Introduction Definition, meaning and concept of environmental security

Unit:2

Environmental security and the Military, Identify the issues impacting environmental security

Unit:3

Environmental Peace Building, Explain how environmental security is linked to human security

Unit:4

Compare and contrast various strategies used by international organizations, nation states, and non-state actors are working to protect complex ecosystems

Unit:5

Globalization and Breaches in Environmental Security

Reference Books

1. Brauch, H.G., Liotta, P.H., Security and Environment in the Mediterranean, Springer Verlag Berlin Heidelberg, 2003
2. Gleditsch, N.P, Conflict and the Environment Springer Netherlands, 1997
3. Astrid Mittelstaedt, Environmental security and sustainable land use, with special reference to Central Asia Dordrecht : Springer,2006

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L

CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

CORE ELECTIVE

C. ECONOMIC SECURITY

PAPER -3

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Economic Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the concept of Basic Economic Theories | K1 |
| 2 | Understand the concepts of Defence Management | K2 |
| 3 | Describe the Management & Resources for Defence | K3 |
| 4 | Explain the concepts of War Time Management | K4 |
| 5 | Understand the Effects of war. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Brief Review of Basic Economic Theories

Unit:2

Defence Management Definition, Levels & Principles of Management, and Military Management at National Security level

Unit:3

Management & Resources for Defence, Defence Planning – Analysis of Defence Expenditure – Defence Production; Role of Public & Private Sectors

Unit:4

War Time Management of Resources Priority in Management of Resources: Techniques of Control

Unit:5

Effects of war on National Economy Inflationary Economy: Problems of Balance of Payment and Depletion of Economic Resources

Reference Books

1. Subramaniam, K., Defence and Development, Calcutta: Minerva, 1973.
2. Kennedy, Gavin, The Military in Third World, New York: S. Cribners, 1974. 3. Military Expenditure in the Third World: The Economy Effects, London: Rutledge, 1986

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L

C02	S	L	M	M	L	L	L	L	L	L
C03	S	L	L	M	L	M	L	L	L	L
C04	S	L	M	L	L	M	L	L	L	L
C05	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

OPEN ELECTIVE

A. GOVERNANCE OF SECURITY

PAPER -3

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge for the other discipline learners on governance of Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the concept of Governance | K1 |
| 2 | Understand the concepts of Government structures | K2 |
| 3 | Describe the Policy making | K3 |
| 4 | Explain the functions of sectors | K4 |
| 5 | Understand the policy making | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Governance and ethics

Unit:2

Government structures and ideologies

Unit:3

Policy making processes

Unit:4

Public, private and nonprofit sectors

Unit:5

Transnational public policy making

Reference Books

1. James Sperling, Handbook of Governance and Security, Edward Elgar Publishing Ltd (29 Aug 2014).
2. Manish Gupta , Strategic and Practical Approaches for Information Security Governance: Technologies and Applied Solutions, GI Global; 1st edition (February 29, 2012) USA

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L

C02	S	L	M	M	L	L	L	L	L	L
C03	S	L	L	M	L	M	L	L	L	L
C04	S	L	M	L	L	M	L	L	L	L
C05	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

OPEN ELECTIVE

B. INDUSTRIAL SECURITY

PAPER -3

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge for the other discipline learners on Industrial Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the concept of Industrial Security | K1 |
| 2 | Understand the concepts of Industrial Safety and Standards | K2 |
| 3 | Describe the Recruitment in Industrial Sector | K3 |
| 4 | Explain the concepts of Training and Development | K4 |
| 5 | Understand the Recent Developments. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Concept – Meaning – Definition

Unit:2

Industrial Safety – Vision and Mission of Industries – Ethical and Legal Standards.

Unit:3

Recruitment and Selection of Security Forces in Industrial Sector

Unit:4

Training and Development of Industrial Security Forces.

Unit:5

Recent Developments in Industrial Security and Scope for Employment

Reference Books

1. Sharma.R.P., Industrial Security Management, New2005.
2. R.K. Sinha, Industrial Security Management, Vikas Publishing House PVT-LTD, New Delhi India 2012.
3. Charlie Kaufman, Network Security: Private Communication in a Public World, Published By Pearson.
4. Nick Selby, Cyber Attack Survival Manual, Published By Weldon Owen Copy Rights Materials.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10

C01	S	L	L	L	L	M	M	L	L	L
C02	S	L	M	M	L	L	L	L	L	L
C03	S	L	L	M	L	M	L	L	L	L
C04	S	L	M	L	L	M	L	L	L	L
C05	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course
code

OPEN ELECTIVE

C. INFORMATION SECURITY

PAPER -3

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge for the other discipline learners on Information Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the concept of Information Security | K1 |
| 2 | Understand the Vulnerabilities and Safeguards | K2 |
| 3 | Describe the Web Application | K3 |
| 4 | Explain the concepts of Detection | K4 |
| 5 | Understand the impact of Law on it. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Introduction to Information Security

Unit:2

Information Security Vulnerabilities and Information Security Safeguards

Unit:3

Securing Web Application, Services and Servers

Unit:4

Intrusion Detection and Prevention

Unit:5

Information and Network Security, Information space and the Law

Reference Books

1. Title: Principles of Information Security Author: Michael E. Whitman and Herbert J. Mattord Publisher: Cengage Learning; ISBN: 1285448367
2. To understand cryptography in depth Title: Understanding Cryptography: A Textbook for Students and Practitioners Author: Christof Paar and Jan Pelzl Publisher: Springer ISBN: 3642041000

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L

CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

CORE

PAPER- 13

RESEARCH METHODOLOGY IN SOCIAL SCIENCE

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Research Methodology in Defence and Strategic Studies

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the concept of Research | K1 |
| 2 | Understand the concepts of Sampling | K2 |
| 3 | Describe the Data Processing and Analyzing | K3 |
| 4 | Explain the concepts of Peace Research | K4 |
| 5 | Understand the Case study | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Research in Defence and Strategic Studies: Definition, scope, various type of Research, Major steps in Research-Design and Hypothesis

Unit:2

Sampling: Meaning, Definition, Need and Types –Data Collection-Primary and Secondary data, tools of data collection- questionnaire and interviews.

Unit:3

Data Processing and Analyzing: Use of Computer in Social Research Analysis of Data-Interpretation.

Unit:4

Peace Research: Application, practical Problems and Research reports

Unit:5

Case study

Reference books

1. Pannerselvam R, Research Methodology, Prentice Hall of India, New Delhi-2004
2. Green P.E, Research Methodology Decisions, Prentice Hall of India, New Delhi-1994

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L

C04	S	L	M	L	L	M	L	L	L	L
C05	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

CORE

CONFLICT RESOLUTION

PAPER-14

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Conflict Resolution

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the Parameters | K1 |
| 2 | Understand the Treatment to threats | K2 |
| 3 | Describe the International System | K3 |
| 4 | Explain the Settling Disputes | K4 |
| 5 | Understand the concept of International Organization. | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Parameters of Conflict: Causes and Prevention

Unit:2

Conceptual Treatment to Military and Non -Military threats: Internal and External Threats.

Unit:3

Models of International System: New World Order & Phenomenon of Cold War

Unit:4

Conflict Resolution and Methods of Settling International Disputes.

Unit:5

International Organization: Concepts and Role of IGO's & NGO's and UNO

Reference Books

1. Palmer, and Perkins, International Relations, Boston: Houghton Mifflin, 1953.
2. Jackson, R. and G. Sorensen, Introduction to International Relations: Theory and Approaches, Oxford: Oxford University Press, 2003.
3. Frankel, J., International Relations in a Changing World, London: Oxford University Press, 1977.
4. Nicholson, M., International Relations: A Concise Introduction, New York: Palgrave, 2002.
5. Chatterjee, Aneek, International Relations Today: Concept and Applications, New Delhi: Pearson, 2010.
6. Johari, J.C., International Relations and Politics, New Delhi

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

CORE

SCIENCE & TECHNOLOGY AND
SECURITY

PAPER- 15

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on Science & Technology and Security

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Remember the concept of Technology used | K1 |
| 2 | Understand the Technology Changes | K2 |
| 3 | Describe the Technology in between World Wars | K3 |
| 4 | Explain the concepts of Nuclear Energy | K4 |
| 5 | Understand the impact of. New Technologies | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Relevance of Science and Technology in National Security.

Unit:2

A review of Technological changes since the Industrial Revolution until coming of the Nuclear age and their impact on Security.

Unit:3

Science and Technology Development in between World Wars

Unit:4

Use of Nuclear Energy in War and Peace

Unit:5

New Technologies and their Relevance, Electronics, Computers and Robotic Sciences

Reference books

1. ISRO Annual Reports
2. Ministry of Science and Technology publications

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

CORE ELECTIVE

PAPER - 4

A. AREA STUDIES SOUTH ASIA AND
NEIGHBOURS

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on study of South Asia And Neighbours

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the concept of Area Studies | K1 |
| 2 | Understand the concepts of Geopolitics | K2 |
| 3 | Describe the importance of South Asia | K3 |
| 4 | Explain the Energy Security | K4 |
| 5 | Understand the impact of Environment | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Introduction to Area Studies

Unit:2

Geopolitical study of distribution of different of Conflicts and Power centers

Unit:3

South Asia: An in-depth study of the geo-strategic importance, social, cultural, and economic developments in all neighboring countries of India and their impact on India.

Unit:4

Energy Security in South Asia

Unit:5

Environmental Issues in South Asia

Reference books

1. Ahmar, Moonish, the Road to Peace in South Asia: Lessons for India and Pakistan from the Arab-Israeli Peace Process, ACDIS Occasional Paper (Urbana-Champaign, University of Illinois, August, 1996).
2. Azam, Kousar J, Ethnicity, Identity, and the State in South Asia (New Delhi, South Asian Publishers, 2001).
3. Bajpai, P. Chari, P.R., Cheema Iqbal Pervaiz, Cohen, Stephen P., Ganguly Sumit, Brasstacks and Beyond: Perception and Management of Crisis in South Asia (New Delhi, Manohar, 1995) .
4. Basrur, Rajesh M., Security in the New Millennium: Views from South Asia (New Delhi, India Research Press, 2001).
5. Bose, Anima, Peace and Conflict Resolution in the World Community (New Delhi: Vikas

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

CORE ELECTIVE

B. SOUTH EAST AND WEST ASIA

PAPER – 4

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on study of South East and West Asia

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|---|----|
| 1 | Describe the study of part of Asia | K1 |
| 2 | Understand the South East Asia | K2 |
| 3 | Understand the West Asia | K3 |
| 4 | Explain the impact of Rise of China | K4 |
| 5 | Understand the importance of Indian Ocean | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Introduction to South East and West Asia

Unit:2

South East Asia: Geographical & Historical background, Interests of super powers and China

Unit:3

West Asia: Historical background, Geo-Strategic importance, economic & military potential and areas of conflicts

Unit:4

Rise of China and its impact in South East Asia

Unit:5

Indian Ocean: Geopolitical & economic importance, aspirations and attitudes littoral states.
Concepts of Zone of peace and Nuclear free zone.

Reference books

1. Johari, J.C., International Relations and Politics, New Delhi: Sterling Publishers, 1985.
2. Palmer, N.D., and H.C., International Relations, Boston: Houghton Mifflin, 1991

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

CORE ELECTIVE

C. CENTRAL ASIA RESPONSIBILITY

PAPER - 4

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge on study of Central Asia

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|------------------------------------|----|
| 1 | Describe the study of Central Asia | K1 |
| 2 | Understand the History | K2 |
| 3 | Understand the State formation | K3 |
| 4 | Explain the Foreign policy | K4 |
| 5 | Understand the importance to India | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Introduction to Central Asia

Unit:2

History of Central Asia

Unit:3

State formation and Nation Building process in Central Asia, shanghai cooperation organization

Unit:4

Foreign policy of Central Asian Countries

Unit:5

India and Central Asia relations

Reference books

1. Adeeb Khalid, The politics of Muslim cultural reform: Jadidism in Central Asia, Berkeley: University of California Press, 1998, pp.45-113 ('The Making of Colonial Society 'and 'The Origins of Jadidism')
2. Gail Lapidus, "From Democratization to Disintegration: The Impact of Perestroika on the National Question," in From Union to Commonwealth: nationalism and separatism in the Soviet Republics, Gail Lapidus, eds., New York: Cambridge University Press, 1992, pp.45-70

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L

C04	S	L	M	L	L	M	L	L	L	L
C05	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

OPEN ELECTIVE

PAPER - 4

A. INTRODUCTION TO DEFENCE JOURNALISM

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge for the other discipline learners on Defence Journalism

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the concept of Journalism | K1 |
| 2 | Understand the concepts of Defence Writing | K2 |
| 3 | Describe the Formats and Techs used | K3 |
| 4 | Explain the terminologies | K4 |
| 5 | Understand the ethics and laws | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

- a) Journalism: Meaning and Importance.
- c) Defence Writing – Need for specialist.
- d) Defence Journalism – A Profession.

Unit:2

- a) Meaning and Definition of Journalism and Defence Journalism.
- b) Kinds and Sources of Defence News.
- c) Defence Writing Procedure.

Unit:3

- a) Format: Language and Grammar.
- b) Forms: Eye witness and Computer Assigned Features.
- c) Concept of Graphics and Animation (Role of Modern Technology).

Unit:4

- a) Defence Terms and Abbreviations.
- b) Role and Importance of News organization: Press Trust of India (PTI), Press Council of India (PCI).

Unit:5

- a) Media Ethics.
- b) Media Laws.
- c) Problem in Defence Writing – Political Pressure and Official Secrecy.
- d) Introduction to Defence Journals: Sainik Samachar, Trishul, Strategic Digest, Strategic Analysis and so on.

Reference books

1. Waren ,K Agrie., (ed)., The Press and the Public Interest, Washington, D.C.: Public Affairs Press, 1968.
2. Bhatt, S.C., Practical Journalism, Jaipur: Aavishkar, 2005.
3. Dhara, R., Journalism, Calcutta: Industry Publishers, 1945.

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

OPEN ELECTIVE

B. MANAGEMENT OF REFUGEE CRISIS

PAPER - 4

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge for the other discipline learners on Refugee Crisis.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the History | K1 |
| 2 | Understand the concepts of rights | K2 |
| 3 | Describe the Humanitarianism | K3 |
| 4 | Explain the concepts of Securitization | K4 |
| 5 | Understand the Access to Asylum | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

The History of Asylum: Refugees, Asylum and Historical Memory

Unit:2

Citizenship rights, human rights and the “bare Human”

Unit:3

The Politics of Humanitarianism

Unit:4

Borders and bordering practices: Securitization

Unit:5

Accessing Asylum, Spatializing the Refugee, Asylum as Domestic politics: emergency crisis and sovereignty

Reference books

1. Megan Bradley, “Back to Basics: The Conditions of Just Refugee Returns” Journal of Refugee Studies Vol. 21, No. 3, 285-304
2. Lecadet, “Refugee Politics: Self Organized Government and Protest.” Journal of Refugee Studies Vol. 29, No. 2 , 187-107;
3. Romeyn (2014), “Asylum seekers, citizenship and reality TV in the Netherlands: quizzing refugees in jeopardy,” Citizenship Studies, 18:6-7, 741-757;
4. Arnold Zable, “From Manus to London: how two strangers made a landmark movie together”

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	L	L	M	M	L	L	L
CO2	S	L	M	M	L	L	L	L	L	L
CO3	S	L	L	M	L	M	L	L	L	L
CO4	S	L	M	L	L	M	L	L	L	L
CO5	S	L	M	M	L	M	M	L	L	L

*S-Strong; M-Medium; L-Low

SEMESTER-IV

Course
code

OPEN ELECTIVE

C. INDIAN OCEAN STUDIES

PAPER - 4

Syllabus 2022
Version -23

Course Objectives:

The main objectives of this course are To obtain knowledge for the other discipline learners on study of Indian Ocean

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

- | | | |
|---|--|----|
| 1 | Remember the importance of ocean | K1 |
| 2 | Understand the Geo-Strategic Importance | K2 |
| 3 | Describe the Zone of Peace | K3 |
| 4 | Explain the concepts of Indo - Pacific relations | K4 |
| 5 | Understand the importance of trade | K5 |

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

Unit:1

Introduction to the Indian Ocean

Unit:2

The Indian ocean Geo-Strategic Important

Unit:3

The traditional view of the Indian Ocean areas - Zone of Peace

Unit:4

The Indian subcontinent as its pivot, the world's total productive activity in Indian Ocean .Indo - Pacific relations

Unit:5

The Relationship between the land-based states and maritime trade and port cities in India

Reference books

1. Wink, 'From the Mediterranean to the Indian Ocean: Medieval History in Geographic Perspective,' Comparative Studies in Society and History (July, 2002), pp. 416-445.
2. R. Hall, Empires of the Monsoon: A History of the Indian Ocean and its Intruders (London, 1996).
3. H. Louis Gates, Jr., Wonders of the African World (New York, 1999)
4. K. N. Chaudhuri, Trade and Civilisation in the Indian Ocean: An Economic History from the Rise of Islam to 1750 (Cambridge, 1985).
5. Reid, Southeast Asia in the Age of Commerce, 1450-1680, Volume One: The Lands below

the Winds (New Haven & London, 1988).

6. M. Adas, "High" Imperialism and the "New" History (Washington, 1993).
7. Rashid, Taliban: Islam, Oil and the New Great Game in Central Asia (London & New York, 2000).
8. Additional chapters of books and articles in reader.

THIRUVALLUVAR UNIVERSITY

B. A. DEFENCE AND STRATEGIC STUDIES

SYLLABUS

2022-2023

THIRUVALLUVAR UNIVERSITY

DEPARTMENT OF DEFENCE AND STRATEGIC STUDIES

MISSION

To train the students for acquiring knowledge about Defence and Strategic Studies and applications to enhance their employability.

VISION

To undertake scientific way of research in Defence and Strategic Studies for regional, national and global development and to create World peace through Diplomacy.

Programme Objectives

1. To provide the concepts related to international relations and security.
2. To create awareness on India's contribution to strategic thought.
3. To make student to understand India's Strategic relationship with neighbors
4. To facilitate a thorough knowledge on the internal security issues.
5. To enable critical thinking on issues related to strategic affairs

Programs Educational Objectives

1. To enable students to adapt themselves on new perspectives and develop their competencies.
2. To promote spirit of benevolence and commitment to National Harmony
3. Orient ICT enabled teaching and learning process on a progressive and continuous basis.
4. Promotion of professional qualification.
5. Prepare young minds to serve in the Indian Armed Forces.

Programme Specific Outcomes

1. To provide sound theoretical knowledge on strategic affairs.
2. Enhancing their knowledge on National Security.
3. Develop their Understanding on International Relations.
4. Provide scope for higher learning.
5. Develop spirit of Nationalism and Patriotism.
6. Gain mastery in pursuance of inter-disciplinary studies.
7. To master leadership Qualities.
8. Enables to manage any crisis situation.
9. To enable independent thought process and analysis.
10. To understand the historical part with reference on Indian Military Culture and Value system.

Programme Outcomes

1. To provide a theoretical foundation and Strategic affairs.
2. To gain mastery in the specialized are of study.
3. To support in the policy making process.
4. To enable interpersonal and communication skill.
5. Mold them into responsible citizen and socially conscious citizen.
6. Developing their competence in skills.
7. Preparing them for competitive exams.
8. Acquiring adequate skills for higher learning.
9. Evolve as leaders and entrepreneurs.
10. Pursuance of inter-disciplinary studies.

THIRUVALLUVAR UNIVERSITY

BACHELOR OF ARTS

B. A. DEFENCE AND STRATEGIC STUDIES

DEGREE COURSE

CBCS PATTERN

(With effect from 2022-2023)

The Course of Study and the Scheme of Examinations

S.NO.	Part	Study Components		Ins. hrs. /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3	III	Core Theory	Paper-1	5	3	Fundamentals of War And Peace	25	75	100
4	III	Core Theory	Paper-2	5	3	Defence Mechanism of India	25	75	100
5	III	ALLIED -1	Paper-1	6	3	Outlines of Political Theory-I	25	75	100
6	III	PE	Paper-1	6	3	Professional English I	25	75	100
7	IV	Environmental Studies		2	2	Environmental Studies	25	75	100
				36	22		175	525	700
SEMESTER II							CIA	Uni. Exam	Total
8	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9	II	English (CE)	Paper-2	4	4	Communicative English I	25	75	100
10	III	Core Theory	Paper-3	5	3	The Art of Warfare in India upto 15 th Century	25	75	100
11	III	Core Theory	Paper-4	5	3	World military History-I (4 th cent. BC to Napoleonic Warfare	25	75	100
12	III	ALLIED-1	Paper-2	6	5	Outlines of Political Theory-II	25	75	100
13	III	PE	Paper-2	6	3	Professional English II	25	75	100
14	IV	Value Education		2	2	Value Education	25	75	100
15	IV	Soft Skill		2	1	Soft Skill	25	75	100
				36	25		200	600	800

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SEMESTER –III							CIA	Uni.Exam	Total
16.	I	Language	Paper-3	6	4	Tamil/ Other Language	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-5	4	4	The Art of Warfare in India Since 16 th Century	25	75	100
19.	IV	Core Theory	Paper-6	5	4	World military History-II (Since American War of Independence to World War II)	25	75	100
20.	V	ALLIED -I	Paper-3	5	3	General Economics-I	25	75	100
21.	VI	Skill Based Subject	Paper-1	2	2	Service Commissions in Indian Armed forces	25	75	100
22.	IV	Non-major elective	Paper-1	2	2	Fundamentals of Defence and Strategic Studies	25	75	100
				30	23		175	525	700
SEMESTER –IV							CIA	Uni.Exam	Total
23.	I	Language	Paper-4	6	4	Tamil/ Other Language	25	75	100
24.	II	English	Paper-4	6	4	English	25	75	100
25.	III	Core Theory	Paper-7	5	4	International Relations and Organizations	25	75	100
26.	III	Core Theory	Paper-8	4	3	Limited wars	25	75	100
27.	III	ALLIED -I	Paper-4	5	5	General Economics-II	25	75	100
28.	IV	Skill Based Subject	Paper-2	2	2	Industrial Security	25	75	100
29.	IV	Non-major elective	Paper-2	2	2	Fundamentals National Security	25	75	100
				30	24		175	525	700
SEMESTER – V							CIA	Uni.Exam	Total
30.	III	Core Theory	Paper-9	6	4	Armed forces and society	25	75	100
31.	III	Core Theory	Paper-10	6	4	Strategic thought	25	75	100
32.	III	Core Theory	Paper-11	6	4	Nuclear Warfare	25	75	100
33.	III	Core Theory	Paper-12	6	4	Defence Economics	25	75	100
34.	III	Internal Elective	Paper-1	3	3	(To choose any 1 out of 3) A. Warfare in independent India B. Military Geography C. Essentials of Public Administration	25	75	100
35.	IV	Skill based subject	Paper-3	3	2	Conflict and Media	25	75	100
				30	21		150	450	600
SEMESTER – VI							CIA	Uni.Exam	Total

B.A., Defence and Strategic Studies – Syllabus (CBCS)

36.	III	Core Theory	Paper-13	5	4	National Security of India	25	75	100
37.	III	Core Theory	Paper-14	5	4	Introduction to International Law	25	75	100
38.	III	Core Theory	Paper-15	5	3	Arms Control and Disarmament	25	75	100
39.	III	Compulsory Project	Paper-16	5	5		25	75	100
40.	III	Internal Elective	Paper-2	3	3	(To choose any 1 out of 3) A. Specialized Warfare B. Warfare and Technology C. Elementary Study of the Constitution of India	25	75	100
41.	III	Internal Elective	Paper-3	3	3	(To choose any 1 out of 3) A. Defence Management B. Human Rights C. Terrorism	25	75	100
42.	VI	Skill based subject	Paper-4	3	2	Basics of Defence Journalism	25	75	100
43.	V	Extension Activities		-	1		100	-	100
				30	25		275	525	800
									4300

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Electives	3	3	9	100	300
	Core	15	(3-5)	54	100	1500
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	43		140		4300

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-I

Course code		FUNDAMENTALS OF WAR AND PEACE				
Core I						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
On completion of the paper the students will have the ability to understand the concept meaning definition and impact of War and peace.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Recall the fundamental concepts of War			K1 & K2		
2	Understand the basic concepts of Defence and Strategic Studies			K3		
3	Aware of Principles, causes of war			K3		
4	To gain knowledge about peace research			K2		
5	Understand the peaceful settlement of International disputes.			K3		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
ConceptualFormulation						
a) MeaninganddefinitionofDefenceandStrategicStudies–Itsrelevanceandsignificance. b) SubjectcontentofDefenceandStrategicStudies– Itsfeaturesandrelationshipwithotherdisciplinesofstudy. c) Definitionandmeaningofbasicconcepts– War,Campaign,Battle,Strategy,Tactics,SecurityandDefence.						
Unit:2						
HistoryofWarfare						
a) HistoricalevolutionofWarfare–Salientfeaturesofwarfareatvarioushistorical stagesandrecenttimes. b) Causes ofWar. c) Principlesof War.						
Unit:3						
TypologyofWarfare						
a) Conventionalandunconventionalwars– Civilwars,Nationalistwar,Guerillawar,Insurgency,Limited warandTotalwar. b) ABCWarfare–Atomic, BiologicalandChemicalwarfare.						

B.A., Defence and Strategic Studies – Syllabus (CBCS)

c) Hi-tech Warfare– Electronicwar andCyberwar.		
Unit:4	Peace-ConceptualFormulations	
a) Conceptofpeace–Meaning, DefinitionandTypologyofPeace. b) Peacemovements:Anti-nuclearMovements–CNDandsoon c) Zonesof Peaceand NuclearWeapon FreeZones(NWFZ).		
Unit:5	MechanicsofPeace	
a) PeacefulSettlementofInternationalDisputesandInternationalCourtofJustic e(ICJ). b) PeaceKeepingOperations(UnitedNationsOrganisation). c) PeaceBuilding,PeaceMaking,andPeaceResearch.		
Reference		
1	Philip,T.R.,(ed),RootsofStrategy, 1943.	
2	Defence and Development, M,C Shrin	
3	Red Coats to Olive green, L.M.Longer	
4	War in Modern society, A. Buchan	
5	MichaelHoward,(ed),TheTheory andPractice ofWar,1965.	
6	D.G.Chandler,TheAtlasofMilitaryStrategy:theart,theoryandpracticeofwar(London1980)	
7	Fuller,J.F.C., TheFoundationoftheScienceofWar(London, 1925)	
8	FieldMarshal,Montgomery,Viscount.AHistoryofWarfare,(London:Collins1968).	
9	Galtung,Johan,TheStruggleforPeace,(Ahamedabad)	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	M	M	M
CO3	S	S	M	M	S
CO4	S	M	M	M	S
CO5	S	M	S	S	S

S- Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-I

Course code		DEFENCEMECHANISMOFINDIA				
Core II						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
On completing this paper the students will have basic understanding of the Knowledge of the meaning of Organization, Management, managerial Functions and Leadership qualities.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Discuss Nature and scope of Management process			K1& K2		
2	Describe Planning and decision making process.			K2		
3	Explain Organization and Defence organization structure.			K1& K2		
4	Enumerate the types of Headquarters			K2		
5	Describe Co-ordination and control process in Army, Navy and Air force.			K3		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	TheIndianDefenceForces					
a) RankStructureoftheThreeServices. b) ImportantTrainingInstitutionoftheThreeServices. c) Second Line of Defence [Introduction of Border Security Force (BSF), CoastGuard (CG), Central Industrial Security Force (CISF) and RashtriyaRiffiles(RR).						
Unit:2	HigherDefenceOrganizationsofIndia					
a) Powerof thePresidentof Indiawithreference toDefence. b) CabinetCommitteeonPoliticalAffairs(CCPA) c) Roleand FunctionofMinistryof Defence. d) Composition and Functions of Defence Committees/National SecurityCouncil (NSC). e) ChiefofStaffCommitteeandJointIntelligenceCommittee.						
Unit:3	ArmyOrganization					
a) OrganizationofArmyHeadquarters,RoleofChiefofArmyStaff(COAS)andPrin						

B.A., Defence and Strategic Studies – Syllabus (CBCS)

cipalStaffOfficer(PSO). b) StaticandFieldformationofIndianArmy. c) Armsand Services. d) WeaponsofIndianArmy.		
Unit:4	AirForceOrganization	
a) OrganizationofAirForceHeadquartersChiefofAirforceStaff(CAS)andPrincipa l StaffOfficer(PSO). b) StaticandFieldformationofIndianAirForce. c) TypesofAircrafts.		
Unit:5	NavyOrganization	
a) OrganizationofNavalHeadquartersChiefofNavalStaff(CNS)andPrincipalSta fOfficer(PSO). b) StaticandFieldformationofIndianNavy. c) Types of Warships.		
Reference		
1	Venkateswaran, A.L., Defence Organisation in India, New Delhi:Government ofIndia,1967.	
2	GovernmentofIndia,TheArmyofIndiaanditsEvolution,Calcutta, 1924.	
3	MinistryofDefence, GovernmentofIndia,IndianArmedForcesYearBook,(Annual).	
4	Palit, D.K.,Essentialsof MilitaryKnowledge,New Delhi,1989	
5	Singh, Nagendra, Defence MechanismofModernState,NewDelhi, 1967.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	M	M	M
CO3	S	S	M	M	S
CO4	S	M	M	M	S
CO5	S	M	S	S	S

S- Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-I

Course code		OUTLINE OF POLITICAL THEORY I				
Allied 1 Paper 1						
			Syllabus Version	2020-21		
Course Objectives:						
This paper tries to: a) Give an introduction to the discipline of Political Science. b) Point out the origin of States. c) Sketch various forms of States. d) Point out the importance of Law, Equality and Liberty. e) Examine the spheres of State activity						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about basics of Political theory					K1
2	Understand about State					K2
3	Identify the origin of the State					K2
4	Acquire knowledge about Law					K3
5	To know about Liberty and Equality					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Introduction					
1. Nature, Scope and Importance of Political Science. 2. Evolution of Political Science. 3. Methodology of Political Science. 4. Political Science and Social Sciences. 5. Politics-Arts or Science.						
Unit:2	State					
1. Elements of State. 2. Sovereignty. 3. Nation-States. 4. Democratic States. 5. Non-Democratic States.						

B.A., Defence and Strategic Studies – Syllabus (CBCS)

Unit:3	Originofthe State	
<ol style="list-style-type: none"> 1. DivineRightTheory. 2. Force Theory. 3. PatriarchalTheory. 4. MatriarchalTheory. 5. EvolutionaryTheory. 6. SocialContractTheory. 		
Unit:4	Law	
<ol style="list-style-type: none"> 1. NatureofLaw. 2. SourcesofLaw. 3. KindsofLaw. 4. LawandMorality. 		
Unit:5	Liberty andEquality	
<ol style="list-style-type: none"> 1. MeaningofLiberty. 2. SafeguardofLiberty. 3. LawandLiberty. 4. Meaningand typesof Equality. 5. EqualityinModernStates. 6. EqualityandLiberty. 7. SphereofStateAction(Economic,SocialandCultural) 		
Reference		
1	Amal Roy and Mohit Bhattacharya: Political Theory: Ideas and Institutions, TheWorldPress, Calcutta, 2002.	
2	J.C.Johari : Principles of Modern Political Science, Sterling, New Delhi, 1999	
3	A.C.Kapoor : Principles Of Political Science, S.Chand and Co., New Delhi, 2000	

B.A., Defence and Strategic Studies – Syllabus (CBCS)

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-II

Course code		THEARTOFWARFARE ININDIA UP TOTHE15THCENTURY				
			Syllabus Version	2020-21		
Course Objectives:						
On completion of this paper the student will have sound background of early to Mughal Military traditions						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Acquire knowledge about Vedic and Epic military traditions			K1&K2		
2	To learn about Mauryan Military system			K3		
3	Understand Tamil military system			K3		
4	To gain knowledge about Guptas and Harshavardhanas			K3		
5	To know the concept of Rajputs.			K3&K4		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
		WarfareinAncientIndia				
a)		Types of Wars duringVedic period.				
b)		Alexander's invasionof India(BattleofHydaspes).				
c)		CausesofAlexander's Victory.				
d)		CausesofPorus' Defeat.				
Unit:2						
		MilitarySystemoftheMauryan Period				
a)		BattleofKalingaanditsSignificance.				
b)		MilitaryOrganizationofMaurayas				
c)		Kautilya'sArthasastra-PhilosophiesonWar,Peace,Fort,EspionageandDiplomacy.				
Unit:3						
		Military SystemoftheGupta Period				
a)		IntroductiontotheGuptaDynasty.				
b)		MilitaryOrganizationoftheGuptas.				
c)		MilitaryorganizationofHarshaVardhana.				
Unit:4						
		Rajput Military System				
a)		Rajputchallenge totheArabConquests- BattleofRawar.				
b)		MuhammadGhori'sConquestofIndia-BattleofTerrainIandII.				
c)		Causesof downfall of RajputsintheMiddleAges.				

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Unit:5	MilitarySysteminSouthIndia.	
a)	PoliticalPowersofSouthIndiaintheMedievalPeriod.	
b)	MilitaryOrganizationofthePallavasandthePandyas.	
c)	MilitaryachievementsofCholaandCheraEmperors.	
Reference		
1	Majumdar,R.C.,AnAdvancedHistoryofIndia,NewYork:St.Martin,1967.	
2	Malleson,G.B.,TheDecisiveBattlesofIndia,London:W.H.Allen,18853)Saxena,K.L.M.,Military SystemofIndia-1850-1900,Delhi'1976.	
3	Roy,Koushik.,FromHydespastoKargil:AHistoryofWarfareinIndiafrom326 B.C.toA.D1999,Delhi:Manohar,2004.	
4	AnjoliNirmal,TheDecisiveBattlesofIndianHistory,Jaipur:PointerPublications,1999.	
5	Sarkar,Jadunath.,MilitaryHistoryofIndia,Bombay:OrientLongmans,1970.	
6	Das,S.T.,IndianMilitary:ItsHistoryandDevelopment,Allahabad:KitabMahal,1979.	
7	V.R.R.Dikshitar, WarsinAncientIndia, 1948.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	M	S	M	S	M
CO3	S	S	M	M	S
CO4	S	M	M	M	S
CO5	S	M	S	M	S

S- Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-II

Course code		WORLD MILITARY HISTORY - I (4thCentury BCtoNapoleonicEra)				
Core IV						
			Syllabus Version		2020-21	
Course Objectives:						
On successful completion of the paper, the candidates will be able to appreciate the evolution of warfare from early times.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand The Basic concepts of Greek military system					K1&K2
2	To learn about Romans military traditions.					K2
3	Understand about Mongols.					K2
4	Acquire knowledge about 16 th and 17 th Century armies					K3
5	Grasp knowledge about French revolution					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		GreekWarfare				
a) Militarysystemof theGreeks. b) Greco Persian Wars – with special reference to the Battles of Marathon,Thermopyle andSalamis. c) PeloponnesianWars.						
Unit:2		RomanWarfare				
a) Military System of the Romans b) Punic wars (Battle of Cannae and Zama) c) Campaigns of Julius Caesar						

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Unit:3	Warfare in the Middle Ages	
a) Crusades - Age of velour b) Mongol Military System c) Advent of gun powder and its impact on warfare		
Unit:4	Warfare During 16th and 17th Centuries	
a) Development of weapons during 16 th and 17 th centuries b) Reforms of Gustavus Adolphus c) Siege craft and fortification - Vauban d) Rise of Professional Armies and Navies.		
Unit:5	Napoleonic Warfare	
a) French Revolution – Causes and Outcome. b) Rise of Napoleon. c) Napoleon's Art of Warfare. d) Battles of Trafalgar and Waterloo.		
Reference		
1	Howard, Michael. War in European History, Oxford: Oxford University Press, 1977.	
2	Keegan, John. A History of Warfare, New York: Vintage, 1993	
3	Fuller, J.F.C., A Military History of the Western World, New York: Funk and Wagnall's	
4	Neilberg, Michael. Warfare in World History, London/New York: Rutledge, 2001.	
5	Andre Corviser, (ed.), A Dictionary of Military History, Oxford: Blackwell Publishers, 19	
6	Dupey and Dupey, Encyclopedia of Military History.	
7	Woodhouse - Tutorial History of Greece	
8	Alcroft and Mason - Tutorial History of Rome	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-II

Course code		OUTLINE OF POLITICAL THEORY II				
Allied 1 Paper 2						
			Syllabus Version	2020-21		
Course Objectives:						
This paper tries to: 1. Sketch the features of Democratic States. 2. Outline the structure and function of the Legislative System. 3. Outline the structure and function of the Executive System. 4. Outline the structure and function of the Judicial System. 5. Describe the linkages of various systems in a Democratic State.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about democratic state					K1
2	Understand about Legislature					K2
3	Understand about Executive					K2
4	Acquire knowledge about Judiciary					K3
5	To know about Political Participation					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
		Democratic State				
1. Definition of Democracy. 2. Representative Democracy. 3. Direct Democracy. 4. Theories of Representation. 5. Elections.						
Unit:2						
		Legislature				
1. Functions of Legislature. 2. Theories of Suffrage. 3. Constituencies. 4. Unicameral Legislature. 5. Bicameral Legislature.						

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Unit:3	Executive	
1. ParliamentaryExecutive. 2. PresidentialExecutive. 3. CollectiveExecutive. 4. Dictatorship. 5. MilitaryGovernance. 6. ExecutiveFunctions.		
Unit:4	Judiciary	
1. Functionsof Judiciary. 2. IndependenceofJudiciary. 3. RuleofLaw. 4. AdministrativeLaw. 5. JudicialActivism. 6. AlternativeDisputesMechanism.		
Unit:5	PoliticalParticipation	
1. PoliticalParties. 2. PublicOpinion. 3. PressureGroups. 4. MassMedia. 5. ElectronicMedia.		
Reference		
1	Amal Roy and MohitBhattacharya:Political Theory: Ideas and Institutions,TheWorldPress,Calcutta,2002.	
2	J.C.Johari :ModernConstitutions,S.Chandand Co.New Delhi,1990	

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Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-III

Course code		THE ART OF WARFARE IN INDIA SINCE 16th CENTURY				
Core V						
			Syllabus Version		2020-21	
Course Objectives:						
The main objectives of this course are to:						
Will have sound background of Maratha Military System to British Indian Armed Forces.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Acquire conceptual knowledge of Shivaji Military system					K1
2	Understand basic concepts of Sikh army					K2
3	To learn about Development of Presidency armies					K3
4	Gain knowledge about Indian army during world wars					K3
5	Equip knowledge about nationalization of armies					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Military System of the Mughals					
a) Foundation of the Mughal Empire (Battle of Panipat I) b) Consolidation of the Empire (Battle of Panipat II) c) The Mughal Military Organization, Weapon System and Art of War.						
Unit:2	The Maratha Military System					
a) The Military Organization of Shivaji. b) Development of Guerilla Warfare and its Characteristics. c) The Maratha Navy under KanohjiAngre.						
Unit:3	The Sikh Military System					
a) Rise of Sikhism and its Philosophy. b) Guru Govind Singh's KhalsaPanth. c) The Military Organizations of the Sikhs under Maharaja Ranjit Singh.						

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Unit:4	The Advent of Europeans in India	
a) The Early European Settlers. b) Conquest of Bengal (Battle of Plassey). c) The rise of Presidency Armies.		
Unit:5	British Conquest of India	
a) The decline of the Marathas (Battle of Panipat III) b) The First War of Independence and the Great Mutiny 1857.- Causes, Course and Consequences. c) The Military Reforms under the British Crown.		
Reference		
1	Majumdar,R.C., An Advanced History of India, New York: St.Martin, 1967.	
2	Malleson, G.B., The Decisive Battles of India, London:W.H.Allen, 1885	
3	Saxena,K.L.M., Military System of India-1850-1900, Delhi'1976	
4	Roy, Koushik, From Hydespas to Kargil: A History of Warfare in India from 326 B.C. to A.D 1999, Delhi: Manohar, 2004.	
5	AnjoliNirmal, The Decisive Battles of Indian History, Jaipur: Pointer Publications, 1999	
6	Sarkar, Jadunath, Military History of India, Bombay: Orient Longmans, 1970.	
7	Das, S.T., Indian Military: Its History and Development, Allahabad: KitabMahal, 1979.	
8	V.R.R. Dikshitar, Wars in Ancient India,1948.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	M	S	M	S	M
CO3	S	S	M	M	S
CO4	S	M	M	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-III

Course code		World Military History II (Since American War of Independence to World War II)				
Core VI						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to: On completion of the paper, the students will be in a position to analyses the cause for war in modern period.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about nature and source of Trench warfare					K1
2	Understand about American Military system					K2
3	Identify the causes of WWI					K2
4	Acquire knowledge about World War II					K3
5	To know about Battles during WWII					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		AMERICAN MILITARY EXPERIENCE				
a) American war of Independence - 1776 -1782 b) American Civil war - 1861 -1865 c) Spanish American war - 1898- 1900.						
Unit:2		WORLD WAR I				
a) Causes b) Trench warfare c) Mobile warfare - Battles of Somme and Cambrai						
Unit:3		DEVELOPMENT OF WARFARE DURING INTER WAR PERIOD				
a) Land Warfare b) Sea Warfare c) Air warfare.						
Unit:4		WORLD WAR II				

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a) Causes b) Development of armored warfare c) The Blitzkrieg		
Unit:5	WORLD WAR II	
a) Desert warfare b) Role of Naval Power - Battle of Midway c) Role of Air power - Battle of Britain d) Consequences		
Reference		
1	Reid, Brain Holden, The Origin of American Civil War, (London: 1996).	
2	Parish, Peter, The American Civil War, (London: 1975).	
3	Falls, Cyril, The First World War (London: 1960).	
4	Strachan, Hew (ed). The Oxford Illustrated History of the First World War (Oxford: 1998).	
5	Dupey and Dupey, Encyclopedia of Military History.	
6	Posen, B.R., The Sources of Military Doctrine, Cornell University Press, (Ithaca: 1984).	
7	Fuller, J.F.C., the Decisive Battles.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-III

Course code		GENERAL ECONOMICS I				
Allied 2 Paper 3						
			Syllabus Version	2020-21		
Course Objectives:						
To provide a frame work of knowledge relating to the concepts and practice of Economics in Indian context and to make the students understand the application of Economic principles in the strategic sector. Also, to provide insight on the most pressing issue “Demand for Defence Expenditure” i.e. the right size of Defence Budget.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about an introduction to the discipline of Economics.					K1
2	Understand about the concepts used in Economics					K2
3	Identify the various Mechanisms in economics.					K2
4	Acquire knowledge about importance of market forms					K3
5	To know about economics related to Defence					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Economic Analysis - Basic Problems of Economy - Economic Systems - Capitalism - Socialism - Mixed Economy - Communalism - Role of Government.						
Unit:2						
Concept and Management of National Income - Problems of Measurement - Trends in NationalIncome and Planning.						
Unit:3						
Market Mechanism - Law of Demand and Supply - Elasticity of Demand - Elasticity Measurement - Uses - Limitations.						

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Unit:4		
Market Forms - Perfect Competition - Monopoly - Discriminative Monopoly - Monopolistic Competition - Wastes of Monopolistic Competition.		
Unit:5		
Defence Economics - Economics of Conflict and Terrorism - Scope and Definition - Micro and Macro Economic impact - Disarmament and Peace.		
Reference		
1	Dr. S. Sankaran, Micro Economics.	
2	M.L. Jhingan, Micro Economics	
3	Dutt and Sundaram, Indian Economy.	
4	Defence Economics,	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

SEMESTER-III

Course code		SERVICE COMMISSIONS IN INDIAN ARMED FORCES		
Skill based Subject -1				
			Syllabus Version	2020-21
Course Objectives:				
The main objectives of this course are to:				
Expected Course Outcomes:				
On the successful completion of the course, student will be able to:				
1	Understanding the key concepts of the service commission's opportunities in Indian Armed forces			K1
2	To learn about the opportunities in Tamil Nadu Police forces.			K2
3	Discuss Matters to be stated in the content of the Basic tenants of Indian History.			K2
4	To know about the basics of World history			K3
5	Acquire knowledge about current affairs			K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create				
Unit:1	Recruitments in Indian Army, Navy and Air force			
a) Short Term Service –Army b) Short Term Service – Navy c) Short Term Service - Air force d) Para Military Services e) Coastal Security Guard				
Unit:2	Recruitment into Police forces			
a) TN Police Force – Constable and Sub-Inspector. b) TNPSC – Group I c) UPSC – IPS				

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d) TNPSC – Other services e) UPSC – Other services		
Unit:3	GERNERAL KNOWLEDGE I (Indian History and Other Facts)	
a) Indian History b) Facts about India c) Indian Constitution d) Civic Life e) National Movement		
Unit:4	GERNERAL KNOWLEDGE II (World History)	
a) Countries of the World b) World Organizations c) Physical Geography d) World Geography e) Industrial Geography		
Unit:5	GERNERAL KNOWLEDGE III (India)	
a) Geography of India b) Sports and Awards. c) Books and Authors d) Indian Culture e) Economics and Commerce		
Reference		
1	Manorama Year book	
2	Civil Services Chronicle	
3	Unique Guide for Civil Service Prelims.	

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Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-III

Course code		FUNDAMENTALS OF DEFENCE AND STRATEGIC STUDIES				
NON MAJOR ELECTIVE Paper 1						
			Syllabus Version	2020-21		
Course Objectives:						
To introduce the discipline of Defence and Strategic Studies – its content, relevance and importance in the contemporary world and its fundamental goals and its relationship with other disciplines						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the basic concepts and definitions in Defence studies.					K1
2	Understand about the historical evolution and types of warfare.					K2
3	Identify the Basic Concepts in International Relations.					K2
4	Acquire knowledge about the meaning and approaches towards peace.					K3
5	To know about peace mechanism					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		Introduction and Conceptual Formulations				
a) Introduction to the discipline of Defence and Strategic Studies – Contents – Relationship with other disciplines – Relevance and Significance. b) Basic Concepts of War, Battle and Campaign. c) Definition of Security, Defence, Strategy and Peace.						
Unit:2		History of Warfare				
a) Historical Evolution of Warfare – Its Features and Significance. b) Principles, Causes and Functions of War. c) Types of War – and Scope						
Unit:3		Basic of International Relations				
a) Introduce to IR Nature and Scope of International Relations; and Features of International Political System- Structure of international Political System (Uni, Bi and Multi Polar) b) Basic Concept Actors in International Political System – State and Non – State actors; World government (UNO) c) Security features in International Political system – Collective security, Balance of power,						

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Hegemony, Regionalism, etc.		
Unit:4	Introduction to Peace	
a) Meaning and Definition of peace; typology and peace; b) Approaches to peace – Disarmament, International Law; c) Peace movement, peace research, peace-making, peace building, peace keeping		
Unit:5	Mechanics of Peace	
a) Role and function of International organizations – League of Nations, UNO; b) Amicable means to settle Inter-state conflicts; c) Diplomacy-Scope and Function; type of diplomacy – its features.		
Reference		
1	Field Marshal Montgomery, Viscount, A History of Warfare, London: Collins, 1968	
2	Palmer, N.D. and H.C. Perkins, International Relations, Boston: Houghton Mifflin, 1953.	
3	Margenthau, H.J., Politics among Nations: The Struggle for Power and Peace, Calcutta: Scientific Book Agency' 1972	
4	Waltz, K., Man, the State, and War: A Theoretical Analysis, New York: Columbia University Press, 1959	
5	Johan, Galtung, The Struggle for Peace, Ahmedabad: Gujarat VidhyaPeeth, 1985.	
6	Chopra, Jarat (ed), The Politics of Peace - Maintenance, New York: 1998	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-IV

Course code		INTERNATIONAL RELATIONS AND ORGANIZATIONS				
Core VII						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
After completing the paper the students will understand the types of war prevalent in the world.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Enabling the students to understand the features of Psychological warfare.				K1&K2	
2	Develop an understanding about Biological warfare				K 2& K3	
3	To give an exposure Chemical warfare				K3	
4	To provide knowledge on a Nuclear warfare				K3	
5	To get an idea about Terrorism				K3&K4	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Introduction to International Relations					
a. Concepts, Features and Scope of State, Nation and Nation-state. b. National Power and Components of National Power. c. Approaches to International Relations, Mainstream Theories: Idealism and Realism.						
Unit:2	Power Systems in International Relations					
a. Definition, Meaning, and Scope of International Power Structure: Uni – polar, Bi – Polar and Multi – Polar. b. Meaning and Definitions of Balance of Power, Characteristics of Balance of Power, Techniques of Balance of Power. c. Collective Security.						
Unit:3	Diplomacy and Foreign Policy					
a. Meaning, Definitions, Objectives and Scope of Diplomacy, Types of Diplomacy. b. Meaning and Definitions of Foreign Policy, Determinants of Foreign Policy. c. Meaning and Definitions of National Interest.						

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Unit:4	International Organization and Scope	
a. Origin, Growth and Functions of International Organizations. b. Origin, Organization and Functions of the League of Nations, Failure of the League of Nations. c. Origin, Aim, Structure, Scope and Functions of the United Nations Organisation.		
Unit:5	Regional Organization	
a. Origin, Development and Functions of Regional Organizations – its relevance and utility. b. Origin, Objectives, Development and Functions of SAARC. c. Origin, Objectives, Developments and Functions of ASEAN. d. Origin, Development and Current Status of the European Union.		
Reference		
1	Palmer, N.D. and H.C. Perkins, International Relations, Boston: Houghton Mifflin, 1953.	
2	Jackson, R. and G. Sorensen, Introduction to International Relations: Theory and Approaches,	
3	Frankel, J., International Relations in a Changing World, London: Oxford University Press,	
4	Nicholson, M., International Relations: A Concise Introduction, New York: Palgrave, 2002.	
5	Chatterjee, Aneek, International Relations Today: Concept and Applications, New Delhi:	
6	Johari, J.C., International Relations and Politics, New Delhi: Sterling Publishers, 1985.	
7	Theories of Terrorism, Anand V.K	
8	Guerilla Warfare, Mao	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-IV

Course code		LIMITED WAR				
Core-VIII						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
After going through this paper students will have an understanding of wars that were fought after the end of world war- II						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Remember the basic concepts of Limited wars					K1
2	Identify the role of UNO in Korean wars					K2
3	Evaluate the American presence in Vietnam war					K2
4	Understand the causes of Arab Israeli wars					K2
5	Know the facts about Iran Iraq war..					K2
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	KOREAN WARS					
a) Concept, meaning and scope of limited wars b) Causes of Korean war c) Main events d) Role of UNO						
Unit:2	VIETNAM WAR					
a) Causes b) Main events c) Lessons learnt						
Unit:3	ARAB ISRAELI WARS , 1967& 1993					
a) Causes b) Main Events c) Role of Airpower d) Lessons learnt						
Unit:4	IRAN - IRAQ WAR					
a) Causes b) Highlights of the war c) Result and lessons learnt						

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Unit:5	Gulf War I & II	
a) Causes b) Highlights of the war c)Role of the UN		
Reference		
1	Hastings, Max, The Korean War, (London: 1987)	
2	Herring, George, America's Longest War (New York, 1996)	
3	Fraser, T.G., The Arab - Israeli Conflict (London: 1995)	
4	Agwani, M.S., The West Asian Crisis, New Delhi: 1995	
5	Colvocoressi, P., World Politics: 1954 - 2000, New Delhi: Pearson Education, 2001.	
6	Schoot, Ian., World Famous Battles , London : Magpie Books Ltd., 1994	
7	Politics in Gulf, Agwani M.S.,	
8	The West Asian Crisis, Agwani M.S.,	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-IV

Course code		GENERAL ECONOMICS II				
Allied 2 Paper 4						
			Syllabus Version	2020-21		
Course Objectives:						
To provide a frame work of knowledge relating to the concepts and practice of Economics in Indian context and to make the students understand the theories and growth of Economy in the strategic sector. Also, to provide insight on the most pressing issue “Demand for Defence Expenditure” i.e. the purpose of Defence Budget.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the basic terms in economics					K1
2	Understand about the theories and analysis in economics.					K2
3	Identify the systems used in economics					K2
4	Acquire knowledge about the strategies in economics					K3
5	To know about the budget used for Defence purpose					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Money - Functions - Changes in supply of Money, Inflation - Deflation - Types - Characteristics - Causes - Effects - Remedies - Deflationary Gap						
Unit:2						
Keynesian Theory of Employment - Savings and Investment Analysis						
Unit:3						
Macro-Economic Goals and Tools - Objectives - Central and Commercial Banking in India - Fiscal Policy - Indian Tax System						
Unit:4						
Growth and Development Strategies - Planning - Agriculture and Industry under Plans with Special reference to the tenth plan						

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Unit:5		
Budget - Salient Features - Central and State - Deficit Financing - Priorities in Budgeting - Expenditure in Defence - Recent Trends in Military Finance - Role of Social and Economic infrastructure for Defence Purposes.		
Reference		
1	Dr. S. Sankaran, Macro Economics	
2	M. L. Jhingan, Macro Economic Theory	
3	Dutt and Sundaram, Indian Economy	
4	B. P. Tyagi, Public Economics.	
5	Dr. S. Sankaran, Monetary Economics	
6	Chrystal, A, Lipsey, R.G Introduction to Positive Economics, Oxford University	
7	Garfinkel, M.R. (University of California) Economics of Conflict, An Overview (Paper presentation).	
8	Hartley and Sandler, Hand Book of Defence Economics, North Holland	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-IV

Course code		INDUSTRIAL SECURITY				
Skill Based Subject - 2						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this paper attempts at explaining the fundamental components of journalism - the News it also outlines the News Writing procedures.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explain Basic concepts of News					K1
2	Acquire knowledge about reporting					K2
3	Understand the methods of news content					K2
4	Enumerate various news writing methods					K2
5	To learn about news content					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Concept – Meaning – Definition						
Unit:2						
Industrial Safety – Vision and Mission of Industries – Ethical and Legal Standards.						
Unit:3						
Recruitment and Selection of Security Forces in Industrial Sector						
Unit:4						
Training and Development of Industrial Security Forces.						
Unit:5						
Recent Developments in Industrial Security and Scope for Employment						
Reference						
1	The Journalist's Handbok , Kamath, M.V.,					
2	Vikas Publishers , 2005) ,					
3	Nalini ed., Practicing Journalism (New Delhi : Sage, 2005)					

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Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	M	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-IV

Course code		FUNDAMENTALS OF NATIONAL SECURITY				
			Syllabus Version	2020-21		
Course Objectives:						
To cultivate basic knowledge about the Concept of National Security and Approaches to achieve National Security (With Special Reference to India).						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the basic concept of national security.					K1
2	Understand about the concept of Foreign and Defence policies.					K2
3	Identify the Approaches to National Security					K2
4	Acquire knowledge about the Strategic Environment in India					K3
5	To know about the India's Strategic Relationship with other countries.					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Unit:1		Introduction				
a) Definition, Scope and Features of the Concept of National Security. b) Concept of National Power – Elements of National Power (Tangible and Intangible). c) Fundamental Factors, Values, Goals, Policies and Determinants of National Security Policy.						
Unit:2						
Unit:2		Foreign Policy and Defence Policy				
a) Definition, Meaning, Scope of Foreign Policy and Defence Policy. b) Determinants of Foreign Policy and Defence Policy. c) Instruments of Foreign Policy and Defence Policy – Diplomacy.						
Unit:3						
Unit:3		Approaches to National Security				
a) Coercive and Non-Coercive Approaches – Meaning and Scope. b) Coercive Means – Threats, Threat Perception and Defence Apparatus, Armed Forces – Its organization and functions (India)						

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c) Non – Coercive Means, Peace Mechanics, Peace Making and Peace Building.		
Unit:4	Strategic Environment - India	
a) Feature of Strategic Environment – Its Scope in Policy Making. b) India’s Strategic Environment – Immediate Neighbours, Adjacent Regions, Indian Ocean and Global Structure. c) India’s Military Preparedness – Defence Budget, Force Structure and Organization		
Unit:5	India’s Strategic Relationship (Salient Features)	
a) India – Pakistan: Politico – Strategic Relations. b) India – China: Politico – Strategic Relations. c) India and the World Powers.		
Reference		
1	Barry, Buzan, People, State and Fear: The National Security Problems in International Relations, Sussex;Wheatsheaf Books, 1983.	
2	Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983	
3	Dixit, J.N., Accross Borders: Fifty Years of India's Forgeign Policy, New Delhi: Picus Books, 1998.	
4	Satish Kumar, (ed). Yearbook on India's Foreign Policy, New Delhi: Deep and Deep, 1993.	
5	Jayaramu, P.S., India's National Security and Foreign Policy, New Delhi: ABC Publishers, 1978.	
6	Kaul, T.N., India and the New World Order, Vol. 1, New Delhi: Gyan, 2000	
7	Kux, Dennis, Estranged Democracies: India and the United States 1941 - 1991, New Delhi: Sage Publications, 1994.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

SEMESTER-V

Course code		ARMED FORCES AND SOCIETY				
Core IX						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
To inculcate interest amongst students to learn more about modern inter - state relations.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the key element of International relations					K1
2	Analyze the relationship between foreign policy and Diplomacy					K2
3	Acquaint the knowledge on Diplomacy					K2
4	Understand the knowledge of Balance of Power and Collective security					K3
5	Understand the key concepts of Cold war					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Study of Society					
a) Definitions and Types of Societies. b) The Concept of Community, Association and State. c) Differences between Society, Community, Association and State.						
Unit:2	Evolution of State System					
a) Theories and Elements of State. b) State – Pre-historic to Modern State. c) Concepts of Nation, Nation-State, National Power and National Character. d) Concept of Nation Building.						
Unit:3	Study of Militarism					
a) Concept, Meaning and Definition of Militarism. b) Evolution of Military System. c) Types and Kinds of Military Formations. d) Role of Armed Forces in Modern Times.						

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Unit:4	Leadership	
a) Meanings and Definition of Leadership. b) Characteristics and Qualities of Leadership. c) Styles or Techniques of Leadership. d) Theories of Leadership.		
Unit:5	Civil – Military Relations	
a) Relations in political set – up. b) Military influence on National Policy. c) Armed Forces aid to Civil Power.		
Reference		
1	Shankar Rao, C.N., Sociology, New Delhi: S. Chand and Company, 1997	
2	Goode, W.J., Principles of Sociology, New Delhi: T M H Publishing Co. Ltd., 1977.	
3	Koithara, Varghese, Society, State and Security: Indian Experience, New Delhi: Sage, 1996	
4	Johnson, John, Role of Military in Underdeveloped Countries	
5	Morris Janowitz, Sociology and Military Establishment	
6	Jewaki, Androze S, Military Organisation and Society.	
7	Grille, Race, Class and Militar	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	M	S	M	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-V

Course code		STRATEGIC THOUGHT				
Core X						
			Syllabus Version		2020-21	
Course Objectives:						
The main objectives of this course are to:						
To inform the students the heroic efforts made by the India Armed forces to protect the nation.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand the basic concepts of Kashmir problem				K1&K2	
2	Imparting knowledge on Indo-Pak war 1948				K2&K3	
3	Have a comprehensive knowledge on Chinese Aggression				K3	
4	Acquire knowledge on comparative strengths of Indian and Pakistan Army				K3&K4	
5	Acquire knowledge on Kargil issues				K4	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		Introduction				
a) Concept of Strategic Thought. b) Concept of Non–Violence by Gandhi. c) Concept of Non–Alignment by Nehru.						
Unit:2		Linkages between War and Politics				
a) Concepts of Machiavelli. b) Concepts of Jomini. c) Concepts of Clausewitz.						

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Unit:3	Strategic Thoughts on Land Warfare	
a) Vauban. b) Schlieffen. c) Von Moltke.		
Unit:4	Strategic Thoughts on Sea Warfare	
a) Chola's Theory of Sea Power. b) Maratha's Theory of Sea Power. c) A.T.Mahan's Theory of Sea Power.		
Unit:5	Strategic Thoughts on Air Power	
a) Concepts of Douhet. b) Concepts of Mitchel. c) Concepts of Servesky.		
Reference		
1	E.M. Earle (ed), Makers of Modern Strategy: Military Thought from Machiavelli to Hitler, 1948.	
2	Paret, Peter (ed.), Makers of Modern Strategy , (Princeton, 1986)	
3	Murray, Williamson, Knox, Mac Gregor, and Bernstein, Alvin (eds.), The Making of Strategy,(Cambridge,1994).	
4	Weller, Jac, Weapons and Tactics (London, 1966).	
5	Fuller, J.F.C., the Foundations of the Science of War (London, 1925).	
6	Tripathi, K.S., Evolution of Nuclear Strategy, (Delhi,19	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-V

Course code		NUCLEAR WARFARE				
Core XI						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
On completion of the paper, the students will be able to analyses the defence budget and other related areas.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand and explain the conceptual framework Economics					K1
2	To learn about Defence Planning					K2
3	To acquire knowledge on System Analysis					K3
4	Illustrate the various Defence requirements					K3
5	Understand the concept of War on Economy.					K4&6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
INTRODUCTION						
a) The evolution of Nuclear Era since 1945.						
b) Basics of Nuclear Energy and Technology.						
c) Effects of Nuclear Explosion.						
Unit:2						
Delivery Systems						
a) Missiles, Types and Effects.						
b) Triad.						
c) Tactical Nuclear Weapons.						
Unit:3						
Nuclear Warfare Theories						
a) Preventive War and Pre-emptive War Strategy						
b) Massive Retaliation and Flexible Response.						
c) Counter Value, Counter Force and Mutually Assured Destruction (MAD) and Mutually Assured Survival (MAS).						

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Unit:4	Nuclear Weapon Treaties	
a) Unilateral Treaties (PTBT, NPT and ABM). b) Bilateral Treaties (SALT-I, SALT-II and START). c) Multilateral Treaties (CTBT).		
Unit:5	Nuclear Strategy	
a) The Impact of Nuclear Weapons on Strategy b) Strategy of Deterrence c) Nuclear Strategies since 1945		
Reference		
1	Cochran, Thomas, Arkin, William, and Hoenig, William, Nuclear Weapons Databook (5 vols.,Cambridge, Mss, 1984).	
2	Glasstone, S., and Dolan, P.J., The Effects of Nuclear Weapons (Washington, 1977).	
3	Grace, Charles, Nuclear Weapons: Principles, Effects and Survivability (London, 1994).	
4	Brodie,Bernard, Strategy in the Missile Age (Princeton, 1959).	
5	Lee, R.G., Guided Weapons (London, 1988).	
6	Pande,S., CTBT : India and the Nuclear Test Ban Treaty, New Delhi:Cosmo,1994	
7	Pande, S., Future of NPT, New Delhi: Lanser, 1995	
8	Mistry, D., Containing Strategic Missile Proliferation, Seattle: University of Washington Press, 2005	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-V

Course code		DEFENCE ECONOMICS				
Core-XII						
			Syllabus Version		2020-21	
Course Objectives:						
The main objectives of this course are to:						
On completion of the course the candidates will be also able to appreciate the geographical components of defiance preparedness						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explain Elements of geography				K1 ,K2&K3	
2	Understand Geo political theories				K3	
3	Acquire knowledge about Remote sensing				K2	
4	Understand the concept of Natural resources				K3	
5	Explain maritime borders				K3&K4	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		INTRODUCTION				
a) Definition of Economics. b) Types of Economic Systems – Their Merits and Demerits. c) Defence Vs Development.						
Unit:2		Defence Budget				
a) Concept of Finance, Revenue and Expenditure. b) Budgetary Process, National Income, Gross National Product and Gross Domestic Product. c) Analysis of India’s Defence Budget for the past five years.						
Unit:3		Defence Planning				
a) Concept of Defence and Important of Defence Planning. b) System Analysis – Its Utility in Defence Planning. c) Cost Effectiveness and Choice of Weapons System.						

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Unit:4	Defence Production	
a) Classification of Defence Requirements. b) Role of Ordnance factories, Public and private Sector undertakings in Defence Production. c) Role of Defence Research and Development Organization (DRDO) in Defence Production		
Unit:5	Effects of War on Economy	
a) Inflation: Balance of Trade and Balance of Payment. b) Mobilization of Resources for War efforts. c) Growth of Science and Technology.		
Reference		
1	Subramaniam,K., Defence and Development, Calcutta:Minerva,1973	
2	Deger,S., Military Expenditure in the Third World: The Economy Effects, London:Routledge,1986	
3	Kennedy, Gavin,The Military in Third World, New York: Scribners, 1974.	
4	Khanna,D.D., and P.N.Mehrotra, Defence Verses Development: Case Study of India, New Delhi:Indus Publishing Company,1993.	
5	Subramaniam,K., Perspectives in Defence Planning, New Delhi:ABC Publishers	
6	Shaw and Scilevsky, Mobilizing Resources for War.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-V

Course code		A. WARFARE IN INDEPENDENT INDIA	L	T	P	C
INTERNAL ELECTIVE – I			4	-	-	4
			Syllabus Version		2020-21	
Course Objectives:						
To provide a frame work of knowledge relating to the concepts of Warfare in India after independence and to make the students understand the causes and results of the events.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about causes of Kashmir Operation in 1947-48.					K1
2	Understand about Chinese Aggression in 1962					K2
3	Identify the Indo – Pak Conflict in 1965					K2
4	Acquire knowledge about Liberation War in 1971					K3
5	To know about Kargil Operations in 1999					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		Kashmir Operation 1947-48				
a) Causes. b) Outline of Events. c) Result and Lessons Learnt.						
Unit:2		Chinese Aggression 1962				
a) Causes. b) Outline of Events. c) Result and Lessons Learnt.						
Unit:3		Indo – Pak Conflict 1965				
a) Causes. b) Outline of Events. c) Result and Lessons Learnt.						
Unit:4		Liberation War 1971				

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a) Causes. b) Outline of Events. c) Result and Lessons Learnt.		
Unit:5	Kargil Operations 1999	
a) Causes. b) Main of Events. c) Result and Lessons Learnt.		
Reference		
1	Prasad,S.N., and Dharampal, History of Operations in Jammu and Kashmir, (1947 - 48), History Division, Ministry of Defence, Govt. of India, New Delhi,1987.	
2	Sinha,S.K., Operation Rescue - Military Operations in JandK 1947-48, Delhi : Vision,1977.	
3	Maxwell, Neville., India's China War, New Delhi: Orient Longman, 1972.	
4	Kaul,B.N., Untold Story, Delhi : Allied,1967	
5	Palit, D.K., War in High Himalaya: The Indian Army in Crisis, 1962, Delhi: Lancer, 1991	
6	Menon, V.K. Krishna, India and the Chinese Invasion, Bombay: Contemporary, 1963	
7	Brig. John, P. Dalvi, Himalayan Blunder, New Delhi: Nataraj, 1967	
8	Vice.AdmiralN.Krishnan, No way but Surrender, Delhi: ABC Publishers, 1989	
9	The Kargil Committee Review Report, From Surprise to Reckoning, New Delhi: Sage, 2000	
10	Moosa, M., My Version, India - Pakistan War, 1965, Lahore, 1983.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-V

Course code		B. MILITARY GEOGRAPHY				
INTERNAL ELECTIVE – I						
			Syllabus Version	2020-21		
Course Objectives:						
To provide a frame work of knowledge relating to the concepts of Geography that connected with military and to make the students understand the application, factors of military role in geography.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the concept and elements of military geography.					K1
2	Understand about the Evolution of Military Geography					K2
3	Identify the Inter-State relations and Geographical factors.					K2
4	Acquire knowledge about the Geography and Foreign Policy of India.					K3
5	To know about the Applications in Military Geography.					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Introduction					
a) Meaning and Nature of Military Geography. b) Scope of Military Geography. c) Elements of Military Geography- Earth Size, Shape, Location, Climate, Topography and Population.						
Unit:2	Evolution of Military Geography					
a) History and Development. b) Founders of Military Geography - F. Ratzal, A.T. Mahan, c) Sir. Halfred Mackinder, Karl Haushofer, N.J. Spykman						
Unit:3	Inter-State relations and Geographical factors					
a) Frontiers and Boundaries - Meanings and Differences, Types, Boundary Making and Functions. b) Communication Routes- Land, Sea and Aerial- Strategic scope. c) Population and Power.						

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Unit:4	Geography and Foreign Policy of India	
a) India's Geo-strategic Significance - Location, Size, Shape, Climate, Topography and Resources. b) India's Borders - Nature and Characteristics of Land Border and Maritime Boundary. c) Indian Ocean Territory and Strategic Significance.		
Unit:5	Applied Military Geography	
a) Global Positioning System (GPS). b) Global Information System (GIS). c) Remote Sensing.		
Reference		
1	Das, S.T., Geo-Strategies, Allahabad:Kitab Mahal,1985	
2	Black, Jeremy, Cambridge Illustrated Atlas, Warfare, Renaissance to Revolution: 1492-1792, (Cambridge: Cambridge University Press, 1996).	
3	Chandler, David G., Atlas of Military Strategy: The Art, Theory and Practice of War, 1618-1878, (1980 reprint, London: Arms and Armor, 1996)	
4	William D Puleston, The Life and Work of Alfred Thayer Mahan, U.N.S. (New Haven, CT, 1939) 5) Earl Meade, Edward, Makers of Modern Strategy: Military Thought from Machiavelli to Hitler, 1948.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-V

Course code		C. ESSENTIALS OF PUBLIC ADMINISTRATION				
INTERNAL ELECTIVE – I						
			Syllabus Version	2020-21		
Course Objectives:						
This paper introduces the discipline of Public Administration; its Methods and Scope. It introduces the Structure and Functions of the Union and State Administration, the Organization, Principles and Public Management through the Administrative Services						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the basics of Public Administration					K1
2	Understand about the Administration of Union Government.					K2
3	Identify the Administration of State Government.					K2
4	Acquire knowledge about the Organization and Principles in administration.					K3
5	To know about the Public Management					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
		Introduction				
(a) Meaning, Nature, Scope and Importance of Public Administration. (b) Evolution of Public Administration. (c) Public Administration and other Social Sciences. (d) Public Administration: Arts or Science.						
Unit:2						
		Union Administration				
(a)President. (b) Prime Minister's office. (c) Central Secretariat. (d) Organization of Ministers.						
Unit:3						
		State Administration				
(a) Governor. (b) Chief Minister's Office. (c) State Secretariat. (d) Organization of Ministers.						

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Unit:4	Organization - Principles	
(a) Hierarchy and Span of Control. (b) Unity of Command. (c) Centralization and De-centralization. (d) Coordination.		
Unit:5	Public Management	
(a) Principles of Management- Motivation, Communication, Decision-making and Leadership. (b) All India Services - Indian Administrative Service (IAS), Indian Police Service (IPS), Indian Foreign Service (IFS) and other Central Services. (c) State Administration- Collectors., Superintendent of Police, Tahsildars and BDOs. (d) Centre - State Relations.		
Reference		
1	Maheswari, S.R., Indian Administration, New Delhi:Orient Longmans,2005	
2	Baghwan, Vishnoo and VidyaBhushan, Indian Administration, New Delhi: S.Chand and Co, 2005.	
3	Arora and RajniGoyal, Indian Public Administration, New Delhi:Wishwa Prakashan,2006.	
4	Avasthi and S.R.Maheshwari, Principles of Public Administration, New Delhi:LakshmiNarain Agarwal,1990	
5	Tyagi, A.R., Principles of Public Administration, New Delhi:Atma Ram,1990	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-V

Course code		CONFLICT AND MEDIA				
Skill						
			Syllabus Version	2020-21		
Course Objectives:						
This paper aims at teaching the students the nuances in presenting a News story. The usage of words in writing a story to make an impact on the reader is taught to the students in this paper.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Apply the functions of News writing			K1,2 &3		
2	Remember the types of writing			K1,2,&3		
3	Understand the Data and importance of sources			K3,4&5		
4	Acquire knowledge on Editing			K3		
5	Apply the basic functions of News story			K3,4&5		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
a) Conflict and Media: Concept, Meaning and Definition. b) Role of Media in International Conflict.						
Unit:2						
a) Media Types: - Print, Audio, Video and Internet. b) Political, Sports, Financial and Entertainment. c) Civic Affairs.						
Unit:3						
a) Information Age and Changing Dimensions of Conflict. b) Increasing Impact of Media on Society and States.						

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Unit:4		
a) National Security and Role of Media. b) Role of Media in Conflicts: Indian Perspective.		
Unit:5		
a) Terrorism and Media. b) Media Ethics and Laws Regarding Conflict.		
Reference		
1	Allen Tim and Seaton Jean, eds., (1999) The Media of Conflict: War Reporting and Representations of Ethnic Violence, University of Chicago Press.	
2	Andrew Hoskins, Ben O'Loughlin (2010) War and Media: The Emergence of Diffused war, John Wiley andons	
3	Carruthers Susan, (2000) The Media at War: Communication and Conflict in the Twentieth Century, St.Martin's Press, New York	
4	DayaKishanThussu, Des Freedman, (2003) War and the Media: Reporting Conflict 24/7, Sage Publications, California	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-VI

Course code		NATIONAL SECURITY OF INDIA				
Core XIII						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
To make the students realize the value of strategic thought in policy formation.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Explain various strategic theories					K1
2	Describe basic concepts of War					K2
3	Understand concepts of Vauban and Schlieffien					K2
4	To know about Mahan’s theory of Sea power					K2
5	To acquire knowledge about Mao’s theory					K3
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1						
Unit:1		Concept of Security				
a) Meaning, Definition and Objectives. b) Elements of National Security. c) Kinds of National Security.						
Unit:2						
Unit:2		Threats to National Security				
a) Meaning and Definition. b) Threat Perception. c) Types of Threats and Threats to India.						
Unit:3						
Unit:3		India’s Strategic Relations with its Neighbors				
a) Pakistan. b) China. c) South Asian Neighborhood.						

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Unit:4	India's Strategic Relations with External Powers	
a) United States of America. b) Russia. c) European Powers.		
Unit:5	India's Interest in Asia	
a) India and West Asia b) India and ASEAN c) India and Indian Ocean.		
Book(s) for study		
1	Barry, Buzan, People, State and Fear: The National Security Problems in International Relations, Sussex; Wheatsheaf Books, 1983	
2	Bajpai, U.S., (ed) India's Security: The Politico-Strategic Environment, New Delhi: Lancers Books, 1983	
3	Dixit, J.N., Accross Borders: Fifty Years of India's Foreign Policy, New Delhi: Picus Books, 1998.	
4	Satish Kumar, (ed), Yearbook on India's Foreign Policy, New Delhi: Deep and Deep, 1993.	
5	Jayaramu, P.S., India's National Security and Foreign Policy, New Delhi: ABC Publishers, 1978	
6	Kaul, T.N., India and the New World Order, Vol. 1, New Delhi: Gyan, 2000	
7	Kux, Dennis, Estranged Democracies: India and the United States 1941 - 1991, New Delhi: Sage Publications, 1994.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER VI

Course code		INTRODUCTION TO INTERNATIONAL LAW				
Core-XIV						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to:						
To create interests in students to pursue their efforts in international Law.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about holding company accounts.			K1&K2		
2	Acquire knowledge about goodwill.			K2&K3		
3	Prepare Liquidator's final statement of receipts and payments			K3		
4	Prepare Final accounts of Banking companies.			K3		
5	Prepare Final accounts of Insurance companies			K3		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		INTRODUCTION				
a) Definition, basis of international Law, History and development law b) Nature, source and Confliction c) Relationship between international and Municipal laws						
Unit:2		LAWS OF WAR-I				
a) Peaceful means of Settlement of International Disputes. b) Cohesive means of Settlement of International Disputes. c) War – Its Legal Character and Effects.						
Unit:3		LAWS OF WAR-II				
a) Laws of Land Warfare. b) Laws of Maritime Warfare. c) Laws of Aerial Warfare.						

B.A., Defence and Strategic Studies – Syllabus (CBCS)

Unit:4	LAWS OF NEUTRALITY	
a) The laws of Neutrality b) Right of Angary c) Contraband and Doctrine of Continuous Voyage		
Unit:5	LEGAL MECHANISM	
a) Concept, Establishments and Kinds of Blockade, Penalties for breach of Blockade. b) Role and Importance of Prize Courts. c) Role and Functions of International Court of Justice.		
Reference		
1	Tandon, M.P, and Rajesh Tandon, an Introduction to International Law, Allahabad: Allahabad Law Agency, 1987.	
2	Kapoor, S.K., International Law, Allahabad; Allahabad Law Agency, 1989.	
3	Chavan, R.S., An Approach to International Law, New Delhi: Sterling, 1971	
4	Starke, J., An Introduction to International Law. Oppenheim, International Law	
5	Stake. J. - An Introduction to International law.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-VI

Course code		ARMS CONTROL AND DISARMAMENT				
Core-XV						
			Syllabus Version	2020-21		
Course Objectives:						
The main objectives of this course are to: To make students realize the importance of National Security.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	Understand basic concepts of National Security			K1		
2	Describe Threat perception			K2&K3		
3	To understand the Strategic relations with neighbors			K2&K3		
4	To understand relations with SAARC nations			K3		
5	Discuss Strategic relations with Super[powers			K3		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1		Introduction				
a) Definition of Arms Control, Arms Limitations, Arms Reduction and Arms Trade. b) Differences between Arms Control, Arms Limitations, Arms Reduction and Disarmament. c) Nature and Scope of Arms Control and Disarmament.						
Unit:2		From Treaty of Westphalia to World War - II				
a) Efforts towards Disarmament from Treaty of Westphalia 1648 to the outbreak of World War I. b) Efforts towards Disarmament from World War I to the outbreak of World War II. c) Efforts towards the formation of the UNO.						
Unit:3		UN and Disarmament				
a) United Nations' Perception on Disarmament and Arms Control. b) Major efforts of the United Nations. c) Limitations of the United Nations.						

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Unit:4	Major Treaties on Disarmament	
a) Partial Test Ban Treaty, Nuclear Non-Proliferation Treaty. b) Strategic Arms Limitation Treaty (SALT-I and SALT-II). c) Intermediate – Range Nuclear Forces Treaty, Strategic Arms Reduction Treaty (START) and Outer space.		
Unit:5	Role and contributions of India towards Disarmament and Arms control	
a) Non Aligned Movement. b) Nuclear Weapon Free Zones (NWFZ) and Zone of Peace. c) Nehru, Indira Gandhi and A.B.Vajpayee.		
Reference		
1	Chaudri J. N. India's Problems of National Security	
2	Subramaniam. K. India's Security perspectives	
3	Kavic L.O -- India's Quest for security	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-VI

Course code		A. SPECIALIZED WARFARE				
Internal Elective Paper 2						
			Syllabus Version	2020-21		
Course Objectives:						
After completing the paper the students will understand the types of war prevalent in the world.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the concept of Psychological Warfare.					K1
2	Understand about the concept of Biological and Chemical Warfare.					K2
3	Identify the concept of Guerilla Warfare					K2
4	Acquire knowledge about the concept of Nuclear Warfare					K3
5	To know about the concept of Terrorism					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Psychological Warfare					
a) Definition and Nature of Psychological Warfare. b) Types of Propaganda. c) Brain washing and its Effects. d) Rumor: Nature and Techniques.						
Unit:2	Biological and Chemical Warfare					
a) Concept and Objectives. b) Characteristics. c) Types of Agents and Methods of use. d) Recent Trends.						
Unit:3	Guerilla Warfare					
a) Concept and Objectives. b) Characteristics of Guerilla Warfare. c) Elementary knowledge of Insurgency and Counter Insurgency						

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Unit:4	Nuclear Warfare	
a) Concept and Origin of Nuclear Warfare. b) Effects of Nuclear Flash, Thermal Radiation and Nuclear Radiation. c) Elementary knowledge of Missiles, ICBMs, and MIRVs.		
Unit:5	Terrorism	
a) Definition and Causes b) Naxalism in India. c) Types and Techniques of Terrorism.		
Reference		
1	Philip M. Taylor, Munitions of the Mind: War Propaganda from the Ancient World to the Nuclear Age, (Wellingborough, 1990)	
2	Qualter, T.H., Propaganda and Psychological Warfare, (New York, 1962)	
3	SIPRI, The Problem of Chemical and Biological Warfare (4 Vols, New York, 1971)	
4	Brown, F.J., Chemical Warfare : a Study in Restraint, (Princeton,1968)	
5	Walter Laqueur, Guerilla, (London,1977)	
6	Fairbairn, G., Revolutionary Guerilla Warfare (Harmondsworth,1974)	
7	Asprey, R.B., War in the Shadows (London,1975)	
8	Lawrence Freeman, The Evolution of Nuclear Strategy (London,1981) Herbert Feis, The Atomic Bomb and the End of War	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-VI

Course code		B. WARFARE AND TECHNOLOGY				
Internal Elective Paper 2						
			Syllabus Version	2020-21		
Course Objectives:						
After completing the paper the students will understand the types of technology used in warfare						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the basics of Evolution of Warfare and technology.					K1
2	Understand about the scope of Science and technology.					K2
3	Identify The Weapons Technology in Warfare					K2
4	Acquire knowledge about The Emerging Technologies in Warfare					K3
5	To know about The Weapons Technology in India					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Introduction					
(a) Historical Evolution of Warfare. (b) Evolution of Science and Technology. (c) Synergy of warfare and science and technology.						
Unit:2	Science and technology and its Scope					
(a) Science and Technology: Military and Non-military Applications and Dual usage. (b) Industrial Revolution and New Technologies- Internal Combustion Engine (Steam engine), Radio, Electricity and Radar. (c) Emerging Technologies- Nuclear science, Oceanography, Space Technology and Electronics.						
Unit:3	Weapons Technology and Warfare					

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(a) Weapons of Land Warfare: Types of Arms and Armaments and Artillery. (b) Naval Weapons: Types of Ships, Aircraft Carrier, Submarines and Torpedoes. (c) Aerial War Weapons: Types of Aircrafts, Missiles, Satellites and Radars.		
Unit:4	Emerging Technologies and Warfare	
(a) Information Technology and Communication Warfare. (b) Robotics and Cyber War. (c) Revolution in Military Affairs (RMA).		
Unit:5	Weapons Technology and India	
(a) Pioneering Institutions and its Contributions. (b) Science and Technology Policy of India. (c) Defence and Research Development Organisation (DRDO): Its role in Weapons Development.		
Reference		
1	AjeyLele, Strategic Technology for the Military, New Delhi: Sage, 2009.	
2	Gopalakrishnan, K.V., Impact of Science and Technology on Warfare, New Delhi: National Book Trust, 2003.	
3	Buzan,Barry., An Introduction to Strategic Studies: Military Technology and International Relations, New York: St.Martin Press,1987.	
4	Kelin, John. Space Warfare: Strategy, Principles and Policy' London: Routledge, 2006.	
5	Nair, K.K., Space the Frontier of Modern Defence, New Delhi: Knowledge World, 2006.	
6	Pruthi, R.K. (ed). Robotic Warfare, Delhi: Prashant Publishing House, 2009.	
7	Rappert, Brain (ed), Technology and Security: Governing Threats in the New Millennium, New York: Hamshire, Palgrave Macmillan, 2007.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5

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CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-VI

Course code		C. ELEMENTARY STUDY OF THE CONSTITUTION OF INDIA				
Internal Elective Paper 2						
			Syllabus Version	2020-21		
Course Objectives:						
This paper introduces the student to the Constitution of India and its salient features including the Fundamental Rights and Directive Principles of State Policy. It also focuses on the role and functioning of the Executive, Legislature and the Judicial organs of the Indian Government.						
Expected Course Outcomes:						
On the successful completion of the course, student will be able to:						
1	To learn about the basics of Constitution of India					K1
2	Understand about the. Executives of Union government					K2
3	Identify The. Parliament of India					K2
4	Acquire knowledge about The. State Administration					K3
5	To know about The. Constitutional Bodies in India					K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create						
Unit:1	Introduction					
(a) Meaning and Scope of Constitution. (b) Types of Constitutions: Written and Unwritten, Flexible and Rigid, and Unitary and Federal. (c) Salient Features of the Constitution of India. (d) Fundamental Rights and Directive Principles of State Policy.						
Unit:2	The Union Executive					
(a) The President of India: Qualifications and Election procedure.						

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(b) The role of the President. (c) The Vice-President of India: Qualifications and Election procedure. (d) The role of the Prime Minister		
Unit:3	The Parliament of India	
(a) Lok Sabha: Its Composition and Function. (b) Rajya Sabha: Its Composition and Function. (c) Basic Legislative procedures. (d) Budget-procedures and Scope.		
Unit:4	The State Administration	
(a) The Governor: Role and Powers of Governor. (b) The Role and Functions of the Chief Minister. (c) The State Legislature: Its Role and Functions		
Unit:5	The Constitutional Bodies in India	
(a) The Role and Functions of the Supreme Court of India. (b) The Role and Functions of the Election Commission. (c) The Role and Functions of the Comptroller and Auditor General (CAG). (d) The Role and Functions of the Union Public Service Commission (UPSC).		
Reference		
1	Basu, D.D., Introduction to the Constitution of India, 20th edn. Nagpur: LexisNexis, 2008.	
2	Basu, D.D., Shorter Constitution of India, 14th edn, Nagpur: LexisNexis, 2008.	
3	Arvind P Datar, Constitution of India, 3 Vols, Nagpur: LexisNexis, 2007.	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5

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CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-VI

Course code		A. DEFENCE MANAGEMENT	
Internal Elective Paper 3			
		Syllabus Version	2020-21
Course Objectives:			
To introduce the student to the concept of Defence Management, structure, Power and analysis			
Expected Course Outcomes:			
On the successful completion of the course, student will be able to:			
1	To learn about the basics of Defence Management.		K1
2	Understand about the structure of Defence organization.		K2
3	Identify the recruitments, trainings of personnel.		K2
4	Acquire knowledge about the valuation of Defence management.		K3
5	To know about the qualities of Defence management.		K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			
Unit:1			
Definition, Scope and Principles of Management and Decision Making Process and HDO of India			
Unit:2			
Defence organization – nature and structure [Line and staff, Pyramid hierarchy in Army Navy and Air Force].			
Unit:3			
Personnel Management – Staffing [Recruitment and Training]			
Unit:4			
System Analysis – Qualitative Management and Evaluation of Defence Forces			
Unit:5			
Cost Effectiveness – Force Level, Production and procurements of weapons systems and R and D			
Reference			
1	Knoontz and O'Donnel, Principles of Management, (Printice, 1976)		
2	Osgood, Robert, Principles of Management, New Delhi: Printice-Hall, 1978.		
3	Davar,R.S., Management, Delhi: Cosmos, 1975.		
	Keatz, James Euerett., Arms Production in the Developing Countries,		

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Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

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SEMESTER-VI

Course code		B. HUMAN RIGHTS		
Internal Elective Paper 3				
			Syllabus Version	2020-21
Course Objectives:				
To introduce the student to the rights of humans in various aspects.				
Expected Course Outcomes:				
On the successful completion of the course, student will be able to:				
1	To learn about the evolution and concept of human rights.			K1
2	Understand about the Approaches and Perspectives in human right.			K2
3	Identify the human rights by UN.			K2
4	Acquire knowledge about the human rights in Indian Perspective.			K3
5	To know about the Issues and Challenges in human rights.			K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create				
Unit:1				
		Definition and evolution of the concept		
(a) Meaning, Nature and Development.				
(b) Three Generation Rights.				
(c) Contributions: Hobbes, Locke, Rousseau and Rawls.				
Unit:2				
		Approaches & Perspectives		
(a) Universalistic and Relativist approaches.				
(b) Feminist & Marxist approach.				
(c) Third World Perspective- Gandhian view				
Unit:3				
		United Nations & Human Rights		
(a) U N Charter and the Universal Declaration of Human Rights.				
(b) International Conventions and Covenants.				
(c) Other Protocols				
Unit:4				
		Indian Perspective		
(a) Human Rights in Indian tradition- Civil, Political, Economic, Cultural Rights & Women's Rights.				
(b) Constitutional & Legal framework in India- Human Rights Commission & Special				

B.A., Defence and Strategic Studies – Syllabus (CBCS)

Commission for weaker section. (c) Human Rights Education: UNESCO & Montreal Protocol.		
Unit:5	Issues and Challenges	
(a) Human Rights and challenges - ethnic conflict, social & political violence, global terrorism, environmental sources. (b) Rights of Refugees. (c) Internally Displaced people.		
Reference		
1	Bajwa, G.S., Human Rights in India: Implementations and Violations, New Delhi: Sterling, 1995.	
2	Mehta, P.L., Verma, N., Human Rights Under the Indian Constitution, New Delhi : Deep & Deep, 1999.	
3	Donnelly, Jack. The Concept of Human Rights, New York: St. Martin, 1985.	
4	Gibson, John, S., Dictionary of International Human Rights Law, Lanham, MD:	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-VI

Course code		C. TERRORISM	
Internal Elective Paper 3			
		Syllabus Version	2020-21
Course Objectives:			
This paper introduces the concept of Terrorism and its manifestations in historical perspective. Motivated organized violence targeting the population and the government threatening the existing social and political order has become very prevalent in today's world. Basic understanding of terrorism is essential to appreciate the events in right perspective.			
Expected Course Outcomes:			
On the successful completion of the course, student will be able to:			
1	To learn about the basics of terrorism.		K1
2	Understand about the perspective s of Terrorism.		K2
3	Identify the Terrorism in India.		K2
4	Acquire knowledge about the International Terrorism issues.		K3
5	To know about the Terrorism in International Relations.		K4
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create			
Unit:1	Introduction		
(a) Definition and meaning of Terrorism. (b) History of Terrorism. (c) Nature and Tactics of Terrorism			
Unit:2	Terrorism in perspective		
(a) Causes of Terrorism. (b) Types of Terrorism. (c) Levels of Terrorism.			
Unit:3	Terrorism and India		
(a) Kashmir- Cross-border terrorism - Lashkar-e-Toiba; Taliban, (b) Extremism in North-East India. (c) Naxalites in India. (d) Parliament & Mumbai Taj hotel attack.			

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Unit:4	International Terrorism	
(a) Palestinian Issue. (b) Irish Issue. (c) Sri Lanka- LTTE Issue. (d) September 11 attack in the USA.-Al Qaeda		
Unit:5	Terrorism in International Relations	
(a) War against Terrorism- responses of Major Powers. (b) Terrorism and United Nations Organization. (c) Terrorism and other International Organizations.		
Reference		
1	Yonah Alexander, David Carton and Paul Wilkinson, Terrorism: Theory and Practice, Colorado: West View Press, 1979.	
2	Walter Laqueur, Terrorism, Boston: Little Brown and Co., 1977.	
3	B.P.Singh, Sehgal, Global Terrorism: Socio-Political and Legal Dimensions, New Delhi: Deep & Deep Publications, 1996.	
4	Virender Grover, (ed), Encyclopedia of International Terrorism: Terrorism, History and Development, Vol.1, New Delhi: Deep & Deep Publications, 2002.	
5	Virender Grover, (ed), Encyclopedia of International Terrorism: Terrorism in World Countries, Vol.2, New Delhi: Deep & Deep Publications, 2002	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

B.A., Defence and Strategic Studies – Syllabus (CBCS)

SEMESTER-VI

Course code		BASICS OF DEFENCE JOURNALISM		
Skill based Subject-4				
			Syllabus Version	2020-21
Course Objectives:				
The main objectives of this course are to:				
To prepare the students in handling a specialized field of journalism Viz defence journalism				
Expected Course Outcomes:				
On the successful completion of the course, student will be able to:				
1	Create mail merge, documents, templates and text formatting			K1,K2&K6
2	Prepare worksheets and drawing graphs			K1,K2&K6
3	Organize data and manipulate files			K1,K2&K6
4	Create new slides and insert clip arts and pictures.			K1,K2&K6
5	Learn to create Defence news			K1,K2&K6
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create				
Unit:1	INTRODUCTION			
Journalism: Meaning and Importance. c) Defence Writing – Need for specialist. d) Defence Journalism – A Profession.				
Unit:2	Defence Journalism			
Meaning and Definition of Journalism and Defence Journalism. b) Kinds and Sources of Defence News. c) Defence Writing Procedure.				
Unit:3	DEFENCE REPORTING			
(a) Format language and grammar (b) Forms - Eye witness, computer assigned features (c) Concept of Graphics and Animation (Role of Modern Technology)				
Unit:4	DEFENCE TERMINOLOGY			

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a) Defence Terms and Abbreviations. b) Role and Importance of News organization: Press Trust of India (PTI), Press Council of India (PCI).		
Unit:5	PROBLEMS IN DEFENCE WRITING	
(a) Media Ethics (b) Media Laws (c) Problems in Defence Writing - Political Pressure Official Secrecy - etc., (d) Introducing existing defence journals Sainik, Samachar, Trishul, Strategic Digest Strategic Analysis etc.,		
Reference		
1	Waren, KAgrie., (ed). The Press and the Public Interest, Washington, D.C.: Public Affairs Press, 1968	
2	Bhatt, S.C., Practical Journalism, Jaipur: Aavishkar, 2005.	
3	Dhara, R., Journalism, Calcutta: Industry Publishers, 1945.	
4	Chatterjee, R.K., Mass Communication, New Delhi: National Book Trust, 1973	
5	Bhatt, S.C., Practical Journalism (Jaipur: Aavishkar publishers, 2005	

Mapping with Programme Outcomes					
COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	M	S	M	M
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

*S-Strong; M-Medium; L-Low

THIRUVALLUVAR UNIVERSITY

M.A. ECONOMICS

SYLLABUS

UNDER CBCS

(With effect from 2022-2023)

The Course of Study and the Scheme of Examinations

S. No	Study Components		ins. hrs / week	Credit	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
SEMESTER I								
1.	Core	Paper 1	6	4	Microeconomics – I	25	75	100
2.	Core	Paper 2	6	4	Macroeconomics – I	25	75	100
3.	Core	Paper 3	6	4	Statistics for Economics – I	25	75	100
4.	Core	Paper 4	6	4	Indian Economic Development	25	75	100
Internal Elective for same major students (Choose any one)								
5.	Core Elective	Paper-1	3	3	A. Agricultural Economics B. Labour Economics C. Monetary Economics	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								
6.	Open Elective	Paper-1	3	3	(To choose one out of 3) A. Basic Economics B. Recent Issues in Indian Economy - I C. An Introduction to Environmental Economics	25	75	100
			30	22		150	450	600
SEMESTER II								
7.	Core	Paper 5	6	4	Microeconomics – II	25	75	100
8.	Core	Paper 6	6	4	Macroeconomics – II	25	75	100
9.	Core	Paper 7	6	4	Statistics for Economics – II	25	75	100
Internal Elective for same major students (Choose any one)								
10.	Core Elective	Paper-2	5	3	A. Economics of Social Issues B. Statistical Software C. Mathematical Economics	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								

11.	Open Elective	Paper-2	5	3	(To choose one out of 3) A. Marketing Management B. Recent Issues in Indian Economy - II C. Agricultural Economy of India	25	75	100
12.	Field Study		-	2		100	-	100
13.	Compulsory Paper		2	2	Human Rights	25	75	100
			30	22		250	450	700

SEMESTER III						<i>CIA</i>	<i>Uni. Exam</i>	<i>Total</i>
14.	Core	Paper 8	5	4	Public Finance I	25	75	100
15.	Core	Paper 9	5	4	International Economics	25	75	100
16.	Core	Paper 10	5	4	Economics of Growth and Development	25	75	100
17.	Core	Paper 11	5	4	Research Methodology	25	75	100
Internal Elective for same major students (Choose any one)								
18.	Core Elective	Paper-3	5	3	(to choose one out of 3) A. Industrial Economics B. Econometrics C. Health Economics	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
19.	Open Elective	Paper-3	5	3	(to choose one out of 3) A. Tamilnadu Economics B. Labour Economics C. Urban Economics	25	75	100
20.	MOOC Courses		-	2	1. Environmental Economics 2. Contemporary Economics 3. Managerial Economics 4. Operations Research 5. Communication Skill 6. Economics of Tourism 7. Business Planning and Management 8. Financial Management 9. Marketing Management 10. Engineering Econometrics	-	-	100
			30	24		150	450	700
SEMESTER IV						<i>CI A</i>	<i>Uni. Exam</i>	<i>Total</i>
21.	Core	Paper 12	6	5	Public Finance II	25	75	100
22.	Core	Paper 13	6	4	Managerial Economics	25	75	100
23.	Core	Paper 14	5	4	History of Economic Thought	25	75	100
24.	Core	Project	5		Project with <i>viva voce</i>	100		100

		Compulsory		5		(75 Project +25 viva)		
Internal Elective for same major students (Choose any one)								
25.	Core Elective	Paper-4	4	3	A. Human Resource Development B. Financial Economics C. Environmental Economics	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
26.	Open Elective	Paper-4	4	3	(to choose one out of 3) A. Economics of insurance B. Rural Economic development C. Women And Economy	25	75	100
			30	24		125	375	600
			120	92				2600

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I PAPER TYPE: CORE

PAPER -1 MICRO ECONOMICS-I

Course Objectives

1. To teach the students the basic theoretical foundation of microeconomic.
2. The concepts, theories and diagrammatical representations use the most important theoretical tools that aid the student to understand the subject.
3. To teach students to analyze how individual decision makers both consumers and producers behave in a variety of economic environments.
4. The subject helps the students to focus on the different types of market structure.
5. The subject develops skills of application of microeconomic principles to take decision in real life situations, to generate a better economic life for themselves and their neighbors.

Course Outcomes

1. After studied unit-1, the student will be able to understand the basic theoretical foundation of microeconomics.
2. After studied unit-2, the student will be able to analyse consumer behavior based especially on market purchases.
3. After studied unit-3, the student will be able to analyse consumer equilibrium through the techniques of indifference curve and budget line.
4. After studied unit-4, the student will be able to compare the cost for the purchase of disclosing and reporting on condition subject to improvement.
5. After studied unit-5, the student will be able to learn the nature of different market structure based on the characteristics of market.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1: Theory of Consumer behavior and Demand

Utility and Preference Ordering - Demand and Supply Equilibrium - Price, Income and Cross Elasticity of Demand - Derivation of Demand curves - Hicks and Marshall- Revealed Preference Theory – Consumer surplus – Indifference curves Analysis.

Unit-2: Hicksian Analysis

Income and Substitution Effects - Slutsky Theorem - Revision of Demand theory by Hicks – Cobweb Theorem.

Unit-3: Laws of Production and Costs

Production Functions - Least cost combination and Producers Equilibrium – Law of variable proportions Cobb – Douglas and CES Production Function - Law of Returns and Returns to Scale - Cost- Output relationship - Short – run and long – run – optimum cost - Modern theory of Costs.

Unit-4: Market Structure I

Perfect competition – Short run and long run equilibrium of the firm and industry – Price and output determination – Optimum firm. - Monopoly – Short run and long run equilibrium - Price discrimination, monopoly control, and regulation – Contestable Market. - Monopolistic competition–Chamberlin Model- Selling costs - Excess capacity.

Unit-5: Market Structure II

Oligopoly – Non-collusive Models – Cournot- Bertrand – Chamberlin – Edgeworth – Sweezy - Stackelberg - Oligopoly - Collusive Models - Cartels and mergers - Price leadership - Base point price system - Monopsony – Price and output determination – Workable competition.

Text Books

Unit- 1: Koutosoyiannis.A. (1979), Modern Microeconomics, Macmillan Press - London.

Unit- 2: N. Gregory Mankiw. (2012), Principles of Microeconomics, 7th Edition, Cengage Learning, US.

Unit- 3: Daniel Rubinfeld, Robert Pindyck(2014), Microeconomics, 8th Edition, Pearson Publications.

Unit- 4: H.L.Ahuja, Principles of Microeconomics, (2016), 22nd Edition, S.Chand, New Delhi.

Unit-5: Domonic Salvatore, Principles of Microeconomics, 5th Edition, (2007), Oxford Press, London.

Referencebooks

- Akerlof, G. A. (1970). The market for “lemons”: Quality, uncertainty, and the market mechanism. *Quarterly Journal of Economics* 84(3), 488–500.
- Arrow, K. J. (1962). The economic implications of learning by doing. *Review of Economic Studies* 29(3), 155–173.
- Baumol, W. J., Panzar, J. C., & Willig, R. J. (1982). *Contestable markets and the theory of industry structure*. San Diego, CA: Harcourt Brace Jovanovich.
- Baye, M. R. (2010). *Microeconomics and business strategy*. New York, NY: McGraw-Hill Irwin.
- Boston Consulting Group. (1970). *The product portfolio*. Retrieved December 13, 2010, from <http://www.bcg.com/documents/file13255.pdf>.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

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SEMESTER – I PAPER TYPE: CORE

PAPER -2 MACRO ECONOMICS-I

Course Objectives:

1. To get awareness on National Income Accounts
2. To study the Theory of Employment
3. To know about Consumption Function
4. To know about Investment function and
5. To specify the General Equilibrium models.

Course Outcomes:

1. After studied Unit-1, the student will be able to get awareness on National Income components.
2. After studied Unit-2, the student will be able to know about the classical theory of Employment and Unemployment.
3. After studied Unit-3, the student will be able to know about the theories of Consumption Function.
4. After studied Unit-4, the student will be able to know about the Investment function and its empirical evidences.
5. After studied Unit-5, the student will be able to understand the General Equilibrium models.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

UNIT-I: National Income Accounts

National Income Perspective – GNP – NNP Components - Circular flow of income in Closed and Open Economy - Stock-flow relationship - Concepts of Social Accounting - Input-Output Accounting and Balance of Payments Accounting - Economic Welfare and National Income – The Consumer Price Index and Producer Price Index.

UNIT-II: Theory of Employment

Classical, Say's Law of Market - Full Employment Equilibrium – Saving Investment Equality - Pigou - Keynesian Underemployment Equilibrium – Vertical Aggregate Supply Curve – Real balance cycles.

UNIT-III: Consumption Function

Short-run and Long-run Consumption Function - Developments in Consumption Functions (Absolute Income, Relative Income, Permanent Income and Life Cycle Hypothesis) Early Empirical Evidence on the Keynesian Consumption functions other factors affecting consumption - Empirical Studies and Policy implications of Consumption Theory.

UNIT-IV: Investment Function

Types - Marginal Efficiency of Capital and the Rate of Interest - Factors influencing – Multiplier – Accelerator – Interaction – Super Multiplier - Influence of Policy measures on Investment - Empirical Evidence – The Desired stock of capital – Inventory Investment.

UNIT-V: General Equilibrium

Keynesian IS–LM model with Government Sector - Extension to Open Economy - IS–LM models with labour market and flexible prices – Dynamic Shifting of Aggregate demand and supply functions – Effective demand – Integration of real and monetary sectors through IS and LM function -Interaction of Monetary and Fiscal Policy in General Equilibrium.

Text Books:

Unit 1: Mankiw N. Gregory, (2010), Macroeconomics, Worth Publishers, New York.

Unit 2: Roger E.A. Farmer, (2002), Macroeconomics, (2002, Second Edition) Thomson Asia Pvt. Ltd.

Unit 3: Ackley G. (1978), Macroeconomics: Theory and Policy Macmillan, New York.

Unit 4: Shapiro G. (1996), Macro Economic Analysis, Galgotia Publication, New Delhi.

Unit 5: Jhingan M.L. (2000), Macro Economic Theory, Vrinda Publication Ltd, Delhi.

References

1. Dornbusch, Rudiger, Stanley Fischer, and Richard Startz (2000). Macroeconomics, Tata McGraw-Hill Publishing Company, New Delhi.
2. Roger E.A. Farmer (2002), Macro Economics, Thompson Asia Pvt. Ltd., Singapore
3. R T Froyen (2008), Macroeconomics, Theory and policies, Prentice Hall.
4. Errol D'Souza (2012), Macroeconomics, Pearson Publications, New Delhi.
5. Mihir Rakshit (2007) Money and Finance in the Indian Economy, OUP, New Delhi, India

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

6.

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I PAPER TYPE: CORE

PAPER –3 STATISTICS FOR ECONOMICS I

Course Objectives:

1. To make students understand the concept of measurements of statistics.
2. To make student to gain knowledge with numerical and quantitative issues in business.
3. To enable the students to use statistical sampling methods.
4. To have a proper understanding of statistical applications.
5. To give practical knowledge of using basic statistical data.

Course outcomes

1. After studying Unit-1, the student will be able to understand the basic Statistics.
2. After studying Unit-2, the student will be able to gain knowledge on collection of data and statistical survey.
3. After studying Unit-3, the student will be able to understand the Sampling methods
4. After studying Unit-4, the student will be able to understand the Descriptive Statistics.
5. After studying Unit-5, the student will be able to gain knowledge on correlation and regression analysis.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit – I: Introduction

Definition of Statistics – Importance of Statistics - Origin and Growth of Statistics – Types of Statistics (Descriptive and Inferential Statistics) – Applications of Statistics – Statistics and Economics – Importance of Statistics for Economics – Statistics and Computers.

Unit – II: Methods of Data Collection

Data Definition – Types of Data - Quantitative Data, Qualitative Data – Primary Data - Secondary - Method of Data Collection – Presentations of Data (Tables and Different types of Graphs and charts - Frequency Distribution and Cumulative Tables and Graphs) – Planning the survey – Scope of the Survey - Specification of the Purpose Survey – Executing the Survey

Unit – III: Sampling Methods

Definition Population, Sample, Sampling – Sampling Techniques – Probability Sampling – Types of Probability Sampling - Methods of Probability Sampling – Advantages and Limitations of Probability Sampling – Non-Probability Sampling – Types of Non-Probability Sampling - Methods of Non-Probability Sampling – Advantages and Limitations of Non-Probability Sampling – Size of Sampling - Theoretical Basis of Sampling

Unit – IV: Descriptive Statistics

Descriptive Statistics – Measures of Central Tendency – Mean – Median – Mode – Uses of various Measures of Average – Merits – Limitations - Spread of a Distribution - Measures of Dispersion- Range - Variance - Quartile - Mean Deviation - Standard Deviation –Coefficient of Variation - Merits – Limitations – Skewness – Moments – Kurtosis

Unit –V: Correlation and Regression Analysis

Scatter Diagram – Correlation Definition – Significance of Correlation – Causation – Types of Correlation – Methods of Correlation – Uses of Correlation – Regression Definition – Uses of Regression Analysis – Regression Equation – Difference between Correlation and Regression analysis – Limitations of Regression Analysis – List of Formulae

Text Books

1. **Unit-1:** S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi and Spiegel, M.R. (1992), Theory and Problem of Statistics, McGraw Hill Book Co., London.
2. **Unit-2:** S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi.
3. **Unit-3:** S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi and Prof. A.L. Nagar and R.K. Das. 'Basic Statistics', Oxford University Press, New Delhi.
4. **Unit-4:** S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi and Seymour Lipschutz and John J, Schiller (1999), Introduction to Probability and Statistics, Schaum's Outlines, McGraw – Hill International Editions.
5. **Unit-5:** S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi and Miller, I. and Miller, Marylees. John E. Freund's Mathematical Statistics with Application, 7th ed., New Jersey: Prentice Hall, 2010.

References

1. Aggarwal. Y.P (2002), Statistics Methods – Concepts Application and Computation, Sterling Publishers Private Ltd., New Delhi.

2. Speigal, M.R. (1992), Theory and Problems of Statistics, McGraw Hill Book Co., London.

3. Wonnacott H. Thomas & Wonnacott J. Ronald (1969), Introductory Statistics, John Wiley & Sons, Inc. New York.

4. V.K. Kapoor operations research sultan chand & sons new Delhi

5. Dr. V.K. Kapoor problems and solutions in operations research sultan chand & sons new Delhi

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I PAPER TYPE: CORE

PAPER – 4 INDIAN ECONOMIC DEVELOPMENT

Course Objectives

1. To enable the students to know the Economic Development of India
2. To provide an understanding of the various phases of growth of Indian economy.
3. To familiarize with various plan and initiations towards development of the economy.
4. To introduce macro level trends, status, issues and policies of the various sector of Indian economy.
5. To achieve the goal of economic development.

Course Outcomes

1. After studied unit-1, the student will be able to understand the workforce participation in different sectors.
2. After studied unit-2, the student will be able to understand the importance of agriculture in economic development.
3. After studied unit-3, the student will be able to analyze the achievements of all the five year plans and present NITI Aayog's functions.
4. After studied unit-4, the student will be able to understand the economic infrastructure and its role in economic development.
5. After studied unit-5, the student will be able to gain knowledge on new economic policy and its implications in India.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit 1: Growth and Structural Change

Indian economy at Independence - The policy framework: statist policy, transition to market-oriented policy - role of erstwhile Planning Commission and NITI AyogTwo phases of growth (1950-1980 and 1980 onwards) -Factors Underlying Turnaround in growth - Structural Change in Indian economy

Unit 2: Agricultural and Industrial Sectors

Performance of agricultural sector, factors determining agricultural growth - Factors underlying food inflation - Agricultural price policy and food security - Industrial Growth - Industrial growth before and after reforms - Dualism in Indian manufacturing - Issues in performance of public sector enterprises and privatization.

Unit 3: Fiscal Developments, Finance and External Sector

Expenditure trends - GST: rationale and impact - Evolution of the financial sector in post-liberalisation period - External sector performance - Emergence of India as Major Exporter in services - Performance of manufacturing sector

Unit 4: Poverty and Inequality

Measuring poverty in India: Selection of poverty lines - Poverty in pre and post liberalization periods - Impact of growth on poverty - PDS vs cash transfers, feasibility of universal basic income in India - Inequality in India in pre and post liberalization periods

Unit 5: Social Issues

Gender gap in India - Trends in Female Labour Force Participation Rates - Factors Determining Female Labour Force Participation - Employment: changing nature of employment in India, jobless growth" - Labour in informal sector - India's demographic transition.

Textbook

- Uma Kapila (Ed.) (2020), Indian Economy Since Independence , Academic Foundation, New Delhi, 30th Edition.
- Uma Kapila (Ed.) (2017), Indian Economy: Economic Development and Policy (2016-17), Academic Foundation, New Delhi.

References

- Kausik Basu (Ed.) (2012), Oxford Companion to Indian Economy, 3rd Edition, OUP, New Delhi
- Ashima Goyal (Ed.) The Oxford Handbook of the Indian Economy in the 21st Century: Understanding the Inherent Dynamism, Oxford University Press.
- Government of India, Economic Survey (Annual issues since 2015). Ministry of Finance, New Delhi

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I PAPER TYPE: CORE ELECTIVE

PAPER –1 (a) AGRICULTURAL ECONOMICS

CORE ELECTIVE (To choose 1 out of 3)

Course Objectives

1. To make the students to comprehend the core aspects of agricultural economics and its scope and importance.
2. To analyze the various theories on agricultural development and their using in research context.
3. To make awareness on agricultural produce and channels of marketing.
4. To elevate the students to grasp the different sources of agricultural finance and its operations.
5. To provide the students information on various agricultural polices pertaining to agricultural commodities.

Course Outcomes

6. 1. After studied unit-1, the student will be in a position to understand the overview of agricultural economics and basic knowledge of production function.
7. 2. After studied unit-2, the student acquires knowledge on knowing various models on agriculture and its development.
8. 3. After studied unit-3, the student will be able to understand the agricultural marketing and its operations.
9. 4. After studied unit-4, the student will be able to understand different sources of agricultural finance.
10. 5. After studied unit-5, the student will be able to understand the government pricing policies on agriculture and allied industries

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-I: Introduction

Scope and significance of agriculture- role of agriculture in India's development- inter-sectoral linkages - an overview.

Unit- II: Agriculture production and Development

Schultz's Transformation model – Jorgensen's model of development of dual economy - Fei and Ranis model of economic growth – Mellor's model of agricultural development – Boserup model of agricultural development-- production function: Cobb Douglas, Spillman and Cobweb theorem.

Unit –III: Agricultural Labour

Agricultural labour: types – supply of labour – problems - rural unemployment: types, consequences and remedial measures- minimum wages for agricultural workers - an evaluation- poverty eradication programmes – recent wage and self-employment programmes

Unit– IV: Agricultural Marketing Finance

Agricultural finance: meaning, nature, types, sources and problems of agricultural finance- co-operatives in rural finance- role of commercial banks and NABARD in rural finance- farm capital - meaning, types, and marginal efficiency of farm - capital and capital formation in agriculture.

Unit– V: Agricultural Price Policy

Objectives and need of agricultural price policy – stability and trends in agricultural prices – evaluation of agricultural price policy in India – agricultural exports - current issues in Indian agriculture.

Text Books

Unit-1 Lekhi R.K. and Joginder Singh, 2015, Agricultural Economics: An Indian Perspective, Kalyani Publishers, Ludhiana.

Unit-2 Sadhu An, Singh Amarjit and Singh Jasbir, 2014, Fundamentals of Agricultural Economics, Himalaya Publishing House, Delhi

Unit-3 Acharya SS & Agarwal NL 2004, Agricultural Marketing in India – Oxford & IBH.

Unit-4 Lekhi R.K. and Joginder Singh, 2015, Agricultural Economics: An Indian Perspective, Kalyani Publishers, Ludhiana.

Unit-5 Janardhana Rao. N, 2005, Indian Agriculture: Issues and Perspectives, ICFAI University Press, Hyderabad.

References

1. Mridula Mishra, 2010, Agriculture and Food Economics, Serials Publication, New Delhi.
2. Shovan Raj, 2009, Handbook of Agriculture, Oxford University Press, New Delhi.

3. Gangadhar Banerjee and Srijeet Banerjee, 2017, Economics of Sustainable Agriculture and alternative production systems, Ane Books Pvt. Led, Chennai.
4. John B. Penson, Oral Capps, Parr Rossan and Richard T. Woodward, 2019, Introduction to Agricultural Economics, Pearson Publication, New Delhi.
5. Nirmala Ravi Kumar K, 2016, Agricultural Production Economics, Astral International Pvt. Ltd, New Delhi.
6. David. L. Derbertin, 1986, Agricultural Production Economics, Macmillan Publishing Company, New York.
7. R.L. Cohen, 2001, The Economics of Agriculture, Mohit Publication, New Delhi.
8. Bilgrami S.A.R, 2000, An Introduction to Agricultural Economics, Himalaya Publishing House, Mumbai.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

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SEMESTER – I PAPER TYPE: CORE ELECTIVE

PAPER –1 (B) LABOUR ECONOMICS CORE ELECTIVE (To choose 1 out of 3)

Course Objectives

1. The objective of the course is to develop abilities in acquiring a better understanding of the functioning of labour market.
2. The study of labour economics seeks to understand the relationship between workers and employers.
3. The study is important to society as it determines wages, the causes for discrimination and how government should manage recessions.
4. The study helps to make a policy frame work for maintaining equilibrium between demand and supply of labour.
5. It is a systematic study of various theories, concepts, hypotheses and steps relating to the labour class.
6. The scope of subject covers state activity where labour directly or indirectly involved.

Course Outcomes

1. After studied unit-1, the student will be able to understand the theories of labour market.
2. After studied unit-2, the student will be able to understand the employment and unemployment issues.
3. After studied unit-3, the student will be able to gain knowledge on wage determination in theory and practice.
4. After studied unit-4, the student will be able to know about the labour movement.
5. After studied unit-5, the student will be able to understand the labour legislations in India.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1: Supply and Demand Behaviors

Nature and characteristics of labour markets in Developing countries like India - Paradigms of Labour Market: Classical, Neo- classical and dualistic model - Analysis of demand supply forces- Demand for Labour market - size and pattern of investment - Government Labour policies.

Unit-2: Unemployment and Inequality

Importance of employment - Concept and measurement of unemployment - Causes and measures of Industrial Dispute, rationalization, technological change and modernization - Rural Unemployment and educated Unemployment- Technological progress and productivity- capitalization effect.

Unit-3: Wage Determination: Theory and Practice

Classical, Neo classical and bargaining theories of wage determination - Concepts of wages –problems in implementation of minimum Wages - Wage determination - Organised and Unorganised sectors - Wage and productivity- wage and inflation relationship - Wage differentials in terms of firm, Industry, Occupation, Sex and Skills- wage standardization - Wage policy in India- Risk sharing- efficiency wage and involuntary.

Unit-4: Industrial Relations and Trade Unions

Need for Industrial Relation Machinery-Preventive and Curative methods-Collective Bargaining, Arbitration and Adjudications-Industrial Democracy – concept of workers participation in Management – Role of State in Industrial Relations.

Unit-5: State and Labour

Role of state in determination of Labour issues - Labour policies of the Government in the past and present - various social security schemes- Importance Labour legislations in India and their implications - Impact of ILO.

Text Books

Unit-1 George.J.Borjas, (2018), Labour Economics, McGraw Hill,8th Edition, London.

Unit-2 Hyclak, Jones, Thornton, (2018) 2nd Edition, Fundamentals of Labour Economics, Cengage Learning Inc., London.

Unit-3 Sinha and Sinha, Labour Economics, SBPD Publications, New Delhi.

Unit-4 Esrafil Ali, Labour Economics, (2013), 1st Edition, Everest Publishing House, New Delhi.

Unit-5 M.V.Joshi, (2015), Labour Economics and Labour Problems, Atlantic Publishers and Distributors, New Delhi.

References

1. Pierre Cahuc& Andre Zylberberg (2009), Labour Economics, PHI Learning Private Ltd. New Delhi.
2. Lester.R.A.(1964), Economics of Labour, Macmillan, London.
3. Connell.C.R. and S.L. Brue(1986), Contemporary Labour Economics, McGraw Hill, New Delhi.
4. Papola T.S. P.P. Ghosh and A.N.Shama(EDS) (1993) Labour employment: Industrial relation in India, B.R. Publishing Corporation.
5. Praveen Jha B.R. (2001), Agricultural labour in India, Vikas publication, New Delhi.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

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SEMESTER – I PAPER TYPE: CORE ELECTIVE

PAPER –1 (C) MONETARY ECONOMICS

CORE ELECTIVE (To choose 1 out of 3)

Course Objectives

1. To make students understand on different concepts of monetary theory.
2. To familiarize the monetary policy of Indian Economy.
3. To elaborate the knowledge on the money and capital markets
4. To familiarize students on Keynesian and post Keynesian views on money
5. To bring awareness on the concept of Inflation.

Course Outcomes

1. After studied unit-1, the student will be able to understand the nature and scope of monetary economics.
2. After studied unit-2, the student will be able to understand the Classical theories of money.
3. After studied unit-3, the student will be able to gain knowledge the Keynesian and post Keynesian theories of money.
4. After studied unit-4, the student will be able to acquire knowledge on monetary policies and its operations.
5. After studied unit-5, the student will be able to acquire knowledge on the concept of inflation and deflation.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1:Nature and functions of Money

Nature and scope of monetary economics- Functions of Money – the concept and definition of money – Measurement of money – Advantages of money – Theories of demand for money - Traditional and modern-concepts of liquidity-Newlyn-Radcliffe committee-Gurley and Shaw.

Unit-2: Classical and Neo-Classical Views on Theories of Money

Neutrality and Non-neutrality of Money-Classical and Neo-Classical Dichotomy-Integration of monetary and value theories.

Unit-3 Keynesian and Post Keynesian Theories of Money-

Transactions demand for money-Keynes speculative demand for money- Baumol's Theory – Patinkin's the real balance effect-Tobin's Portfolio Theory - Friedman Restatement Quantity theory of Money -Gurley and Shaw theories.

Unit-4: Monetary Policy

Monetary policy-concept of monetary policy – Instrument of monetary policy – Effectiveness of monetary policy in recession - Functions, techniques and constraints-Monetary Transmission Mechanism – Role of monetary policy in India.

Unit-5: Inflation and Deflation

Meaning – Open and suppressed inflation – Demand pull inflation – Inflationary Gap – Cost push inflation – Phillips Curve and inflation - Causes of inflation - theories of inflation-control and impact of inflation, Recent trends of inflation in India.

Text Books;

Unit-1:Chandler, L.V., Economics of Money and Banking (UBS) Revised Edition.

Unit-2:Chandler, L.V., Economics of Money and Banking (UBS) Revised Edition.

Unit-3:Gosh.B.N.and Rama Gosh,(1989),Fundamentals of Monetary Economics, Himalaya Publication, Bombay.

Unit-4:Gibson.W.E.and George G.Kaufman (1975),Monetary Economics, Tata Mc-Graw Hill, New Delhi.

Unit-5:Gibson.W.E.and George G.Kaufman (1975),Monetary Economics, Tata Mc-Graw Hill, New Delhi.

References:

1. Pierce, D G and P J Tysome (1985) Monetary economics: theories, evidence and policy, Butterworths, London.
2. Carl E Walsh (1998), Monetary Theory and Policy, MIT Press, Cambridge.
3. Bennett McCallum (1989), Monetary Economics: Theory and Policy, Macmillan.
4. C Rangarajan (1999), Indian Economy: Essays in Money and Finance, UBSPD.
5. Narendra Jadhav (1994), Monetary Economics for India, Macmillan.
6. R.B.I: Money supply in India: Concepts, Compilations and Analysis Report of the Second Working Group 1977
7. R.B.I: Working of the Monetary System in India: Report of Sukumony Chakravorthy Committee, 1985.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

THIRUVALLUVAR UNIVERSITY VELLORE, 632 115

M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I PAPER TYPE: OPEN ELECTIVE PAPER 1 A. BASIC ECONOMICS

Course Objectives:

1. Students who complete this course will be able to illustrate how consumers and sellers are behave in the market through use of the demand and supply theory, consumption, production and market structure.
2. Students who complete this course will be able to comprehend the important role of pricing methods to economic decision making.
3. Students who complete this course will be able to understand what is meant by market success and market failure.

Course Outcomes:

1. The Students will be able to know the basic ideas of micro economics to the non-economic students
2. The students will be able to understand the basic knowledge about the consumption, demand and supply
3. The students will be able to know about the factors of production and their features
4. The students will be able to understand various market conditions and their pricing

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit: I Introduction

Meaning - Definition – Scope of Economics – Relationship between Economics with other Social Sciences - Micro and Macro Economics.

Unit: II Consumption

Wants - Utility - Law of Diminishing Marginal Utility - Equip - Marginal Utility -Indifference Curve - Consumers Surplus.

Unit: III Demand and Supply

Law of Demand - Demand Schedule - Determinants of Demand - Elasticity of Demand - Law of Supply – Determinants of Supply - Supply Schedule.

Unit: IV Production

Factors of production and their features Law of Diminishing Marginal Return – Returns to scale - Economies of Scale – Organization of Enterprise - Cost Concepts and classification

Unit: V Market Structure

Features of Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly - Price Determination under Perfect Competition.

Text Books

1. Thomos Sowell Basic Economics, Fifth Edition: A Common Sense Guide to the Economy
2. Tony Cleaver (2004) The Basic Economics, Publisher Routledge
3. R.G. Lipsey. An Introduction to Positive Economics, ELBS (6th edition).
4. G.S.Maddala and E. Miller, 1989, Microeconomics, Prentice Hall, McGraw Hill International Editions.
5. Pindyck, Rubinfeld and Mehta, Microeconomics, Pearson

References:

1. K.K.Dewett : Modern Economic Theory, New Delhi, Shyam Lal Chariatable Trust.
2. H.L.Ahuja : A Text Book of Modern Economics, New Delhi, S.Chand & Co. Ltd.
3. M.L.Seth : Principles of Economics, Agra, Lakshmi Narain Agarwal.
4. Sampat Mukherjee: Modern Economic Theory WishwaPrakashan, New Delhi.
5. P Samuelson and W.Nordhaus, Economics, McGraw hill International Edition (14th edition or later edition)
6. J.E.Stiglitz and C.E.Walsh, Principles of Economics, WW Norton and Company, NY, (3rd edition or later edition)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S		S	S
CO2			M	M		M	S	S		S
CO3		M		M			S			S
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S		S

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I PAPER TYPE: OPEN ELECTIVE

A. PAPER 1 B. RECENT ISSUES IN INDIAN ECONOMY- I

Course Objectives

1. Understand the approach to economic development.
2. Describe the indicators of development.
3. Understand the objectives and strategies of Indian Planning.
4. Understand the features of India's population.
5. Understand the development of infrastructural facilities in India.
6. Understand the new economic policy in India.

Course Outcomes

1. After studied unit-1, the student will be able to understand the workforce participation in different sectors.
2. After studied unit-2, the student will be able to understand the importance of agriculture in economic development.
3. After studied unit-3, the student will be able to analyze the achievements of all the five year plans and present NITI Aayog's functions.
4. After studied unit-4, the student will be able to understand the economic infrastructure and its role in economic development.
5. After studied unit-5, the student will be able to gain knowledge on new economic policy and its implications in India.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1: Economic Development and its Determinants

Approaches to economic development – Sustainable development – Indicators of development – Physical quality of life index – Human development index – Gender development index

Unit-2: Planning in India

Objectives of planning – Strategies of Indian planning – Targets of Indian planning – Achievements of plans – Decentralizations of Indian planning – Panchayat raj – Nagar palika.

Unit-3: Demographic Features, Poverty and Inequality

Meaning of demography – Broad demographic features of Indian population – Rural features of Indian population – Urban features of Indian population – Poverty in India – Poverty alleviation programme in India – Inequality.

Unit-4: Resource Base and Infrastructure

India's infrastructure development – Energy – Coal and oil – Electric power – Thermal power – Nuclear power – Transport – Shipping – Communication

Unit-5: Economic Reforms

Rational internal reform - Rational external reform – New economic policy – Liberalization of Indian Economy -Privatization of Indian Economy - Globalization of Indian Economy – Inclusive growth

Reference books

1. Jhingan.M.L., The Economics of Development and Planning, Vrinda Publication Ltd, Delhi, 2012.
2. Misra and Puri, Indian Economy, Himalaya Publishing House. New Delhi, 2013
3. RuddarDutt and K.P.M. Sundaram, Indian Economy,S.Chand and Company Ltd.,New Delhi,2013..
4. S.Sankaran, Indian Economy-problems and policies, Margham Publications, Chennai,2012

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I PAPER TYPE: OPEN ELECTIVE

PAPER 1 B. AN INTRODUCTION TO ENVIRONMENTAL ECONOMICS

Course Objectives:

- 1.To apply economic theories in to the environmental problems to solve the social issues.
- 2.To understand the importance of economic motives in all aspects of human life and will be familiar with constructing economic arguments
- 3.To explain environmental degradation in economic terms

Course Outcomes:

- 1.The students will able to understand the subject of environmental economics, including its key principles and theories.
2. The students will able to understand the economic techniques to analyse environmental problems and to create environmental policies
3. The students will able to understand the procedures of allocation goods and resources, optimal usage and market failure in public goods provision
4. The students will able to understand the theoretical and practical knowledge of principles and practices in natural resource management, sustainability, globalization and environmental management to professional practice or further study;
5. The students will able to understand, analyse, synthesis and reflect the social implications of environmental concerns and challenges both in India and global.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit: I Introduction

Nexus between environment and economics – the principle of material balance – Market failure - private versus social cost – Trade-off between economic growth and environment - sustainable development - Environmental Quality as a Public Good.

Unit: II - Environmental Economic Theory for Resource Allocation

Economic theory for resource allocation: Theory of externalities - Benefit/Cost Analysis – Limits to Growth – Coase's theorem- Simon Kuznets Inverted “ U ”shaped curve – Hedonic Theory.

Unit: III - Environmental problem in India

Sources and types of pollution (air, water, solid waste, noise, land degradation); Causes and

effects of environmental degradation, Urbanisation and its Impact on Environment and Rural
environmental problems - Energy-environment interaction.

Unit: IV –Environment-society interface and policy

Population and Environment – women and environment – Environmental acts in India –
International initiative on environmental protection.

UNIT-IV: Environment and Human Health Problems

Consequences on Environmental Quality - Problems of Urbanization and Environmental
Quality in India - Environment and Human Health.

References

1. U. Shankar (2000) „Environmental Economics, Oxford University Press, New Delhi
2. Eugene T. (2005): “Environmental Economics”, Vrinda Publications, Pvt. Ltd, New Delhi.
3. M. Karpagam (2000) „Environmental Economics” Sterling Publisher Pvt.Lyd. New Delhi.
4. Charles D. Kolstad (2000): “Environmental Economics”, O
5. Oxford University Press, New York.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

THIRUVALLUVAR UNIVERSITY
M.A. ECONOMICS
SYLLABUS
UNDER CBCS

SEMESTER I **OPEN ELECTIVE: ECONOMICS FOR COMPETITIVE**
EXAMS **CREDITS: 3**

Course Objectives

1. To impart knowledge to the students regarding the basic concepts of micro and macroeconomic principles.
2. To understand the banking operation systems and its procedures.
3. To get familiarize with various international transactions, documents and procedures.
4. To know the occupational structure, employment pater and economic development of the economy.
5. To acquire better ideas about the planning commission, current affairs and other contemporary issues of Indian economy.

Course Outcomes

1. After studied unit-1, the student will be able to understand the basic theories and principles of micro and macro economics.
2. After studied unit-2, the student will be having better knowledge of banking operations both at national and international levels.
3. After studied unit-3, the students learn different theories pertaining to international trade, international organizations and India's link with those organizations.
4. After studied unit-4, the student is able to get thorough comprehension of economic growth and development of the country.
5. After studied unit-5, the student will be grasping the impact of LPG and updating the current affairs.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

Unit – I Basics of Micro and Macro

(9 hours)

Basic of Micro: Theory of Demand, Production, Market Structure.

Basics of Macro: National Income, Aggregates of money, inflation, unemployment.

Unit - II Role of Banking

(9 hours)

Role of Banking- types of functions, financial institutions (RBI&SEBI) in economic development
banking rates and terms-CRR, SLR, Raporate. Foreign Exchange Management: FERA, FEMA, Current
News on banking sector –India and Global

Unit - III International Economics (9 hours)

Tariffs- International Economic Institution- From GATT to IMF, World Bank, ADB,WTO.
EXIM Policy, BOP (with respect to India.

Unit - IV Growth and Development (9 hours)

Factors influencing growth and development- unemployment and poverty, measurement of HDI

Unit - V Indian Scene (9 hours)

Planning- economic reforms-LPG, Poverty and Unemployment schemes in India- Health and
Education. Agriculture- Green Revolution and Price policy, Current Affairs in India over the last 6
months.

Text Books

- Unit 1: H.L.Ahuja, Principles of Microeconomics, (2016), 22nd Edition, S.Chand, NewDelhi.
Dornbusch, Rudiger, Stanley Fischer, and Richard Startz (2000). Macroeconomics, Tata
McGraw-Hill Publishing Company, New Delhi.
- Unit 2: Chandler, L.V., Economics of Money and Banking (UBS) Revised Edition.
- Unit 3: Apple yard, et.al, International Economics. McGraw Hill, New York.2009.
- Unit 4: Alex Mourmourras, Peter Rangazas and Sibabrata Das - Economic Growth and Development
– A Dynamic Dual Economy Approach Spinger International Publishing 2018.
- Unit 5: Uma Kapila (Ed.) (2020), Indian Economy Since Independence , Academic Foundation, New
Delhi, 30th Edition.

References:

1. Dewet, K.K, Modern Economic Theory, S. Chand, New Delhi. 2006.
2. Koutosoyiannis.A. (1979), Modern Microeconomics, Macmillan Press - London.
3. N. Gregory Mankiw. (2012), Principles of Microeconomics, 7th Edition, Cengage Learning, US.
4. Errol D'Souza (2012), Macroeconomics, Pearson Publications, New Delhi.
5. Mihir Rakshit (2007) Money and Finance in the Indian Economy, OUP, New Delhi, India
6. KausikBasu (Ed.) (2012), Oxford Companion to Indian Economy, 3rd Edition, OUP, New Delhi
7. Ashima Goyal (Ed.) The Oxford Handbook of the Indian Economy in the 21st Century: Understanding
the Inherent Dynamism, Oxford University Press.
8. Government of India, Economic Survey (Annual issues since 2015). Ministry of Finance, New Delhi
9. R.B.I: Money supply in India: Concepts, Compilations and Analysis Report of the Second
Working Group 1977
10. R.B.I: Working of the Monetary System in India: Report of Sukumony Chakravarthi
Committee, 1985.

Journals

1. Business Magazines- The Economist, Business Weekly,
2. RBI, UNDP Report, Malayalam Manorama Year Book
3. Competition Success Review.
4. Competition Master
5. Pratiyogita Darpan
6. Chronicle
7. The Economic Times
8. The Civil Services Times

Web Resources

1. <http://www.jagranjosh.com/economy-pdf-ids-preliminary-st-1359711724>
2. <http://www.gktoday.in/gk/current-affairs-questions-answers>
3. <https://www.dailyexcelsior.com/top-websites-to-help-prepare-for-government-exams>
4. <https://www.edubull.com/exams/competitive-exams>
5. <https://upscfever.com/>
6. <https://www.jagranjosh.com/about-us>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M						
CO2					M			S		
CO3			M	S			M			
CO4		M			M			S		
CO5						M	S			

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – II I

PAPER 5 MICROECONOMICS II

Course Objectives

1. The concepts, theories and diagrammatical representations use the most important

Theoretical tools that aid the student to understand the subject.

1. The objective of micro economic theory is to analyse how individual take decisions and behave in a variety of economic environments.
2. The subject helps to focus on the different types of market structure.
3. The subject helps to take decision in real life situations to generate a better
4. economic life for themselves and their neighbours.
5. Microeconomics assist for determining the most efficient manufacturing process.

Course Outcomes

6. After studied unit-1, the student will be able to understand the theories of firm.
7. After studied unit-2, the student will be able to acquire knowledge on theories of distribution.
8. After studied unit-3, the student will be able to get awareness on the contribution of economist towards welfare economics model.
9. After studied unit-4, the student will be able to understand the general equilibrium through various models.
10. After studied unit-5, the student will be able to acquire knowledge on modern utility analysis.

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

Unit-1: Alternative Theories of Firm

Objectives of business firms by Marris, Simon, Hall, and Hitch - Theories of pricing - Sales maximization model Baumols' Static models – Baumol's Dynamic Model. Williamson's Baumol.

Unit-2: Theories of Distribution

Factor pricing Factor Pricing in imperfect product and Factor markets -Theories of Rent: Ricardo- Modern theory of rent – Theories of wages: classical and modern theories of wages –Theories of Interest: Classical – Keynesian and Neo Keynesian theory of interest – Theories of Profit: Hawley's Risk theory, Knight's Uncertainty theory and Schumpeter's Innovation theory.

Unit-3: Welfare Economics

Criteria of Social welfare Concept of Social Welfare Function – Consumption Principle the Kaldor and Hicks Criterion – Classical Welfare Economics- Pareto Optimality - Problem of Welfare Maximization - Compensation Principle - A.K. Sen's Social Welfare function – Arrow's social choice and individual values.

Unit-4: General Equilibrium

Stable and Unstable equilibrium – Types – Static: micro static – macro Static – comparative static – Dynamic: micro dynamic equilibrium – macro dynamic equilibrium - Two sector model of General equilibrium - Walrasian Model – General equilibrium 2x2x2 model (Restricted to static properties of general equilibrium)

Unit-5: Economics of Uncertainty

Modern Utility Analysis – Newmann – Morgenstern utility index – Friedman – Savage hypothesis - Consumer sovereignty – its limitations

Text Books

Unit-1: Koutsoyiannis.A. (1979), Modern Microeconomics, Macmillan Press - London.

Unit-2: N. Gregory Mankiw. (2012), Principles of Microeconomics, 7th Edition, Cengage Learning, US.

Unit-3: Daniel Rubinfeld, Robert Pindyck (2014), Microeconomics, 8th Edition, Pearson Publications.

Unit-4: H.L.Ahuja, Principles of Microeconomics, (2016), 22nd Edition, S.Chand, New Delhi.

Unit-5: N.Gregory Mankiw, Principles of Microeconomic, (2007), Cengage Learning India Pvt Ltd., New Delhi.

References

1. Koutsoyiannis.A. (1979), Modern Microeconomics, Macmillan Press – London.
2. N. Gregory Mankiw. (2012), Principles of Microeconomics, 7th Edition, Cengage Learning, US.
3. Hal R. Varian (2009), Intermediate Microeconomics – A Modern Approach, 8th Edition, Published by Affiliated East-West Press. US.
4. Dominic Salvatore (2018), Microeconomics 4th Edition, Schaum's Series.

COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01		M		M						
C02					M			S		
C03			M	S			M			
C04		M			M			S		
C05						M	S			

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – II

PAPER 6 MACROECONOMICS II

Course Objectives:

1. To enlarge the scope and understanding of Macroeconomics through IS LM model
2. To understand the impact of inflation and deflation.
3. To explain the concept of Business cycle and its phases.
4. To explore the role of monetary and fiscal policy.
5. To explain Neo Classical and Post Keynesian models.

Course Outcomes:

1. After studied Unit-1, the student will be able to know about the macroeconomic policies and its implications.
2. After studied Unit-2, the student will be able to understand the concept of multiplier and accelerator.
3. After studied Unit-3, the student will be able to gain knowledge on various theories of inflation and deflation
4. After studied Unit-4, the student will be able to acquire knowledge on different phases of business cycle and its theories.
5. After studied Unit-3, the student will be able to analyse the application of monetary and fiscal policy to attain the price stability.

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

Unit-I: Multiplier and Accelerator:

Multiplier - Definition – Assumption – Types: Investment Multiplier - Employment Multiplier- Leakage of Multiplier – Accelerator – Income determination – Multiplier in under developed country.

Unit-II: Inflation and Deflation:

Classical – Keynesian – Monetarist – Structural theories of Inflation - Phillips Curve – Short-

run and Long run – Deflation and Stagflation - Measures to control Inflation and Deflation.

Unit-III: Business Cycle:

Concept and Phases of Business cycle – Models: Samuelson - Hicks - Kaldor -Schumpeter – Cobweb Theorem - Relative efficacy of Monetary and Fiscal Policies.

Unit-IV: Modern Macroeconomics

The New Classical Macroeconomics - Rational expectations hypothesis - Policy ineffectiveness theorem -Policy implications of new classical approach - New Keynesian Macroeconomics - Core propositions - New Keynesian business cycle theory - Policy implications of new Keynesian macroeconomics

Unit-V: Macro Economic Policy:

Macroeconomic Goals – Objectives –Instruments – Macroeconomic Imbalances – Macroeconomic Policy during the Reform period - Macroeconomic Policy and Sustainable growth.

Text Books:

Unit I: Mankiw N. Gregory , (2010), Macroeconomics, Worth Publishers, New York.
Unit II:Jhingan.M.L.(2000), Macro Economic Theory, Vrinda Publication Ltd, Delhi.
Unit III:Mankiw N. Gregory , (2010), Macroeconomics, Worth Publishers, New York.
Unit IV:Brian Snowden and Howard R Vane, (2005), Modern Macroeconomics : Its origins, Development and Current State, Cheltenham and Massachusetts : Edward Elagar.
Unit V: Jhingan.M.L.(2000), Macroeconomic Theory, Vrinda Publication Ltd, Delhi.

Reference Books:

1. Mankiw N. Gregory , (2010), Macroeconomics, Worth Publishers, New York.
2. Roger E.A. Farmer Macroeconomics, (2002, Second Edition)Thompson Asia Pvt Ltd.
3. Brian Snowden and Howard R Vane, (2005), Modern Macroeconomics : Its Origins, Development and Current State, Cheltenham and Massachusetts : Edward Elagar.
4. ***Business Cycle Economics*** by Todd A. Knoop (Santa Barbara, California: Praeger)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M						
CO2					M			S		
CO3			M	S			M			
CO4		M			M			S		
CO5						M	S			

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M.A. ECONOMICS - 2022 – 2023 onwards

SEMESTER – I I

PAPER TYPE: CORE

PAPER –

STATISTICS FOR ECONOMICS II

Course Objectives:

1. To impart the knowledge on Probability theorems.
2. The course will mainly emphasize on the different sampling distribution.
3. To develop detailed understanding on testing of hypothesis.
4. To encourage students to analyze economic indicators with the help of statistics.
5. To make students to apply different statistical tools on research projects.
6. To understand the role of statistics in day today life.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studying Unit-1, the student will be able to understand the various probability theorems.
2. After studying Unit-2, the student will be able to identify the Statistical tools in probability distributions.
3. After studying Unit-3, the student will be able to understand the Sampling distribution.
4. After studying Unit-4, the student will be able to use testing of hypothesis in research.
5. After studying Unit-5, the student will be able to gain knowledge on analysis of variance

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit – I: Probability

Basics of Probability – Definitions of Outcome – Sample Space – Experiment – Events – Types of Events - Exhaustive event - Equally likely events - Mutually exclusive events - Complementary event - Simple and Compound event - Dependent event - Independent event – Problems based on

Identification of Events - Additive Law of Probability - Multiplicative Law of Probability – Bayer's Theorem – Problems based on Additive law, Multiplicative law and Bayer's theorem

Unit – II: Probability Distributions

Distribution Definition – Types of Distribution (Discrete, Continuous) – Random Variable – Probability Density Function - Probability Distribution Function – List of Discrete Distributions - List of Continuous Distributions - Binomial Distribution – Poisson Distribution - Exponential Distribution - Normal Distribution - Standard Normal Distribution - Properties, Simple Problem; use of Tables.

Unit – III: Sampling Distribution and Hypothesis Tests

Sampling Distribution Definition – Parameter -Sample Size - Sample Mean – Sample Proportion – Sample Variance – Confidence Interval – Sampling Error - Central Limit Theorem - Sampling distribution of the sample mean – Sampling distribution of the sample proportion

Unit – IV: Hypothesis Tests for Two Populations

Hypothesis Definition – Types of Hypothesis – Types of Error – P- Value – Level of Significance – One tailed tests – Two tailed tests – Single population – Test for Mean, Proportion and Variance – 'z'-Tests – 't'- test – 'F'- test – Chi Square Test – Basics and properties – One way Analysis of variance – Two way analysis of Variance

Unit – V: Non Parametric Tests

Non Parametric - Concept and Definition – Uses - Sign Test - Mann Whitney test - Wilcoxon signed rank test - Kruskal Wallis test.

Text Books

1. Unit I: S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi and Speigal, M.R. (1992), Theory and Problem of Statistics, McGraw Hill Book Co., London.
2. Unit II: S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi.
3. Unit III: S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi.
4. Unit IV: S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi and Prof. A.L. Nagar and R.K. Das. 'Basic Statistics', Oxford University Press, New Delhi.
5. Unit V: S.P. Gupta (1969) Last Edition (2017), Statistical Methods, Sultan Chand & Sons., New Delhi.

Reference Items: Books, Journal.

1. Seymour Lipschutz and John J. Schiller (1999), Introduction to Probability and Statistics, Schaum's Outlines, McGraw – Hill International Editions

2. S.P. Gupta (2017), Statistical Methods, Sultan Chand & Sons., New Delhi.
3. 1.Aggarwal. Y.P (2002), Statistics Methods – Concepts Application and Computation, Sterling Publishers Private Ltd., New Delhi.
4. 2.Speigal, M.R. (1992), Theory and Problems of Statistics, McGraw Hill Book Co., London.
5. 3.Wonnacott H. Thomas &Wonnacott J. Ronald (1969), Introductory Statistics, John Wiley & Sons, Inc. New York.
6. 4.V.K.Kapoor operations research sultan chand &sons new Delhi
7. 5.Dr, V.K. Kapoor problems and solutions in operations research sultan chand &sons new Delhi

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M	M		M		S			
CO2			M	M		M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S	S	S
CO5		M	M		M		M	S		

THIRUVALLUVAR UNIVERSITY
MA ECONOMICS SYLLABUS
Under CBCS
CORE ELECTIVE
PAPER 2
(To choose 1 out of 3)

A. ECONOMICS OF SOCIAL ISSUES

Semester : 2

Credits : 3

COURSE OBJECTIVES

1. To describe the economic value with cultural heritage.
2. To equip the students to analyze various social and economic issues.
3. To make students understand income distribution and its impact on economic wellbeing.
4. To analyze the impacts of government programs and policies on social issues.
5. To develop the ability of students to understand and analyze social issues from an economic perspective.

Course Outcomes

1. After studied unit-1, the student will be able to understand economic value and cultural heritage.
2. After studied unit-2, the student will be able to get awareness on various social issues.
3. After studied unit-3, the student will be able to know the functioning of IPL.
4. After studied unit-4, the student will be able to understand the conceptual framework of the economics of discrimination.
5. After studied unit-5, the student will be able to study the impact of IT on business and culture.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

Unit-1: Economics of Art and Culture (12 Hours)

The economic value of Cultural heritage-Economics and classical music “Baumol’s cost disease”-The impact of commercialization on art and culture- The costs and benefits of farming and legalizing drugs-The concept of “National Addiction”-Costs and benefits of prohibition.

Unit -2: Economics of Social Customs(12 Hours)

Economics of rising age of marriage and declining family size- How economic globalization is changing the Indian family- Economics of gift-giving: why value of gift in kind is higher compared to gift in cash- Application: Reasoning about economic Inequality between men and women.

Unit- 3: Economics of Social Evils(12 Hours)

Discrimination: Why discrimination can be rational and the economic harm it causes- Pollution: The economic roots of the pollution problem- Addiction: Economic case for legalizing drugs as solution to addiction- Corruption-An Economists Perspective- Application: Why prohibition does more harm than good: An Economic Perspective.

Unit-4: Economics of Sports and Discrimination(12 Hours)

The nature of competition in sports-Economic earnings of sports people “Economies of scale”-Economics of Indian Premier League (IPL) - Economic costs of discrimination- Types of discrimination, Rationale and Pure discrimination-Market state and discrimination-casteism - honor killing–religionism.

Unit-5: The Information Economy and National Issues(12 Hours)

The features of the information economy-The market system and the information economy-The impact of the Internet on business and culture- The Union Budget and you – Taxes, Subsidies and Fiscal Deficit- How the stock market works – Bulls and Bears- The global economic crisis: Its origin and impact on India- Application: Living through an economic downturn.

Text Books:

1. Unit-1:Dale yoder - Mass power Economics and Labour Problems, 1950, McGraw Hill Book Company. New York
2. Unit-2:Gumango. S.P. - Child labour (A Precarious Future), E35/103 Jawahar Park, Laximi Nagar, Delhi, year of publication 2001
3. Unit-3:Gilbert Slater - Some South Indian Villages, Oxford University Press, Madras,1918

4. Unit-4:Guha, Biswajit, - Economics of Child labour 2001, Deep and Deep Publication, New Delhi. (2001)
5. Unit-5:HemaVerma - Parents child rearing attitudes, Mohit publications, New Delhi110 002, year 1997.

Books for References

1. Charles A.Register and Paul W.Grimes(2015), Economics of Social issues, McGraw Hill – New Delhi 21st edition.
2. Robert J. Stonebraker (2005), The Joy of Economics: Making Sense of Life, Online book available free at <http://www.facutly.winthrop.edu.stonebraker/book.html>.
3. Tim Harford (2000), The Logic of Life: Discovering the New Economics of everything, (London: Little).
4. Paul Hayne (1998), Economic Way of Thinking, Prentice Hall, New Delhi.

Journals for Reference:

1. Journal of Social and Economic Development
2. International Journal of Social Economics
3. Journal of Economic Issues
4. Journal of Social and Economic Policy
5. Journal of Economic and Social Thought.

Web Resources :

1. https://books.google.co.in/books/about/Economics_of_Social_Issues.html?id=gHmFkgAACAAJ&source=kp_book_description&redir_esc=y
2. <https://www.mheducation.com/highered/product/economics-social-issues-register-grimes/M9780078021916.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M			M				S	
CO2				M			M			
CO3					M			S		
CO4			M			M			S	
CO5				M	M			S	S	

THIRUVALLUVAR UNIVERSITY
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Under CBCS

CORE ELECTIVE
PAPER 2
(To choose 1 out of 3)

COMPUTER APPLICATION FOR ECONOMIST

Course Objectives.

1. To create a data file and understand the logics of opening an existing and saving a file in the software.
2. To make the students know the diagrammatic representation of the coded data and its interpretations.
3. To enrich the knowledge of the students in the application of statistical tests using the software.
4. To improve the knowledge of the students in the application of advanced statistical tests using the software.
5. To know more about the application of appropriate statistical test for error correction and basic understanding of time series model using the software.

Course Outcomes

1. After studied unit-1, the student will be able to understand to open a file, code the data and enter the data in the file.
2. After studied unit-2, the student will be able to understand the usage of diagrammatic representation of the coded data and its interpretations.
3. After studied unit-3, the student will be able to get thorough knowledge of the application of various statistical tests.
4. After studied unit-4, the student will be able to acquire better understanding of the application of advanced statistical tests.
5. After studied unit-5, the student will be able to perform the different test on statistical errors and time series models

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit – I: Introduction to Statistical Software**(12 hours)**

Creating SPSS data file - Opening existing data file - Importing data from Non-SPSS file Format Data View – Variable view - Merging data from multiple files - Transforming variables - output; Creating tables, charts and graphs, Exporting output ,Creating and using syntax file

Unit- II: Diagrammatic Representation**(12 hours)**

Simple – Multiple - Drop line diagrams Area graph - Histograms - Pie chart – Range - Simple high low close Chart - Cluster high low close Chart - simple and cluster box plot.

Unit– III: Descriptive Statistics in Economics**(12 hours)**

Mean – Median – Mode – Percentiles – Quartiles - Standard deviation – Variance - Range, Minimum value – Maximum Value - Skewness - Kurtosis – ‘t’ tests – cross tab and chi square test, one way ANOVA – Interpretation of Output

Unit- IV: Correlation Regression**(12 hours)**

Correlation – Regression - Logit Regression Dummy variables - Multi collinearity, test for detecting multicollinearity - Interpretation of Output

Unit– V: Serial Correlation and Non Parametric Tests**(12 hours)**

Non Parametric Tests - Durbin-Watson Statistics, Ljung-box Q-statistic, unit root test, time series models - Interpretation of Output

Text Books

1. Unit-1 George Darren Mallery Paul, (2009), SPSS FOR WINDOWS, Pearson education. New Delhi.
2. Unit-2 Andy Field, (2000), Discovering Statistics Using IBM SPSS Statistics, Sage Publications Ltd, New Delhi.
3. Unit-3 Nancy L. Leech, Karen C. Barret and George A. Morgan (2014), IBM SPSS for Intermediate Statistics: Use and Interpretation, Routledge Publications, New Delhi.
4. Unit-4 George Argyrous (2012), Statistics for Research: With a Guide to SPSS, Sage South Asia Publications, New Delhi.
5. Unit-5 Andy Field, (2019), Discovering Statistics Using IBM SPSS Statistics, Sage Publications Ltd, New Delhi.

References

1. Foster Jeremy.J,(2001), Data Analysis Using SPSS For Windows Version 8 to 10:A Beginners Guide ,Sage Publications, New Delhi.
2. Croxton,Fredric.E.Dudley.J,Cowden and Sideny Klein,(1988), Applied General Statistics,Prentice Hall of India Ltd.New Delhi.
3. Andy Field, (2019), Discovering Statistics Using IBM SPSS Statistics, Sage Publications Ltd, New Delhi.

4. George Darren Mallery Paul, (2009), SPSS FOR WINDOWS, Pearson education. New Delhi.
5. Nancy L. Leech, Karen C. Barret and George A. Morgan (2014), IBM SPSS for Intermediate Statistics: Use and Interpretation, Routledge Publications, New Delhi.

Web Resources

1. <https://gacbe.ac.in/pdf/ematerial/18MEC24C-U1.pdf>
2. <https://www.commonsense.org/education/top-picks/best-economics-websites>
3. <https://inomics.com/teach/10-great-resources-to-help-teach-economics>
4. <https://economics.iisuniv.ac.in/courses/subjects/computer-application-economic-analysis>
5. <https://www.techwalla.com/articles/uses-of-computers-in-economics>
6. <https://www.economicsdiscussion.net/articles/use-of-computers-in-economic-analysis-and-forecasting>
7. www.spss.co.in
8. www.spss.com
9. www.spsstools.net/spss.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1					M				S	
CO2						M		S		
CO3				M					S	
CO4						M				S
CO5			M			M				S

THIRUVALLUVAR UNIVERSITY
M.A. ECONOMICS
SYLLABUS
UNDER CBCS

Semester II

Core Elective: Mathematical Economics

Credits: 3

Course Objectives

1. To make the students to understand the meaning and usage of matrices and their application to various economics theories.
2. To get the knowledge of basic realization of differential calculus and their application to various economic concepts.
3. To help the students to get familiarize about differentiation of first and higher orders and its application.
4. To make the students acquaint about the application of input -output analysis and thorough learning of game theory.
5. To support the students to understand the concept of integration and its application in various economic concepts.

Course Outcomes

1. After studied unit-1, the student will be in a position to apply different concepts of calculus in various economic situations.
2. After studied unit-2, the student understands the application of linear algebra and their usage in economic concepts.
3. After studied unit-3, the student acquires thorough knowledge of higher order derivatives and its application in economic theoretical concepts.
4. After studied unit-4, the student gets acquainted with the application of higher order analysis and also different methods of calculus.
5. After studied unit-5, the student gets clear understanding of linear programming and its usage in economic concepts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit- I: Elementary Calculus

(12 hours)

Mathematics for Economists – History of Thought – Graphs and Co-ordinates – intercept and slope of a straight line equations in Economics. Elementary functions – Linear functions – non - linear functions – Economic Applications – Market Equilibrium – National Income determination.

Unit-II: Linear Algebra

(12 hours)

Determinants and their basic properties – Solution of simultaneous equations through Cramer's rule – matrix inversion and rank of a matrix – Concept of vector – its properties – Matrices and vectors – Concept of quadratic forms – Eigen roots and Eigen vectors.

Unit- III: Differential Calculus-I

(12 hours)

Exponential growth – Separable equations – linear differential equations and integrating factors – Second-order differential equations – Economic applications of differential equations.

Unit-IV: Differentiation Calculus-II

(12 hours)

Second order derivatives and Curvature Convex, Concave, point of Inflexion -Application in Economics: TC, AC, MC curves Derivatives of Exponential and logarithmic functions - Chain Rule; Product Rule; Quotient Rule; Elasticity and the derivatives.

Unit-V: Linear Programming

(12 hours)

Basic concept, formulation of a linear programming problem -its structure and variables – Solution of linear programming through graphical and simplex method – Statement of basic theorems of linear programming –Concept of duality and statement of duality theorems – Concept of a game – Strategies – simple and mixed – Value of a game – Saddle point solution – Simple applications.

Text Books

1. Unit-1: Chaing A.C and Kevin Wainwright, Fundamental Methods of Mathematics Economics, McGraw Hill Education, New Delhi, 2017.
2. Unit-2: Edward T. Dowling, Mathematical Methods (Schuman's Series), McGraw Hill Publications, New Delhi 2003.
3. Unit-3: Chiang. A.C, Fundamentals methods of Mathematical Economics, McGraw Hill Publications, New Delhi 2002.
4. Unit-4: Agarwal C.S and Joshi R.C, Mathematics for students of Economics, New Academic Publications, Delhi 2008.
5. Unit-5: Rehshaw, Geoff, Mathematics for Economics; 2nd Edition Oxford University Press, New Delhi 2009.

Books for References

1. Anthony, Martin & Biggs, Norman (2009), Mathematics for Economics and Finance- Methods and Modelling, Cambridge University Press, New York.
2. Bradley, Teresa & Patton, Paul (2002), Essential Mathematics for Economics and Business, Wiley India Private Ltd., New Delhi.
3. Renshaw, Geoff, (2009), Maths for Economics (2nd Edition), Oxford University Press, New York.
4. Weber, E. Jean, (1982), Mathematical Analysis Business and Economic Applications (4th Edition), Harper & Row, Publishers, New York.
5. Vittal P.R, Business Mathematics and Statistics, Margham Publications, Chennai, 2017.
6. Agarwal C.S and Joshi R.C, Mathematics for students of Economics, New Academic Publications, 2008.
7. Kam Yu, Mathematical Economics: Prelude to the Neoclassical Model, Springer Publications, New Delhi, 2020.

8. Lokesh Boro, Mathematical Economics, Bidya Bhawan Publishers private Ltd, India, 2019.
9. Jain T.R, Majhi B.D, Mathematical Methods for Economics, VK Global Publications Pvt, Ltd, India, 2020.
10. Bose D, An Introduction to Mathematical Economics, Himalaya Publishing House, New Delhi, 2018.

Journals for Reference

1. Journal of Mathematical Economics, Elsevier.
2. Mathematics and Financial Economics, Springer.
3. Mathematical Economics: Application of Fractional Calculus, MDPI
4. International Journal of Game Theory, Springer.
5. Journal for Quantitative Economics, Springer.

Web Resources

<https://www.economicsnetwork.ac.uk/teaching>
<http://www.math.uni-magdeburg.de>
<http://www.parisschoolofeconomics.com>
<https://mjo.osborne.economics.utoronto.ca>
<https://www.haverford.edu/mathematical-economics>
<https://www.classcentral.com/course/swayam-mathematical-economics-14187>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M			M				S	S
CO2				M		M	M			S
CO3			M		M			S		S
CO4			M			M			S	S
CO5				M	M			S	S	S

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UNDER CBCS
OPEN ELECTIVE
(To choose 1 out of 3)

A. MARKETING MANAGEMENT

Semester : 2

Credits : 3

Course Objectives

1. Understand the nature, scope, importance, characteristics of marketing, marketing planning, marketing segmentation
2. Analyse the marketing environment, Consumer behavior and market research
3. Identify the Product decisions and the strategy of pricing decisions
4. Understand the distribution channels of a business firm and the composition of sales promotion
5. Understand the Marketing services.

Course Outcomes

1. After studied unit-1, the student will be in a position to know the concepts of marketing and selling.
2. After studied unit-2, the student understands the knowledge about consumer behaviour.
3. After studied unit-3, the student acquires through knowledge of product, packaging and development of new product.
4. After studied unit-4, the student gets acquainted with the types of distribution and sales promotion techniques.
5. After studied unit-5, the student gets clear understanding of marketing services and E-marketing .

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

Unit-1: Marketing Management (12 Hours)

Meaning of marketing and marketing management - Nature of marketing - scope of marketing -

Importance of marketing - Marketing concepts: Production concept, Selling Concept - Marketing segmentation - Importance of marketing planning - Steps in marketing planning process.

Unit-2: Marketing Environment(12 Hours)

Meaning of Marketing Environment - Marketing mix - Elements of Marketing mix - Consumer decision making process - Consumer behavior - Factors influencing consumer behavior - Characteristics of buying behavior - Market research.

Unit-3: Product Decisions(12 Hours)

Concept of a product - classification of products - Product mix strategies - Branding - Types of Branding - Functions of branding - Packaging - Kinds of packages - Functions of packages - Labeling - Functions of labeling - Product life cycle - New product development and process.

Unit-4: Distribution - channels and sales promotion decisions(12 Hours)

Meaning - Functions - Types of distribution - channels - Factors affecting the channels of distribution - Retailing - Wholesaling – Promotion - Promotional mix - Advertising - Personal selling - Sales promotion tools and techniques.

Unit-5: Marketing services(12 Hours)

Social, ethical and legal aspects of Marketing - Concepts of Marketing Services - Characteristics of market services - International marketing - Importance of international marketing - Green marketing - Cyber marketing - E-commerce - E-Banking - E-trading –E-business - E-Marketing.

Reference books

1. R.S.N. Pillai&Bagavathi - Modern Marketing Principles and Practices, 2009, S. Chand & Company Ltd., New Delhi.
2. Dr. C. B. Gupta & Dr. N. Rajan Nair - Marketing Management, 2008, New Delhi, Sultan Chand & Sons.
3. Philip Kotler - Marketing Management, 2009, Prentice Hall of India.
4. RajanSaxena-Marketing Management, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2006.
5. S.A.Sherlekar- Marketing Management, Himalaya Publishing House, Bombay,2012

Journals for Reference:

1. Management Journal of Research
2. Journal of Marketing Management
3. Journal of Industrial Marketing Management
4. Journal of Marketing – SAGE Journals
5. International Journal of Marketing Management
6. African Journal of Marketing Management.

Web Resources :

1. <http://www.ijhssm.org/>
2. <https://journals.sagepub.com/home/iej>

3. <https://journals.sagepub.com/toc/iej/current>
4. <https://www.springer.com/journal/41775>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M			M				S	
CO2		M		M		M	M			
CO3		M	M		M			S		
CO4			M			M			S	
CO5		M		M	M			S	S	

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UNDER CBCS

OPEN ELECTIVE
PAPER 2

B. RECENT ISSUES IN INDIAN ECONOMY – II

Course Objectives

1. Understand the approach farming and precision.
2. Analyse the trends in agricultural farming
3. Understand the pricing of agricultural inputs.
4. Describe the performance of public sector enterprises in India.
5. Distinguish between micro and small enterprises.
6. Understand the corruptions.
7. Understand the tax evasions.
8. Explain trade reports in India.

Course Outcomes

9. After studied unit-1, the student will be able to understand the workforce participation in different sectors.
10. After studied unit-2, the student will be able to understand the importance of agriculture in economic development.
11. After studied unit-3, the student will be able to analyze the achievements of all the five year plans and present NITI Aayog's functions.
12. After studied unit-4, the student will be able to understand the economic infrastructure and its role in economic development.
13. After studied unit-5, the student will be able to gain knowledge on new economic policy and its implications in India.

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: Agricultural Sector

Size of farms – Trends in agricultural production – Organic farming – Precision farming – Pricing of agricultural input – Agricultural marketing – Agricultural credit.

Unit-2: Industrial Sector

Growth and pattern of industrialisation – Industry policy since 1991 – Micro and small enterprises – Measures to promote MSEs – MSEs act 2006 – Industrial sickness.

Unit-3: Service Sector

Education – Health – Contributions of education and health to development – Policies and performance – Commercial banking – Development banking – Insurance – Information technology sector

Unit-4: Good Governance

Factors affecting good governance – Parallel economy – Black money – Corruption – Corruption perception index in India – Tax evasion – Reforms in Fiscal sector, money market and capital market – SEBI

Unit-5: External Sector

Structure and direction of foreign trade – Structure and components of balance of payment – Export and import policy – Foreign capital and aid – Foreign direct investment – MNCs in India – Trade reforms in India.

Reference books

1. Jhingan. M.L., The Economics of Development and Planning, Vrinda Publication Ltd, Delhi, 2012.
2. .Misra and Puri, Indian Economy, Himalaya Publishing House. New Delhi, 2013.
3. RuddarDutt and K.P.M. Sundaram, Indian Economy, S.Chand and Company Ltd., New Delhi, 2013.
4. S.Sankaran, Indian Economy-problems and policies, Margham Publications, Chennai, 2012.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M			M				S	
CO2		M		M		M	M			
CO3		M	M		M			S		
CO4			M			M			S	
CO5		M		M	M			S	S	

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OPEN ELECTIVE
PAPER 2
C. AGRICULTURAL ECONOMY OF INDIA

Course Objectives:

- 1.To familiarize the agricultural situation in India
2. To provide sound knowledge base on India's Agricultural economy before green revolution and after it.
- 3.To develop a critical study on recent Agricultural crises in India.

Course Outcome:

- 1.The students will be able to understand the structure of the agricultural sector of the Indian economy.
2. The students will be able to understand role and impact of institutional support to agricultural sector.
3. The students will be able to demonstrate an awareness of various agricultural market structures.
4. The students will be able to understand the marketing of agricultural products.

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit: I Agriculture and Economic Development

Features of Agriculture - Importance of Agriculture in the Indian Economy - Relationship between Agriculture and Non-Agriculture sectors.

Unit: II Issues in India's Land Reforms

Agriculture Development in India - Subdivision and Fragmentation of holdings in India and causes - Land Tenure and Land Reforms.

Unit: III Green Revolution and Price Mechanism in India

Productivity in Agriculture - New Agriculture Strategy - Green Revolution - Agriculture price policy in India - Public Distribution system.

Unit: IV Agricultural Credit

Rural Indebtedness - Causes of Rural Indebtedness - Sources of Agricultural Finance.

Unit: V Agricultural Market

Market and Marketed Surplus - Defects in marketing Agricultural produce - Regulated markets - Co-operative marketing.

References:

- 1.Misra and Puri, Indian Economy, Himalaya Publishing House Bombay.
- 2.Ruddar Dutt and K P M Sundaram Indian Economy, S. Chand & Co. Ltd, New Delhi.
- 3.Bansil.B.C. Agricultural Problems of India, Vikas Publishing House. Pvt. Ltd., New Delhi.
- 4.Sankaran.S Agricultural Economy of India, Progressive Corporation. Pvt. Ltd., Bombay.
- 5.Srivastava.O.S. Agricultural Economics, Rawat Publications, Jaipur, 1996.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M			M				S	
CO2		M		M		M	M			
CO3		M	M		M			S		
CO4			M			M			S	
CO5		M		M	M			S	S	

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UNDER CBCS
COMPULSORY PAPER
PAPER 2
A. HUMAN RESOURCES DEVELOPMENT

Course Objectives

1. To pinpoint the resource value of human like other resources.
2. To develop the understanding of the concept of human resource management.
3. To develop the understanding of the impact of training on the HRD.
4. To develop necessary skill set for application of various HR issues.
5. To make students understand the human resource planning and performance appraisal process.

Course outcomes

1. After studied unit-1, the student will be able to understand the importance of Human Resource Development.
2. After studied unit-2, the student will be able to understand the theories of HRD.
3. After studied unit-3, the student will be able to understand development of human capacity through training.
4. After studied unit-4, the student will be able to study organizational behavioural issues of HRD.
5. After studied unit-5, the student will be able to study recent trends in HRD.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit - I: Introduction

Human Resource Development: Definition – evolution of HRD from Personnel management – Developmental perspectives of HRD – HRD at micro and macro levels – Outcomes of HRD in the National and Organizational contexts – Qualities and competencies required in a HRD professional – Development of HRD movement in India.

Unit-II: Practices and Theories of HRD

Concepts of HRD – Systems of HRD – Human Resource planning – Potential Appraisal - Assessment center – Performance appraisal – Career planning and Succession planning – Reinforcement theories – Cybernetic and information theories – Cognitive theories and problem solving theories – Experiential learning to attain self-development.

Unit – III: Development of Human Capacity

Development of Human Capacity: Concept – Attitude – Knowledge – Values – Loyalty and Commitment – Leadership development. Training and Development: Meaning and scope of training – Education and development – Importance and types of training – Effectiveness of Internal and External training. Evaluating HRD: impact and assessment of HRD.

Unit-IV: Organizational Behaviour of HRD

Organisational Behaviour of HRD: Meaning of Organisational development – intervention – Programmes and techniques – Behavioural modelling – Gaming – Quality of Work life – Quality of Life Programs – Team building – Grid training – Benefits of organisational development – Organizational culture – Organizational development – Review of organizational behavior.

Unit-V: Recent trends in HRD

Recent trends in HRD: Aims and policies of HRD - Training for trainer and HRD – Professionals – Promoting research in HRD – Significance of HRD in Corporate Sector - Impacts of developments in the other fields such as Business management, Communication, Psychology and Information technology.

Text Books

1. Unit-1: Dr. J. Jayasankar (2014), Human Resource Management, Margham Publications, Chennai.
2. Unit-2: Dr. K. Karuppiah and Dr. G. Hemapriya (2019), Thakur Publications, Chennai.
3. Unit-3: Arun Monappa, (1997), Managing Human Resources, Macmillan India Limited, New Delhi
4. Unit-4: Batra V.P. (1998), The Economy and Human Resources, B.R. Publishing Corporation, Ansari Road, Darya Ganj, New Delhi.
5. Unit-5: Lakshmanasamy T. and T.M. Srinivasan, (1997), Economics of Human Behaviour, Allied Publishers, New Delhi – Chennai.
8. Human Resource Development [Paperback] Dr. Mukund Chandra Mehta, Doel Kar Paperback – 1 January 2020

References

1. Lallan Prasad & A.M. Bannerjee- Management of Human Resources, Sterling Publishers Private Limited, New Delhi 1985.
2. Mitchael V.P. (1995), Human Resources Management and Human Relations, Himalaya Publishing House, New Delhi.
3. C.Krishnamurthy – Human Resource Management – Macmillan publishers India Limited, New Delhi 2010.
4. SureshVyas, HRD Priorities, Pointer Publishers, Jaipur – 1998
5. Margaret Anne Reid, Harry Barrington and Mary Brown – Human Resource Development – Chartered Institute of Personnel and Development – New Delhi 2007.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

THIRUVALLUVAR UNIVERSITY
M.A. ECONOMICS
SYLLABUS
UNDER CBCS
CORE PAPER
PAPER - 9
INTERNATIONAL ECONOMICS

Course Objectives

1. To prepare presents clear explosion of the theory and principles of international economics that are essential for understanding evaluating to the important international economic problems.
2. To acquire basic knowledge about International Trade and trade issues.
3. To understanding of the key concepts and practical applications of international trade.
4. To outline the development trade theory historically, differentiating standard classical and trade theories.
5. To critically comment on and participate in current debates on international economic policy.

Course Outcomes

1. After studied unit-1, the student will be able to understand various international trade theories.
2. After studied unit-2, the student will be able to know the terms of trade and its implications.
3. After studied unit-3, the student will be able to get thorough knowledge on Balance of payments and various suggestions to correct disequilibrium.
4. After studied unit-3, the student will be able to understand the implications of international organizations.
5. After studied unit-4, the student will be able to acquire knowledge on trade problems and trade policies in India

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1: Trade Theories of International Trade

Theories of Absolute advantage and Comparative advantage-Haberler's Opportunity cost Theory- Modern Theory of International Trade: Heckscher- Ohlin theory of trade-Kravis and

Linder theory of trade –Standard trade model - Rybczynski Theorem-External Economics of scale and the international location of production.

Unit-2: Theory of Interventions

Concepts of terms of trade, types and limitations-Measurement of gains from trade and their distribution-Trade as an engine of economic growth; welfare implications-Tariff – Quota -Non-tariff barriers and their implications – Economic effects of tariff and Quota on National Income – Output, Employment.

Unit-3: Balance of Payments

National Income accounting and the balance of payment-Causes and measures to correct BOP Disequilibrium-The process of adjustment under systems of gold standard, fixed exchange rates and flexible exchange rates-Foreign trade multiplier with and without foreign repercussion and determination of National Income Relative merits and demerits of fixed and flexible exchange rate in the contest of growth and development in developing countries.

Unit-4: Exchange rate models and International Organisation

Purchasing power parity – Exchange rate – Interest rate and money – Exchange rate and price level – over shooting exchange rate model - Rise and fall of gold standard and Bretton – Woods system-Role of IMF, IBRD-IMF and World Bank from the point of view of India-Theory of short – term capital movement – FDI-Role of WTO, UNCTAD and Asian Development Bank.

Unit -5: Trade Policies

The Instruments of Trade Policy-the Political Economy of Trade Policy- Trade Policy in Developing Countries- Controversies in Trade Policy- International monetary Systems- Optimum Currency Areas and the European Experience- Financial Globalization- Opportunity and Crisis- Developing Countries: Growth, Crisis, and Reforms. -Recent changes in the Direction and Composition of trade and their implications-Rationale and impact of trade reforms since 1991 on balance of payments-Problems of India's International debt-Working and regulations of MNCs in India-Instruments of export promotion and recent import and export policies.

Text Books

- Unit-I:Jhingan M.L. International Economics, Vrinda Publications (P) Ltd.,
- Unit -II:Soderstrom Bo and Geoffrey, Reed. International Economics, Macmillan Press Ltd, London -1990
- Unit-III:Jhingan M.L. International Economics, Vrinda Publications (P) Ltd.,
- Unit-IV:Jhingan M.L. International Economics, Vrinda Publications (P) Ltd.,
- Unit - V:Soderstrom Bo and Geoffrey International Economics, The Macmillan Press Ltd, London-1990

References:

Krugman P. R., Obstfeld M., and Melitz M., (2018), International Economics: Theory and Policy, 11th Edition, Pearson, New York.

Salvatore D. (1997), International Economics, Prentice Hall of India, (PHI), New York.

Carbough ,R. J. (2008), International Economics, South Western, Cengage Learning, United Kingdom.

Dana, M. S. (2000), International Economics, Routledge Publications, London.

Bhagwati J. (1981), International Trade, Cambridge University Press, London.

Van Marrewijk, C., (2007), International Economics, Oxford University Press, New Delhi.

Caves, R, R. Jones, and J. Frankel, (1999), World Trade and Payments: an Introduction, Addison-Wesley.

Soderston, BO and Geffry Reed (1994) International Economics, thePalgrave Macmillan; 3rd edition, London

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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CORE PAPER
PAPER 10
ECONOMICS OF GROWTH AND DEVELOPMENT

Course Objectives

1. Economic growth and development forms the basic theoretical foundation of the core subject.
2. The concepts, theories and diagrammatical representations use the most important theoretical tools that help the student to understand the subject.
3. The subject helps to understand the recent study on optimal aggregate economic growth models and comments on the difficulties encountered.
4. It enables to understand economic stability and comprehensive economic development.
5. The knowledge of the subject gives idea to frame policy to reduce economic equality and improve social justice.

Course Outcomes

6. After studied unit-1, the student will be able to understand the growth and development.
7. After studied unit-2, the student will be able to acquire knowledge on various theories of economic development.
8. After studied unit-3, the student will be able to analyze various growth models.
9. After studied unit-4, the student will be able to get knowledge on various tools to measure the economic development.
10. After studied unit-5, the student will be able to identify the social and institutional factors and its role in economic development.

11.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1: Introduction

Growth and Development – Concepts and Approaches national income and per capita income – Measurement of purchasing power parity – GNP – a biased index of development and welfare – construction of poverty weighted index of social welfare – indicators of development and growth - Obstacles to economic development - Economic and Non-Economic factors - Meaning and characteristics of Modern Economic Growth.

Unit-2: Theories of Economic Development

Schumpeter's Theory – Criticism and underdeveloped countries - Rostow's stages of Economic Growth - Nurkse's Theory of Disguised unemployment as a potential - Lewis' Theory of Unlimited Supplies of Labour - Leibenstein's Critical Minimum Effort Thesis.

Unit-3: Growth Models

The Harrod – Domar Model - Joan Robinson's Model of Capital Accumulation - Models of Technical Change - The Solow Model of Long – Run Growth - Steady-State Growth.

Unit-4: Measures for Economic Development

Capital Formation and economic development - Fiscal Policy in economic development - Population Growth and Economic Development - Human Capital Formation and Manpower Planning - Role of the state in Economic Development.

Unit-5: Social and Institutional aspects of Economic Development

Poverty in India – Absolute and Relative, causes of poverty, Poverty Alleviation Programmes - Economic Inequalities in India – Growth vs Equality, Estimates of Inequality, Causes and Policy Measures – Unemployment – Its nature and extent, causes and Policy measures of unemployment.

Text Books

Unit-1: Dutt and Sundaram, K., (2017), Indian Economy, Sultan Chand and Co, New Delhi.

Unit-2: Alex Mourmourras, Peter Rangazas and Sibabrata Das - Economic Growth and Development – A Dynamic Dual Economy Approach Springer International Publishing 2018.

Unit-3: Philippe Aghion and Steven N. Durlauf, A Hand Book of Economic Growth, Vol. 1A, Elsevier

Unit-4: Albert O Hirschman, the Strategy of Economic Development, Yale University Press.

Unit-5: Amartyan Sen, (1998), Resources, Values and Development, Harvard University Press.

References

1. Kindleberger, C.P. (1977), Economic Development, (3rd Edition), McGraw Hill, New York.
2. Meier, G.M. (1995), Leading Issues in Economic Development, (6th Edition), Oxford University Press, New Delhi. Latest edition.
3. Myint, Hla (1965), The Economics of Underdeveloped Countries, Preager, New York.
4. Dwight H. Perkins, (2012), Economics of development, 7th Edition, W.W.Norton and Company.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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CORE PAPER
PAPER - 11
RESEARCH METHODOLOGY

Course Objectives

1. To understand research terminology.
2. To make students capable of designing an elementary research projects.
3. This paper has an objective of exposing the students on various research concepts.
4. The paper will help to acquiring research skill and capability to take of the project work.
5. To understand the components of literature review process.

Course Outcomes

1. After studied unit-1, the student will be able to understand the significance of research.
2. After studied unit-2, the student will be able to gain knowledge on designing research.
3. After studied unit-3, the student will be able to identify the important conditions in the formulation of hypotheses.
4. After studied unit-4, the student will be able to gain proficient in organizing economic survey.
5. After studied unit-5, the student will be able to become proficient in writing of research report

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

UNIT-1: Introduction

Meaning, Nature and Scope of Social Research – objectives, characteristics and uses of social research- Relevance of social research - Types of Research - Identification of a Research Problem – Qualities of good research – Importance of literature review in social science.

Unit –2: Sampling and Data collection

Sampling; Need, types, Probability sampling, random, systematic, stratified, multistage or cluster sampling, Non Probability sampling; Purposive Judgment, quota and snowball sampling- Data collection; Primary and Secondary data; NSS and censuses data Methods of data collection- Tools of data collection; schedule and questionnaire.

Unit – 3: Data Processing and Presentation

Processing and analysis of data: Editing, coding and tabulation; use of computers in social science research- Diagrammatic and graphic representation of data- Interpretation of results and Report writing – Preparation of Project Proposals.

Unit – 4: Statistical Inferences

Census Versus sampling -Random and Non-Random sampling Techniques- Estimation – Point and interval estimation – Statistics and Parameter – Standard Error – Confidence interval- Null and Alternative hypothesis – Type I Error and Type II Error, Level of Significance – Critical region – Steps in Testing of Hypothesis.

Unit-5: Format of Research writing:

Report Writing Requirements and stages of Report writing, format of report writing– Precautions in report writing – Bibliography–Role of Computers in research – Aims and objectives of presentation.

Text Books

Unit-1:Goode W.J. (1952) and Hatt P.K. Methods in Social Research, McGraw – Hill

Unit-2:Young P (1966) Scientific Social Surveys and Research, Prentice Hall

Unit-3:Kothari C.R. (2010) Research Methodology: Methods and Techniques, Wiley Eastern Limited

Unit-4:Goode, William J., and Hatt, Paul K., Methods in Social Research, New York: McGraw-Hill.

Unit-5:Gopal, M.H., An Introduction to Research Procedure in Social Sciences, Bombay: Asia Publishing House.

References

1. Mukherji, ParthaNath.(2000),Methodology in Social Research, New Delhi: Sage Publication, New Delhi.
2. Misra R.P., Research Methodology A Hand Book, New Delhi: Concept publishers 1988.
3. C.R. Kothari (2002), Research Methodology Vikas publishing House, New Delhi.
4. Kenneth. D, and Bailey (1962), Methods of Social Research, Longman's Green Co, New York.

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CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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CORE ELECTIVE
PAPER - 3
(to choose one out of 3)
A. INDUSTRIAL ECONOMICS

Course Objectives

1. To provide the students with a thorough knowledge and understanding of the basics of industrial economic analyses.
2. To provide them the knowledge of understanding the various theories of industry and industrial location.
3. To make them familiar with the market structure and operation of economies of scale in enhancing the profitability and growth of the industry or firm.
4. To get the ideas of various sources of industrial finance and their operation procedures.
5. To have a better understanding of small-scale industries and their contribution to the Indian economy

Course Outcomes

1. After studied unit-1, the student will be able to understand the role of industry in economic development of a country
2. After studied unit-2, the student will be able to acquire knowledge on the market structure and market performance.
3. After studied unit-3, the student understands the pattern of industrial development over the decades in India and its contributions
4. After studied unit-4, the student is able to learn the different sources of finance and its procedures.
5. After studied unit-5, the student will be in a position to analyze the existence of different small-scale industries and its nomenclature.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit – I: Theories of Industries

Meaning of Industrialization, the role of Industry in Economic development -Theories of Industry: Hoffman, Chennery and Gershenkron. Weber's theories of Industrial Location

Unit- II: Market Structure and Market Performance

Concepts and organization of a firm, Market structure – Sellers concentration - Product differentiation, Entry conditions, Economies of scale - Profitability and innovation - Growth of firm – Size and Growth, Growth and Profitability of the Firm - Constrains on growth; Productivity and efficiency

Unit– III: Industrial Growth and Pattern

Review of Industrial Growth under planning and structural transformation - Role of Public and Private Sector - Its shortcomings - Industrial policy 1991 and subsequent changes, FDI

Unit- IV: Industrial Finance

Industrial Finance: Sources of finance –Internal, External and other components of finance - State level financial institutions SFC, SIDCO, SIDBI– Central level financial institutions IDBI, IFCI, ICICI, - Commercial Banks.

Unit– V: Small Scale and Rural Industries

Importance of small scale enterprises - Problems of SSIs and its sickness- Measures to promote SSI - Need for Rural Industrialization Significance of cottage industries in employment generation – Government incentives.

Text Books

Unit-1KiranMrsJotwani -Industrial Economics, M.Com Semester III, NiraliPrakashan Publishers, New Delhi 2016

Unit-2 Barthwal, R. R. Industrial Economics: An Introductory Textbook. New Age International Publishers, New Delhi.,2019.

Unit-3Marshall, A. Elements of Economics of Industry, Simon Publications, UK.(2003):

Unit-4 Rajan Mishra - Industrial Economics and Management Principles, New Delhi, Laxmi Publications 2017.

Unit-5 S.B. Gupta (2017), Industrial Economics, SBPD Publications, New Delhi.

References

1. Lee, N., Jones, R. M., and Tyson, W. J. (1985). An Introduction to Industrial Economics, Allen and Unwin Publications. London:
2. Jayanta K. Nanda (2001), Industrial Development, Sarup Book Publishers (P) Ltd. New Delhi.

3. SayedVazithHussain, 2003, Small Scale Industries in the New Millennium, Sarupal Sons Publishers, New Delhi.
4. Desai S.S.M and Bhalerao. N, 2001, Industrial Economy of India, Himalaya Publishing House, Mumbai.
5. VivekMadhukerDandekar, 2016, Handbook of Small Scale Industry, Mangalam Publishers, Delhi.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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PAPER - 3
B. ECONOMETRICS

Course Objectives

1. To develop the application of econometric methods in economics and business data.
2. To provide them basic understanding of the principles and foundations of econometrics.
3. To provide the students with a thorough knowledge of advanced econometric theories and their empirical applications.
4. To create awareness on econometric models and its applications
5. To understand and build models for existing volatility in the statistical data.

Course Outcomes

1. After studied unit-1, the student will be able to understand the concept of econometrics.
2. After studied unit-2, the student will be able to know the perception of lagged variables, usage of dummy variables and testing the validity of the regression analysis.
3. After studied unit-3, the student will be able to understand the simultaneous equation model.
4. After studied unit-4, the student will be able to understand the usage of secondary data analysis.
5. After studied unit-5, the student will be able to build econometric model based on the nature of data and its applicability.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit – I: Introduction to Econometrics and Problems of Error Estimation

Meaning, Nature and scope of econometrics, Simple and general linear regression model – Assumptions, Estimation through OLS approach and properties of estimators- Problems of Heteroscedasticity, Multi collinearity and Auto-Correlation.

Unit- II: Regression with Qualitative and Dummy variables

Regression with Qualitative and Lagged Variables, Dummy Variable Techniques- Testing structural stability of regression models, Regression with dummy dependent variables, Uses of Dummy variables.

Unit- III: Simultaneous Equation Models

Simultaneous equation models: equation bias and inconsistency of OLS estimators, The identification problem and the rules of identification. Methods of estimating simultaneous equation system, instrumental variables. Estimation of demand, production: Cobb Douglas and cost functions.

Unit- IV: Stationarity and Forecasting of Data

Stationarity, unit roots, co-integration-spurious regression, Dickey-Fuller test, Error correction mechanism- Forecasting with ARIMA modeling- Box-Jenkins methodology.

Unit- V: Vector Auto Regression and Volatility Structure Model

Vector Auto Regression-Problems with VAR modelling, its applications. Volatility Structure Model: ARCH and GARCH.

Unit	I. Remembering	ii.Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Text Books

Unit-1: Damodar G. Gujarati, Dawn Porter and SangeethaGunasekar, “Basic Econometrics”, McGraw Hill Publications, New Delhi, 2011.

Unit-2 JefferyWooldrige, “Introductory Econometrics”, Cengage Publications, New Delhi, 2014.

SampritChaterjee and AlisHadi, “Regression Analysis by Example”, Wiley Publications, Mumbai, 2013.

Unit-3Dominik Salvatore and Derrick Reagle, “Schaum’s Outline of Statistics and Econometrics” (Schaum’s Outline Series), McGraw Hill Education, New Delhi, 2011.

Unit-4

William H. Greene, “Econometric Analysis”, Pearson Education, New Delhi, 2003.

Steven C. Wheelright and Rob J. Hyndman and Spyros Makridakis, “Forecasting: Methods and Applications”, Wiley Publications, Mumbai, 2008.

Unit-5 Walter Endens, “Applied Econometric Time Series”, Wiley Publication, Mumbai, 2013.

References

1. Goldberger, A.S. (2000) Introductory Econometrics, Harvard University Press, Cambridge.
2. Gujarati, D. (2004) Basic Econometrics, McGraw Hill, New Delhi.
3. Pattreson, Kerry (2000) An Introduction to Applied Econometric: Time Series Approach,
4. RamanathanRamu (2002), Introductory Econometrics with applications, Thomson South Western, Singapore
5. Wooldridge (2006), Introductory Econometrics, Thomson-South Western, Singapore.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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PAPER - 3
C. HEALTH ECONOMICS

Course Objectives:

1. After this course the student will be able to master key economic concepts and analytical tools needed to analyze health economic.
2. To assess the effacing and effects of function of cost implications.
3. To improve the policy relevance and utility though assessment planning and avoidance of wasteful expenditure in the hospital.
4. Competence to apply economic concept and model to the fields of demand for health.
5. Demand for health services, insurances in developing country.

Course outcomes:

1. After studied unit-1, the student will be able to get awareness about health concept and its indicators.
2. After studied unit-2, the student will be able to know the issues of general health facilities.
3. After studied unit-3, the student will be able to understand the need for health care
4. After studied unit-4, the student will be able to understand the importance of health education new health policy.
5. After studied unit-5, the student will be able to analyse the situations of health in developing countries.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit – I: Basic concepts

Definition and Dimensions of Health [WHO definition]-Meaning and Importance of Health Economics- Determinants of Health- Input and Output Indicators of Health.

Unit -II -Health and Development

Income and Health Linkages- Concept of Wellbeing – PQLI and HDI- Poverty and Health – Occupational Health Hazards- Fertility, Morbidity, Mortality and Life Expectancy- Nutrition and Health – Mal-nutrition – Under-nutrition.

Unit -III - Health as Investment

Economics of Public Health- Education and Health – Concept of Health Education- Capital Formation in Health Care.

Unit-IV - Micro-Economics of Health Services

Demand for health services - Preference for health care and health cure - Income and Price effects- Physician as a price-discriminating monopolist- Health Production Function with Illustration.

Unit – V: Health in Developing Countries

Significance of Health in Developing Countries – Measuring the burden of disease – Concept of DALY and QALY – Challenges for the Future.

Text Books

Unit-1:Paul J. Feldstein, (2011), Economics of Health Care, 3rd Edition, cengage learning India private limited, New Delhi.

Unit-2:William Jack Principles of Health Economics for Developing Countries, WBI Development studies The World Bank, Washington. D.C.1999.

Unit-3: Curly. A.J. (2010) – Directory of Health Economics, EdwasdElgas Publications, Holland.

Unit-4:SomkidKaewsonthi and Alan G. Harding (1993), Micro Economic Analysis and Applications in the Health Sector, Students Guide [The Centre for Health Economics Faculty of Economics, Chulalonglorn University.

Unit-5: HimanushaSkar, Rout and Prashant Panda (2007) – Health Economics in India, New Century Publications, Delhi.

References

1. Guire A.M, Henderson J and Mooney G. (2016) The Economics of Health Care: AnIntroductory Text. Routledge and Kegan Paul London and New York. PP. 9-30
2. Park, K. Park's Text Book of Preventive and Social Medicine. M/sBanarsidasBhanot Publishers, Jabalpur 23rd edition 2015.
3. Government of India National Health Policy, New Delhi.2015.

4. SomkidKaewsonthi and Alan G.Harding(1993), Micro Economic Analysis and Applications in the Health Sector, Students Guide [The Centre for Health Economics Faculty of Economics, Chulalongkorn University.
5. WHO South-East Asian Region. SEA/ACMR12/Agenda Item 13.(1986), Health Economic Research. Prepared by SomkidKaewsonthi Chulalongkorn University, Bangkok Thailand.
6. David H. Peters, et al. (2002)., Better Health Systems for India's Poor Findings, Analysis and Options. Human Development Network. Health, Nutrition and Population Series, The World Bank Washington.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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OPEN ELECTIVE
PAPER - 3
(to choose one out of 3)
A)Tamilnadu Economics

Course Objectives(CO):

- 1.To understand the relevance of Economy of the State
2. To understand the sectoral contributions of Tamilnadu

Course Outcomes

At the end of course, the students will be able to

CO1: Understand the geographical feature and natural resources of the Tamil Nadu Economy

CO2: Formulate the human development indicators and relevance to the economy

CO3: Appreciate the growth and development planning in Tamil Nadu

CO4: Evaluate the structure and growth of the agricultural and industrial sector

CO5: Demonstrate the development of service sector in the economy

Unit	I. Remembering	ii.Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1:

Basic Concept of Tamilnadu Economy:Introduction Meaning of regional economy -geographical features-natural resources. Land, forest, fisheries and minerals-relevance of regional economics.

Unit 2:

Human Capital: Human Resources in Tamilnadu- Analysis of 2011 Census : Size, growth , density, occupation pattern, sex ratio , fertility rate- education and health, nutrition – water supply, housing and slums – evaluation of poverty alleviation programmes in Tamilnadu

Unit-3:

Planning: Planning and development in Tamilnadu- Trend and composition of SDP- PCI –Sectoral composition – Infrastructure development in Tamilnadu

Unit-4:

Agriculture and Industry: Agriculture growth in Tamilnadu-Cropping pattern- Agricultural Productivity –Agricultural policy- Agricultural marketing. Growth of Industry-Changes in Industrial structure –Large Scale and Small Scale Industries-Industrial finance in Tamilnadu

Unit-V

Service Sectors: Trends in Energy Sector –Power as a bottle neck in development-Transport and communication sector- banking sectors

Text Books

1. Leo nard S.J 2006 “Tamil Nadu Economy”, New Delhi: Rejiv Bero Macmillan India Limited
2. Rajalakshmi,N. 2009 “Tamil Nadu Economy”, Mumbai,’Business Publication
3. Manickam S 2006 “Tamil Nadu Inperspective” Uyrimmai Publication , Chennai

Reference

1. Kurian C.T. and James Joseph, 1979 Economic change I Tamil nadu; A regionally and functionally disaggregated study, allied publishers Pvt.Ltd.
2. Government of Tamil Nadu, Tamil Nadu an economic appraisal, evolution and applied research department, Chennai, Various issues
3. Madras Institute id Development Studies,1988,
Tamil Nadu Economy performance and issues, oxford and IBH Publishing Co, New Delhi.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

THIRUVALLUVAR UNIVERSITY
M.A. ECONOMICS
SYLLABUS
UNDER CBCS
OPEN ELECTIVE
PAPER - 3
B)Labour Economics

Course Objectives (CO):

1. To familiarize the students with the problems of labour and the stress and strains developed in Industrial economy.
2. To develop the analytical skills of the students identifying the problems of labour and settlement of industrial disputes and evaluate the conditions of Industrial relation

Course Outcomes

At the end of course, the students will be able to

C01: Perform supply and demand analysis in the labour market

C02: Analyze the effect of labour unions

C03: Explain the analyse the determinants of wages

C04: Show what causes changes in the productivity of labour

C05: Understand Labour welfare legislations in India

Unit	I. Remembering	ii.Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1:

Introduction -Concept of Labour and Labour Economics-Labour Problems. -Labour Market – Demand and Supply of Labour – Characteristics of labour market in India.-Recruitment Procedure and Employment Exchange

Unit-2:

Organisation of Industrial Labour: Role and functions of Trade Union-Theories of Trade Unionism (i) Webbs (ii) KarlMarx (iii) Gandhi-Trade Union Movement in India-Recent Trends-Justifications of Strikes and Lockouts

Unit-3:

Industrial: Disputes and International Labour Organisations (ILO)-Industrial Disputes: Causes and Consequences-Industrial Disputes in India-ILO Purposes-Constitution-Functions-ILO and India.

Unit-4:

Industrial Relation: Need for Industrial Relation Machinery-Preventive and Curative methods-Collective Bargaining, Arbitration and Adjudications-Industrial Democracy, concept of Workers participation in management-Role of State in Industrial Relations

Unit-5:

Labour: Welfare-Labour Welfare concept, significance, classification, Principles and programmes-Concept of Labour in India; Factory Act ,Labour Welfare Legislation in India.

Text Books

- 1.Tyagi P.B (2016) Labour Economics and Social Welfare,(Jaiprakash Nath & Co. Merut)
2. Perre Cahur, Stephane Carcillo and andre zylberberg,Labour Economics, PHI Learning Delhi, 2 nd Edition 2014

Reference

- 1.Baholiwal T.N. (1981) Economics of LABour and Industrial Relations,(Sahity Bhawan,Agra)
2. Giri V.V (1985) Labour Problems in Indian Industry (Asia Publish House, Bombay)
3. Peter Solane Paul Latreille and Nigel Oleary, Modern LABour Economics,Routledge London 1 st Ed.2013

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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OPEN ELECTIVE
PAPER - 3

C) Urban Economics

Course Objectives (CO): The study of urban economics in intended

1. To make the students understand the economic factors and forces underlying the process of urbanization
2. . 2. To develop students skill to examine the economic aspects or urban problems.
3. 3. To provide insights into the formation of effective urban policies

4. Course Outcomes

1. At the end of course, the students will be able to
2. CO1: Understand the theories of urbanization
3. CO2: Appreciate the economic and social factors causing migration from rural to urban
4. CO3: Evaluate the problems of urbanization
5. CO4: Formulate the policies for integrated development of towns
6. CO5: Analyse the measures of decentralization industry-growth centres, installing satellite

Unit	I. Remembering	ii.Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1:

The process of Urbanisation:Definition of Urban Area- causes of urbanization. -
Theories or urban structure and urban growth-Concentric Zone Theory-Central Place Theory-Urban base theory. -Features of urbanization in Developing countries.

Unit-2:

Rural-Urban migration:Theories of Rural- Urban migration-Rosente in's Law, Lewis-Fei Ranis Model, Lee's Theory-Concept of informal sector and its role in economic development-Factors affecting migration-Economic Factors-Push and Pull factors Social and other factors

Unit-3:

Problems of Urbanisation:Urban Transportation-Slums,Housing and Urban Renewal-Urban Water supply and Public Health-Urban Financial Problems.

Unit-4:

Urbanisation in India:21st Century Urbanisation in India-Growth of Urban Population-Urbanisation without labour absorption in India

Unit-5:

Urban Development Policy in India-Policies and Programmes under the plans- Integrated Development of small and medium towns-Urban development and Housing Policy-Measures to control urban growth-Decentralisation industry-Growth Centres-Satellite towns

Text Books

1. Ashish Bose (1989) India's Urbanisation 1901-2001 (New Delhi,Tata Mrgraw Hill Co.)
2. Francis Cherunillam (2016) Urbanisation in Developing Countries (Bombay,Himalaya Publishing House)
3. Ghanshyam Shah, (2016) Urban Economics (Sage Publications,New Delhi)

Reference:

1. Brian A and Ravinder Singh,(edited) (1995) Housing the Urban poor, Policy and Practice in Developing Countries, (Sage Publications, New Delhi)
2. Fred Durr, The Urban Economy (London, Index Educational Publishers) 1971.
3. Harris Tordon (1973), Introduction to urban Economic Analysis and policy (New York)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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MOOC Courses

Inclusion of the Massive Open Online Courses (MOOCs) with two credits available on SWAYAM, NPTEL and other such portals approved by the University Authorities.

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SEMESTER-IV
PAPER 12
PUBLIC FINANCE II

Course Objectives:

1. To study the tax structure in India
2. To know about the policies of Public Debt
3. To understand the role of fiscal policy and its functions.
4. To understand the role of fiscal federalism and its issues.
5. To understand the role of Government in Local Finance.

Course Outcomes:

6. After studied Unit-1, the student will be understand tax structure of India.
7. After studied Unit-2, the student will be to understand theories of public debt and its impact.
8. After studied Unit-3, the student will be able to acquire knowledge on the fiscal policy and its objectives.
9. After studied Unit-4, the student will be able to know about the Finance Commission and its Recommendations.
10. After studied Unit-5, the student will be able to know about the role of Local Finance.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-I: Tax Structure in India: Income tax, Corporation tax, Excise duty, VAT, State taxes: Sales tax, Agricultural Income tax - Tax Evasion - Tax Reforms in India – Direct

and Indirect Tax – Institutional Structure of GST – Performance of GST in India.

Unit-II: Public Expenditure in India: Growth and Composition of Public Expenditure in India since 1990s - Appraisal of Public expenditure policy in India – Expenditure on Education, Health, Agriculture, Rural Development Poverty, Women Development and Social Welfare.

Unit-II: Deficits and Public Debt: Deficits – Revenue Deficit, Fiscal Deficit and Primary deficit- FRBM Act and its Implementation – N. K Singh Committee Report - Theories of Public Debt –Deficit and Debt - Burden of Public Debt - Magnitude and Impact of Public debt in India - Management of Public debt.

Unit-III: Fiscal Policy: Objectives – Fiscal Policy for Stabilization and Growth - Fiscal Policy alternatives – Built – in – Stabilizer - Deficit Financing - Fiscal Policy Reforms since 1990s in India.

Unit-IV: Fiscal Federalism: Theories of Fiscal Federalism - Fiscal Federalism in India – Institutional Structure – Changes in Center – State Financial relation in India since 1950s - Finance Commissions - Recommendations of Fourteenth and Fifteenth Finance Commission - Panchayat Raj Institutions in India - 73rd and 74th Amendments of the Constitution and the Role of Local Self Government - Role of State Finance Commission.

Text Books:

Unit I: Mahesh C. Purohit and Vishnu Kanta Purohit, (2014), *Handbook of Tax System in India: An Analysis of Tax Policy and Governance*, Oxford University Press, New Delhi.

Unit II: Tyagi B.P. (2009) *Public Finance*, Jai Prakash Nath & Co, Meerut

Unit III: Amerash Bagchi (2005), *Readings in Public Finance*, Oxford University Press, New Delhi.

Unit IV: Lekha S. Chakraborty, (2016), *Fiscal Consolidation, Budget Deficits and the Macro Economy*, Sage Publications India Private Limited, New Delhi.

Unit V: Rao, M. Govinda and Nirvikar Singh, (2005), *The Political Economy of Federalism in India*, Oxford University Press, New Delhi.

References:

Mahesh C. Purohit and Vishnu Kanta Purohit, (2014), *Handbook of Tax System in India: An Analysis of Tax Policy and Governance*, Oxford University Press, New Delhi.

Amerash Bagchi (2005), *Readings in Public Finance*, Oxford University Press, New Delhi.

Rao, M. Govinda and Nirvikar Singh, (2005), *The Political Economy of Federalism in India*, Oxford University Press, New Delhi.

Lekha S. Chakraborty, (2016), *Fiscal Consolidation, Budget Deficits and the Macro Economy*, Sage Publications India Private Limited, New Delhi.

Government of India, Economic Survey (Annual issues). Ministry of Finance, New Delhi.

Articles from Economic and Political weekly.

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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UNDER CBCS
PAPER - 13

MANAGERIAL ECONOMICS

Course Objectives:

1. The main objective of this paper is to apply in business decision making, demand forecasting and pricing methods.
2. The students understand the role and responsibilities of Managerial Economist.
3. The students acquires the knowledge of the Demand forecasting and methods of Forecasting.
4. To gains knowledge of different methods of pricing for a product.
5. The student understands the meaning of Capital Budgeting and Methods of appraising Project profitability.

Course Outcomes:

1. After studied unit-1, the student will be able to understand the concept of Managerial Economics, Role of Managerial Economist and Decision making process.
2. After studied unit-2, the student will be able to acquire Knowledge of Demand forecasting and forecasting methods.
3. After studied unit-3, the student will be able to gain knowledge of the different methods of fixing price.
4. After studied unit-4, the student will be able to gain knowledge on Capital Budget.
5. After studied unit-5, the student will be able to gain knowledge of investment decisions and different methods of appraising project profitability.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-I: Introduction

Meaning, Scope and Significance of the study of Managerial Economics–Distinguish

between Managerial Economics and General Economics - Objectives of Modern Business firm – Baumol's Sales Maximization Theory - Role and social responsibilities of managerial economists.

Unit-II: Demand Forecasting

Demand forecasting- Meaning – Types of forecasting – Purpose of forecasting - Methods of forecasting – Trend Projection using Regression equations – Leading indicators - Methods of forecasting for a new product – Qualities of good forecasting.

Unit-II: Pricing Strategies

Pricing Policies – Objectives – factors - Pricing methods: Cost plus pricing, Target pricing, Marginal cost pricing, Going rate pricing and Administered Pricing. Specific Pricing problems: Skimming and Penetration pricing, Pricing of Joint Products, Life Cycle of a Product, Product line Pricing, Resale price maintenance, Pricing by manufacturers and retailers, Export pricing and Dual pricing.

Unit-IV: Capital Budgeting

Capital Budgeting: Meaning – Need – Nature – Size of Capital Budgeting - Forms of Capital budgeting – Cost of Capital: Debt Capital – Preference share capital – Equity Capital – Retained earnings – Average cost of capital.

Unit-V: Investment Decisions and Project Profitability

Investment Decision: Pay-back Method – Discounting risk – Sensitivity analysis – Probability theory approach – Certainty Equivalent approach – Utility Theory approach. Project Profitability: Ranking of alternative investment – Methods of appraising profitability

Text Books:

1. Unit I: William Boyes (2009) The New Managerial Economics (Indian Adaptation), New Delhi, Sigtantra
2. Unit II: Joseph Nellis and David Parken The Essence of Business Economics, Prentice – Hall India , 2003.
3. Unit III: William Boyes (2009) The New Managerial Economics (Indian Adaptation), New Delhi, Sigtantra
4. 4. UnitIV:R.L.Varshney&K.L.Maheshwari Managerial Economics, Sultan Chand and Sons, New Delhi 2016.
5. 5. Unit V:R.L.Varshney&K.L.Maheshwari Managerial Economics, Sultan Chand and Sons, New Delhi 2016.

Reference Books:

1. Keat, Paul G and Young, Philip K.Y (2005) Managerial Economics, Pearson Education, New Delhi.
2. K. Jothi Sivagnanam, and R. Srinivasan, (2010), Business Economics, Tata McGraw Hill Education Private Limited, New Delhi.
3. William Boyes - The New Managerial Economics - Indian Adaptation, New Delhi, Sigtantra 2009.
4. Joseph Nellis and David Parken The Essence of Business Economics, Prentice – Hall India Publishers – 2003.
1. 3. R.L. Varshney & K.L. Maheshwari Managerial Economics, Sultan Chand Publishers, New Delhi, 2016

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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UNDER CBCS
PAPER - 14

HISTORY OF ECONOMIC THOUGHT

Course Objectives

1. To learn and discuss how the economic thought has evolved over time.
2. To critically examine and compare the evolved economic thoughts.
3. To introduce the students to understand the broad concepts of various schools of the economic thought.
4. To encourage students to explore the Indian thoughts and their relevance.
5. To make students capable of distinguish between the main schools and trends in the history of economic thought.

Course outcomes

1. After studied unit-1, Student will be able to understand economic thought before classical period.
2. After studied unit-2, the student will be able to understand the classical theories of Value, Growth and Distribution.
3. After studied unit-3, the student will be able to understand the Neo Classical School.
4. After studied unit 4, the student will be able to understand Keynesian revolution and monetarism.
5. After studied unit 5, the student will be able to understand the contribution made by Indian economists.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit -I: Economic Thought Before Classical Economists

Science, Ideology and Paradigms in History of economic thought – The Economics of Mercantilism – The contributions of Physiocracy.

Unit-II: Classical Theories of Value, Growth and Distribution:

Adam smith; Division of labour, Laissez-faire and the harmony of Interests, Canons of Taxation, theory of economic growth - David Ricardo: Theory of value, Theory of Rent, Comparative advantage theory of Trade – T.R. Malthus: Theory of population, and its

criticism, J.B. Say's law - Marxian thought: Labour Theory of Value, Class struggle, the laws of capitalist motion.

Unit-III: The Neo Classical School

The Marginalist Revolution: Value of Marginal Utility Theory - Marginal productivity theory of wage – General equilibrium: Walras and Pareto – Marshall's contributions – Imperfect competition – Criticism of neo classical school: Veblen Institutional Economics

UnitIV: The Keynesian Revolution and Monetarism

Keynesian theory of Employment on Money and Speculation – Keynes on Business cycle - Keynes Monetarism: Milton Friedman's new quantity theory of Money – Friedman's fundamental Monetarist Propositions.

Unit –V: Indian Thoughts

Indian Economic Thought: R.C Dutt - Economic ideas of Dutt, Gandhian Economics -- Relevance of Gandhian Economic Thought to Modern India, Agricultural Economics- Economics of Caste – Economics of Socialism, D.R.Gadgil: Industrial Evolution of India – Rational Expectations theory – Amartya Sen's Capability theory of Welfare.

Text Books

1. Unit-1: V.Loganathan, (1987), A History of Economic Thought, S.Chand and Company, New Delhi.
2. Unit-2: Robert B Ekelund and Robert Hebert, A History of Economic Theory and Method.
3. Unit-3: Seshadri.G.B. (1987), Economic Doctrines, B.R. Publishing Corporation, New Delhi.
4. Unit-4: R.R. Paul, (2018), History of Economic Thought, Kalyani Publishers.
5. Unit-5: M.L.Jhingan, M.Girija and L. Sasikala, History of Economic Thought 3rd Edition, Vrinda Publications.

References

1. Daniel Bell and Irving Cristol (eds), (1981), The Crisis in Economic Theory, Basic Books, Inc., Publishers, New York.
2. E.K. Hunt and Mark Lautzenheiser, History of Economic Thought: A Critical Perspective, Chapters 18 & 19.
3. Mark Blaug, (1985), Economic Theory in Retrospect, Cambridge University Press, Cambridge.

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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CORE ELECTIVE
PAPER - 4
(to choose one out of 3)
A. HUMAN RESOURCES DEVELOPMENT

Course Objectives

6. To pinpoint the resource value of human like other resources.
7. To develop the understanding of the concept of human resource management.
8. To develop the understanding of the impact of training on the HRD.
9. To develop necessary skill set for application of various HR issues.
10. To make students understand the human resource planning and performance appraisal process.

Course outcomes

1. After studied unit-1, the student will be able to understand the importance of Human Resource Development.
2. After studied unit-2, the student will be able to understand the theories of HRD.
3. After studied unit-3, the student will be able to understand development of human capacity through training.
4. After studied unit-4, the student will be able to study organizational behavioural issues of HRD.
5. After studied unit-5, the student will be able to study recent trends in HRD.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit - I: Introduction

Human Resource Development: Definition – evolution of HRD from Personnel management – Developmental perspectives of HRD – HRD at micro and macro levels – Outcomes of HRD in the National and Organizational contexts – Qualities and competencies required in a HRD professional – Development of HRD movement in India.

Unit-II: Practices and Theories of HRD

Concepts of HRD – Systems of HRD – Human Resource planning – Potential Appraisal - Assessment center – Performance appraisal – Career planning and Succession planning – Reinforcement theories – Cybernetic and information theories – Cognitive theories and problem solving theories – Experiential learning to attain self-development.

Unit – III: Development of Human Capacity

Development of Human Capacity: Concept – Attitude – Knowledge – Values – Loyalty and Commitment – Leadership development. Training and Development: Meaning and scope of training – Education and development – Importance and types of training – Effectiveness of Internal and External training. Evaluating HRD: impact and assessment of HRD.

Unit-IV: Organisational Behaviour of HRD

Organisational Behaviour of HRD: Meaning of Organisational development – intervention – Programmes and techniques – Behavioural modelling – Gaming – Quality of Work life – Quality of Life Programs – Team building – Grid training – Benefits of organisational development – Organisational culture – Organisational development – Review of organisational behaviour.

Unit-V: Recent trends in HRD

Recent trends in HRD: Aims and policies of HRD - Training for trainer and HRD – Professionals – Promoting research in HRD – Significance of HRD in Corporate Sector - Impacts of developments in the other fields such as Business management, Communication, Psychology and Information technology.

Text Books

9. Unit-1 Dr. J. Jayasankar (2014), Human Resource Management, Margham Publications, Chennai.
10. Unit-2: Dr. K. Karuppiah and Dr. G. Hemapriya (2019), Thakur Publications, Chennai.
11. Unit-3: Arun Monappa, (1997), Managing Human Resources, Macmillan India Limited, New Delhi
12. Unit-4: Batra V.P. (1998), The Economy and Human Resources, B.R. Publishing Corporation, Ansari Road, Darya Ganj, New Delhi.
14. Unit-5: Lakshmanasamy T. and T.M. Srinivasan, (1997), Economics of Human Behaviour, Allied Publishers, New Delhi – Chennai.
15. Behaviour, Allied Publishers, New Delhi – Chennai.

References

6. Lallan Prasad & A.M. Bannerjee- Management of Human Resources, Sterling Publishers Private Limited, New Delhi 1985.
7. Mitchael V.P. (1995), Human Resources Management and Human Relations, Himalaya Publishing House, New Delhi.
8. C.Krishnamurthy – Human Resource Management – Macmillan publishers India Limited, New Delhi 2010.
9. SureshVyas, HRD Priorities, Pointer Publishers, Jaipur – 1998
10. Margaret Anne Reid, Harry Barrington and Mary Brown – Human Resource Development – Chartered Institute of Personnel and Development – New Delhi 2007.

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

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SYLLABUS
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CORE ELECTIVE
PAPER - 4
B. FINANCIAL ECONOMICS

Course Objectives:

1. The study the nature and functions of Financial economics
2. The subject analyses indebt about the working and functions of Commercial Bank and Reserve Bank of India.
3. To understand the functions and structure of Money market and Capital market.
4. To explore the structure and financial position of Non – Banking Financial Companies.
5. It helps to analysis the scope of International financial market.

Course Outcomes

1. After studied unit-1, the student will be able understand the history of financial market.
2. After studied unit-2, the student will be able to understand the functions of RBI and Commercial Banks.
3. After studied unit-3, the student will be able to study role of money market and capital market inIndia.
4. After studied unit-4, the student will be able get an understanding of the financial position of Non-Banking financial companies.
5. After studied unit-5, the student will be able to understand recent issues in Foreign exchange market.

Unit	I. Remembering	ii.Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit – I Introduction

Nature and Functions of Financial Market – Evolution of Financial System – Structure – Macro Economic Dimensions of the Financial System - Indian Financial System – Indigenous Bankers – Progress of Financial Institution in India – Profitability of Banks in India - Narasimhan Committee on the Banking System in India – ReformsofIndian Financial System.

Unit – II Indian Financial System: RBI and Commercial Banking System

Reserve Bank of India: Functions – Objectives – Instruments – New Monetary and Liquidity Aggregates - Measures and Limitations – Role of RBI in India - Implementation of Monetary Policy and RBI. Commercial Bank: Functions, Services, Objectives and Progress – Issues of Nationalisation of Commercial Banks - Bank's Balance Sheet and Portfolio Management – Credit Creation - Role of Commercial Bank in Developing Economy.

Unit – III Money and Capital Market in India

Money Market: Function, Features and Structure – Composition of Indian Money Market – Characteristics of Indian Money Market. Capital Market: Function, Features and Structure – Composition of Indian Capital Market – Role of Capital Market in Developing Economy – Major Defects of Money and Capital Market in India.

Unit – IV Non-banking Financial Companies

Structure of Development Financial Institutions – NBFC – Structure and Financial Position – Legislative Control of NBFCs – Features of NBFC – Chit Funds – Lessing Company Mutual Funds – Growth of Mutual Funds – Venture Capital Funds – Regulation of Mutual Funds by SEBI – Issues of Stock Exchange in India.

Unit – V Foreign Exchange Market

Meaning of Exchange Rate – Difference between Foreign Currency Rate and Foreign Exchange Rate – Importance of Exchange Rate – Foreign Exchange Market: Transactions of Foreign Exchange Market – Special Drawing Right (SDR) – Exchange Control in India – International Financial Market: International Foreign Exchange Market - Euro Issue – Benefits if Euro Issue – Importance – Factors Influencing International Market.

Text Books

1. Unit-1: K.H.Erickson, Financial Economics : A simple Introduction, Springer Publications 2013.
3. Unit-2 :Frederic, S. Mishkin, (2013), 12th Edition, The Economics of Money, Banking and Financial Market, Pearson.
5. Unit-3 :L.M. Bholeand Jitendra Mahakud - Financial Institutions and Markets, Tata McGraw Hill – New Delhi 2009.
6. Unit-4 :Pathak, V. Bahrathi (2008) Indian Financial System, Pearson India Ltd, New Delhi.
7. Unit-5: Vasant Desai – IndianFinancial System – Himalaya Publishing House, Mymbai2002.

References

1. Frederic, S. Mishkin, Financial Markets and Institutions, 8th Edition, Tata McGraw – Hill publishing Company, New Delhi.
2. Khan. M.Y, Financial Services, 10th edition, McGraw Hill.
3. Pandey, I.M., Financial Management, Vikas Publishing House Pvt Ltd., 11th edition.
4. Prasanna Chandra, Financial Management Theory and Practice, McGraw Hill, 10th Edition.
5. PathakBharti, Indian Financial System, 5th Edition, Pearson India Ltd., New Delhi.
6. Vasant Desai – IndianFinancial System – Himalaya Publishing House, Mymbai2002.

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

7.

THIRUVALLUVAR UNIVERSITY
M.A. ECONOMICS
SYLLABUS
UNDER CBCS
CORE ELECTIVE
PAPER - 4
C. ENVIRONMENTAL ECONOMICS

Course Objectives

1. To apply economic theories in to the environmental problems to solve the social issues.
2. To understand the importance of economic motives in all aspects of human life and will be familiar with constructing economic arguments.
3. To explain environmental degradation in economic terms.
4. To learn the tools to evaluate the policy interventions aimed to environmental conservation in terms of their costs and benefits.
5. To critically comment on current environmental policy issues.

Course Outcomes

6. After studied unit-1, the student will be able to study the scope and significance of environmental economics.
7. After studied unit-2, the student will be able to understand the various causes, and effects of pollution.
8. After studied unit-3, the student will be able to understand the environmental education.
9. After studied unit-4, the student will be able to understand the how environment helps to attain sustainable development.
10. After studied unit-5, the student will be able to acquire knowledge on International environment policy.

Unit	I. Remembering	ii. Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1: Introduction

Nature and Significance of Environmental Economics: Definition and role – Scope and significance of Environmental Economics - Economics and environment – Ecology and Eco system - factors – Meaning and types – Integration of conservation and development – Relationship between environment and economic system.

Unit-2: Environmental Pollution and Problems:

Environmental Pollution: Causes and Effects of Water pollution, Air pollution, Noise pollution, Marine pollution, Soil pollution, Thermal pollution, nuclear hazards. Nature of costs and benefits in controlling pollution. Environmental Victims: Chernobyl nuclear accident and Holocaust – Bhopal gas tragedy- causes and health effects - Protection: Policy measures to control environmental pollution and Public awareness – Environmental degradation.

Unit-3: Value based Environmental Education:

Value based Environmental Education: Meaning – Objectives – Aims – Guiding principles of environmental education – Environmental awareness: Education Institutions, Establishment of Eco club, Establishment of green belt, Campaign through state transport, Members of local bodies and Mass Media – Environmental Ethics and practical problems.

Unit-4: Sustainable Development-

Global warming- impact of global warming in India-Economic growth and the Environment: Environment Kuznets curve- Definition of Sustainable Development, Conditions for Sustainable development-Poverty and the Environmental Degradation- “Green National Accounts” – Green market.

Unit -5: International Environmental Policy:

International Environmental Policy: Issues of Global problems – Trans frontier pollution – International trade and environmental quality – International agreement acceptances – Stockholm conference of Human environment – Framework for environmental action – UN Conference on Environment and Development and its Recommendations.

Text Books

1. Unit-1: Veena Keshav Pailwar – Economic Environment of Business – PHI Learning Private Ltd., New Delhi 2013.
2. Unit-2: H.L.Ahuja – Economic Environment of Business, S.Chand and Company Ltd., New Delhi 2010.
3. Unit-3: Veena Keshav Pailwar – Economic Environment of Business – PHI Learning Private Ltd., New Delhi 2013.

4. Unit-4:H.L.Ahuja – Economic Environment of Business, S.Chand and Company Ltd., New Delhi 2010.
5. Unit-5:Pushpam Kumar – Economics of Environment and Development – Ane Book Private Ltd., New Delhi 2009.

Reference Books:

1. Nick Hanley, JasonF. Shogren, and Ben White - Environmental Economics in theory and practice – Macmillan India Ltd., London: - 2001.
2. H.L.Ahuja – Economic Environment of Business, S.Chand and Company Ltd., New Delhi 2010.
3. Veena Keshav Pailwar – Economic Environment of Business – PHI Learning Private Ltd., New Delhi 2013.
4. Charles D. Kolstad – Environmental Economics – Oxford University Press, New Delhi 2010.
5. Pushpam Kumar – Economics of Environment and Development – Ane Book Private Ltd., New Delhi 2009.

E- Materials

[https://www.goodreads.com/book/show/1356962.The Economy of the Earth](https://www.goodreads.com/book/show/1356962.The_Economy_of_the_Earth)

[https://www.goodreads.com/book/show/2221399.Economics and the Environment](https://www.goodreads.com/book/show/2221399.Economics_and_the_Environment)

<https://www.goodreads.com/book/show/6114467-can-we-afford-the-future>

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

THIRUVALLUVAR UNIVERSITY
M.A. ECONOMICS
SYLLABUS
UNDER CBCS
OPEN ELECTIVE
PAPER - 4
(to choose one out of 3)
A)Economic of Insurance

Course Objectives (CO):

1. To teach the students various issues of Insurance policies
2. To understand the health insurance to evaluate the insurance institutions.

Course Outcomes

At the end of course, the students will be able to

CO1: Understand different aspects of Insurance policies basics

CO2: Obtain a holistic perspective of schemes /health insurance of implemented by government

CO3: To understand the life insurance policies

CO4: To development of insurance institution of market

CO5: Evaluate the Insurance Policies in social welfare

Unit	I. Remembering	ii.Under standing	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Unit-1

Insurance economics basic concept:Introduction: Meaning and Types of Insurance Insurance and importance of its policies. General Insurance- Types of Non-Life Insurance and Marketing of general insurance.

Unit -II:

Health insurance: Features of Health insurance, fire insurance. Investments in Insurance - tax advantaged and non-tax advantaged Insurance

Unit -III:

Life insurance:Life Insurance Contract: Nature and Classification of Policies - Selection of Risk - Calculation of premium - Investment of Funds - Surrender Value

Unit -IV:

Insurance institutions: Role of Risk-Management and Insurance Insurance Institutions as Financial Intermediaries; Insurance institutions as investment institutions; Insurance institutions in Indian capital market.

Unit -V

Social welfare of insurance: Insurance as social welfare and security : Insurance - an Investment - Tax and Non - Tax Advantages - Retirement Planning - pension plans - Insurance Regulation and Development Authority (IRDA)

Reference books

1. Black. K. Jr. and H.D. Skipper Jr.(2000), Life & Health Insurance, Prentice Hall, Upper Saddle River, New Jersey
2. Dionne, G. and S.E. Harrington (eds.) (1997), Foundations of Insurance Economics, Kluwer academic Publishers, Boston.
3. Pteffer, I. And D.R. Klock (1974), Perspectives on Insurance, Prentice Hall Inc., Engle word Cliffs.
4. Williams Jr., C.A. M.L. Smith and P.C.Young (1995), Risk Management and Insurance, McGraw Hill, New York.
5. Skipper Jr., H.D. (ed.) (1998), International Risk & Insurance: An Environmental Managerial Approach, Irwin McGraw Hill, Boston
6. Government of India (1998), Old Age and Income Security (OASIS) Report (Dave Committee Report), New Delhi
7. Insurance Regulation and Development Authority (2001), IRDA Regulations, New Delhi
8. Meier. K.J. (1998), The Political Economy of Regulation: The Case of Insurance, The State University of New York Press, Albany, N.

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			S
CO2			M	M		M	S	S		S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	

**OPEN ELECTIVE
PAPER - 4
B) Rural Economic Development**

Course Objectives (CO):

1. To teach the students various issues of rural development
2. To understand the rural problems of to evaluate the rural development programme

Course Outcomes

At the end of course, the students will be able to

CO1: Understand different aspects of rural development

CO2: Obtain a holistic perspective of schemes / programmes of implemented by government

CO3: Formulate planning and management of rural development programmes

CO4: Demonstrate development programs that are implemented

CO5: Evaluate Regional Planning and Policy implication

Unit-1:

Introduction-Concepts, Pattern of Development - Pattern of Planning-Indicators of rural development-Features of the process of development in different sectors

Unit-2:

Development Issues-Poverty, inequality, unemployment and Regional Disparities-Land Reform measures – Size of land holding, better utilization of inputs-Rural Industrialization - Small scale and Cottage industries – Economic reforms

Unit-3

Institutional and Organisational Changes-Panchyat Raj and Co-operatives-NGO's and People participation – Self Help Groups-Social and Welfare Organisation

Unit-4

Administration and Training Process-Development of Administrative set up – DRDA - SIRD - BDO

-Development of adequate Community leadership-Rural Development Programmes Implementation, Monitoring and Evaluation

Unit-5:

Planning and Policy 1. Rural Health Care Policy-Technology Development Policy-Conservation, Promotion of environment and Integrated development

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Text Books

1. Misra R.P and Sundaram K.V (2009). Rural Area Development: Perspective and Approaches (S.Chand and Co., New Delhi).
2. Mathur Y.B. (2001). Rural Development in India: 1885 - 1995 (Sage Publications, New Delhi).
3. Singh K (2016). Rural Development Principles, Policies and Management (Sage Publications, New Delhi).
4. Biradar, R.R.(2008): Rural Non-Agricultural Employment in India: An Analysis of Its Determinants and Impact on Poverty and Inequality, Concept Publishing Company, New Delhi
5. Chadha, G. K. and A. N. Sharma (Eds) (1997): Growth, Employment and Poverty: Change and Continuity in Rural India, D K Publishers, New Delhi.

Reference

1. Dubhasi P.R (2009). Policy and Performance, Agricultural and Rural Development in Post- Independence India.
2. Maheswari .S (2009). Rural Development in India (Sage Publications, New Delhi)
3. Setty E.D. (1998).Rural Development Problem and Prospects (Darya Ganj, New Delhi)
4. Preet Pal Singh Rural Economics and Development This book covering all the topics of Rural Development as per UGC syllabus.
5. Katar Singh (2009) Rural Development Principles, Policies and Management Sage Publication India PVT Ltd.
6. Karalay, G. N. (2005): Integrated Approach to Rural Development: Polices, Programmes and Strategies, Concept Publishing Company, New Delhi.
7. Maheshwari, S. R. (1985): Rural Development in India, Sage, Publications New Delhi.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S			
CO2			M	M	M	M	S	S	S	S
CO3		M		M			S		S	
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	S

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**OPEN ELECTIVE
PAPER - 4
C) Women And Economy**

Course Objectives (CO):

1. To teach the students various issues of rural development
2. To understand the rural problems of to evaluate the rural development programme

Course Outcomes

At the end of course, the students will be able to

CO1: To understand patrilineal and matrilineal systems and its relevance to current scenario

CO2: Evaluate Women's decision making power at household and community levels

CO3: Analyze women's contributions to national income

CO4: Appreciate women's labour force participation in agriculture and non-agriculture sectors

CO5: Formulate gender neutral policies for gender equity and gender equality

Unit-1:

Concepts of Women Studies: Women in Patriarchal and Matriarchal societies and structures- Patrilineal and matrilineal systems and relevance to present day society in India-Demography of Female population: Age structure, mortality rates, and sex ratio-causes of declining sex ratio and fertility rates in LDCs and in Indi

Unit-2:

Women in Decision making: Factors affecting decision making by women, Property right, access to and control over economic resources, assets; Power of decision making at household, class and community levels-Economic status of women and its effect on work participation rate, income level health, and education in developing countries and India-Role of kinship in allocating domestic and social resources

Unit-3:

Conceptualization of women's work: Time use pattern –Valuation of productive and unproductive work; visible and invisible work; paid and unpaid work; economically productive and socially productive work-Economic status, private property, and participation of women in pre-industrial and industrial societies-Female contribution to National Income- Gender Budgeting

Unit-4:

Women and Labour Markets: Female entry in labour market-supply and demand for female labour in developed and developing countries, particularly in India-Female work participation in Agriculture,- Non agricultural rural activities- informal sector, cottage and small scale industries-Organized industry and service sector-Wage differences among sectors- Reasons and solutions

Unit-5:

Gender Planning, Developing Policies and Government-Gender and development indices- Mainstreaming gender into development policies-Gender planning techniques; Gender sensitive governances; Paradigm shifts from women's well being to women Empowerment-Democratic decentralization (panchayats) and women empowerment in India

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	YES	YES

Text Books

1. Mukesh Easwaran (2014) Why Gender Matters in Economics, Princeton University Press, USA
2. March C., Smyth,I, Mukhopadhyay, M. (2005). A Guide to Gender Analysis Framework OXFAM.
3. Taslikaan (2007). A Conceptual Framework for Gender and Development Studies: From Welfare to Empowerment.
4. Sarika Sharma (2015) Women Empowerment In India: A Analytical Study (English, Hardcover, Sharika Sharma) Publication Kunal Books.
5. Louise L.Hay A Guide to Loving Yourself, Breaking Rules, and Bringing Good into Your Life

Reference

1. UNDP (2018) Human Development Report, Oxford University Press, New York
2. World Economic Forum (2018) The Global Gender Gap Report, The World Bank india.
3. Alesina, Alberto, Paola Giuliano, and Nathan Nunn. "On the Origins of Gender Roles: Women and the Plough." *Quarterly Journal of Economics* 128, no. 2 (2013): 469–530.

4. Azmat, Ghazala, and Barbara Petrongolo. “Gender and the Labor Market: What Have We Learned from Field and Lab Experiments?” *Labour Economics* 30 (2014): 32–40.
5. Blau, Francine, and Anne Winkler. *The Economics of Women, Men, and Work*. 8th ed. New York: Oxford University Press, 2018.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		M		M			S		S	S
CO2			M	M		M	S	S		S
CO3		M		M			S			S
CO4			M	M		M	S	S		S
CO5		M	M		M		M	S	S	S

THIRUVALLUVAR UNIVERSITY

BACHELOR OF ARTS

B.A. ECONOMICS

DEGREE COURSE

CBCS PATTERN

(With effect from 2022 - 2023)

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni.Exam	Total
SEMESTER I									
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3	III	Core Theory	Paper-1	5	3	Micro Economics I	25	75	100
4	III	Core Theory	Paper-2	5	3	Statistics for Economics I	25	75	100
5	III	ALLIED -1	Paper-1	6	3	(To choose 1 out of 4) 1. History of India - I 2. Agricultural Economics 3. Basics of Computer Application I 4. Financial Accounting - I	25	75	100
6	III	PE	Paper-1	6	3	Professional English I	25	75	100
7	IV	Environmental Studies		2	2	Environmental Studies	25	75	100
				36	22		175	525	700
SEMESTER II							CIA	Uni. Exam	Total
8	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
10	III	Core Theory	Paper-3	4	3	Micro Economics II	25	75	100
11	III	Core Theory	Paper-4	4	3	Elementary Statistics for Economics II	25	75	100
12	III	ALLIED-1	Paper-2	6	5	(To choose 1 out of 4) 1. History of India II 2. Agricultural Marketing 3. Basics of Computer Application II 4. Financial Accounting II	25	75	100
13	III	PE	Paper-2	6	3	Professional English II	25	75	100
14	IV	Value Education		2	2	Value Education	25	75	100
15	IV	Soft Skill		2	1	Soft Skill	25	75	100
				36	25		200	600	800

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni.Exam	Total
SEMESTER III							CIA	Uni. Exam	Total
	I	Language	Paper-3	6	4	Tamil / Other Languages	25	75	100
	II	English	Paper-3	6	4	English	25	75	100
	III	Core Theory	Paper-5	4	3	Indian Economy I	25	75	100
	III	Core Theory	Paper-6	3	3	Monetary Economics I	25	75	100
	III	ALLIED-2	Paper-3	6	3	(To choose 1 out of 4) 1. Economics of Entrepreneurship 2. Economic Development of Tamil Nadu - I 3. Women and the Economy 4. Cost and Management Accounting I	25	75	100
	IV	Skill based Subject	Paper-1	3	2	Interview Skills and Personality Development	25	75	100
	IV	Non-major elective	Paper-1	2	2	Fundamentals of Economics I	25	75	100
				30	21		175	525	700
SEMESTER IV							CIA	Uni.Exam	Total
	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
	II	English	Paper-4	6	4	English	25	75	100
	III	Core Theory	Paper-7	4	3	Indian Economy II	25	75	100
	III	Core Theory	Paper-8	3	3	Monetary Economics II	25	75	100
	III	ALLIED-2	Paper-4	6	5	(To choose 1 out of 4) 1. Basics Econometrics 2. Economic Development of Tamil Nadu II 3. Development Economics 4. Cost and Management Accounting II	25	75	100
	IV	Skill based Subject	Paper-2	3	2	Micro Small and Medium Enterprises	25	75	100
	IV	Non-major elective	Paper-2	2	2	Fundamentals of Economics II	25	75	100
				30	23		175	525	700
SEMESTER V							CIA	Uni.Exam	Total
	III	Core Theory	Paper-9	6	4	Macro Economics I	25	75	100
	III	Core Theory	Paper-10	6	5	Fiscal Economics I	25	75	100
	III	Core Theory	Paper-11	6	4	Managerial Economics	25	75	100
	III	Core Theory	Paper-12	6	4	Industrial Economics	25	75	100
	III	Internal Elective	Paper-1	3	3	[To choose 1 out of 4] 1.Environmental Economics I 2.International Trade I 3.Industrial Organization I 4.Economics of Capital Market and Digital Economy	25	75	100
	IV	Skill based Subject	Paper-3	3	2	Introduction to Research Methodology	25	75	100

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni.Exam	Total
				30	22		150	450	600
SEMESTER VI							CIA	Uni.Exam	Total
	III	Core Theory	Paper-13	6	5	Macro Economics II	25	75	100
	III	Core Theory	Paper-14	5	4	Fiscal Economics II	25	75	100
	III	Core Theory	Paper-15	5	4	History of Economic Thought	25	75	100
	III	Compulsory Project	Paper-16	5	5	Group / Individual Project	25	75	100
	III	Internal Elective	Paper-2	3	3	[To choose 1 out of 4] 1.Environmental Economics II 2.International Trade II 3.Industrial Organization II 4.Energy Economics	25	75	100
	III	Internal Elective	Paper-3	3	3	[To choose 1 out of 4] 1.Labour Economics 2.Insurance & Economics 3.Demography 4. Economics of Development and Planning	25	75	100
	IV	Skill based Subject	Paper-4	3	2	Human Resource Management	25	75	100
	V	Extension Activities		-	1		100	-	100
				30	27		275	525	800
TOTAL					140				4300

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English& English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Electives	3	3	9	100	300
	Core	15	(3-5)	54	100	1500
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	43		140		4300

(I) PROGRAMME OBJECTIVES

PO 1: To inculcate economic thought process in the young minds.

PO 2: To enable them to understand micro and macroeconomic events.

PO 3: To see the real-life time issues through the mirror of economic prism.

PO 4: Understanding economics for their own standing up in life.

PO 5: To develop their human relations skills through the knowledge of economics, as economics is a human behavioural science.

(II) PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO 1: Impart in-depth knowledge of Economics to the students and make them comprehend its relevance in day-to-day life.

PEO 2: Explain Economic theories and highlight its correlation with human behavioural science.

PEO 3: To understand core economic principles and their application to a wide range of real-world issues.

PEO 4: To master the theoretical and applied tools required to both understand and analyse economic research at a global level.

PEO 5: To learn how to bring out pragmatic, principles-based policies aiming to enhance economic well-being and promote social justice.

(III) PROGRAMME SPECIFIC OUTCOMES

PSO-1: Understand the basic concepts and theories in Micro Economics, Macro Economics, International Economics, Public Economics, Agricultural Economics, Economic System and Demography.

PSO-2: Grasp the application of Mathematical and Statistical methods in Economics.

PSO-3: Build up their capacity in undertaking Socio-economic surveys and project.

PSO-4: Contribute in solving economic problems faced by them and the society.

PSO-5: Assess the impact of green revolution and Industrial revolution and foreign capital on Indian Economy.

PSO-6: Get job opportunities in government department and private institutions in India and all over the world.

PSO-7: Empowering with the knowledge in economic systems for meeting their real-life challenges.

PSO-8: To take decisions on investing, saving, insuring at an appropriate time.

PSO-9: Enriching the economic knowledge along with the sweet mixing of computer, history, accounting skills.

PSO-10: Create awareness about economics and ecology and environment.

(IV) PROGRAMME OUTCOMES (PO) FOR UNDER GRADUATE DEGREE IN ECONOMICS

PO1: A sound understanding of the science of Economics and its application through the aid of Mathematics, Statistic, Accounting and Computer Application.

PO2: Application of economic theories in handling real-life situations.

PO3: Students equipped with the knowledge and skills required to fit into Industrial, Agricultural and Service sectors, which will make them industry ready and employable immediately after graduation.

PO 4: Gaining broad idea of Macro Economic policies being adopted in the Indian economy

PO 5: Students reaped the advantage of a comprehensive curriculum including Economics along with Mathematics, Accountancy, History and Statistics will motivate graduates to apply for Indian Economic Service examination.

PO 6: The ability to collect process and interpret data including statistical inferences and create hypotheses and sets of economic variables.

PO 7: Creation of knowledge to evaluate the solutions available for complex economic issues and train them in problem solving.

PO 8: An awareness of institutions and institutional forces that shape the Indian Economy like RBI and Planning Commission.

PO 9: An awareness of international institutions and institutional forces like IMF & WTO that impacts the Indian Economy.

PO 10: Enlightening ethics of inland and international trade.

THIRUVALLUVAR UNIVERSITY

B.A. ECONOMICS

SYLLABUS

UNDER CBCS

(With effect from 2022-2023)

SEMESTER I

PAPER - 1

MICRO ECONOMICS I

.....
COURSE OBJECTIVES:

1. The make students capable of analyzing individual rationality in situation of scarcity and choice.
2. The students understand the definitions of Economics and concepts Normative Economics, Positive Economics, Inductive and Deductive method.
3. Acquires the knowledge of the Cardinal utility analysis.
4. The students understand the Indifference curve analysis & Consumer Surplus.
5. Understands the importance of the theory of production& Producer Equilibrium.
6. The student acquires the skill of calculating various cost and revenues in the process of production.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to understand the concept of Micro Economics, Definitions of Economics, Inductive and Deductive methods and Positive and Normative Economics.
2. After studied unit-2, the student will be able to acquire Knowledge of the law of Diminishing Marginal utility Law of Demand and Elasticity of Demand.
3. After studied unit-3, the student will be able to understand the Indifference curve analysis, Consumers equilibrium and consumer surplus.
4. After studied unit-4, the student will be able to gain knowledge of the theories of Production Function and producer equilibrium.

5. After studied unit-5, the student will be able to gain knowledge of types of cost and Revenue

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-I: Definitions, Nature and Scope of Economics(15hrs)

Definition of Economics - Adam Smith - Marshall - Robbins - Samuelson –Micro Economics-Meaning-Importance and Uses of Micro Economics- Macro Economics - Meaning-Difference between Micro and Macro Economics - Inductive and Deductive methods - Positive vs Normative study - Static and Dynamic analysis - Partial vs General Equilibrium.

UNIT-II: Marshallian Cardinal Utility Analysis (15hrs)

Introduction-Assumptions of cardinal Utility Analysis- Law of Diminishing Marginal utility- Law of Equi - Marginal Utility -Law of Demand–Exceptions to Law of Demand- Elasticity of Demand-Types of Elasticity of Demand -Factors determining elasticity of demand- Importance of Elasticity of Demand.

UNIT-III: Indifference Curve Analysis(15hrs)

Indifference Curves- Meaning-Indifference Map- Properties of Indifference Curve-Budget Line-Consumer's Equilibrium-Income Effect-Substitution Effect - Price Effect - Consumer Surplus –Meaning –Definition- Marshall's Measurement of Consumer Surplus.

UNIT-IV: The Theory of Production(15hrs)

Production Function-Meaning- Law of Variable Proportions-Law of Returns to Scale- Cobb-Douglas production function-Isoquants – Marginal Rate of Technical Substitution-Producers equilibrium.

UNIT-V: Cost and Revenue Functions(15hrs)

Cost concepts- Money cost- Economic cost- Real cost- Opportunity cost- Marginal cost, Average cost- Variable cost- Fixed cost and Total cost- Relationship between Average Cost and marginal cost – Revenue concepts - Average and Marginal revenue curves- Relationship between AR and MR

TEXT BOOKS:

Unit-I: Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-II: Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-III: Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-IV: Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-V: Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi

REFERENCE BOOKS:

1. R.Cauvery, U.K.SudhaNayak ,M.Girija, N.KruparaniR.Meenakshi , Micro Economic Theory, Sultan Chand & Company LTD, Ram Nagar New Delhi.
2. Dewett, K.K. Modern Economic Theory, S. Chand & Company LTD, New Delhi
3. M.L.Jhingan, Modern Micro Economics, Vrinda Publication Private Limited, New Delhi 2011.
4. S.K.Misra and V.K.Puri, Advanced Micro Economic Theory, Himalaya Publishing House, 2009.
5. Koutsoyiannis, A: Modern Micro Economics, Macmillan Press Limited.
6. Maurice Dobb: Theories of Value and Distribution since Adam Smith – Vikas Publishing House, New Delhi. 2012.
7. Sankaran, S: Micro Economics - Margham Publications, Chennai Edition 2012.

E- MATERIALS

1. www.managementnote.com/introduction-microeconomics
2. www.oxfordreference.com/view/10.1093/oi/...
3. uk.life123.com/Study microeconomics/
4. en.wikipedia.org/wiki/Microeconomics
5. www.investopedia.com/terms/m/microeconomics.asp
6. economictimes.indiatimes.com/.../microeconomics
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MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	M	M	M
CO2	S	S	S	M	S	M	S	M	M	M
CO3	S	M	S	M	S	M	S	M	M	M
CO4	S	M	S	M	S	M	S	M	M	M
CO5	S	M	S	M	S	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low

CORE THEORY

PAPER – 2

STATISTICS FOR ECONOMICS –1

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COURSE OBJECTIVES:

1. To bring awareness on the aspects of statistics namely, correlation and regression, probability and distributions and index numbers.
2. To impart the knowledge of data collection.
3. The course will mainly emphasize the different statistical methods.
4. To develop detailed understanding of discrete and continuous distributions.
5. Encourage to critically examine the economic indicators with the help of statistics.
6. To understand the role of statistics in day today life.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to understand the concept of statistics with its functions.
2. After studied unit-2, the student will be able to acquire the Knowledge of methods of collecting primary data.
3. After studied unit-3, the student will be able to gain knowledge of calculating mean, mode and median.
4. After studied unit-4, the student will be able to gain knowledge on measures of dispersion.
5. After studied unit-5, the student will be able to gain knowledge of skewness and kurtosis

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	No	No	No	No
3	Yes	Yes	Yes	No	No	No

4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-I: Introduction:

(15hrs)

Statistics: Origin and Definition - Relationship with other Subjects - Functions of Statistics - Objectives - Importance and Limitations - Classification – Tabulation: -Objectives, Rules, Types and Parts – Diagrams: Types of Diagrams, One dimensional and Two dimensional - Graphical presentation: Types, Merits and Demerits.

UNIT-II: Collection of Data

(15hrs)

Primary And Secondary Data - Methods of Collecting Primary Data: Census and Sampling methods, Random Sampling Method, Pre-testing and Pilot Survey - Sources of Secondary Data: Published and Unpublished Sources – Questionnaire.

UNIT-III: Measures of Central Tendency

(15hrs)

Meaning – Definition – Characteristics of a good Average - Objectives of Average - Types of Average: Mean, Median, Mode - Geometric Mean - Harmonic Mean.

UNIT-IV: Measures of Dispersion

(15hrs)

Meaning - Definition - Objectives - Characteristics of a good Measures of Dispersion - Types: Range - Quartile Deviation - Mean Deviation - Standard Deviation and Co-efficient of Variation - Lorenz Curve.

UNIT- V: Skewness and Kurtosis:

(15hrs)

Skewness: Meaning - Methods – Features – Karl Pearson's Co-efficient of Skewness - Bowley's Co-efficient of Skewness. Kurtosis: Meaning – Moments – Difference between Skewness and Kurtosis.

TEXT BOOKS:

Unit-I: Gupta, S.P.: Statistics for Economic - S. Chand & Company LTD, New Delhi 2017

Unit-II: Gupta, S.P.: Statistics for Economic - S. Chand & Company LTD, New Delhi 2017

Unit-III: Gupta, S.P.: Statistics for Economic - S. Chand & Company LTD, New Delhi 2017

Unit-IV: Gupta, S.P.: Statistics for Economic - S. Chand & Company LTD, New Delhi 2017

Unit-V: Gupta, S.P.: Statistics for Economic - S. Chand & Company LTD, New Delhi 2017

REFERENCE BOOKS:

1. D.C.Sancheti , V.K.Kapoor, Statistics Theory, Methods And Application Sultan Chand & Company LTD, New Delhi.
2. S.P.Gupta Statistical Methods Sultan Chand & Company LTD New Delhi 2017
3. R.S.N. Pillai and V.Bagavathi Statistics Theory and Practice Sultan Chand &Company LTD, New Delhi.

E - RESOURCES

1. [www.homeandgardenideas.com/Economics statistics/](http://www.homeandgardenideas.com/Economics%20statistics/)
2. [in.zapmetasearch.com/Statistics For Economics](http://in.zapmetasearch.com/Statistics%20For%20Economics)
3. www.toppr.com/guides/economics/statistics-
4. www.learnbse.in/statistics-for-economics
5. [en.wikipedia.org/wiki/Economic statistics](http://en.wikipedia.org/wiki/Economic_statistics)
6. www.ncrtsolutions.in/...statistics-for-economics-ncert.html
7. books.google.co.in/books/about/Statistics..
8. [www.thefreedictionary.com/statisticsin.zapmetasearch.com/Statistics For Economics](http://www.thefreedictionary.com/statisticsin.zapmetasearch.com/Statistics%20For%20Economics)
9. www.investopedia.com/terms/m/Statistics.asp

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	M	M	M
CO2	S	S	S	M	S	S	M	M	M	M
CO3	S	M	S	M	S	S	M	M	M	M
CO4	S	M	S	M	S	S	M	M	M	M
CO5	S	M	S	M	S	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

ALLIED – 1

PAPER – 1

2. AGRICULTURAL ECONOMICS

COURSE OBJECTIVES

1. To help the students to understand Scope and Role of Agriculture in Economic development.
2. To understand the term agricultural productivity and cropping pattern.
3. To gain knowledge of wage Discrimination and problems of farmers.
4. To acquire knowledge of Size of holdings in India.
5. To gain knowledge of indebtedness and sources of Agricultural credit.
6. To understand Scope and Types of Agricultural markets.

COURSEOUTCOMES

1. After studied unit-1, the student will be able to understand the nature and importance of Agriculture
2. After studied unit-2, the student will be able to gain knowledge of Agricultural productivity.
3. After studied unit-3, the student will be able to understand the size of Land holdings.
4. After studied unit-4, the student will be able to gain knowledge of sources of Agricultural Credits.
5. After studied unit-5, the student will be able to understand the scope and types of Agricultural markets.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	yes	Yes	Yes	No	No
2	Yes	Yes	No	Yes	No	No

3	Yes	Yes	No	Yes	No	No
4	Yes	Yes	No	No	NO	No
5	Yes	Yes	No	No	No	No

UNIT-1: Nature and Importance of Agriculture (18hrs)

Definition - Scope of Agriculture Economics - Nature of Agriculture Economics - Interdependence between Agriculture - Agriculture in a Growing Economy - Role of Agriculture in Economic development.

UNIT-II: Agriculture Productivity (18hrs)

Measuring Agriculture Productivity - Farm size - Cropping Pattern - Agricultural Labour and Wages - Women in Agriculture - Wage Discrimination - Green Revolution - Problems of Small and Marginal Farmers.

UNIT-III: Size of Land Holdings (18hrs)

Types of Farming - Factors Determining the Types of Farming - Economic Holding - Size Pattern of holding in India - Subdivision and Fragmentation of Holding in India - Causes of Sub-division and Fragmentation - Problems of Fragmentation - Ceiling on Land Holding.

UNIT-IV: Agricultural Credit (18hrs)

Meaning - Importance - Agricultural Indebtedness - Causes - Remedies - Co-operatives Bank - Commercial Banks - Regional Rural Banks - Agricultural Credit in India - Institutional Agencies Supplying Agricultural Credit.

UNIT-V: Agricultural Markets (18hrs)

Meaning - Definition - Scope - Importance - Types of Agricultural Markets - Co-operative Marketing - Regulated Markets –Agricultural Marketing in India.

TEXT BOOKS:

Unit-I: Sankaran, S.: Agricultural Economic – Margham& Company LTD, New Delhi.2014

Unit-II: Sankaran, S.: Agricultural Economic – Margham& Company LTD, New Delhi.2014

Unit-III: Sankaran, S.: Agricultural Economic – Margham& Company LTD, New Delhi.2014

Unit-IV:B.P.Tyagi, Agricultural Economics and Rural Development, Jai Prakash Nath&co, Meerut.2010

Unit-V:Sankaran, S.: Agricultural Economic – Margham& Company LTD, New Delhi 2014

REFERENCE BOOKS:

1. R.G.Desai, Agricultural Economics, Himalaya Publishing House, New Delhi, 2017.
2. B.P.Tyagi, Agricultural Economics and Rural Development, Jai Prakash Nath&co,Meeryt.2010
3. P.Mala,AgriculturalEconomics,Dominent Publisher, New Delhi.2018
4. S.K.Mishra&V.K.Puri,IndianEconomyHimalaya Publishing House, New Delhi.2011
5. S.SubbaReddy,AgriculturalEconomics,Oxford&IBH Publishing Co.Pvt.Ltd., New Delhi.2018

E- MATERIALS

1. [www.answerroot.com/Agricultural economics/Look no further](http://www.answerroot.com/Agricultural_economics/Look_no_further)
2. [uk.life123.com/Agricultural economics/See now](http://uk.life123.com/Agricultural_economics/See_now)
3. [in.downloadsearch.cnet.com/Agriculture/Look no further](http://in.downloadsearch.cnet.com/Agriculture/Look_no_further)
4. [www.amazon.in/Agricultural Economics/Agricultural Economics](http://www.amazon.in/Agricultural_Economics/Agricultural_Economics)
5. www.economicsdiscussion.net/agricultural-economics/...
6. en.wikipedia.org/wiki/agricultural-economics
7. www.britannica.com/topic/agricultural-economics
8. www.studyingeconomics.ac.uk/.../agricultural-economics
9. www.sciencedirect.com/journal/agricultural-economics
10. www.researchgate.net/topic/Agricultural-Economics

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	M	M
CO2	S	S	S	M	S	S	S	S	M	M
CO3	S	S	S	M	S	S	S	M	M	M

CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

SEMESTER II

PAPER – 3

CORE THEORY

MICRO ECONOMICS –II

COURSE OBJECTIVES:

1. The main objective of this paper is to introduce the concept of Market to the students.
2. The students understand the behavior of firms in Perfect competitions.
3. Acquires the knowledge of the firms in output and price determination in a imperfect competition.
4. Gains knowledge of the Marginal productivity theory of distribution and theories of Rent.
5. Understands the importance of Trade unions and wage theories.
6. The student understands the theories of Interest and Profit.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to understand the concept of market competition and how price and output determined in a perfect competition.
2. After studied unit-2, the student will be able to acquire Knowledge of the Imperfect market, price and output determination in the short run and long run.
3. After studied unit-3, the student will be able to understand the Marginal productivity theory of distribution and the theories based on which the rent is fixed.
4. After studied unit-4, the student will be able to gain knowledge of the theories of wages and the importance of Trade unions.
5. After studied unit-5, the student will be able to gain knowledge of the theories of Interest and profit.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	No
2	Yes	Yes	No	Yes	No	No

3	Yes	Yes	No	No	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	Yes	No	No

UNIT-I: Market Structures and Perfect competition (12hrs)

Market – Meaning - Classification of market - Perfect competition – Features, Price and Output determination – Equilibrium of the Firm and Industry in the short run and long run.

UNIT-II: Imperfect Competition (12hrs)

Imperfect competition-Meaning-Monopoly-Meaning-Price and Output Determination-Monopolistic Competition –Features- Price and Output determination the short run and long run – Price discrimination – Oligopoly: Features- Kinds of Oligopoly - Kinked Demand Curve -Duopoly –Meaning and Cournot Model.

UNIT-III: Theory of Distribution (12hrs)

Distinction between personal and functional distribution - Marginal Productivity Theory of Distribution - Rent –Meaning- Ricardian Theory of Rent - Modern theory of rent – Quasi-Rent.

UNIT-IV: Wages (12hrs)

Wages-Meaning- Real and Money wages – Factors determining Real wages - Theories of Wages - The Subsistence Theory of Wages - Wage fund theory - Modern theory of wages Minimum wages - Trade Union and wages.

UNIT-V: Interest and Profits (12hrs)

Interest – Meaning - Loanable Fund theory- Liquidity Preference Theory – Profits - Modern Theory of Interest - Theories of Profit - Schumpeter's Innovation theory of Profit - Knight's Uncertainty Bearing Theory of Profit - Hawley's Risk theory of profit.

TEXT BOOKS:

Unit-I:Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-II:Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-III:Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-IV:Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

Unit-V:Ahuja, H.L.: Advanced Economic Theory - S. Chand & Company LTD, New Delhi.

REFERENCE BOOKS:

1. R.Cauvery, U.K.SudhaNayak ,M.Girija, N.KruparaniR.Meenakshi , Micro Economic Theory, Sultan Chand & Company LTD, Ram Nagar New Delhi.
2. Dewett, K.K. Modern Economic Theory, S. Chand & Company LTD, New Delhi
3. M.L.Jhingan, Modern Micro Economics, Vrinda Publication Private Limited, New Delhi 2011.
4. S.K.Misra and V.K.Puri, Advanced Micro Economic Theory, Himalaya Publishing House, 2009.
5. Koutsoyiannis, A: Modern Micro Economics - Macmillan Press Limited.
6. Maurice Dobb: Theories of Value and Distribution since Adam Smith – Vikas Publishing House, New Delhi. 2012.
7. Sankaran, S: Micro Economics - Margham Publications, Chennai Edition 2012.

E - MATERIALS

1. www.managementnote.com/introduction-microeconomics
2. www.oxfordreference.com/view/10.1093/oi/...
3. uk.life123.com/Study microeconomics/Save your time
4. en.wikipedia.org/wiki/Microeconomics
5. www.investopedia.com/terms/m/microeconomics.asp
6. economictimes.indiatimes.com/.../microeconomics
7. www.businessdictionary.com/definition/microeconomics.html

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	M	M	M
CO2	S	S	M	M	S	M	S	M	M	M

CO3	S	S	M	M	S	M	S	M	M	M
CO4	S	S	M	M	S	M	S	M	M	M
CO5	S	S	M	M	S	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low

PAPER – 4

CORE THEORY

STATISTICS FOR ECONOMICS –II

COURSE OBJECTIVES:

1. To give adequate information to the students regarding the testing of hypothesis such that how various types of tests can be utilized under different situations.
2. To make the students aware about the various types of index numbers and their constructions.
3. To impart knowledge regarding the development of linear relationship between the two correlated variables to the students.
4. To understand the relevance of probability and its limitations.
5. To improve the analytical skill sync with statistics.
6. Improving the interpreting skills through statistical knowledge.

COURSE OUTCOMES

1. After studied unit-1, the student will be able to understand the calculation of coefficient of correlation and rank correlation.
2. After studied unit-2, the student will be able to acquire Knowledge of importance and calculation regression analysis.
3. After studied unit-3, the student will be able to acquire knowledge on the components of time series.
4. After studied unit-4, the student will be able to gain in depth knowledge of methods of constructing index numbers.

5. After studied unit-5, the student will be able to understand probability theorem.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	No
2	Yes	Yes	No	Yes	No	No
3	Yes	Yes	No	Yes	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-I: Correlation

(12hrs)

Meaning – Types, Measurement of Correlation - Karl Pearson's Co-efficient of Correlation - Spearman's Rank Correlation and Concurrent Deviation Method.

UNIT-II: Regression

(12hrs)

Meaning - Definition - Difference between Correlation and Regression –Importance of Regression Analysis - Regression Equations - Calculation of Regression Coefficient - Correlation Coefficient from Regression Coefficients.

UNIT-III: Time Series

(12hrs)

Time series – Components of Time Series- Measurement of trend – Moving average, method of least square, Seasonal indices by simple average method.

UNIT-IV: Index Numbers

(12hrs)

Meaning - Uses - Problems in The Construction of Index Numbers –Methods of constructing Index numbers – Simple and weighted Index Numbers - Laspyre's Method – Paachee's Method - Fisher's Index Method - Cost of living Index – Uses of Index Numbers.

UNIT-V: Probability

(12hrs)

Meaning - Definition - Uses - Types - Objectives - Empirical Probability - Subjective Probability - Theorems of Probability: Addition Theorem - Multiplication Theorem.

TEXT BOOKS:

Unit-I: Gupta.S.P.:StatisticsforEconomics – S.Chand& Company LTD, New Delhi 2017

Unit-II: Gupta.S.P.:StatisticsforEconomics – S.Chand& Company LTD, New Delhi 2017

Unit-III: Gupta.S.P.:StatisticsforEconomics – S.Chand& Company LTD, New Delhi 2017

Unit-IV: Gupta.S.P.:StatisticsforEconomics – S.Chand& Company LTD, New Delhi 2017

Unit-V: Gupta.S.P.:StatisticsforEconomics – S.Chand& Company LTD, New Delhi 2017

REFERENCE BOOKS:

1. D.C.Sancheti , V.K.Kapoor, Statistics Theory, Methods And Application Sultan Chand & Sons New Delhi, 2019
2. S.P.Gupta Statistical Methods Sultan Chand & Sons New Delhi. 2017
3. R.S.N. Pillai and V.BagavathiStatistics Theory and PracticeSultan Chand & Sons New Delhi. 2019

E - RESOURCES

1. www.homeandgardenideas.com/Economics statistics/
2. in.zapmetasearch.com/Statistics For Economics
3. www.teoma.co.uk/Economic/Tamil Nadu
4. www.toppr.com/guides/economics/statistics-
5. www.learnbse.in/statistics-for-economics
6. en.wikipedia.org/wiki/economics statistics
7. www.ncrtsolutions.in/...statistics-for-economics-ncert.html
8. books.google.co.in/books/about/statistics.
9. www.thefreedictionary.com/statisticsin.zapmetasearch.com/Statistics For Economics
10. www.investopedia.com/terms/m/Statistics.asp

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	S	S	M	M	M
CO2	S	M	S	M	S	S	S	M	M	M
CO3	S	M	S	M	S	S	S	M	M	M
CO4	S	M	S	M	S	S	S	M	M	M
CO5	S	M	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low

ALLIED – 1

PAPER – 2

1. AGRICULTURAL MARKETING

COURSE OBJECTIVES

1. To enable the students to understand the concepts of Marketing.
2. To help the students to understand functions of Agricultural marketing.
3. To understand the term Marketing structure and role of wholesaler, retailer and middlemen.
4. To gain knowledge of marketing agencies and channels.
5. To acquire knowledge of Supply chain management.
6. To gain knowledge of market regulations.

COURSE OUTCOMES

1. After studied unit-1, the student will be able understand to basic concepts of marketing.
2. After studied unit-2, the student will be able to acquire knowledge of marketing functions.
3. After studied unit-3, the student will be able to understand the structure of market.
4. After studied unit-4, the student will be able to acquire knowledge of channels of marketing.
5. After studied unit-5, the student will be able to know the regulations of market.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	No	No	No
3	Yes	Yes	No	No	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-1: Introduction**(18hrs)**

Meaning - Nature - Scope - Basic Concepts of Marketing - Significance of Marketing - Classifications - Marketing Processes - Market Structure - Market Force - Demand – Supply.

UNIT-II: Marketing Functions**(18hrs)**

Meaning - Classes of Functions - Functions of Exchange - Functions of Physical Supply - Facilitation Function - Buying - Assembling - Selling - Transportation - Warehousing - Standardization - Grading - Financing - Risk - Market Information.

UNIT-III: Marketing Structure**(18hrs)**

Marketing Of Agricultural Production - Marketing Structure - Regulated Market - Organized Markets - Wholesalers and Retailers - Functions and Services of the Wholesaler - Role of Middlemen and the Retailers - Cooperative Marketing Bodies.

UNIT-IV: Marketing Agencies and Channels**(18hrs)**

Meaning - Definition - Factors Affecting Marketing Channels - Contract Forming - Advantages of Contract Forming - Types of Contracts Forming - Supply Chain Management.

UNIT-V: Regulation**(18hrs)**

Definition - Objectives - History of Market Regulation - Progress - Important Features of Regulated Market - Need for Reorientation of Market Regulation - Council of State Agricultural Marketing Bodies.

TEXT BOOKS:

Unit-I: Acharya, S.S. Agricultural Marketing in India Oxford &IBH Company Pvt. Ltd., New Delhi 2010

Unit- II: Sankaran, S.Agricultural Marketing Margham Company Pvt Ltd., New Delhi 2012

Unit-III: Acharya, S.S. Agricultural Marketing in India Oxford & IBH Company Pvt. Ltd., New Delhi 2010

Unit- IV: Acharya, S.S. Agricultural Marketing in India Oxford & IBH Company Pvt. Ltd., New Delhi 2010

Unit- V: Sankaran, S.Agricultural Marketing Margham Company Pvt Ltd., New Delhi 2012

REFERENCE BOOKS:

1. R.G.Desai Agricultural Economics Himalaya Publishing House, New Delhi
2. B.P.Tyagi Agricultural Economics and Rural Development Jai Prakash Nath&co,Meeryt.2010
3. P.Mala,Agricultural Economics Dominent Publisher, New Delhi.2018
4. Benjamin, Harioran&Karunagaran, Economics of Agriculture S.Chand& Co, New Delhi,2011

E- MATERIALS

1. www.hillagric.ac.in/edu/coa/agriecoextedursocio/lectures/...
2. www.agrimoon.com/agriculture-icar-ecourse-pdf-book
3. agritech.tnau.ac.in/agricultural_marketing/agrimark...
4. ecourses.icar.gov.in
5. www.agmarknet.gov.in
6. www.ccsniam.gov.in
7. www.indiaagronet.com/indiaagronet/Agri_marketing/...
8. www.uniprjectmaterials.com/agricultural...
9. en.wikipedia.org/wiki/agricultural-marketing

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	M	M
CO2	S	S	S	M	S	M	S	M	M	M
CO3	S	S	S	M	S	M	S	M	M	M
CO4	S	S	S	M	S	M	S	M	M	M

CO5	S	S	S	M	S	M	S	M	M	M
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PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

SEMESTER III
CORE PAPER - 5
INDIAN ECONOMY - 1

Course Objectives:

1. The salient objective of this paper is to introduce the students to understand the main concepts of the Indian Economy.
2. The concepts which help to the students to assess gain knowledge on various Economic Policies of the Government and also students should know that India is a fifth largest economy.
3. The students become aware of the historical and theoretical perspectives of the development of Indian Economy.
4. The students become aware of the various challenges of the Indian economy.
5. Students are able to analyse current economic scenario in India.
6. To impart knowledge about the functioning of various industrial financial institutions.

Course Out Comes

1. After studied unit-1, the student will be able to understand the various indicators of economic development.
2. After studied unit-2, the student will be able to understand the importance, causes and impact of population growth.
3. After studied unit-3, the student will be able to gain knowledge about the role of agriculture in economic development.
4. After studied unit-4, the student will be able to understand the industrial development during plan periods.

5. After studied unit-5, the student will be able to acquire knowledge about the role of industries in Economic development, and also to analyse the existing leading financial institutions in Indian Economic development.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	No
2	Yes	Yes	No	Yes	No	No
3	Yes	Yes	No	Yes	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	No	No	No

UNIT- I: Introduction

(12hrs)

Concept of Economic Development and Growth - Basic Characteristics of LDCs - Economic and Non- economic factors - Factors inhibiting economic development.

UNIT- II: Human Development, Poverty and Unemployment

(12hrs)

Human development - Components of human development - HD Index - Recasting Planning in terms of Human development - Population Growth - Population Policy - Demographic Transition Theory - Poverty Alleviation Programmes - Unemployment - Types - Causes and Effects.

UNIT- III: Agriculture

(12hrs)

Indian Agriculture - Contribution to Economic Development - Agricultural Productivity - Land Reforms - Green Revolution II - Mechanization of Agriculture - Agricultural Development under Five Year Plans.

UNIT- IV: Industry

(12hrs)

Meaning and Definition of Industry - Role of Industries - Industrial Policy of 1991 and recent changes - Role of Small-Scale Industry in economic development - Large Scale Industry in India - Industrial Development Under Five Year Plans - Measures to Promote Small- and Large-Scale Industry in India

UNIT - IV: Industrial Finance

(12hrs)

Industrial Finance - Meaning and Definition - Need and Sources of Finance - Internal and External Sources - Industrial Financial Institutions (IDBI, SIDCO & SIDBI).

Text Books

Unit- I: Indian Economy Sankaran.SMargham Publications 7th edition 2014

Unit-II: Indian Economy RuddarDutt& Sundaram KPN Sulan Chand Publishing 7th edition 2016

Unit-III: Indian Economy Sankaran.SMargham Publications 7th edition 2014

Unit-IV: Indian Economy Sankaran.SMargham Publications 7th edition 2014

Unit- V: Indian Economy Sankaran.SMargham Publications 7th edition 2014

Reference Books:

1.Ruddar Dutt & Sundaram KPN Indian Economy S Chand Publishing 7th edition 2016

2. Sankaran .S..Indian Economy Margham Publications 7th 2014

3. Dhingra I.C. Indian Economy Manakin Press Sultan Chand & Sons 28th edition.

4.Puri V.K & Misra S.K Indian Economy Himalaya Publishing House 35th 2017

5. Agarwal A.N Indian Economy New Age 41st 2016

6. KK Dewett JD Varma & M Sharma Indian Economy S Chand & Company Pvt Ltd 1st 2016

E- Materials

1. www.studydhaba.com/indian-economy-study-material-pdf
2. www.examrace.com/IEcoS/IEcoS-Study-Material
3. www.winmeen.com/tnpsc-indian-economy-study-materials
4. www.jagranjosh.com/articles/ias-prelims-2015-gs...
5. www.governmentexams.co.in/tnpsc-indian-economy-notes
6. www.clearias.com/ias-study-materials
7. www.tnpscshouters.com/2019/02/tnpsc-indian...
8. www.hirensir.com/indian-economy-in-gujarati-pdf

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	M	M	M
CO2	S	S	S	M	S	M	M	M	M	M
CO3	S	S	S	M	S	M	M	M	M	M
CO4	S	S	S	M	S	M	M	M	M	M
CO5	S	S	S	M	S	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

CORE PAPER - 6
MONETARY ECONOMICS -1

Course Objectives:

1. The main objective of this paper is to introduce the concept of Money.
2. The students will understand the stages of evolution of Money & Functions of Money.
3. The students gain knowledge on the Monetary Standards.
4. The Students understand various theories on value of money.
5. The Student gains knowledge of Demand for money & Supply of money.

Course Out Comes

1. After studied unit-1, the student will be able to understand the concept of Money, Stages of evolution of Money & Functions of Money.
2. After studied unit-2, the student will be able to acquire Knowledge from Monetary standards and standard system of Note issue.
3. After studied unit-3, the student will be able to understand the theories on value of money and Index numbers.
4. After studied unit-4, the student will be able to gain knowledge on Demand for money & Supply of money.
5. After studied unit-5, the student will be able to gain knowledge on Inflation, Deflation and effects of Inflation.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	Yes	No	No
3	Yes	Yes	No	No	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	Yes	No	No

UNIT-I: Evolution and Functions of Money

(9hrs)

Barter System and its Defects - Stages in Evolution of Money- Money-Commodity Money- Metallic Money-Paper Money-Credit Money-Definition of Money-Kinds of Money-Money and Near Money-Functions of Money-Primary Function-Secondary Function-Contingent Functions.

UNIT - II: Monetary Standards(9hrs)

Monetary standards- Meaning-Types of Monetary standards -Metallic Standard- Gold Standard - Types of Gold Standard -Merits and Demerits of Gold Standard-Downfall of Gold Standard -Bimetallism -Gresham's Law-Paper currency standard-Merits & Demerits of Paper Standard -Principles of Note Issue-Methods of Note issue- Qualities of Good Monetary Standard.

UNIT - III: Value of Money

(9hrs)

Meaning of value of money - Fisher's Quantity theory of money - The Cambridge equations - Marshall's Equation-Pigou's Equation - Robertson's Equation - Keynes's Equation - Superiority of Cash Balance Approach over Cash Transaction Approach - Saving and Investment theory.

UNIT-IV: The Demand and Supply of Money

(9hrs)

The Demand for Money- The Classical Approach-The Modern view of Demand for Money - Transaction Motive-Precautionary Motive -Speculative Motive-Liquidity Trap -The supply of Money-Definition- Different Views of Money Supply-Determinants of Money supply - Velocity of Circulation.

UNIT-V: Inflation and Deflation

(9hrs)

Inflation- Meaning and Definition -Types of Inflation - Inflationary Gap- Effects of Inflation- Measures to control Inflation- Deflation-Meaning-Effects of Deflation-Inflation Vs Deflation-Control of Deflation.

Text Books

Unit-I: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi.

Unit-II: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi.

Unit-III: M.L.Jhingan, MonetaryEconomics,Vrinda Publications(P)LTD,Delhi.7th Edition(2016)

Unit-IV: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi

Unit- V: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi

Reference Books:

1. K.K.Dewett, Modern Economic Theory,S.Chand& Company LTD,New Delhi.
2. T. T.Sethi, Monetary Economics, S.Chand& Company LTD, New Delhi.
3. Suraj,B.Gupta, Monetary Economics, Sultan Chand & Company, New Delhi.
4. S. Sankaran, Monetary Economics, Margham Publication, Chennai.

5. D.M.Mithani, Money, Public Finance and International Trade, Himalaya Publishing House.

E - Resources

1. <https://www.studynama.com/community/threads/monetary-economics-hand-written-notes-pdf-ebook-for-bcom-final-year-free-download.2474/>
2. <https://economicsnetwork.ac.uk/teaching/Online%20Text%20and%20Notes/Monetary%20Economics>
3. <https://www.coursera.org/learn/money-banking>
4. http://www.brainkart.com/article/Monetary-Economics_37077/
5. <http://whystudyeconomics.ac.uk/During-your-study/module-choices/monetary-economics/>
6. <https://www.springer.com/gp/economics/macroeconomics-monetary-economics-growth>
7. <https://www.stuvia.com/doc/293019/monetary-economics-ecs3701-selected-examination-questions-and-suggested-solutions>
8. [uk.life123.com/Monetary economics/Save your time](http://uk.life123.com/Monetary_economics/Save_your_time)

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	M	M	M
CO2	S	M	S	M	S	M	S	M	M	M
CO3	S	M	S	M	S	M	S	M	M	M
CO4	S	M	S	M	S	M	S	M	M	M
CO5	S	M	S	M	S	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

ALLIED - 2

PAPER - 3

(to choose one out of 4)

1. ECONOMICS OF ENTREPRENEURSHIP

Course Objectives:

1. To explore and understand deeply the meaning and importance of entrepreneurship.
2. Understand the basic concepts in the area of entrepreneurship.
3. To understand the role and importance of entrepreneurship for economic development.
4. To explain various stages of entrepreneurial process.
5. To understand the legal structure, to know the protection and punishments in the entrepreneurial process.
6. To understand resource mobilization for successful entrepreneurial venture.

Course Outcomes:

1. After studied unit-1, the student will be able to understand importance of entrepreneurship.
2. After studied unit-2, the student will be able to gain knowledge on different theories of motivation.
3. After studied unit-3, the student will be able to understand the creativity, innovation and decision-making process.

4. After studied unit-4, the student will be able to understand various assisting organizations like industrial park and SEZ.

5. After studied unit-5, the student will be able to acquire knowledge on rules and legislations for internal functioning and for external operations.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Introduction

(18 Hours)

Meaning - Definition - Importance - Evolution of Term Entrepreneurship - Factors influencing Entrepreneurship - Characteristics of an Entrepreneur - Types of Entrepreneurs - Barriers to Entrepreneurship.

UNIT-II: Motivation

(18 Hours)

Meaning - Definition - Entrepreneurial Motivation - Maslow's Theory - Herzberg's Theory - McGregor's Theory - Achievement Theory - Culture & Society - Values / Ethics - Risk Taking Behavior.

UNIT-III: Creativity

(18 Hours)

Meaning - Definition - Creativity and Entrepreneurship - Steps in Creativity - Innovation and Inventions - Using Left Brain Skills to Harvest Right Brain Ideas - Legal Protection of Innovation - Skills of an Entrepreneur - Decision Making and Problem Solving - Steps in Decision Making.

UNIT-IV: Organisation Assistance

(18 Hours)

Meaning - Definition - Assistance to an Entrepreneur - New Ventures - Industrial Park - Special Economic Zone - Financial assistance by different agencies - MSME Act Small Scale Industries - Carry on Business (COB) License - Environmental Clearance - National Small Industries Corporation (NSIC).

UNIT-V: Rules and Legislation

(18 Hours)

Rules and Legislation - Applicability of Legislation - Industries Development (Regulations) Act, 1951 - Factories Act, 1948. The Industrial Employment (Standing Orders) Act, 1946 - Suspension - Stoppage of work - Termination of employment - Environment (Protection) Act, 1986 - The sale of Goods Act, 1950 - Industrial Dispute Act 1947.

Text Books:

Unit-I: H. Nandan - Fundamentals of Entrepreneurship PHI Learning Publisher - 3rd edition.

Unit-II: H. Nandan - Fundamentals of Entrepreneurship PHI Learning Publisher - 3rd edition.

Unit-III: Srivastava S. B: A Practical Guide to Economics of Entrepreneur; Sultan Chand and Sons, New Delhi

Unit-IV: Srivastava S. B: A Practical Guide to Economics of Entrepreneur Sultan Chand and Sons, New Delhi

Unit-V: Srivastava S. B: A Practical Guide to Economics of Entrepreneur Sultan Chand and Sons, New Delhi

Reference Books

1. Tendon, C: Environment and Entrepreneur; Chugh Publications, Allahabad.

2. Siner A David: Entrepreneurial Megabucks; John Wiley and Sons, New York.
3. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi
4. Prasanna Chandra: Projects Preparation, Appraisal, Implementation; Tata McGraw Hill. New Delhi
5. Pandey I.M: Venture Capital - The Indian Experience; Prentice Hall of India. New Delhi
6. Holt: Entrepreneurship-New Venture Creation; Prentice Hall of India. New Delhi
7. Tendon, C: Environment and Entrepreneur; Chugh Publications, Allahabad.
8. Siner A David: Entrepreneurial Megabucks; John Wiley and Sons, New York.
9. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi
10. Prasanna Chandra: Projects Preparation, Appraisal, Implementation; Tata McGraw Hill. New Delhi
11. Pandey I.M: Venture Capital - The Indian Experience; Prentice Hall of India. New Delhi
12. Holt: Entrepreneurship-New Venture Creation; Prentice Hall of India. New Delhi
13. Simon C.Parker, The Economics of Entrepreneurship - Cambridge University Press - 2018.

E - Materials:

1. www.mbaexamnotes.com/entrepreneurship-notes.html
2. www.simplynotes.in/.../mbabba/entrepreneurship-development
3. universityofcalicut.info/syl/Entrepreneurship Development...
4. www.cambridge.org/core/books/economics-of...
5. www.uniprojectmaterials.com/entrepreneurship/...
6. www.yourarticlelibrary.com/entrepreneur/entrepreneurship...
7. www.projecttopics.org/projects/entrepreneurship
8. study.com/.../common-forms-of-entrepreneurship.html
9. in.zapmetasearch.com/Entrepreneurship Studies

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	M	S	M	M
CO2	M	S	M	S	M	M	S	M	M	M
CO3	M	S	S	M	S	M	S	M	M	M
CO4	M	M	M	S	S	S	M	M	S	M
CO5	S	M	S	S	M	M	S	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

ALLIED - 2

PAPER - 3

2. ECONOMIC DEVELOPMENT OF TAMIL NADU-1

Course Objectives:

1. To understand the status of Tamil Nadu among states.
2. To learn about the strength and opportunities in the economic development of Tamil Nadu.
3. To understand the development and problems of agricultural sector in Tamil Nadu.
4. To learn about the existing infrastructures of Tamil Nadu.
5. To learn about the futuristic vision infrastructure requirements.
6. To analyse the Tamil Nadu development model and their planning for future development.

Course Outcomes:

1. After studied unit-1, the student will be able to acquire knowledge on economic characteristics of Tamil Nadu.
2. After studied unit-2, the student will be able to gain knowledge on the comparison of Tamil Nadu with other states.
3. After studied unit-3, the student will be able to understand the saga of infrastructure development.
4. After studied unit-4, the student will be able to understand the prevailing agriculture crop pattern.
5. After studied unit-5, the student will be able to get knowledge on agricultural production, animal husbandry and fish farming.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	Yes	No	No	No	No
2	Yes	Yes	No	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT - I: Introduction

(18 Hours)

Relevance of Regional Economics - The place of Tamil Nadu in the National Economy Scene
 - Basic characteristics: Size - Demography - Urbanization - Literacy - Resources Endowment
 - Land - Soil - Minerals - Water - Forests - Coast Line.

UNIT-II: Development Experience

(18 Hours)

Development Experience of Tamil Nadu - Trends in SDP - Per Capita SDP - Composition of SDP - Sectoral Contribution - Inter-State Comparison.

UNIT-III: Infrastructure

(18 Hours)

Infrastructure: Transport - Railways - Roads - Nationalization of Road Transport - Performance of Roadways Corporations - Power - Trends in Demand and Supply - Rural Electrification - Banking Coverage - Credit - Deposits and Advances - Housing - Slum Improvement.

UNIT-IV: Agriculture

(18 Hours)

Development in Agriculture - Crops are Grown in Tamil Nadu - Changes in Land Use Pattern - Cropping Pattern and Crop Intensity.

UNIT-V: Agricultural Production

(18 Hours)

Index of Agricultural Production and Productivity - Green Revolution - Productivity and Yield - Agricultural Marketing - Animal Husbandry - Fisheries.

Text Books:

Unit-I: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Unit-II: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Unit-III: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006

Unit-IV: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Unit-V: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Reference Books:

1. Tamil Nadu Economic Appraisal
2. Tamil Nadu Economy- MIDS Publication

3. A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

E - Materials:

1. www.ibef.org/states/tamil-nadu-presentation
2. en.wikipedia.org/wiki/Economy_of_Tamil_Nadu
3. www.ibef.org/states/tamil-nadu-infographic
4. www.tnpscgruru.in/2020/02/Human-Development...
5. tnpsc.academy/tnpsc-development-administration...
6. www.civilserviceaspirants.in/gk/Indian-Economy/...
7. tnpsc.academy/course/tnpsc-development...
8. en.wikipedia.org/wiki/Tamil_Nadu
9. www.thehindu.com/news/national/tamil-nadu/tamil...
10. www.teoma.co.uk/Economic_development/Tamil_Nadu

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	M	M
CO2	M	S	M	M	S	S	S	M	M	M
CO3	M	S	S	M	M	M	M	M	S	M
CO4	S	M	M	S	S	M	S	M	M	S
CO5	M	S	S	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

ALLIED - 2

PAPER - 3

3. WOMEN AND THE ECONOMY

Course Objectives:

1. Introducing women as an equal contributor for GNP.
2. Emphasize the need of women development for economic upliftment.
3. To emphasize women empowerment and its positive outcome on national economy.
4. To understand the importance of women health and education for better awareness.
5. To make them understand women related laws for solving social and economic issues.
6. Elaborate multiplier effect of women development.

Course Outcomes:

1. After studied unit-1, the student will be able to understand the role of women in economic development.
2. After studied unit-2, the student will be able to acquire Knowledge on women Empowerment.
3. After studied unit-3, the student will be able to understand the concept of demography.
4. After studied unit-4, the student will be able to get clear picture on status of women in health and education.
5. After studied unit-5, the student will be able to gain knowledge on women rights.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	No	Yes	No	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Introduction**(18 Hours)**

Women as Human Resource - Women and Economic Development - Contribution of Women to GNP.

UNIT-II: Role of Women the Economy**(18 Hours)**

Women`s Empowerment - Concept - Objectives - Types: Social Empowerment - Economic Empowerment - Economic Empowerment - Working in Household Industries - Role of Women in European, American, Asian, African countries,

UNIT-III: Demography and Social Issues**(18 Hours)**

Demographic and futurological Issues - Gender ratio - Age composition - Female IMR - Fertility Rate - Female Infanticide - Male Preference - Problems Faced by Women.

UNIT-IV: Status of Women in Health and Education**(18 Hours)**

Health Education: Meaning - Definition - Concept - Dimensions of Health - Determinants of Health - Health Care and Delivery System - Female Adult Education - Health Information System - Health and Education of Women in India.

UNIT-V: Law and Women`s Rights**(18 Hours)**

Domestic Violence - Dowry Harassment - Wife Battering - Sexual Abuse - treatment of Widows - Crimes Against Women - Equality for Women - Legal Literacy for women - Promoting of Women`s Right by Government - Property Right.

Text Books:

Unit-I: M.L.Jhingan, Women and the Economy, Vrinda Publication Haryana, 2015

Unit-II: M.L.Jhingan, Women and the Economy, Vrinda Publication Haryana, 2015

Unit-III: M.L.Jhingan, Women and the Economy, Vrinda Publication Haryana, 2015

Unit-IV: M.L.Jhingan, Women and the Economy, Vrinda Publication Haryana, 2015

Unit-V: M.L.Jhingan, Women and the Economy, Vrinda Publication Haryana, 2015

Reference Books:

1.M.L.Jhingan Different Demographic Measurement Vrinda Publication, Haryana.2015

2. G.Das,Determinants of Population Growth,King Publication, New Delhi.2005

E - Resources

1. phys.org/news/2018-06-women-impact-economy...
2. www.oecd.org/gender/Enhancing Women Economic Empowerment...
3. www.unwomen.org/en/what-we-do/economic-empowerment
4. www.ignouhelp.in/ignou-ba-study-material
5. www.empowerwomen.org/en/resources
6. study.com/.../lesson/women-in-the-qing-dynasty.html
7. www.mckinsey.com/featured-insights/employment...

8. [www.gigapromo.in/Compare-Now/Economic Study Material](http://www.gigapromo.in/Compare-Now/Economic%20Study%20Material)

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	S	M	S	M	M
CO2	M	S	S	M	S	S	M	S	S	M
CO3	S	S	M	M	M	M	S	S	M	S
CO4	S	M	M	S	S	M	S	M	S	M
CO5	S	S	S	M	M	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

SKILL BASED SUBJECT

PAPER - 1

INTERVIEW SKILLS AND PERSONALITY DEVELOPMENT

Course Objectives:

1. To make students learn the art of presenting curriculum vitae in appropriate way.
2. To improve the employable skill.
3. To get acquainted with group discussion procedure.
4. To improve self-confidence through mock interviews.
5. Tips to improve overall personality development.
6. Design this program for more interactions and personal development.

Course Outcomes:

1. After studied unit-1, the student will be able to understand to write curriculum vitae.
2. After studied unit-2, the student will be able to acquire Knowledge of inter personnel communication skill.
3. After studied unit-3, the student will be able to acquire the knowledge of interview skills.
4. After studied unit-4, the student will be able to gain knowledge on categories of group discussion.
5. After studied unit-5, the student will be able to gain practical knowledge on solving the competitive exam question paper.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	No	Yes	Yes	No	No	No
5	No	Yes	Yes	No	No	No

UNIT-I: Introduction

(9 Hours)

Interview Meaning - Definition - Types of an Interview - Process of an Interview - Purpose of an Interview - Writing Curriculum Vitae.

UNIT-II: Employability Skills

(9 Hours)

Interpersonal Communication Skill - Critical Thinking Skills - Personal development and presentation skills - Leadership.

UNIT-III: Interview Skills

(9 Hours)

Principles for Success - Do's and Don'ts before the Interview - During the Interview - After the Interview - Common Interview Errors.

UNIT-IV: Group Discussion

(9 Hours)

Meaning - Definition – Objectives - Group Discussion - Categories of Group Discussion - Structure and Evaluation Components - Tips for Successful Group Discussion.

UNIT-V: Sample Interview Questions

(9 Hours)

Model Interview Questions for Discussion: UPSE Civil services Examinations - Staff Selection communication - Banks - Business Sectors - Higher Jobs in Educations - Guidelines for the Salary Negotiations.

Text Books:

Unit-I:SajthaJayaprakash Interview Skills and Personality Development Himalaya Publication House2019

Unit-II:SajthaJayaprakash Interview Skills and Personality Development Himalaya Publication House2019

Unit-III:SajthaJayaprakash Interview Skills and Personality Development Himalaya Publication House2019

Unit-IV:SajthaJayaprakash Interview Skills and Personality Development Himalaya Publication House2019

Unit-V:SajthaJayaprakash Interview Skills and Personality Development Himalaya Publication House2019

Reference Books:

1. SajthaJayaprakashInterview Skill, Himalaya Publication House. 2019
2. BarunK.Mitra,Personality Development and Soft Skill,Oxford University. 2019

E - Resources

1. gethppy.com/talent-management/how-to-assess...
2. www.cnbc.com/2019/07/24/career-advice-the...
3. resources.workable.com/managers-interview-questions
4. hiring.monster.com/.../interview-for-leadership
5. atmanco.com/blog/hiring/7-personality-questions...
6. www.managementstudyguide.com/personality-traits...

7. www.clearias.com/ias-interview-tips
8. www.jobtestprep.com/personality-test-free
9. www.thebalancecareers.com/personal-skills-list...
10. [www.teoma.co.uk/The interview questions/Search no more](http://www.teoma.co.uk/The%20interview%20questions/Search%20no%20more)

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	S	S	M	M
CO2	S	S	S	M	S	S	M	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	M	M	S	S	S	M	S	M	S	M
CO5	S	S	M	M	S	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

NON-MAJOR ELECTIVE

PAPER - 1

FUNDAMENTALS OF ECONOMICS - 1

Course Objectives:

1. This course is designed to make the undergraduate students of other disciplines aware of the basic ideas and concepts in economics.
2. To make students understand economic ideas and its implications in real time life situation.

Course Outcomes:

1. After studied unit-1, the student will be able to understand the concept of economics with definition.
2. After studied unit-2, the student will be able to acquire Knowledge of the importance of micro economics and macroeconomics.
3. After studied unit-3, the student will be able to understand the economic growth and economic development.
4. After studied unit-4, the student will be able to gain knowledge on causes of poverty and eradication programmes.
5. After studied unit-5, the student will be able to gain knowledge on employment guarantee programme

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No

3	Yes	Yes	No	No	No	No
4	Yes	Yes	Yes	No	No	No
5	No	Yes	Yes	No	No	No

UNIT-I: Micro Economics

(6 Hours)

Definition of Economics - Adam Smith - Marshall - Robbins - Samuelson -Micro Economics-Meaning-Importance and Uses of Micro Economics- Macro Economics - Meaning-Difference between Micro and Macro Economics

UNIT-II: Macro Economics

(6 Hours)

Meaning - Definition- Basic Concepts of National Income - Gross National Product - Net National product - Personal Income - Per-capita income - Methods of Calculation of national Income - Problems of Calculation

UNIT-III: Economic Growth and Economic Development

(6 Hours)

Meaning of Economic Growth - Meaning of Economic Development - Difference between Development and Growth - Determinants of Economic Development and Economic Growth

UNIT-IV: Poverty

(6 Hours)

Meaning - Definition - Causes of Poverty - Absolute and Relative Poverty - Poverty Eradication Programmes.

UNIT - V: Unemployment

(6 Hours)

Meaning - Causes of Unemployment - Kinds of Unemployment - Employment guarantee programmes.

Text Books:

Unit-I: M.L.Jhingan, Fundamentals of Economics Vrinda Publication Pvt.Ltd.,Delhi 2012

Unit-II: A.L.Ahuja Fundamental of Economics Sultan Chand & Sons New Delhi 2017

Unit-III: M.L.Jhingan, Fundamentals of Economics Vrinda Publication Pvt.Ltd.,Delhi 2012

Unit-IV: A.L.Ahuja Fundamental of Economics Sultan Chand & Sons New Delhi 2017

Unit-V : M.L.Jhingan, Fundamentals of Economics Vrinda Publication Pvt.Ltd.,Delhi 2012

Reference Books:

1. M. L. Jhingan Principles of Economics Vrinda Publication Pvt.Ltd.,Delhi Latest Edition
2. GopalK.PuriEconomics for Civil Services (IAS)IIMS Publication, New Delhi Latest Edition2018
3. A.N.Agrawal Indian EconomyVikas Publishing House Latest Edition2019
4. H.L.Ahuja Advanced Economic Theory Sultan Chand & Sons New Delhi Latest Edition 2017

E - Resources

1. byjus.com/commerce/introduction-to-economics...
2. www.examrace.com/Study-Material/Economics
3. www.clearias.com/economics
4. www.thoughtco.com/economics-for-beginners-
5. www.clearias.com/ias-study-materials
6. www.clearias.com/basic-concepts-of-economics...
7. en.wikipedia.org/wiki/Economics
8. www.freebookcentre.net/Business/Economics-Books.html
9. [in.downloadsearch.cnet.com/Learning economics online free/Answers](http://in.downloadsearch.cnet.com/Learning_economics_online_free/Answers)
10. [www.homeandgardenideas.com/Basic of economics/](http://www.homeandgardenideas.com/Basic_of_economics/)

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	M	M
CO2	S	S	S	S	M	M	S	S	M	M
CO3	S	M	M	M	S	S	M	M	S	S
CO4	M	S	S	S	M	M	S	S	M	M
CO5	M	S	S	S	S	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong, **M** – Medium, **L** – Low (may be avoided)

SEMESTER IV
CORE PAPER - 7
INDIAN ECONOMY-II

Course Objectives:

1. To acquire sufficient knowledge about India's Economic Development and fundamental Concept about National Income in India.
2. The knowledge acquired through this paper will help the students to know the current changes towards economic development.
3. To equip the students to enhance their knowledge about the economic progress and problems of our country.
4. To impart the knowhow of planning and its methodologies.
5. To bring awareness on international trade and its impact on our daily life.
6. To understand the importance of logistics and movement of people through various transport system.

Course Out Comes:

1. After studied unit-1, the student will be able to understand the formation of National Income.
2. After studied unit-2, the student will be able to acquire knowledge about the planning in India.
3. After studied unit-3, the student will be able to clarify the economic reforms and LPG policy.
4. After studied unit-4, the student will be able to assess the India's foreign trade policy.
5. After studied unit-5, the student will be able to understand the transport system and policy in India.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	No	No	No	No
3	No	Yes	No	No	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	No	No	No	No

UNIT - I: National Income**(12 Hours)**

National Income - Definitions - Concepts - Methods of measuring National Income - Difficulties in the Measurement of National Income - Trends in National Income Growth and Structure - National Income estimate in India - Limitations of National Income estimation in India.

UNIT - II: Planning**(12 Hours)**

Planning in India - Objectives - Importance - Evaluation of Economic Planning - Strategy of India's development Plan's - Regional Planning in India - Regional Planning Policy in India. Assessment of Indian Planning - Establishment of NITI Aayog and its functions.

UNIT - III: Economic Reforms and Liberalization**(12 Hours)**

Economic Reforms since 1990's - Appraisal of Economic Reforms - Liberalization: Meaning - Advantages and Disadvantages - Privatization: Meaning and Scope - Globalization - its impact on Indian Economy - Merits and Demerits of Globalization.

UNIT - IV: International Trade**(12 Hours)**

International Trade - India's Foreign Trade - Growth and Structure of India's Foreign Trade - India's Balance of Payments - Measures to Solve disequilibrium in the Balance of Payments Position - New Trade Policy - The Reform Period - Foreign Trade Policy of 2015-2020 - Function and Organization of WTO, IMF and IBRD.

UNIT- V: Transport System in India

(12 Hours)

Transport - Importance of Transport (Roadway, Railways, Shipping and Civil Aviation) to Economic Development - Communication System in India - Transport contribution to Agriculture and industry. Recent trends in all transport in India.

Text Books

Unit-I: Sankaran.S Indian Economy Margham Publications 7th edition 2014

Unit-II: RuddarDutt&Sundaram Indian Economy KPN Sulan Chand Publishing 7th edition 2016

Unit-III: Sankaran.S Indian Economy Margham Publications 7th edition 2014

Unit-IV: Sankaran.S Indian Economy Margham Publications 7th edition 2014

Unit-V: Sankaran.S Indian Economy Margham Publications 7th edition 2014

Reference Books:

S.No	Title	Authour	Publisher	Edition	Year
	Indian Economy	RuddarDutt&Sundaram KPM	S Chand Publishing	7 TH	2016
	Indian Economy	Sankaran S	Margham Publications	7 th	2014
	Indian Economy	Dhingra I.C	Manakin Press	21 ST	2013
	Indian Economy	Misra S.K &Puri V.K	Himalaya	35 TH	2017

			Publishing House		
	Indian Economy	Sanjiv Verma	Unique Publishers	8 th	2019
	Indian Economy	Agarwal A.N	New Age	41 ST	2016
	Economics of Development & Planning	Jhingan M.L	Vrinda Publication	41 ST	2016

E- Materials

1. www.studydhaba.com/indian-economy-study-material-pdf
2. www.examrace.com/IEcoS/IEcoS-Study-Material
3. www.winmeen.com/tnpsc-indian-economy-study-materials
4. www.jagranjosh.com/articles/ias-prelims-2015-gs...
5. www.examrace.com/NTA-UGC-NET/NTA-UGC-NET-Study...
6. www.governmentexams.co.in/tnpsc-indian-economy-notes
7. www.tnpscshouters.com/2019/02/tnpsc-indian...

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	S	M	M
CO2	S	S	M	M	S	S	M	M	S	M
CO3	M	S	S	S	M	M	S	S	M	S
CO4	M	S	S	S	S	M	M	S	S	M
CO5	S	M	S	S	M	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

CORE PAPER - 8

MONETARY ECONOMICS -II

Course Objectives:

1. The main objective of this paper is to introduce the concept of Bank.
2. The students understand the Working of Commercial Banks.
3. Acquires the knowledge of the Central Banks and its functions.
4. Gains knowledge of monetary policy and the role played in an Economy.
5. Understands the importance of Money market in economic development.
6. The student Understand the Capital Market and its functions.

Course Out Comes:

1. After studied unit-1, the student will be able to understand the Commercial banks and its functions.
2. After studied unit-2, the student will be able to acquire Knowledge of Central banks, its functions and the instruments of credit control.
3. After studied unit-3, the student will be able to acquire knowledge of Monetary policy and its role in a developing economy
4. After studied unit-4, the student will be able to gain knowledge of importance of Money market in economic development
5. After studied unit-5, the student will be able to gain knowledge of Capital market and its working in India.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	No	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Commercial Banks**(9 Hours)**

Commercial Banks - Meaning- Functions of Commercial Banks - Credit Creation -Meaning - Technique of Credit Creation - Nationalization of Commercial Banks- Objectives of Nationalization-A critical Appraisal of the functioning of Nationalized Banks in India.

UNIT-II: Central Banking**(9 Hours)**

Nature and Functions of a Central Bank - Instruments of Credit control - Its efficiency and limitations - Key differences between Central Bank and Commercial Bank.

UNIT - III: Monetary Policy**(9 Hours)**

Monetary Policy-Meaning and Definition - Objectives of Monetary policy - Instruments of monetary policy - Role of Monetary policy in a Developing Economy- RBI and Monetary Policy -Limitation of Monetary policy.

UNIT IV-Money Market**(9 Hours)**

Money Market- Meaning - Features-Institutions of the Money Market-Instruments of the Money Market-Functions and Importance of Money Market in economic development.

UNIT - V: Capital Market**(9 Hours)**

Capital Market-Meaning-Features-Functions of Capital Market-Working of Indian Capital Market-Distinction between Money Market and Capital Market

Text Books

Unit-I: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi.

Unit-II: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi.

Unit-III: M.L.Jhingan, Monetary Economics, Vrinda Publications(P)LTD,Delhi.7th Edition

Unit-IV: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi

Unit-V: R.Cauvery, N.Kruparani, U.K.SudhaNayak ,A.Manimekalai, Monetary Economics, Sultan Chand & Company LTD,Ram Nagar New Delhi

Reference Books:

- 1.K.K.Dewett, Modern Economic Theory,S.Chand& Company LTD,New Delhi.
2. T. T.Sethi, Monetary Economics, S.Chand& Company LTD, New Delhi.
3. Suraj,B.Gupta, Monetary Economics, Sultan Chand & Company, New Delhi.
4. S. Sankaran, Monetary Economics, Margham Publication, Chennai.
5. D.M.Mithani, Money, Public Finance and International Trade, Himalaya Publishing House.

E Resources

1. <https://www.studynama.com/community/threads/monetary-economics-hand-written-notes-pdf-ebook-for-bcom-final-year-free-download.2474/>
2. <https://economicsnetwork.ac.uk/teaching/Online%20Text%20and%20Notes/Monetary%20Economics>
3. <https://www.coursera.org/learn/money-banking>

4. http://www.kvongcmehsana.org/admin/downloads/1190010322session_2015-16_class_xi_economics_study_material.pdf
5. http://www.brainkart.com/article/Monetary-Economics_37077/
6. <http://whystudyeconomics.ac.uk/During-your-study/module-choices/monetary-economics/>
7. http://www.lse.ac.uk/resources/calendar/courseGuides/EC/2018_EC321.htm
8. <https://www.springer.com/gp/economics/macroeconomics-monetary-economics-growth>
9. <https://www.stuvia.com/doc/293019/monetary-economics-ecs3701-selected-examination-questions-and-suggested-solutions>
10. uk.life123.com/Monetary_economics/Save_your_time

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	M	S	M
CO2	M	S	S	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	M	S	M	S
CO5	S	M	S	S	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

ALLIED - 2

PAPER - 4

(To choose one out of 4)

1. Basic Econometrics

Course Objectives:

1. To prepare students for basic empirical works in economics.
2. To introduce set of research tools used to estimate and test economic relations.
3. To introduce linear regression analysis to students.
4. To introduce theory and application of contemporary economic tools.
5. To provide opportunity to use actual economic for testing economic theories.
6. To introduce simultaneous equation methods and its application in economic models.

Course Outcomes:

1. After studied unit-1, the student will be able to understand the nature and scope of econometrics.
2. After studied unit-2, the student will be able to gain knowledge on linear regression.
3. After studied unit-3, the student will be able to understand generalized least square and its applications.
4. After studied unit-4, the student will be able to understand simultaneous equation methods.
5. After studied unit-5, the student will be able to understand to apply econometric models.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT - I: Nature and Scope of Econometrics

(18 Hours)

Meaning - Definition - Econometric Approach - Economic theory - Statistics and Econometrics - Nature and Uses of Econometric Models.

UNIT- II: Linear Regression

(18 Hours)

Meaning - Two Variable Regression - Multiple Regression - Correlation Coefficient - Multi Co-linearity - Extensions of Linear Regression - Functional Forms - Dummy Variables - Analysis of Variance.

UNIT -III: Generalized Least Squares

(18 Hours)

Meaning - Heteroscedastic Errors - Autocorrelation - Errors in Variables - Methods of Instrumental Variable - Grouping of Observations and Grouping of Equations.

UNIT - IV: Simultaneous Equation Methods

(18 Hours)

The problem of identification - Estimation - Two Stage Least Squares - Introduction to Limited Information and Full Information- Maximum Likelihood and Three Stage Least Squares.

UNIT - V: Application of Econometric Models

(18 Hours)

Application of Single Equation Technique in Demand analysis - Aggression Problem, Engle's Law, Slutsky's Theorem - Model in Relative Prices, Aggregation over consumers -

Properties of the Estimators - Estimation of Consumption Function - Cross Section and Time Series - Estimation of Production functions: Cobb Douglas.

Text Books:

Unit- I: Damodar, Gujarati, Basic Econometrics, Singapore McGraw Hill Inc., 1995.

Unit-II: Damodar, Gujarati, Basic Econometrics, Singapore McGraw Hill Inc., 1995.

Unit- III: Damodar, Gujarati, Basic Econometrics, Singapore McGraw Hill Inc., 1995.

Unit- IV: Damodar, Gujarati, Basic Econometrics, Singapore McGraw Hill Inc., 1995.

Unit- V: Damodar, Gujarati, Basic Econometrics, Singapore McGraw Hill Inc., 1995.

References Books:

1. Johnstron. J. Econometric Methods. Singapore, McGraw Hill Inc., 1994.

2. Johnson, Aaron.C Jr et al. Econometrics: Basic and Applied. New York,

MacmillanPublishing Co, 1987.

3. Maddala.G.S. Econometrics. New York, McGraw Hill, 1997.

E- Materials:

1. home.iitk.ac.in/~shalab/econometrics/Chapter1...
2. www.examrace.com/NTA-UGC-NET/NTA-UGC-NET-Study...
3. www.clearias.com/ias-study-materials
4. www.icsi.in/Study Material Foundation/BE.pdf
5. www.thoughtco.com/economics-for-beginners-4140372
6. www.ignouhelp.in/ignou-mec-study-material
7. ocw.mit.edu/courses/economics/14-32-econometrics...
8. jobrapido.com/jobs econometrics
9. in.zapmetasearch.com/Basic Econometrics/Now
10. www.gigapromo.in/Compare-Now/Economic

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	M	S	S	M
CO2	S	S	S	M	S	S	S	M	M	S
CO3	S	M	S	S	M	M	S	S	S	S
CO4	M	S	M	M	S	S	M	S	S	M
CO5	S	S	M	S	S	M	S	S	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong, **M** – Medium, **L** – Low (may be avoided)

SEMESTER – IV PAPER TYPE: ALLIED - 2

PAPER – 4 ECONOMIC DEVELOPMENT OF TAMIL NADU-II

Course Objectives

1. To understand the industrial map of Tamil Nadu.
2. To learn about the growth of industrial output.
3. To understand the salient features of human capital.
4. To learn about the existing plan and its resource allocation on various sector.
5. To learn about the sources of state finance and expenditure pattern.
6. To study about welfare measures and its impact on society.

Course Outcomes:

1. After studied unit-1, the student will be able to acquire knowledge on various industries from Chennai to Tuticorin.
2. After studied unit-2, the student will be able to gain knowledge on the role played by industrial finance institutions for the industrial development.
3. After studied unit-3, the student will be able to acquire knowledge on human capital of Tamil Nadu with education and skilled work force.
4. After studied unit-4, the student will be able to understand the pattern of resource allocation on various sectors.
5. After studied unit-5, the student will be able to get knowledge on various welfare schemes of Tamil Nadu.

Matching Table (Put Yes / No in the appropriate box)

Unit	i.	ii.	iii.	iv.	v.	vi.
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	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	No	No	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-I: Industrial Development

(18 Hours)

Industrial Development: Major Industries - Cotton -Textiles - Sugar - Cement - IT - Automobiles - Leather Processing - Small Scale Industries - Cottage Industries - Light Engineering Goods

UNIT-II: Industrial Production

(18 Hours)

Index of Industrial Production - Change in the Industrial Structure - Investment - Export Value Added - Employment - Number of Registered Factories - State aid to Industrial Development - State Sponsored Corporations.

UNIT-III: Human Capital

(18 Hours)

Human resource and economic development - Occupational Pattern - Employment and Unemployment - Poverty - Education-Health and Nutrition-Water Supply and Sanitation.

UNIT-IV: Planning

(18 Hours)

Planning - Objectives - Targets - Sectoral Allocation - Performance - Problems of Poverty and Unemployment - State Finance - Sources of Finances - Pattern of Expenditure - Central Assistance.

UNIT-V: Welfare Measures

(18 Hours)

Recent welfare Measures: Various Schemes of TN Government - Social Welfare Schemes - Importance - Impact on the Society.

Text Books:

Unit-I: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Unit-II: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Unit-III: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Unit-IV: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Unit-V: A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.

Reference Books:

1. Tamil Nadu Economic Appraisal
2. Tamil Nadu Economy- MIDS Publication
3. A.G. Leonard, Tamil Nadu Economy, Macmillan India, Laxmi publication 2006.
4. S. Perumalsamy, Economic Development of Tamil Nadu, S. Chand & Company, 1985.
5. A. G. Leonard, Tamil Nadu Economy, illustrated, Macmillan India, 2006.
6. S. Kuppusamy, Economic Development of Tamil Nadu, Sharada Publishing House, Delhi, 2014.

E - Materials:

1. www.ibef.org/states/tamil-nadu-presentation
2. en.wikipedia.org/wiki/economy-of_tamil-nadu
3. www.ibef.org/states/tamil-nadu-infographic
4. www.tnpscguu.in/2020/02/Human-Development...
5. tnpsc.academy/tnpsc-development-administration...
6. www.civilserviceaspirants.in/gk/Indian-Economy/...
7. tnpsc.academy/course/tnpsc-development...
8. en.wikipedia.org/wiki/Tamil_Nadu
9. www.thehindu.com/news/national/tamil-nadu/tamil...
10. www.teoma.co.uk/Economic_development/Tamil_Nadu

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	M	M
CO2	M	S	M	M	S	S	S	M	M	M
CO3	M	S	S	M	M	M	M	M	S	M
CO4	S	M	M	S	S	M	S	M	M	S
CO5	M	S	S	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

SEMESTER – IV

ALLIED - 2

PAPER – 4

3. DEVELOPMENT ECONOMICS

Course Objective

1. The goal of this course is to provide students with the essential concepts of Development economics.
2. To prepare them to understand the causes of under development.
3. To make them understand various growth models of development.
4. To emphasise the importance of resource allocation.
5. To explain the choice of technology this makes a big difference in the result.
6. An attempt to train students to collect and interpret data on developing economies.

Course Outcome

1. After studied unit-1, the student will be able to understand the importance of growth for development.
2. After studied unit-2, the student will be able to analyse various growth models.
3. After studied unit-3, the student will be able to understand the present-day growth models.
4. After studied unit-4, the student will be able to acquire knowledge on various stages of growth.
5. After studied unit-5, the student will be able to get knowledge on the importance of resource allocation.

Matching Table (Put Yes / No in the appropriate box)

Unit	I. Remembering	ii.Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	No	No	No
3	Yes	Yes	Yes	No	No	No
4	No	Yes	No	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT - I: Growth and Development

(18 Hours)

Growth and Development - Meaning -objectives - relevance of economic development - Measurement of economic development - Development gap.

UNIT -II: Growth Models

(18 Hours)

Basic assumptions of Growth Models -The Harrod - Domar Model and its applications - The Kaldors Growth Model.

UNIT - III: Growth Models (Continue)

(18 Hours)

The Fei -Ranis Model of economic growth -The wage goods Model -A critique of Dual economy Model- The Mahalanobis Model.

UNIT - IV: Stages of Growth

(18 Hours)

The stages of Growth Model - Rostow- Lewis Model -Nurkse balanced Growth model - Leibenstein Model.

UNIT - V: Resource Allocation

(18 Hours)

Resource allocation and choice of technology - Appropriate and inappropriate technology- Linear programming and development planning.

Text Books:

Unit - I: M.L.Jhingan, The Economics of Development Planning, Vrinda Publications Private Ltd., February 2014.

Unit- II:M.L. Jhingan, The Economics of Development Planning, Vrinda Publications Private Ltd., February 2014.

Unit- III:M.L.Jhingan, The Economics of Development Planning, Vrinda Publications Private Ltd., February 2014.

Unit- IV: M.L.Jhingan, The Economics of Development Planning, Vrinda Publications Private Ltd., February 2014.

Unit- V:M.L.Jhingan, The Economics of Development Planning, Vrinda Publications Private Ltd., February 2014.

Reference Books:

1. Albert O.Hirschman, The Strategy of Economic Development, ww Norton & Co.,
2. W.Arthur Lewis, The theory of Economic Growth - Routldge publication, 2007.
3. Albert O.Hirschman, Development Projects Observed, Brookings Institution, 2014.
4. GPH Panel of experts, Economics of Growth and Development, GullybabaPulishing House Latest edition.
5. M.L.Jhingan& B.K, Jhingan, The Economics of Development Planning, 42nd edition January 2019.
6. Adelman, I., Theories of Economic Growth and Development, Stanford University Preess, Stanford 1961.
7. Chakravarty, S., Development Planning the Indian Experience, Clarendon Press 1989.
8. Todaro, M. P., Economics for a developing, 2ndEd., Longman 1981.
9. Todaro, M. P., Development Planning Models and Methods. Oxford University Press 1971.
10. Kindleberger, C. P., Economic Development, 3rd Ed., McGraw-Hill 1977.

E - Materials:

1. exampariksha.com/.../economics-study-material-notes
2. mycbseguide.com/blog/economics-story-development...
3. www.clearias.com/economics
4. exampariksha.com/indian-economy-introduction...
5. www.ignouhelp.in/ignou-mec-study-material
6. study.com/academy/lesson/what-is-economic...
7. www.ignoustudentzone.in/ignou-ma-economics-study...
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Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	S	M	S	M	M
CO2	M	S	S	M	S	S	M	S	S	M
CO3	S	S	M	M	M	M	S	S	M	S
CO4	S	M	M	S	S	M	S	M	S	M
CO5	S	S	S	M	M	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

SKILL BASED SUBJECT

PAPER - 2

MICRO SMALL AND MEDIUM ENTERPRISES

Course Objectives

1. To learn the role of MSME sector in Indian economy
2. To understand ownership patterns, size, financial difficulties of the MSME sector.
3. Emphasize the role of MSME in providing larger employment.
4. To kindle the spirit of entrepreneurship among the students.
5. Highlight the contribution of MSME sector towards exports.
6. To understand the inter dependence between MSME sector and large-scale industry.

Course Outcomes:

1. After studied unit-1, the student will be able to understand the characteristics of MSME and their role in economic development.
2. After studied unit-2, the student will be able to acquire Knowledge about various forms of ownership structure of the companies.
3. After studied unit-3, the student will be able to understand the importance of financial planning and sources of finance.
4. After studied unit-4, the student will be able to gain knowledge on various growth performed by MSME in India.
5. After studied unit-5, the student will be able to understand the functions of entrepreneurship along with motivating factors.

Matching Table (Put Yes / No in the appropriate box)

Unit	I. Remembering	ii.Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	No	No	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-I: Introduction

(09 Hours)

Meaning - Definition - Characteristics - Objectives - Rationale - Role of MSMEs in Economic Development.

UNIT-II: Ownership Structure

(09 Hours)

Meaning - Definition - Proprietorship - Partnership - Company - Co-operative - Selection of an Appropriate Form of Ownership Structure.

UNIT-III: Financing of MSMEs

(09 Hours)

Need for Financial Planning - Source of Finance - Capital Structure - Short-term Loans - Long-term Loans.

UNIT-IV: Growth of MSMEs in India

(09 Hours)

Growth of Fixed Investment - Growth in Production - Growth in Employment - Growth in Exports - Share of MSMEs in the Exports of Manufacturing Sector.

UNIT-V: Entrepreneurship and Skill Development

(09 Hours)

Entrepreneurship: Meaning - Definition - Functions of Entrepreneurship - Motivating Factors of Entrepreneurship - Demonstration of Skill Training in Juice Making, Fruit Processing - Doll Making - Vermin-culture - Industrial Visit.

Text Books:

Unit-I: S.S.Khanka, Micro Small and Medium Enterprise Sultan Chand & Sons New Delhi. 2018

Unit-II: S.S.Khanka, Micro Small and Medium Enterprise Sultan Chand & Sons New Delhi. 2018

Unit-III: S.S.Khanka, Micro Small and Medium Enterprise Sultan Chand & Sons New Delhi. 2018

Unit-IV: S.S.Khanka, Micro Small and Medium Enterprise Sultan Chand & Sons New Delhi. 2018

Unit-V: S.S.Khanka, Micro Small and Medium Enterprise Sultan Chand & Sons New Delhi. 2018

Reference Books:

1. S.S.Khanka, Entrepreneurial Development, Sultan Chand & Sons New Delhi, Latest Edition, 2018.
2. Vasant Desai, Management of SSIs, Himalaya Publishing House, Mumbai, Latest Edition, 2017.
3. T.Ramachandran, Entrepreneurship Perspectives and Strategies, Sri Venkateswara Publication, Tamil Nadu, Latest Edition, 2013.
4. Kalyan Sengupta, Micro, Small and Medium Enterprise, B.C. Publication (9 November 2020).
5. Dr. Maturi Balakrishna Rao, Dr.Talluri Sreekrishna, Micro, Small and Medium Enterprises: Msme, KY Publications.
6. Kalyan Sengupta , Micro, Small and Medium Enterprises, B.C. Publications Easy Guide to MSME -New Edition 2020.
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3. www.rtc.bt/.../6-RajibLahiri-MSMEs_in_India.pdf
4. www.clearias.com/micro-small-and-medium...
5. www.nimsme.org
6. msme.gov.in/know-about-msme
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9. www.india.gov.in/.../micro-small-medium-enterprises
10. [www.homeandgardenideas.com/Micro & small enterprises/Search no more](http://www.homeandgardenideas.com/Micro_&_small_enterprises/Search_no_more)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	S	S	M	M
CO2	S	S	S	M	S	S	M	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	M	M	S	S	S	M	S	M	S	M
CO5	S	S	M	M	S	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

NON-MAJOR ELECTIVE

PAPER - 2

FUNDAMENTALS OF ECONOMICS -II

Course Objectives

1. This course is designed to make the undergraduate students of other disciplines aware of the basic ideas and concepts in economics.
2. To make students understand economic ideas and its implications in real time life situation

Course Outcomes:

1. After studied unit-1, the student will be able to understand the concept of public finance.
2. After studied unit-2, the student will be able to acquire Knowledge on the functions of Reserve Bank.
3. After studied unit-3, the student will be able to understand concept of inflation.
4. After studied unit-4, the student will be able to gain knowledge on deflation.
5. After studied unit-5, the student will be able to gain knowledge on international trade

Matching Table (Put Yes / No in the appropriate box)

Unit	I.	ii.Understanding	iii.	iv.	v.	vi.

	Remembering		Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	No	No	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-I: Public Finance

(06 Hours)

Meaning - Definition - Scope of Public Finance - Public Revenue - Public Expenditure - Causes of increasing Public Expenditure in India.

UNIT-II: Reserve Bank of India

(06 Hours)

Origin of Reserve Bank of India - Functions of Reserve Bank of India - Monetary Policy - Control of Credit - Relationship Between RBI and Commercial Banks.

UNIT-III: Inflation

(06 Hours)

Meaning - Definition - Types - Causes and Effects of Inflation - Controlling Measures - Inflationary Gap.

UNIT - IV: Deflation

(06

Hours)

Deflation - Effects of Deflation - Trade Cycle - Role of Monetary Policy and Fiscal Policy in Inflation and Deflation Period

UNIT-V: International Trade

(06 Hours)

Meaning - Definition - Difference between Internal and External Trade - Balance of Payment - Methods of Correcting unfavourable BOP - Functions of WTO, IMF.

Text Books:

Unit-I: M.L.Jhingan, Fundamental Economics Vrinda Publication Pvt. Ltd., Delhi 2012.

Unit-II: M.L.Jhingan,Fundamental Economics Vrinda Publication Pvt. Ltd.,Delhi 2012.

Unit-III:M.L.Jhingan,Fundamental Economics Vrinda Publication Pvt. Ltd.,Delhi 2012.

Unit-IV: M.L.Jhingan,Fundamental Economics Vrinda Publication Pvt. Ltd.,Delhi 2012.

Unit-V:M.L.Jhingan,Fundamental Economics Vrinda Publication Pvt. Ltd.,Delhi 2012.

Reference Books:

1. [Serkan Gürlük](#), Fundamental of Economics, Dora Publishing – Turkey,[Uludag University](#), ISBN: 978-605-247-137-1, October 2019.
2. [William Boyes](#), [Michael Melvin](#), Fundamentals of Economics, 5thEd, illustrated, Cengage Learning, 2011.
3. [William J Boyes](#); [Michael Melvin, \(Economist\)](#), Fundamentals of economics, Mason, Ohio: South-Western Cengage Learning, 2014.
4. M.L.Jhingan, Principles of Economics, Vrinda Publication Pvt. Ltd.,Delhi, Latest Edition 2012.
5. Gopal K.Puri, Economics for Civil Services (IAS), IIMS Publication, New Delhi, Latest Edition, 2018.
6. A.N.Agrawal, Indian Economy, Vikas Publishing House, Latest Edition, 2019.
7. H.L.Ahuja, Advanced Economic Theory, Sultan Chand & Sons New Delhi, Latest Edition, 2017.

E - Resources

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3. www.clearias.com/economics
4. www.thoughtco.com/economics-for-beginners-
5. www.clearias.com/ias-study-materials
6. www.clearias.com/basic-concepts-of-economics...
7. en.wikipedia.org/wiki/Economics

8. www.freebookcentre.net/Business/Economics-Books.html
9. [in.downloadsearch.cnet.com/Learning economics online free/Answers](http://in.downloadsearch.cnet.com/Learning_economics_online_free/Answers)
10. [www.homeandgardenideas.com/Basic of economics/](http://www.homeandgardenideas.com/Basic_of_economics/)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	M	M
CO2	S	S	S	S	M	M	S	S	M	M
CO3	S	M	M	M	S	S	M	M	S	S
CO4	M	S	S	S	M	M	S	S	M	M
CO5	M	S	S	S	S	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

SEMESTER V
CORE PAPER - 9
MACRO ECONOMICS -1

Course Objectives

1. Purpose of this course is to familiarize the students with the generally accepted principles of macroeconomics.
2. Improving the awareness on consumption and investment function.
3. Explore the employment theory with reference to present day conditions.
4. To understand the inter dependability between consumption, savings and investment functions.
5. To make them capable to estimate equilibrium level of income and other related variables from hypothetical situations.
6. To equip students to compute National Income from a hypothetical situation.

Course Out Comes

1. After studied unit-1, the student will be able to understand the Nature concepts of National Income and Methods of Measuring National Income.
2. After studied unit-2, the student will be able to appreciate different theories of Employment
3. After studied unit-3, the student will be able to analyses the theories of consumption function

4. After studied unit-4, the student will be able to acquire the knowledge about the Investment function

5. After studied unit-5, the student will be able to critically evaluate General Equilibrium Analysis

Matching Table (Put Yes / No in the appropriate box)

Unit	I. Remembering	ii.Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	No	No	No
4	No	Yes	No	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT - I: Introduction

(18 Hours)

Meaning - Nature and Scope - Importance - Circular flow of Income in Two, Three and Four Sector Economy - National Income Analysis - Concepts - Methods of Measuring National Income and Difficulties to Measuring of National Income.

UNIT - II: Theory of Employment

(18 Hours)

Classical Theory - Wages and Employment – J.B.Say's Law of Market - Keynesian Theory of Employment - Principal of Effective Demand Aggregate Demand - Aggregate Supply Function.

UNIT - III: Consumption Function

(18 Hours)

Keynes Psychological Law of Consumption Function - Concepts - Technical Attributes of the Law - APC, APS, MPC AND MPS - Factors determining consumption Function - Measures to Raise the Consumption Function - Consumption Theories: Absolute, Relative, Permanent and Life Cycle Hypothesis.

UNIT - IV: Investment Function

(18 Hours)

Meaning - Definition - Types of Investment - Determinants of the Level of Investment - Marginal Efficiency of Capital and Rate of Interest - Factors affecting MEC - Relationship between MEC and MEI.

UNIT - V: General Equilibrium Analysis (18 Hours)

Meaning - Assumption - Goods Market Equilibrium - Derivation of IS Curve - Slope of IS curve - Disequilibrium of Goods Market - Money Market Equilibrium Derivation of LM Curve - Slope of LM Curve - Disequilibrium of Money Market - General Equilibrium.

Text Books

Unit- I: M.L.Jhingan, Macro Economic Theory, Vrinda Publications Private Limited 12th edition 2014.

Unit- II: S.Sankaran, Macro Economic Theory, , Margham Publications Sulthan Chand ,2016.

Unit-III: S.Sankaran, Macro Economic Theory, Margham Publications Sulthan Chand, 2016.

Unit-IV: S.Sankaran, Macro Economic Theory, Margham Publications Sulthan Chand, 2016.

Unit- V: S.Sankaran, Macro Economic Theory Margham Publications Sulthan Chand ,2016.

Reference Books:

1. M.L Jhingan, Macro Economic Theory, Vrinda Publications P.Ltd. 12th Edition 2014.
2. S. Sankaran, Macro Economics, Margham Publications, 21st Edition 2016.
3. Ahuja H.L, Macro Economics Theory and Policy S.Chand, 20th Edition 2016.
4. Shapiro E, Macro Economic Analysis, Galgotia Publications Pvt Ltd, 5th Edition 2001
5. Vaish M.C, Macro Economics Theory, Vikas Publishing, 14th Edition 2010.
6. Amit Bhaduri, Macro Economics , Palgrave Macmillan, 1st Edition 1986.
7. Romer D.L, Advanced Macroeconomics, McGraw Hill Higher Education, 2nd Edition

2001.

E- Materials

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2. www.studydhaba.com/introductory-macro-economics...
3. en.wikipedia.org/wiki/Macroeconomics
4. www.investopedia.com/terms/m/macroeconomics.asp
5. economictimes.indiatimes.com/.../macroeconomics
6. www.businessdictionary.com/definition/macroeconomics.html
7. www.merriam-webster.com/dictionary/macroeconomic
8. www.tutorialspoint.com/.../macroeconomics_basics.htm
9. www.learncbse.in/cbse-notes-class-12-macro-economics
10. [in.zapmetasearch.com/Macroeconomics Book/](http://in.zapmetasearch.com/Macroeconomics_Book/)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	S	M	M
CO2	S	S	M	M	S	S	M	M	S	M
CO3	M	S	S	S	M	M	S	S	M	S
CO4	M	S	S	S	S	M	M	S	S	M
CO5	S	M	S	S	M	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

CORE PAPER - 10

FISCAL ECONOMICS - I

Course Objectives

1. To make students understand how prudent fiscal policy can develop economic growth.
2. To motivate students to become inquisitive in the core functions of our government.
3. This paper will enable the students to gain deeper and wider knowledge of the Indian Fiscal Tools and policies as well as tax structure and reforms.
4. To understand the impact of public debt and its consequences.
5. To learn about public revenue and public expenditure policies.
6. To understand in depth on theories of taxation.

Course Outcomes:

1. After studied unit-1, the student will be able to understand the scope of public finance.
2. After studied unit-2, the student will be able to acquire Knowledge on the sources of public revenue.
3. After studied unit-3, the student will be able to understand the theories of taxation.
4. After studied unit-4, the student will be able to gain knowledge on the canons of public expenditure.
5. After studied unit-5, the student will be able to gain knowledge of sources, effects and redemption of public debt.

Matching Table (Put Yes / No in the appropriate box)

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	No	No	No
4	No	Yes	Yes	No	No	No

5	Yes	Yes	No	No	No	No
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UNIT-I: SCOPE OF PUBLIC FINANCE

(18 Hours)

Meaning - Definition - Nature and Scope of Public Finance -Importance - Subject matter of Public Finance - Distinction between Private and Public finance - Theory of Maximum Social Advantage - Functions of Government activity.

UNIT-II: Public Revenue

(18 Hours)

Meaning - Definition - Sources and main heads - Tax and Non-Tax Revenue - Canons of Taxation - Types of Tax - Direct and Indirect Taxes: Income Tax, Expenditure Tax, Property Tax, Estate Duty, Capital Gain Tax - Land Revenue, Agricultural Income Tax, Corporation Income Tax, Customs Duties, Excise Duties, Education cess, Goods and Service Tax - Effects of Taxations - Merits and Demerits of Direct and Indirect Taxes.

UNIT-III: Theories of Taxation

(18 Hours)

Theories of Taxation - Factors Determining Taxable Capacity - Absolute and Relative Taxable Capacity - Factor determining Taxable Capacity - Limits to Taxable Capacity- Shifting and Incidence of Taxes - Distinction Between Impact and Incidence - Factors Affecting Incidence of Taxation - Tax Evasion.

UNIT-IV: Public Expenditure

(18 Hours)

Meaning - Definition - Main heads of public expenditure - Scope of Public Expenditure - Classification - Canons of Public Expenditure - Effect of public expenditure - Growth of public expenditure Effects of Public Expenditure on Economic Growth.

UNIT-V: Public Debt

(18 Hours)

Meaning - Definition- Classification of Public Debt - Need for Public Borrowing - Sources of Public Debt - Effects of Public Debt - Burden of Public Debt - Trends in Public Debt of India - Redemption of Public Debt - Methods of Repayment of Public Debt.

Text Books:

Unit-I: Dr.B.P.Tyagi Fiscal Economics-1 Jai Prakash Nath & Co., Meerut Latest Edition 2018

Unit-II: Dr.B.P.Tyagi Fiscal Economics-1 Jai Prakash Nath & Co., Meerut Latest Edition 2018

Unit-III: Dr.B.P.Tyagi Fiscal Economics-1 Jai Prakash Nath & Co., Meerut Latest Edition 2018

Unit-IV: Dr.B.P.Tyagi Fiscal Economics-1 Jai Prakash Nath & Co., Meerut Latest Edition 2018

Unit-V: Dr.B.P.Tyagi Fiscal Economics-1 Jai Prakash Nath & Co., Meerut Latest Edition 2018

REFERENCE BOOKS:

1. Dr.B.P.Tyagi, Public Finance, Jai Prakash Nath & Co., Meerut, Latest Edition, 2018.
2. T.N.Hajela, Public Finance, Ane Books Pvt. Ltd., Delhi, Latest Edition, 2017.
3. D. K. Srivastava, U. Sankar, Development and Public Finance Chelliah Sage Publications Pvt. Ltd; 1st edition (7 March 2012).
4. Richard Abel Musgrave, Peggy B. MusgravePublished December 1st 1989 by McGraw-Hill Companies (first published August 1973).
5. U.K.Hicks, Public Finance, James Nisbet & Co. / Cambridge University Press
6. H.L. Bhatia, Indian Public Finance, George Allen & Unwin Ltd.; First Wraps edition (January 1, 1962)

E - Resources

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2. en.wikipedia.org/wiki/Fiscal_policy
3. www.yourarticlelibrary.com/economics/fiscal-policy...
4. www.economicshelp.org/.../fiscal_policy

5. www.britannica.com/topic/fiscal-policy
6. www.economicdiscussion.net/fiscal-policy/role-of-fiscal...
7. www.investopedia.com/terms/f/fiscaldeficit.asp
8. www.thebalance.com/what-is-fiscal-policy-types...
9. www.economicdiscussion.net/fiscal-policy/top-8...
10. www.economicdiscussion.net/fiscal-policy/5-major...

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	M	S	M
CO2	M	S	S	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	M	S	M	S
CO5	S	M	S	S	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

CORE PAPER - 11

MANAGERIAL ECONOMICS

Course Objectives

1. The main objective of this paper is to apply in business decision making, demand forecasting and pricing methods.
2. The students understand the role and responsibilities of Managerial Economist.
3. The students Acquire the knowledge of the Demand forecasting and methods of Forecasting.
4. Gains knowledge of different methods of pricing for a product.
5. Understands Profit Theories and Break-even analysis.

6. The student understands the meaning of Capital Budgeting and Methods of appraising Project profitability.

Course Out Comes

1. After studied unit-1, the student will be able to understand the concept of Managerial Economics, Role of Managerial Economist and Decision-making process.
2. After studied unit-2, the student will be able to acquire Knowledge of Demand forecasting and Demand Forecasting methods.
3. After studied unit-3, the student will be able to gain knowledge of the different methods of fixing price.
4. After studied unit-4, the student will be able to gain knowledge on Profit Theories and Break - even analysis.
5. After studied unit-5, the student will be able to gain knowledge of Capital Budgeting and different methods of appraising project profitability.

Matching Table (Put Yes / No in the appropriate box)

Unit	I. Remembering	ii.Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	No	No	No
3	Yes	Yes	Yes	No	No	No
4	No	Yes	No	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Introduction

(18 Hours)

Managerial Economics-Meaning- Definition- Characteristics-Nature and Scope of Managerial Economics - Distinguish Managerial Economics from General Economics - Relationship of Managerial Economics with other subjects - Statistics, Mathematics, Accounting -Uses of Managerial Economics - Role of Managerial Economist - Responsibilities of a Managerial Economist- Decision making process-Social Responsibility of Business.

UNIT-II: Demand Forecasting (18 Hours)

Demand Forecasting - Meaning - Purpose (objectives) of Demand Forecasting -Types of Forecasting - Methods of Demand Forecasting - Methods of Forecasting Demand for new products - Criteria for good forecasting.

UNIT-III: Pricing Methods (18 Hours)

Price-Meaning-Pricing Methods -Cost -oriented methods-Full cost Pricing-Target pricing, Marginal cost pricing -Competition oriented Methods-Going rate pricing - Customary Pricing-Pricing a new product -Skimming Price-Penetration Price-Pricing over the life cycle of a product - Product line pricing - Mark up and Mark down pricing by retailers - Resale price maintenance - Dual pricing.

UNIT-IV: Profit (18 Hours)

Profit - Meaning-Functions of Profit - Accounting profit and Economic profit - Theories of profit - Hawley's Risk Theory - Knight's Uncertainty bearing Theory -Clark's Dynamic theory - Schumpeter's Innovation theory - Break -Even analysis - Managerial uses of Break - Even analysis.

UNIT-V: Capital Budgeting (18 Hours)

Capital Budgeting- Meaning- Need for Capital Budgeting -Nature of Capital Budgeting- Forms of capital Budgeting - Project Profitability-Meaning Methods of Appraising project Profitability-Pay-back method-Accounting Rate of Return-Internal Rate of Return -Net Present value index method.

Text Books

Unit-I:R.L.Varshney&K.L.Maheshwari, Managerial Economics,Sultan Chand and Sons,New Delhi.

Unit-II:R.L.Varshney&K.L.Maheshwari, Managerial Economics,Sultan Chand and Sons,New Delhi.

Unit-III:R.L.Varshney&K.L.Maheshwari, Managerial Economics,Sultan Chand and Sons,New Delhi.

Unit-IV:R.L.Varshney&K.L.Maheshwari, Managerial Economics,Sultan Chand and Sons,New Delhi.

Unit-V:R.L.Varshney&K.L.Maheshwari, Managerial Economics,Sultan Chand and Sons,New Delhi.

Reference Books:

1. Mote; Samuel Paul and G.S.Gupta, Managerial Economics, Concepts & Cases, Tata McGraw Hill.
2. Cauvery. , Managerial Economics, S. Chand & Co. New Delhi.
3. H.L.Ahuja, Managerial Economics,S Chand and Co ltd,NewDelhi.Sankaran,. S, Managerial Economics, Margham Publication.
4. Ezra. J. Mishen, Economic Myths & Mythology of Economics (Wheatsneaf Books Ltd., Great Britain, 1986.
5. Hall, R. L. & Hitch, C. J., Price Theory and Business Behaviour (Oxford Economic Paper, 1939.
6. Baumol, William, J., Economic Thory and operation (George Allen & Uniwin Ltd., London).
7. D. Amarchand, Government and Business (McGraw Hill Pub Co, Ltd.)
8. W. Duncan Reekie and Jonathan, N. Crook, Managerial Economics (Heritage Publishers, New Delhi).
9. R. P. Mehewwari and A.N. Gupta, Business, Government and Society (Vikas, New Delhi).
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E - Resources

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2. www.yourarticlelibrary.com/managerial-economics/...
3. economicsconcepts.com/managerial_economics.htm
4. www.tutorialspoint.com/managerial_economics/...
5. www.economicsdiscussion.net/managerial-economics/notes...
6. www.simplynotes.in/managerial-economics/characteristics...
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9. www.simplynotes.in/importance-managerial-economics
10. www.scholarpol.com/nature-and-scope-of-managerial-economics

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	M	S	M
CO2	M	S	S	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	M	S	M	S
CO5	S	M	S	S	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

CORE PAPER - 12

INDUSTRIAL ECONOMICS -1

Course Objectives

1. To enable the students to understand the importance of Industrial Economics.
2. To help the students to understand the Theories of industry.
3. To gain knowledge of the Market structure.
4. To gain knowledge of the Market performance of the firm.

5. To understand how products are differentiated, innovation and profitability.
6. To acquire knowledge about Industrial finance.

Course Out Comes

1. After studied unit-1, the student will be able understand the Nature and Scope of Industrial economics and role of public & private sectors.
2. After studied unit-2, the student will be able to acquire knowledge of the theories of Industries
3. After studied unit-3, the student will be able to understand the Organization of a Firm, Ownership, control and objectives of a Firm.
4. After studied unit-4, the student will be able to acquire knowledge of the firm, productive Efficiency, capacity utilization, profitability and innovation.
5. After studied unit-5, the student will be able to acquire knowledge of Industrial Finance, Assessment of financial soundness.

Matching Table (Put Yes / No in the appropriate box)

Unit	I. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	No	No	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	No	No	No	No

UNIT-I: Framework of Industrial Economics (18 Hours)

Nature and Scope of Industrial Economics - Meaning of Industrialization - Role of Industry in Economic Development - Role of Public and Private Sectors.

UNIT-II: Theories of Industries (18 Hours)

Theories of Industries: Hoffmann, Chenery and Gerschenkron - Theories of Industrial Location: - Weber's theory of industrial location - Sargant's Florence's Theory of Location - Factors affecting Location.

UNIT-III: Market Structure (18 Hours)

Concept and Organization of a Firm - Ownership Control and Objectives of a Firm - Market Structure - Seller's Concentration - Product Differentiation and Entry Conditions.

UNIT-IV: Market Performance (18 Hours)

Growth of a Firm - Size and Growth of a Firm - Growth and Profitability of a Firm - Constraints on Growth - Productivity - Efficiency - Capacity Utilization - Profitability and Innovation.

UNIT - V: Industrial Finance (18 Hours)

External and Other Components of Funds - Financial Statement - Balance Sheets - Profit and Loss Account - Assessment of Financial Soundness.

TEXT BOOKS:

Unit - I: Singh A and A N Sadhu, Industrial Economics, Himalaya publishing House, New Delhi 2012

Unit - II: Singh A and A N Sadhu, Industrial Economics, Himalaya publishing House, New Delhi 2012

Unit - III: Singh A and A N Sadhu, Industrial Economics, Himalaya publishing House, New Delhi 2012

Unit - IV: Singh A and A N Sadhu, Industrial Economics, Himalaya publishing House, New Delhi 2012

Unit - V: Singh A and A N Sadhu, Industrial Economics, Himalaya publishing House, New Delhi 2012

Reference Books:

1. Ahluwalia I.J, Industrial Growth in India, Oxford University Press, New Delhi.
2. Barthwal R.R, Industrial Economics, Wiley Eastern Ltd, New Delhi.
3. Desai B, Industrial Economics in India (3rd Edition), Himalaya Publishing House.
4. Singh A and A N Sadhu, Industrial Economics, Himalaya publishing House, New Delhi 2012

E- Materials

1. encyclopedia2.thefreedictionary.com/Industrial...
2. dictionary.cambridge.org/.../industrial-economics
3. www.bth.se/.../industrial-economics-and-management
4. www.slideshare.net/attrimahesh/industrial-economics
5. en.wikipedia.org/wiki/Industrial_organization
6. books.google.co.in/books/about/Industrial...
7. www.jindec.org
8. www.kopykitab.com/Industrial-Economics-And...
9. www.nottingham.ac.uk/.../Industrial-Economics-BSc
10. london.ac.uk/courses/industrial-economics-ec3099

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	M	S	M
CO2	M	S	S	S	M	M	S	S	M	M
CO3	S	S	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	M	S	M	S
CO5	S	M	S	S	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

PAPER - 1

(to choose one out of 4)

1. ENVIRONMENTAL ECONOMICS – 1

Course Objectives

1. To enable the students to understand the importance of Environmental economics.
2. To help the students to understand the components and issues of Environmental economics.
3. To gain knowledge of the Natural resources and the conservation of resources.
4. To gain knowledge of the causes of Environmental pollution and measures to control Environmental pollution.
5. To understand how population causes Environmental problems.
6. To motivate the students to undertake environment friendly economic activities.

Course Out Comes

1. After studied unit-1, the student will be able understand the importance and issues of environmental economics.
2. After studied unit-2, the student will be able to acquire knowledge of Natural resources, its Depletion and methods of conservation.
3. After studied unit-3, the student will be able to understand the types of environmental pollution and methods to control pollution.
4. After studied unit-4, the student will be able to acquire knowledge of the Environmental Problems caused by population and how human health is affected.
5. After studied unit-5, the student will be able to acquire knowledge of welfare economics and under take environment friendly economic activities.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No

4	No	Yes	No	No	No	No
5	Yes	Yes	Yes	Yes	No	No

(9hrs)

UNIT- I: Environmental Economics

Environmental Meaning - Definition - Importance - Service of Environment - Environmental and its Inter - Relationship with other Services - Economic and Environment - Nature and Scope of Environments - Components of the Environment - Important Issues of Environmental Economics.

(9hrs)

UNIT-II: Natural Resources

Natural Resources - Land - Water - Atmosphere - Energy - Forest - Wild Life - Causes for Depletion of the Resources - Conservation of Resources - Meaning and Methods of Conservation

(9hrs)

UNIT-III: Environmental Pollution

Meaning - Definition - Air Pollution - Water Pollution - Land Pollution - Marine Pollution - Noise Pollution - Implication of Human Health - Animal and Vegetation - Green House Effect - Measures of Control Pollution - Role of an individual in Prevention of Pollution.

(9hrs)

UNIT-IV: Population and Environmental Problems

Population and Environmental Problems - Trends in Global and National Population Levels - Consequences on Environmental Quality - Problems of Urbanization and Environmental Quality in India - Environment and Human Health.

(9hrs)

UNIT-V: Welfare Economics and Environmental Economics

Welfare Economics and Environmental Economics - Pareto Optimality - Cost Benefit Analysis - Private Cost - Social Cost - Pollution Cost - Pollution Control Cost -Evaluation of Environmental Benefit.

TEXT BOOKS:

Unit - I: M.Karpagam, Environmental Economies, Sterling Publication, New Delhi, Latest Edition, 2018

Unit - II: Katar Sing, Anil Shishodia, Environmental Economics Theory and Application, Sage Publication, New Delhi, Latest Edition, 2017

Unit - III: M.Karpagam, Environmental Economies, Sterling Publication, New Delhi, Latest Edition, 2018

Unit - IV: M.Karpagam, Environmental Economies, Sterling Publication, New Delhi, Latest Edition, 2018

Unit - V: M.Karpagam, Environmental Economies, Sterling Publication, New Delhi, Latest Edition, 2018.

Reference Books:

1. Sangar, U. (2012), Environmental Economies, Oxford University Press, New Delhi.
2. Sengupta & Ramprasad. (2017), Ecology and Economics, Oxford University Press, New Delhi.
3. Bhattacharya & Rabindra. (2011), Environmental Economies, Oxford University Press, New Delhi.

E- Materials

1. www.investopedia.com/.../environmental-economics.asp
2. en.wikipedia.org/wiki/Environmental_economics
3. www.britannica.com/topic/environmental-economics
4. www.yourarticlelibrary.com/economics/environmental...
5. www.sciencedirect.com/.../environmental-economics
6. www.epa.gov/environmental-economics
7. www.britannica.com/topic/environmental-economics/...
8. www.env-econ.net
9. www.rff.org/topics/environmental-economics

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	M	M	M
CO2	S	M	M	S	M	M	M	M	M	M
CO3	S	S	M	M	M	S	M	S	M	M
CO4	M	M	S	S	M	M	S	M	M	M
CO5	S	S	M	S	M	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER - 1

2. INTERNATIONAL TRADE - I

Course Objectives

1. To enable the students to understand the concepts of international trade.
2. To help the students to understand theories of international trade.
3. To understand the modern theories of international trade.
4. To gain knowledge of demand and supply of foreign exchange.
5. To acquire knowledge of exchange control and effects of exchange control.
6. To gain knowledge of International Monetary system.

Course Out Comes

1. After studied unit-1, the student will be able understand to basic concepts of International Trade and classical theories of International Trade.
2. After studied unit-2, the student will be able to acquire knowledge of Modern theories of International Trade.
3. After studied unit-3, the student will be able to understand the theories of exchange.
4. After studied unit-4, the student will be able to acquire knowledge of objectives of Exchange Control, Procedure of Exchange Control, Methods & effects of Exchange

Control.

5. After studying unit-5, the student will be able to know the International monetary system and liquidity.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	No	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT- I: Concept of International Trade and Classical Theories (9hrs)

Internal Trade - Meaning - Features - International Trade - Meaning - Features - Nature and importance of International Trade - Classical Theories of International Trade - Adam Smith Absolute Cost Advantage Theories - Ricardo Comparative Cost Theory.

UNIT-II: Modern Theories of International Trade (9hrs)

Heckscher-Ohlin Theories of International Trade - Haberler's Opportunity Cost Theory - Reciprocal Demand Curve - Marshall Edge Worth Offer Curves - J.S.Mill's Theories of Reciprocal Demand - Gain from International Trade.

UNIT-III: Theories of Exchange (9hrs)

Meaning - Definition - Mint Parity Theory - Purchasing Power Parity Theory - Fixed Exchange Theory - Case for Fixed Exchange Rate System - Flexible Exchange Rate - Demand and Supply of Foreign Exchange.

UNIT-IV: Exchange Control (9hrs)

Meaning - Definition - Objectives of Exchange Control - Procedure of Exchange Control - Methods of Exchange Control – Effects of Exchange Control.

UNIT-V: International Monetary System and Liquidity (9hrs)

International Monetary System and Liquidity - IMF - IBRD, ADB, IFC - International Capital Flows - FDI, GATT and WTO - Functions - TRIPS and TRIMS GATS (General Agreement on Trade in service) UNCTAD, UNIDO, ITC.

REFERENCE BOOKS:

1. S.Sankaran., Intrenational Economics, Margham Publication, Chennai, 2017.
2. M.L.Jhingan., International Economics, Vrindha Publication, New Delhi, 2018
3. D.Mithani., International Economics, Himalaya Publication, Mumbai, 2017

E- Materials

1. en.wikipedia.org/wiki/International_trade
2. www.investopedia.com/.../what-is-international-trade
3. www.britannica.com/topic/international-trade
4. www.businessdictionary.com/.../international-trade.html
5. www.thebalance.com/international-trade-pros-cons...
6. www.yourarticlelibrary.com/international-trade/...
7. www.econlib.org/library/Enc/InternationalTrade.html
8. www.india.gov.in/international-trade-agreement
9. www.theguardian.com/business/internationaltrade
10. www.slideshare.net/mathel101/international-trade...

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	M	S	M	S	M	M	M
CO2	M	S	M	S	M	S	M	M	M	M
CO3	M	M	S	M	S	S	M	M	M	M
CO4	M	M	M	S	M	M	S	S	M	M
CO5	M	S	S	M	M	S	M	M	M	M

INTERNAL ELECTIVE
PAPER - 1
6. INDUSTRIAL ORGANISATION-1

Course Objectives:

1. Providing a foundation to study many other fields regarding industrial organization.
2. To elaborate the aspects of scientific management.
3. To explain capital structure and size of the organization.
4. To introduce the theories of location for suitability of place selection.
5. To learn about production management.

Course Outcomes:

1. After studied unit-1, the student will be able to get introduced to industrial organizations.
2. After studied unit-2, the student will be able to gain knowledge on the features of scientific management.
3. After studied unit-3, the student will be able to understand the various forms of capitalization and its structure.
4. After studied unit-4, the student will be able to understand the layout procedures for an organization.
5. After studied unit-5, the student will be able to get acquainted to production management techniques.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

(9hrs)

UNIT - I: Introduction

Industrial Management - Principles of organization - Organizational Process - Delegation - Decentralization forms of Internal Organization - Industrial Productivity and efficiency.

(9hrs)

UNIT - II: Scientific Management

Scientific Management - Objectives of Scientific Management - Principles - Standardization - Scientific Management Used Today - Limitation of Scientific Management - Rationalization - Automation.

(9hrs)

UNIT- III: Capital Structure

Capital structure - Meaning - Definition - Importance - Over Capitalization - Under-capitalization - Trading on Equity - Watered Capital.

(9hrs)

UNIT-IV: Theories of Location

Theories of Location - Meaning - Definition - Factors of Industrial Location - Government Policies - Layout Measuring - Plant - Process.

(9hrs)

UNIT-V: Production Management

Production Management - Meaning - Definition - Nature of Production Management- Objectives Production Management - Types of Production Management - Scope of Production Management - Planning Control - Quality Control - Inspection.

Text Books:

Unit I: Donald A.Hay & Derek J.Morris, Industrial Economics: Theory and Evidence - Oxford Press New Delhi 2015

Unit II: Kanka, S.S.,OrganisationalBehaviour, S.Chand& Co., New Delhi,2016

Unit III: Sivayya, K.V., Indian Industrial Economy, S.Chand&Co.,New Delhi 2017.

Unit IV: Kanka, S.S., Organisational Behaviour, S.Chand & Co., New Delhi, 2016

Unit V: Kanka, S.S., Organisational Behaviour, S.Chand & Co., New Delhi, 2016

Reference Books:

1. Donald A. Hay & Derek J. Morris, Industrial Economics : Theory and Evidence - Oxford Press New, Delhi 2015.
2. Kanka, S.S., Organisational Behaviour, S.Chand & Co., New Delhi, 2016.
3. Sivayya, K.V., Indian Industrial Economy, S.Chand & Co., New Delhi 2017.

E- Materials

1. en.wikipedia.org/wiki/Industrial_organization
2. www.investopedia.com/.../industrial-organization.asp
3. www.coursera.org/learn/industrial-organization
4. policonomics.com/industrial-organization
5. mitpress.mit.edu/.../theory-industrial-organization
6. cepr.org/content/industrial-organization
7. www.verywellmind.com/industrial-organizational...
8. careersinpsychology.org/becoming-an-industrial-or
9. programsandcourses.anu.edu.au/2020/course/ECON8038
10. www.coalitiontheory.net/.../industrial-organisation

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	M	S	M	S	M	M	M
CO2	M	S	M	S	M	S	M	M	M	M
CO3	M	M	S	M	S	S	M	M	M	M
CO4	M	M	M	S	M	M	S	S	M	M
CO5	M	S	S	M	M	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER - 1

7. ECONOMICS OF CAPITAL MARKET AND DIGITAL ECONOMY

Course Objective

1. To provide students an academic base about stock market theories and practices.
2. To learn about the basic characteristics and functions of stock market.
3. To explain the functioning of capital market.
4. To understand the importance digital economy.
5. To analyse the strength and weakness of digital economy.
6. To encourage students to be part of digital economy.

Course Outcomes

1. After studied unit-1, the student will be able to understand the term capital markets and its structure.
2. After studied unit-2, the student will be able to gain knowledge on financial institutions and mutual funds.
3. After studied unit-3, the student will be able to become familiar with shares and debentures.
4. After studied unit-4, the student will be able to understand the functions of stock exchange and SEBI.
5. After studied unit-5, the student will be able to get knowledge on the digital transactions.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

(9hrs)

UNIT-I: Capital Market

Capital Market - Definition - Growth - Tasks - Structure - Role of Commercial Banks.

(9hrs)

UNIT-II: Financial Institutions

Short Term and Long-Term Finance - Interest Free Financial Products and its sources - Financial Institutions - LIC - UTI - IDBI - IFCI - ICICI - Public Deposit - Corporate ploughing back of profits - Mutual Funds - open ended and close ended mutual funds.

(9hrs)

UNIT-III: Shares and Debentures

Corporate securities - Equity Shares - Preference Shares - Debentures and bonds - convertible and non-convertible debentures - fully and partly convertible debentures - Global depository receipts.

(9hrs)

UNIT-IV: Stock Exchange

Stock exchanges - functions services - Listing of securities - Dealers in stock exchanges - Role of Securities and Exchange Board of India (SEBI) in regulating the share market - Demat Account - Opening and Operation - Digital transactions.

(9hrs)

UNIT-V: Primary and Secondary Market

Public Issue of Shares - Primary Market and Secondary Market - Issue of Shares at par and at premium - Right issue of shares - Issue of bonus shares - underwriting of shares - Merchant banks - Foreign Institutional Investors.

Reference Books:

1. Mahesh Dr.Kulkarni , Capital Market and Financial Services, NiraliPrakashan 2014.
2. Rajesh Chakrabarti, Capital Markets in India, Sage Publisher.
3. Gurusamy, S. Capital Markets, Tata McGraw-Hill Education India 2nd edition.

4. Deepak R.Raste, Capital Market in India-Reforms and Regulations, Ingram Short title, 2011
5. Asheesh Pandey, Capital Market and Financial System in India,

E - Materials:

1. [accountlearning.com/role-and-importance- of Capital Market.](http://accountlearning.com/role-and-importance-of-Capital-Market)
2. www.capitalmarket.com/News/Economy-News/Global...
3. download.asic.gov.au/media/...of-capital-markets-20151709...
4. www.accenture.com/us-en/insights/capital-markets/...
5. www.proshareng.com/news/Capital-Market/The-Role...
6. www.toppr.com/.../financial-markets/capital-market
7. www.clearias.com/financial-market-money-market...
8. www.regulationtomorrow.com/eu/the-future-of...
9. www.capitalmarket.com/News/Economy-News/Need-To...
10. www.oecd.org/corporate/capital-markets

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	S	M	M	M
CO2	M	S	M	M	M	S	M	S	M	M
CO3	S	M	M	S	M	M	S	M	M	M
CO4	S	M	S	M	M	S	M	S	M	M
CO5	M	M	S	S	M	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low (may be avoided)

SKILL BASED SUBJECT

PAPER - 3
INTRODUCTION TO RESEARCH METHODOLOGY

Course Objectives:

1. To understand research terminology.
2. To make students capable of designing an elementary research project.
3. To make student competent in quantitative assessment and analysis of economic variables.
4. To make students proficient in organizing economic survey.
5. Critically analyse published research.
6. Identify the components of a literature review process.

Course Outcomes

1. After studied unit-1, the student will be able to understand the significance of research.
2. After studied unit-2, the student will be able to acquire the knowledge of qualities of good research.
3. After studied unit-3, the student will be able to gain knowledge about the methods of research.
4. After studied unit-4, the student will be able to identify research problem.
5. After studied unit-5, the student will be able to understand the methods of collection of data.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

(9hrs)

UNIT-I: Research Introduction

Meaning - Definition - Objectives - Characteristics - Classification - Types: Historical - Descriptive - Comparative - Exploratory - Pure - Applied - Operation - Significance of Research.

(9hrs)

UNIT-II: Research Process

Meaning - Definition - Steps in Research Process: Formulating - Literature Survey - Research Design - Sample Design - Collecting the Data - Analyses - Interpretation - Preparation of the Report - Criteria of Good Research - Quality of Good Research.

(9hrs)

UNIT-III: Researcher and Research Methods

Meaning of Researcher - Definition - Research in Social Science - Objectives of Social Science Research - Functions of Research - Scientific Method - Logical Method - Induction - Deduction - Problem of the Researcher in India.

(9hrs)

UNIT-IV: Research Problem and Research Design

Research Problem: Meaning - Definition - Conditions for Selecting the Problem - Identify a Research Problem - Components - Defining a Problem - Factors Influencing the Choice of Research Problem - Research Design: Meaning - Definition - Need for Research Design - Concept

(9hrs)

UNIT-V: Collection of Data

Sources of Data - Primary data - Secondary Data - Interview Method - Personal Interview - Indirect Oral Investigation - Questionnaire Method - Sampling Method - Random and Non-random Sampling.

Text Books:

Unit-I: K.S.Sonachalam Introduction of Research Methodology, Emperical Publishers, Chennai. 2004

Unit-II: S.C.Gupta Introduction of Research Methodology Himalaya Publication House, Mumbai. 2012

Unit-III: K.S.Sonachalam Introduction of Research Methodology, Emperical Publishers, Chennai. 2004

Unit-IV: S.C.Gupta Introduction of Research Methodology Himalaya Publication House, Mumbai. 2012

Unit-V: K.S.Sonachalam Introduction of Research Methodology, Emperical Publishers, Chennai. 2004

Reference Books:

1. Sonachalam, K.S. (2004), Research Methodology in Social Science, Emperical Publishers, Chennai.
2. Borse, M.N. (2004), Research Methodology Modern Method and New Technique, Shree Niwas Publication, Jaipure.
3. Gupta, S.C. (2012), Fundamentals of Statistics, Himalaya Publication House, Mumbai.

E - Resources

1. www.businessdictionary.com/.../research-methodology.html
2. bbamantra.com/research-methodology
3. encyclopedia2.thefreedictionary.com/Research...-
4. www.ihmgwalior.net/pdf/research_methodology.pdf
5. research-methodology.net/research-methodology/...
6. en.wikipedia.org/wiki/Methodology
7. www.wikihow.com/Write-Research-Methodology
8. [www2.hcmuaf.edu.vn/data/quoctuan/Research Methodology...](http://www2.hcmuaf.edu.vn/data/quoctuan/Research%20Methodology...)
9. explorable.com/research-methodology
10. research-methodology.net/research-methods

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	S	M	M	M	S	S	M	M
CO2	M	S	M	S	S	M	M	S	M	M
CO3	M	M	M	S	M	S	M	M	M	M
CO4	M	S	S	M	S	M	S	M	M	M

CO5	M	M	M	S	M	S	M	S	M	M
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PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low (may be avoided)

SEMESTER VI
CORE PAPER - 13
MACRO ECONOMICS II

Course Objectives

1. To enlarge the scope of understanding of Macro economics.
2. To learn technical aspects of Macro economics.
3. To understand the cause and effect of inflation and deflation.
4. To explain the concept of multiplier and accelerator.
5. To elaborate the possibilities and challenges in international trade.
6. To explain classical and Keynesian views on demand for money.

Course Out Comes

1. After studied unit-1, the student will be able to understand the concepts of Multiplier Accelerator principle and business cycles theory.
2. After studied unit-2, the student will be able to acquire the knowledge about the Demand for money in the Keynesian model and classical views.
3. After studied unit-3, the student will be able to gain knowledge about the inflation and deflation concepts towards economic development.
4. After studied unit-4, the student will be able to assess various policies to economic development
5. After studied unit-5, the student will be able to promote the knowledge to the students about the India's foreign trade.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

(18hrs)**UNIT - I: Multiplier**

Multiplier - Meaning - Definition - Investment Multiplier Vs Employment Multiplier - Assumption - Leakage of Multiplier - Accelerator - Multiplier and Interaction Principle (or) Super Multiplier - Modern Approaches to business Cycle theory by Hicks - Measures to control business cycles- Stabilisation Policies.

(18hrs)**UNIT - II: Demand for Money**

Money in the Keynesian Model - Demand for Money in the Keynesian Theory and Classical Views -Patinkin's Integration of Monetary theory and Value theory - Pigou Effect. Differences between Pigou Effect and Real Balance Effect - Post Keynesian Approaches.

(18hrs)**UNIT - III: Inflation and Deflation**

Meaning - Inflationary Gap - Demand Pull Vs Cost Push Inflation - Types of Inflation - The Phillips curve - Causes of Inflation - Measures to control Inflation - Effects of Inflation - Deflation comparison between inflation and Deflation - control of deflation.

(18hrs)**UNIT - IV: Macro Economic Policies**

Meaning - Policy Targets and Instruments - Objectives - Conflicts (or) Trade off in policy Objectives - Monetary Policy - Objective - instruments - Fiscal Policy - Objectives - instruments - Monetary and Fiscal Policies in LDCs - Keynesian Revolution and its applicable to less development countries.

(18hrs)

UNIT: V International Trade

Meaning - India's Foreign Trade - Value of Export and Import in the planning period - composition of foreign trade - growth and structure of India's foreign trade since 1991 - India's balance of payments - 'EXIM' Policy - Foreign Trade Policy (2015-2020).

Text Books

Unit-1: Macro Economic Theory, M.L.Jhingan, Vrinda Publications Private Limited 12th edition 2014.

Unit-2: Macro Economic Theory, S.Sankaran, Margham Publications Sulthan Chand, 2016.

Unit-3: Macro Economic Theory, S.Sankaran, Margham Publications Sulthan Chand 2016.

Unit-4: Macro Economic Theory, S.Sankaran, Margham Publications Sulthan Chand 2016.

Unit-5: Macro Economic Theory, S.Sankaran, Margham Publications Sulthan Chand 2016.

Reference Books:

1. Jhingan, M.L. (2014), Macro Economic Theory, Vrinda Publications P.Ltd.
2. Sankaran, S. (2016), Macro Economics, Margham Publications.
3. Ahuja H.L. (2016), Macro Economics Theory and Policy, S.Chand.
4. Shapiro, E. (2001), Macro Economics Analysis, Galgotia Publications Pvt Ltd.
5. Vaish, M.C. (2010), Macro Economics Theory, Vikas Publishing.
6. Amit Bhaduri. (1986), Macro Economics, Pargava Macmillan.
7. Romer, D.L. (2001), Advanced Macroeconomics, McGraw Hill Higher Education.

E- Materials

1. freebookcentre.net/.../Macro-Economics-I-Study-Material.html
2. www.studydhaba.com/introductory-macro-economics...
3. en.wikipedia.org/wiki/Macroeconomics
4. www.investopedia.com/terms/m/macroeconomics.asp

5. economictimes.indiatimes.com/.../macroeconomics
6. www.businessdictionary.com/definition/macroeconomics.html
7. www.merriam-webster.com/dictionary/macroeconomic
8. www.tutorialspoint.com/.../macroeconomics_basics.htm
9. www.learncbse.in/cbse-notes-class-12-macro-economics
10. [in.zapmetasearch.com/Macroeconomics Book/](http://in.zapmetasearch.com/Macroeconomics_Book/)

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	M	S	M	M
CO2	M	S	S	S	M	S	M	M	M	M
CO3	M	M	S	M	M	M	S	M	M	M
CO4	M	M	M	S	S	M	M	S	M	M
CO5	M	M	S	M	M	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low (may be avoided)

CORE PAPER - 14
FISCAL ECONOMICS – II

Course Objectives

1. To enlarge the knowledge fiscal economics further.
2. Explaining the causes of deficit financing.
3. To make aware of the similarities and dissimilarities between local and federal finance.
4. To shed more light on budget and their impact on micro and macro economics.
5. Effective learning of prudent fiscal policy.
6. To enlighten the fiscal policy frameworks.

Course Outcomes:

1. After studied unit-1, the student will be able to understand the principles of Budgeting.
2. After studied unit-2, the student will be able to acquire Knowledge on deficit financing in India.
3. After studied unit-3, the student will be able to understand the instruments of fiscal policy.
4. After studied unit-4, the student will be able to gain knowledge on federal finance.
5. After studied unit-5, the student will be able to gain knowledge of local bodies

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	No	No

(15hrs)

UNIT-I: Budget

Meaning - Definition - Objectives of Budgeting - Principles of Budgeting - Qualities of a Good Budget - Types of Budget: Balance Budget - Unbalanced Budget - Revenue and

Capital Budget - Zero-based budgeting - Canon of Budgeting - Performance Budgeting and Success of Performance Budgeting.

(15hrs)

UNIT-II: Deficit Financing

Meaning - Definition - Objectives - Ways and Means of Deficit Financing - Growth of Deficit Financing - Role of Deficit Financing in Promoting Economic Development - Deficit Financing in India.

(15hrs)

UNIT-III: Fiscal Policy

Meaning - Definition - objectives - Instruments of Fiscal Policy - Concept of Sound Finance and Functional Finance - Fiscal Policy and Price Stability - Fiscal Policy and Distribution - Role of Fiscal policy in India.

(15hrs)

UNIT-IV: Federal Finance

Meaning - Definition - Features of Federal Finance - Principles - Financial relations between the Centre and States in India - Methods of Adjustments - Finance Commission: 14th Finance Commission - Recommendations of 14th Finance Commissions.

(15hrs)

UNIT-V: Local Finance

Meaning - Definition - Functions of Local Bodies - Resources of Local Bodies - Taxes of Local Bodies - Problems of Local Finance.

Text Books:

Unit-I: Dr.B.P.Tyagi Fiscal Economics Jai Prakash Nath & Co., Meerut 2018

Unit-II : Dr.B.P.Tyagi Fiscal Economics Jai Prakash Nath & Co., Meerut 2018

Unit-III : Dr.B.P.Tyagi Fiscal Economics Jai Prakash Nath & Co., Meerut 2018

Unit-IV: Dr.B.P.Tyagi Fiscal Economics Jai Prakash Nath & Co., Meerut 2018

Unit-V :Dr.B.P.Tyagi Fiscal Economics Jai Prakash Nath & Co., Meerut 2018

Reference Books:

1. Tyagi, B.P. (2018), Public Finance, Jai Prakash Nath & Co., Meerut.
2. Hajela, T.N. (2017), Public Finance, Ane Books Pvt. Ltd., Delhi

E - Resources

1. www.investopedia.com/insights/what-is-fiscal-policy
2. en.wikipedia.org/wiki/Fiscal_policy
3. www.yourarticlelibrary.com/economics/fiscal-policy...
4. www.economicshelp.org/.../fiscal_policy
5. www.britannica.com/topic/fiscal-policy
6. www.economicsdiscussion.net/fiscal-policy/role-of-fiscal...
7. www.investopedia.com/terms/f/fiscaldeficit.asp
8. www.thebalance.com/what-is-fiscal-policy-types...
9. www.economicsdiscussion.net/fiscal-policy/top-8...
10. www.economicsdiscussion.net/fiscal-policy/5-major...

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	S	M	M
CO2	S	M	M	S	M	M	M	S	M	M
CO3	S	S	S	M	S	S	M	M	M	M
CO4	M	M	M	S	M	M	S	M	M	M
CO5	S	M	S	S	M	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low (may be avoided)

CORE PAPER - 15
HISTORY OF ECONOMIC THOUGHT

Course Objectives

1. To learn and discuss how the economic thought has evolved over time.
2. To critically examine and compare the evolved economic thoughts.
3. To introduce the students to understand the broad concepts of various schools of the economic thought.
4. To encourage students to explore the Indian thoughts and their relevance.
5. To make students capable of distinguish between the main schools and trends in the history of economic thought.
6. To emphasis the point how 'welfare for all' is fulcrum of fair economics.

Course Out Comes

1. After studied unit-1, the student will be able to understand the contributions of Mercantilists and Physiocrats.
2. After studied unit-2, the student will be able to understand how Marxian Theories differ from Classical theories.
3. After studied unit-3, the student will be able to demonstrate the Contributions of Keynes to Economics
4. After studied unit-4, the student will be able to discuss the economic ideas of Welfare School
5. After studied unit-5, the student will be able to apply the economic ideas of different Indian Economic thinkers to Modern India.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	No	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

(15hrs)

UNIT - I: Introduction

Nature and importance- significance of Mercantilism: Role of the State - Role of Money - Rate of Interest - Balance of Trade - Population - Representation Mercantilists -Neo-Mercantilism- Meaning of Mercantilism for Underdeveloped Countries, Physiocrats: Factors of Physiocracy -Main Representatives of Physiocratic School- Meaning of Physiocracy for Underdeveloped Countries.

(15hrs)

UNIT - II: Classical Thoughts

Classical School, Adam Smith: Labour Theory of Value - Role of Government - Canons of Taxation, Alfred Marshall: Marshallian Theory of Value and Time Element - Marshall's Contribution of Monetary Economics, Karl Marx: Marxism System- Marxism and Classicism - Marxian Theory of Value - Marxian Theory of Surplus- Marxian as an Ideology.

(15hrs)

UNIT - III: Modern Thoughts

Keynes and Keynesian Revolution: Keynes and Classical Economics - Keynesian theory of Employment - Aggregate Demand - Aggregate Supply -Consumption Function - Investment Multiplier - Marginal Efficiency of Capital - Keynesian Revolution and its Impact - Post-Keynesian Economics - Critique of Keynesianism.

(15hrs)

UNIT - IV: Economic Ideas of Welfare School

Welfare Economics: Definition of Welfare Economics -A.C.Pigou: Economic ideas - New Welfare Economics - Concept of Social Welfare - Pareto - J.R.Hicks: Economic ideas of Hicks - Hick's compensation Principle, Nobel Laureates in Economics: James J.Heckman and Daniel L.McFadden (2000).

(15hrs)

UNIT - V: Indian Thoughts

Indian Economic Thought: R.C Dutt: Economic ideas of Dutt, Gandhian Economics: Relevance of Gandhian Economic Thought to Modern India, Agricultural Economics-

Economics of Caste -Economics of Socialism, D.R.Gadgil: Industrial Evolution of India - Industrial Labour- War and Economic Policy.

Text Books

Unit-1: V.Lokanathan , A History of Economic Thought, Sulthan Chand10th edition 2018

Unit-II: V.Lokanathan , A History of Economic Thought, Sulthan Chand10th edition 2018

Unit-III: V.Lokanathan , A History of Economic Thought, Sulthan Chand10th edition 2018

Unit-IV: V.Lokanathan , A History of Economic Thought, Sulthan Chand10th edition 2018

Unit-V: V.Lokanathan , A History of Economic Thought, Sulthan Chand10th edition 2018

Reference Books:

1. Lokanathan, V. (2018), A History of Economic Thought, S.Chand.
2. Sankaran. S. (2006), A History of Economic Thought, Margham Publications.
3. Ambedkar, B.R. (2017), History of Indian Currency and Banking, Kalpaz Publications.
4. Ambedkar, B.R. (2019), Problem of Rupee, SamyakPrakashan.
5. Paul, R.R. (2014), History of Economic Thought, Kalyani Publishers .

E- Materials

1. en.wikipedia.org/wiki/history-of-economic-thought
2. www.investopedia.com/.../08/economic-thought.asp
3. www.conted.ox.ac.uk/courses/history-of-economic...
4. www.ineteconomics.org/education/materials/...
5. www.plurale-oekonomik.de/.../Materialien/History.pdf
6. www.amazon.com/History-Economic-Thought-Lionel...
7. en.wikipedia.org/wiki/talk:-history-of-economic...
8. www.amazon.in/History-Economic-Thought-M-L...
9. www.homeandgardenideas.com/History of economics/Look no further
10. www.teoma.co.uk/History of economics/Look no furth

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	M	M	M

CO2	S	M	M	S	M	M	M	S	M	M
CO3	S	S	M	M	M	S	S	M	M	M
CO4	M	M	S	S	M	M	S	M	M	M
CO5	S	S	M	S	M	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low

INTERNAL ELECTIVE

PAPER -2

(to choose one out of 4)

1. ENVIRONMENTAL ECONOMICS – II

Course Objectives:

1. To understand the economics in energy production and consumption.
2. To understand various types of resources and the economics behind its consumption.
3. To bring awareness about environmental issues.
4. To introduce environmental protection Act.
5. To make students understand various environmental hazards.
6. To explain about global environmental issues and local environmental issues.

Course Out comes:

1. After studied unit-1, the student will be able to understand the energy production and consumption
2. After studied unit-2, the student will be able to acquire Knowledge on various types of resources and the economics behind its consumption
3. After studied unit-3, the student will be able to understand the environmental issues
4. After studied unit-4, the student will be able to gain knowledge on environmental protection Act.

5. After studied unit-5, the student will be able to gain knowledge about global environmental issues and local environmental issues.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT- I: Energy Economics

(9hrs)

Energy Sources - Renewable and Non-renewable energy - Sources of Energy - Changing Pattern of World Energy Consumption - Energy Scenario in India - Energy Policy and Environmental Quality.

UNIT-II: Resource Economics

(9hrs)

Classification of Resources - Forest Resources - Deforestation - Optimum Resource Use - Conservation of Natural Resources - Water Resources - Mineral Resources - Food Resources.

UNIT-III: Environmental Education

(9hrs)

Environmental Education: Solid Waste Management - Human Rights - Value Education - Environmental Awareness HIV / AIDS - Women and Child Welfare - Family Planning.

UNIT-IV: Law and Environmental Protection

(9hrs)

Environmental Protection - Environmental Policy (National & International) - Role of Official and Volunteers Agencies - National and State Control Board.

UNIT-V: Environmental Problems

(9hrs)

Environmental Problems in the Global - Critical Issues - Global Warming - Ozone Depletion - Acid Rain - Soil Erosion - Rain Water Harvesting - Problems of Environmental Quality in Developed Economies - Problems of Environmental Quality in Developing Economies - Nature of Environmental Problems in India.

TEXT BOOKS:

S.No	Title	Author	Publisher	Edition	Year
1	Environmental Economies	M.Karpagam	Sterling Publication, New Delhi	Latest Edition	2018
2	Environmental Economics Theory and Application	Katar Sing, Anil Shishodia	Sage Publication, New Delhi	Latest Edition	2017

Reference Books:

S.No	Title	Author	Publisher	Edition	Year
1	Environmental Economies	U.Sangar	Oxford University Press, New Delhi	Latest Edition	2012
2	Ecology and Economics	Sengupta and Ramprasad	Oxford University Press, New Delhi	Latest Edition	2017
3	Environmental Economies	Bhattacharya and Rabindra	Oxford University Press, New Delhi	Latest Edition	2011

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	M	M	S	M	M
CO2	M	M	M	M	S	M	M	S	M	M
CO3	S	S	S	S	S	S	S	S	M	M
CO4	M	M	M	M	S	S	L	S	M	M
CO5	M	S	S	S	M	M	M	L	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE
PAPER -2
2. INTERNATIONAL TRADE - II

Course Objectives:

1. To introduce terms of trade and its impact on economic development.
2. To make students understand exchange rates and monetary policies by central bank.
- 3 To know in detail about Balance of trade and Balance of payment and their implications.
4. To make them understand cause and effect of international capital movement.
5. To introduce the argument for free trade and protectionism.
6. To discuss current global trade issues like China - US trade war.

Course Out comes:

1. After studied unit-1, the student will be able to understand the meaning of terms of trade and its implications.
2. After studied unit-2, the student will be able to acquire Knowledge on currency market issues.
3. After studied unit-3, the student will be able to understand the disequilibrium in the Balance of Payment.
4. After studied unit-4, the student will be able to gain knowledge on international capital movement.
5. After studied unit-5, the student will be able to gain knowledge on free trade vs protectionism

Matching Table (Put Yes / No in the appropriate box)

Unit	i.	ii.	iii.	iv.	v.	vi.
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	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT- I: Terms of Trade

(9hrs)

Trade - Meaning - Definition - Theory of Reciprocal Demand - Marshall Edgeworth Offer Curves - Critical Appraisal - Factors Affecting Terms of Trade - Effects of Term of Trade - Terms of Trade and Economic Development.

UNIT-II: Rate of Exchange

(9hrs)

Meaning - Definition - Changes in Exchange Rate - Speculation in currency Trading - Equilibrium Rate Exchange - Influences of Monetary and Fiscal Policy on Exchange Rate.

UNIT-III: Balance of Payment

(9hrs)

Meaning - Definition- Importance of Balance of Payment - Structure of Balance of Payment - Balance of Trade and Balance of Payment - Disequilibrium in the Balance of Payment - Kinds of Disequilibrium in the Balance of Payment Causes of Disequilibrium.

UNIT-IV: International Capital Movement

(9hrs)

Meaning - Definition - Classification of International Capital Movement - Factors Governing International Capital Movement - Role of International Capital Movement - Effects of International Capital Movement.

UNIT-V: Free Trade Vs Protection**(9hrs)**

Meaning - Definition - Economic Arguments for Protection - Non-economic Arguments for Protection - Role of Protection - Effects of Protection - Protection Devices.

Reference BOOKS:

- 1.S.Sankaran., Intrenational Economics, Marham Publication, Chennai, 2017.
- 2.M.L.Jhingan., International Economics, Vrindha Publication, New Delhi, 2018
- 3.D.Mithani., International Economics, Himalaya Publication, Mumbai, 9th Revised Edition, 2018.

E-Material

1. en.wikipedia.org/wiki/International_trade
2. www.investopedia.com/.../what-is-international-trade
3. www.britannica.com/topic/international-trade
4. www.businessdictionary.com/.../international-trade.html
5. www.thebalance.com/international-trade-pros-cons...
6. www.yourarticlelibrary.com/international-trade/...
7. www.econlib.org/library/Enc/InternationalTrade.html
8. www.india.gov.in/international-trade-agreement
9. www.theguardian.com/business/internationaltrade
10. www.slideshare.net/mathel101/international-trade...

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	S	S	M	M
CO2	M	M	M	S	S	M	S	M	M	M
CO3	M	S	S	S	M	S	M	M	M	M
CO4	S	M	M	M	S	M	M	S	M	M
CO5	M	L	M	M	L	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER -2

3. INDUSTRIAL ORGANISATION – II

Course Objectives:

1. To provide an elaborate study about various managements in industrial organization.
2. To understand the core value of material management for the survival of the organization.
3. To introduce personnel management procedures.
4. To understand labour legislations of state and central governments.

5. To understand the importance and functioning of sales management.
6. To understand controlling management like cost control and quality control.

Course Outcomes:

1. After studied unit-1, the student will be able to acquire knowledge about material management.
2. After studied unit-2, the student will be able to gain knowledge on the functions of personnel management.
3. After studied unit-3, the student will be able to understand about the implications of labour legislations.
4. After studied unit-4, the student will be able to understand the operational functions of sales management.
5. After studied unit-5, the student will be able to get knowledge on various aspects of controlling management and its requirements.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Materials Management

(9hrs)

Materials Management - Meaning - Definition -Character of Materials Management - Functions of Materials Management -Advantages of Materials Management - Storing - Inventory- Inventory Control.

UNIT-II: Personnel Management

(9hrs)

Personnel Management - Meaning - Definition - Personnel Planning and Selection - Human Resource Development - Personnel Problem - Compensation to employee - Worker's Participation in Management.

UNIT-III:LabourLegislation

(9hrs)

Labour Legislation -Meaning - Definition - Principles of Labour Legislation - Types of Labour Legislation - Basic Conditions of Employment Act - Union and Management - Leadership -Morale - Communication.

UNIT-IV:Sales Management

(9hrs)

Sales Management - Meaning - Definition - Concept of Sales Management - Character of Sales Management - Objectives of Sales Management - Principles of Sales Management - Need of Sales Management - Sales Policy - Planning Price Fixation - Advertising Salesmanship.

UNIT-V: Controlling

(9hrs)

Controlling - Meaning - Definition -Importance of Controlling - Process of Controlling - Need of Controlling - Types of Controlling - Budgetary Control - Reporting - Statistical Reports.

Reference Books:

- 1.Donald A.Hay& Derek J.Morris, Industrial Economics : Theory and Evidence - Oxford Press New Delhi 2015
2. Kanka, S.S.,OrganisationalBehaviour, S.Chand& Co., New Delhi,2016
3. Sivayya, K.V., Indian Industrial Economy, S.Chand&Co.,New Delhi 2017.

E - Materials:

1. en.wikipedia.org/wiki/Industrial_organization
2. www.investopedia.com/.../industrial-organization.asp

3. www.coursera.org/learn/industrial-organization
4. policonomics.com/industrial-organization
5. mitpress.mit.edu/.../theory-industrial-organization
6. cepr.org/content/industrial-organization
7. www.verywellmind.com/industrial-organizational...
8. careersinpsychology.org/becoming-an-industrial-or
9. programsandcourses.anu.edu.au/2020/course/ECON8038
10. www.coalitiontheory.net/.../industrial-organisation

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	S	S	S	M	M
CO2	S	S	M	M	S	S	M	S	M	M
CO3	S	S	S	M	S	M	M	M	M	M
CO4	M	M	M	M	S	S	S	S	M	M
CO5	S	S	M	S	S	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER -2

4. ENERGY ECONOMICS

Course Objectives:

1. The main goal is to provide understanding about the role played by energy in global and local economy.
2. To learn economic fundamentals and institutional frameworks in energy production and consumption.
3. To broaden the vision of sources of energy.

4. Emphasizing on energy crisis and the ways to overcome it.
5. To introduce various non-conventional source of energy.
6. To understand the importance of renewable energy.

Course Outcomes:

1. After studied unit-1, the student will be able to get knowledge on nature and scope of energy economics.
2. After studied unit-2, the student will be able to acquire the ideas on the role of energy institutions.
3. After studied unit-3, the student will be able to gain knowledge on energy crisis and environmental impact and some solutions to overcome.
4. After studied unit-4, the student will be able to understand the various energy sectors.
5. After studied unit-5, be able to get knowledge on renewable energy sources the student

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	No	No	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Natural Resources

(9hrs)

Classification & Importance of Energy Resources - Types and classification - Emergence of Energy Economics - Its nature & scope.

UNIT-II: Institutional Role of Energy

(9hrs)

Development Role of Energy in Economic Development - Energy intensity and Elasticity - National and International Comparison - Role of Institutions like ONGC, OPEC, OAPEC, IEA and World Bank.

UNIT-III: Environment Energy Crisis**(9hrs)**

Energy Crisis: causes - Consequences and Remedial Measures - Environmental Crisis - Causes - Consequences - Impact of Energy consumption on production and on Environment.

UNIT-IV: Indian Energy Sector**(9hrs)**

Organisational structure - Energy Supply (Coal & Lignite, Oil & Gas, Hydro, Thermal, Nuclear) Energy Demand (From Agricultural, Industry, Transport, Domestic etc.,)

UNIT-V: Energy sources**(9hrs)**

Renewable (Solar, Wind, Tidal, Wave, Bio-gas, Biomass, Hydrogen etc.) Renewable Energy Programmes under 5-year plans - Energy issues and Policy options for India. Field visit - Project report

Text Books:

Unit-I: Agarwal, S.K. - Environment Economics (Scott Foresman & Co., London 1985)

Unit-II: Agarwal, S.K. - Environment Economics (Scott Foresman & Co., London 1985)

Unit-III: Agarwal, S.K. - Environment Economics (Scott Foresman & Co., London 1985)

Unit-IV: Agarwal, S.K. - Environment Economics (Scott Foresman & Co., London 1985)

Unit-V: Agarwal, S.K. - Environment Economics (Scott Foresman & Co., London 1985)

Reference Books:

1. Agarwal, M.C., and Mongoo, J.R. - Economic and Commercial Geography National Publishing House, New Delhi 1992)
2. David Pearce- Sustainable Development - Economics and Environment in the Third world (Earthscan Publications, London, 1990)
3. Deoffrey Kirk - Schemacher on Energy, Abacus, London 1982,
4. Government of India: Tenth Five-year plan (Planning commission, New Delhi, 2002)
5. Hemalatha Rao - Rural Energy Crises: A Diagnostic Analysis (Ashisi publishing House, New Delhi, 1990)
6. Karpagam, M Environmental economics (Sterling, New Delhi 1991)
7. Kneese. A.C. and Sweeney, J.L. Handbook of Natural resource and Energy Economics (North Holland, 1993)
8. Munasinghe, M and Meier P. Energy Policy and Modeling (Cambridge University press, UK 1993)

9. Paul Stevens (Ed) The economics of Energy, Vol 1 and II (Edward Elgar 2000)
10. Raikhy P.S. and Parminder Singh, Energy Consumption in India - Pattern and Determinants (Deep and Deep, New Delhi 1990)
11. Richard Eden - Energy Economics - Growth, Resources and Policies (Cambridge University Press, London 1981)

E - Materials:

1. www.journals.elsevier.com/energy-economics
2. en.wikipedia.org/wiki/Energy_economics
3. www.sciencedirect.com/journal/energy-economics
4. ocw.mit.edu/.../14-44-energy-economics-spring-2007
5. web.stanford.edu/~jsweeney/paper/Energy_Economics.PDF
6. www.bp.com/en/global/corporate/energy-economics.html
7. www.sciencedirect.com/journal/energy-economics/...
8. en.grenoble-em.com/energy-economics
9. economictimes.indiatimes.com/industry/energy
10. www.elsevier.com/journals/energy-economics/0140...

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	M	M	M	M
CO2	S	S	S	S	M	S	S	M	M	M
CO3	S	S	S	S	M	S	S	M	M	M
CO4	S	M	M	M	M	M	M	M	M	M
CO5	S	S	S	S	S	S	M	S	M	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE
PAPER -3
1. LABOUR ECONOMICS

Course Objectives:

1. To understand and study labour as an element in the process of production.
2. To make students understand the functioning and dynamics of markets for wage.
3. To understand the functions of labour market.
4. To understand the concept wage.
5. To understand the relationship between worker and employees.
6. To understand the relationship between education and wages.

Course Outcome:

1. After studied unit-1, the student will be able to understand the Labour and their problems.
2. After studied unit-2, the student will be able to understand about trade union movement.
3. After studied unit-3, the student will be able to become familiar with industrial dispute and measures to settle dispute.
4. After studied unit-4, the student will be able to understand the social security measures.
5. After studied unit-5, the student will be able to get knowledge on the functions of International Labour Organisation

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	No	No	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Introduction**(9hrs)**

Concept: Concept of Labour - Labour Economics and Labour problems - Factors responsible for labour problems - Characteristic features of Indian Labour.

UNIT-II: Trade Union**(9hrs)**

Collective Bargaining Power: Trade Union Movement in India - Meaning, Functions and role of trade Unions; Problems and Measures to strengthen T.U.

UNIT-III: Industrial Disputes**(9hrs)**

Industrial Disputes: Forms of Disputes - Meaning and causes, prevention methods, Joint Management Council - Code of Discipline. Settlement of Disputes: Works Committee - Conciliation Officer - Board of Conciliation - Court of Enquiry - Labour Court - Industrial Tribunals.

UNIT-IV: Social security measures**(9hrs)**

Labour welfare: Labour Legislations: Social Security in India: Workmen's Compensation - Sickness Benefits Maternity Benefits - Retirement Benefits - ESI Act.

UNIT-V: International Labour Organisation**(9hrs)**

National Commission on labour: Recommendations ILO purpose and functions - India and ILO

Text Books:

Unit-I : Mittal & Agarwal , Labour Economics, Sanjeev Prakashan Publication

Unit-II: Mittal & Agarwal , Labour Economics, Sanjeev Prakashan Publication

Unit-III : Mittal & Agarwal , Labour Economics, Sanjeev Prakashan Publication

Unit-IV : Mittal & Agarwal , Labour Economics, Sanjeev Prakashan Publication

Unit-V : Mittal & Agarwal , Labour Economics, Sanjeev Prakashan Publication

Reference Books:

1. Mamoria C.B. and Mamoria S., Dynamics of Industrial Relations, Himalaya Publishing House, Mumbai Mishra S.K. and Puri V.K., Indian Economy, Himalaya Publishing House, Mumbai
2. Puneekar S.D., Deodhar S.B. and Sankaran Saraswathi , ‘Labour Welfare, Trade Unionism and Industrial Relations’, 2004
3. Ratna Sen, Industrial Relations in India - Shifting Paradigms, Macmillan, New Delhi
4. Singh J.K., Labour Economics - Principles, Problems and Practices, Deep and Deep Publications Pvt. Ltd., New Delhi
5. Sinha P.R.N., Sinha I.B. and Shekar S.P., Industrial Relations, Trade Unions and Labour Legislation, Pearson Education, New Delhi
6. Sarma A.M., Industrial Relations, Himalaya Publishing House, Mumbai
7. Mittal & Agarwal , Labour Economics, Sanjeev Prakashan Publication.
8. Agrawal A.N., Indian Economy, New Age International Publishers, New Delhi
9. Datt R. and Sundaram K.P.M., Indian Economy, S.Chand & Co., New Delhi

E - Material:

1. [www.britannica.com > topic > labour-economics](http://www.britannica.com/topic/labour-economics)
2. **Error! Hyperlink reference not valid.**
3. **Error! Hyperlink reference not valid.**
4. [www.thebalance.com > US Economy and News > Supply](http://www.thebalance.com/US-Economy-and-News/Supply)
5. **Error! Hyperlink reference not valid.**
6. **Error! Hyperlink reference not valid.**

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	M	M	M

CO2	S	S	M	M	S	M	S	M	M	M
CO3	S	S	M	M	S	S	S	M	M	M
CO4	S	S	M	S	S	S	S	S	M	M
CO5	S	S	M	M	S	S	M	S	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER -3

2. INSURANCE AND ECONOMICS

Course Objective

1. To provide an over view and simple explanation of certain economic concepts relevant to risk and insurance.
2. To understand various forms of insurance.
3. To understand the role of insurer as wealth creator.
4. To understand the concept of insurance and the security derived.
5. To understand the role of insurance in modern economics.
6. To explain the role of insurance as social welfare and security/

Course Outcome

1. After studied unit-1, the student will be able to understand the risk factors and security measures through insurance.
2. After studied unit-2, the student will be able to understand the importance and functions of life insurance.
3. After studied unit-3, the student will be able to become familiar with kinds of insurance.
4. After studied unit-4, the student will be able to understand the role of insurance in economic development.

5. After studied unit-5, the student will be able to get knowledge on the role on insurance and IRDA.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: Introduction

(9hrs)

The quest for Economic Security - Classification of Risks - Demand for Insurance. Definition and Nature - Evolution and Importance of Insurance.

UNIT-II: Life Insurance

(9hrs)

Life Insurance Contract: Nature and Classification of Policies - Selection of Risk - Calculation of premium - Investment of Funds - Surrender Value.

UNIT-III: Kinds of Insurance

(9hrs)

Fire Insurance: Nature and uses - Kinds of Policies - Policy Conditions - Rate Fixation - Payment of claim - Motor Insurance - Personal Accident - Health and Medical Insurance

UNIT-IV: Insurance and Economic Development

(9hrs)

Insurance in Economic Development: Insurance and Mobilisation of savings - Insurance Institutions as Investment Institutions and their role in capital market.

UNIT-V: Insurance and IRDA

(9hrs)

Insurance as social welfare and security: Insurance - an Investment - Tax and Non - Tax Advantages - Retirement Planning - pension plans - Insurance Regulation and Development Authority (IRDA)

Text Books:

Unit-I:Mishra, M.N. Insurance : Principles and Practice S.Chand& Co, New Delhi 2014

Unit- II:Mishra, M.N. Insurance : Principles and Practice S.Chand& Co New Delhi 2014

Unit- III:Mishra, M.N. Insurance : Principles and Practice S.Chand& Co New Delhi 2014

Unit- IV:Mishra, M.N. Insurance : Principles and Practice S.Chand& Co New Delhi 2014

Unit- V:Mishra, M.N. Insurance : Principles and Practice S.Chand& Co New Delhi 2014

Books for Reference:

1. Black.K and Skipper.H.D, Life and Health Insurance, Prentice Hall, Upper Saddle River, New Jersey.
2. Dionne.G and S.E. Harrington (eds.), Foundations of Insurance Economics, Kluwer Publishers, Boston.
3. Mishra M,N, Modern Concepts of Insurance, S.Chand& Co. New Delhi 2014
4. IRDA : Insurance Regulations and Development Authority Regulations New Delhi.
5. Govt of India : Old age and Income Security Report (Dave Committee Report) Govt of India, New Delhi

E - Materials:

1. www.investopedia.com › Personal Finance › Insurance
2. www.iii.org › docs › pdf › insurance-driver-econ-growth-053018
3. media.swissre.com › documents › pub_economics_of_insurance
- 4.**Error! Hyperlink reference not valid.**5. fbf.eui.eu › economics-insurance-markets
6. en.wikipedia.org › wiki › Insurance
7. www.cavignac.com › publications › commercial-insurance-update
8. **Error! Hyperlink reference not valid.**
9. **Error! Hyperlink reference not valid.**

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	S	M	M
CO2	S	S	S	S	S	S	S	S	M	M
CO3	S	S	S	S	S	S	S	S	M	M
CO4	S	S	S	S	S	S	S	S	M	M
CO5	S	M	M	M	M	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER -3

2. DEMOGRAPHY

Course Objective

1. Make the students to understand about the demography.
2. To equip the students with the knowledge regarding the relationship between Demography and Economic Development.
3. To make students aware of the importance of population in economic development and the various theories that explains the growth of population in a country.
4. To understand the human development index in a particular population.
5. To learn more about socio economic issues.
6. To understand demographic particulars to decode government policies.

Course Outcome

1. After studied unit-1, the student will be able to understand the population and relevant theories.
2. After studied unit-2, the student will be able to understand the emerging trends in population.
3. After studied unit-3, the student will be able to understand the terms fertility, nuptiality and mortality.

4. After studied unit-4, the student will be able to understand the impact of migration on urbanization.
5. After studied unit-5, the student will be able to get knowledge on the population policy of India.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

Unit - I: Population Theories

(9hrs)

Population and Development- Meaning and scope of demography; components of population growth and their interdependence - Theories of population - Malthus, Optimum theory of population; theory of demographic transition -Population and development.

Unit - II: Population Trends

(9hrs)

Population trends in the twentieth century; Population explosion -Determinants of age and sex structure; Demographic effects of sex and age structure, economic and social implications; Age pyramids and projections.

Unit - III: Fertility, Nuptiality and Mortality

(9hrs)

Fertility, Nuptiality and Mortality-Importance of study of fertility - Factors affecting fertility - Socio-economic factors. Nuptiality - Concept and analysis of marital status, single mean age at marriage. Mortality - Death rates, crude and age-specific; Mortality at birth and infant mortality rate.

Unit - IV:Migration and Urbanisation

(9hrs)

Migration and Urbanization-Concept and types - Temporary, internal and international; International migration -Its effect on population growth and pattern; Factors affecting migration; Urbanization - Growth and distribution of rural-urban population in developed and developing countries. Urbanization in India.

Unit - V: Population Policy and Family Planning

(9hrs)

Population Policy in India-Evolution of population policy in India - The shift in policy from population control to family welfare, to women empowerment; Family planning strategies and their outcomes.

Text Books:

Unit-I: Agarwala, S. N.Demography, Tata McGraw Hill Co., Bombay.

Unit-II:Srinivasan, K. (1998), Demography, Sage, New Delhi.

Unit-III: Agarwala, S. N.Demography, Tata McGraw Hill Co., Bombay.

Unit-IV: Srinivasan, K. (1998), Demography, Sage, New Delhi.

Unit-V: Agarwala, S. N.Demography, Tata McGraw Hill Co., Bombay

Reference Books

1. Agarwala, S. N. (1972), India's Population Problem, Tata McGraw Hill Co., Bombay.
2. Bose, A. (1996), India's Basic Demographic Statistics, B. R. Publishing Corporation, NewDelhi.
3. Bogue, D. J. (1971), Principles of Demography, John Wiley, New York.
4. Choubey, P. K. (2000), Population Policy in India, Kanishka Publications, New Delhi.
5. Srinivasan, K. (1998), Basic Demographic Techniques and Applications, Sage, New Delhi.
6. Gulati, S. C. (1988), Fertility in India: An Econometric Study of a Metropolis, Sage, NewDelhi.

E - Materials:

1. en.wikipedia.org/wiki/Demography
2. www.merriam-webster.com/dictionary/demography
3. www.britannica.com/topic/demography
4. www.thefreedictionary.com/demography

5. www.businessdictionary.com/definition/demography.html
6. www.thoughtco.com/what-is-demography
7. www.sciencedirect.com/.../demography
8. www.sociologydiscussion.com/demography/demography...
9. www.suda.su.se/education/what-is-demography
10. prayagraj.nic.in/demography

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	M	M	M	M	M
CO2	S	S	M	M	M	M	M	M	M	M
CO3	M	S	M	M	M	M	M	M	M	M
CO4	M	S	M	M	M	M	M	M	M	M
CO5	S	S	S	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER -3

4. Economics of Development and Planning

Course Objective

1. To familiarize the students with the models in economic development.
2. To impart the knowledge regarding planning techniques.
3. To understand various strategies for development.
4. To analyse growth models.

5. To understand capital in its various forms.
6. To understand role of technology in economic development.

Course Outcome:

1. After studied unit-1, the student will be able to get knowledge of economic development growth.
2. After studied unit-2, the student will be able to acquire the ideas of various theories of economic development.
3. After studied unit-3, the student will be able to get analytical knowledge of various growth models.
4. After studied unit-4, the student will be able to understand the various forms of capital formation.
5. After studied unit-5, the student will be able to get knowledge on planning commission and today's NITI Aayog

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT - I: Economic Development and Growth

(9hrs)

Economic development and growth - Concepts - Measurements - Determinants of development -Obstacles to development - Characteristics of the Less developed countries - Salient features of Indian Economy.

UNIT -II: Theories of Economic Development

(9hrs)

Strategies of economic development - Theory of Big push - The Critical Minimum Effort Thesis - The Schumpeterian Theory.

UNIT - III: Growth Models

(9hrs)

Growth models: The Harrod - Domar models -The Mahalanobis model - Its applicability - Choice of techniques - Labour intensive technique and capital-intensive technique - Intermediate technology.

UNIT - IV: Capital Formation

(9hrs)

Capital formation and Economic Development - Importance of Capital formation - Types - Role of foreign capital in economic development - The role of technology in economic development.

UNIT - V: Planning

(9hrs)

Objectives of planning - Types of planning - India's Five-Year Plans - Objectives and Performance - Current Five-Year Plan - Regional imbalance - Policy measures to remove regional disparities - NITI Aayog.

Text Books:

Unit-I: M.L. Jhingan Economics of Development and Planning, Konark Publishers, New Delhi - 2003.

Unit- II: RuddarDutt, Economics of Development and Planning, S. Chand and Sons, New Delhi - 2003 K.P.M. Sundaram

Unit-III: M.L. Jhingan Economics of Development and Planning, Konark Publishers, New Delhi - 2003.

Unit-IV:RuddarDutt, Economics of Development and Planning, S. Chand and Sons, New Delhi - 2003 K.P.M. Sundaram

Unit-V: M.L. Jhingan Economics of Development and Planning, Konark Publishers, New Delhi - 2003.

REFERENCES BOOKS

1. M.L. Jhingan The Economics of Development and Planning, Konark Publishers, New Delhi - 2003.
2. RuddarDutt and Indian Economy, S. Chand and Sons, New Delhi - 2003K.P.M. Sundaram
3. Ishwar C. Dhingra Indian Economy, Sultan Chand and Sons, New Delhi - 2003
4. A.N. Agarwal Indian Economy - Problems, Development and PlanningNew Age International (P) Ltd., Chennai - 2000.
5. S.K. Misra and Indian Economy - Himalaya Publishing House, Bombay - 2004V.K. Puri

E - Materials:

1. www.studydhaba.com/indian-economy-study-material-pdf
2. www.examrace.com/IEcoS/IEcoS-Study-Material
3. www.winmeen.com/tnpsc-indian-economy-study-materials
4. www.jagranjosh.com/articles/ias-prelims-2015-gs...
5. www.examrace.com/NTA-UGC-NET/NTA-UGC-NET-Study...
6. www.governmentexams.co.in/tnpsc-indian-economy-notes
7. www.clearias.com/ias-study-materials
8. sol.du.ac.in/SOLSite/Courses/StudyMaterial.aspx?...
9. www.tnpscshouters.com/2019/02/tnpsc-indian...
10. www.hirensir.com/indian-economy-in-gujarati-pdf

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	M	M	M
CO2	S	M	M	M	M	M	M	M	M	M
CO3	S	S	S	M	M	M	M	S	M	M
CO4	M	L	M	M	M	M	M	M	M	M
CO5	M	L	M	S	M	L	L	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

SKILL BASED SUBJECT

PAPER -4

HUMAN RESOURCE MANAGEMENT

Course Objectives

1. To pinpoint the resource value of human like other resources.
2. To develop the understanding of the concept of human resource management.
3. To develop the understanding of the correlation between human resource development and human resource management.
4. To develop necessary skill set for application of various HR issues.
5. To make students understand the human resource planning and performance appraisal process.
6. To make students understand about role played by transfer, promotions and punishments in HRM.

Course Outcomes:

1. After studied unit-1, the student will be able to understand human resource management.
2. After studied unit-2, the student will be able to gain knowledge on human resource planning.
3. After studied unit-3, the student will be able to understand the real meaning of human resource development.
4. After studied unit-4, the student will be able to understand how transfer is being used as a tool in HRM.
5. After studied unit-5, the student will be able to acquire knowledge about various techniques and methods of performance appraisal.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	Yes	No	No
3	Yes	Yes	No	Yes	No	No
4	Yes	Yes	No	Yes	No	No
5	Yes	Yes	No	Yes	No	No

UNIT- I: Introduction(9hrs)

Meaning - Definition - Objectives - Nature - Scope - Importance - Problems - Functions - Personnel Management v/s HRM - Qualities and Qualifications of Human Resource Managers.

UNIT-II: Human Resource Planning(9hrs)

Meaning - Definition - Need - Importance - Objectives - Process - Responsibility.

Recruitment: Meaning - Factors Influencing Recruitment - Recruitment Policy - Problems - Sources of Recruitment. Selection: Meaning - Factors Affecting Selection Decisions - Selection Policy - Steps in Selection - Techniques of Selection. Placement: Meaning and Principles. Placement policy.

UNIT-III: Human Resource Development (9hrs)

Training Meaning - Need and Importance - Objectives -Types - Steps in Training Programme - Organisation of Training Programmes - Methods of Training - Concept of Management Development Programmes - Essentials of Management Development Programmes. Career Development: benefits - career problems.

UNIT-IV: Transfer (9hrs)

Meaning - Definition - Objective - Policy - Types. Promotion: Purpose - Promotion Policy - demotion. Discipline: Meaning- Positive and Negative Aspects of Discipline- Causes of Indiscipline - Disciplinary Procedure - Maintaining Discipline.

UNIT-V: Performance Appraisal

(9hrs)

Meaning - Definition - Need - Importance - Objectives - Problems - Factors Influencing Performance Appraisal - Responsibility - Techniques of Performance Appraisal - Traditional Techniques - Modern Techniques of Performance Appraisal.

Text Books:

Unit-I: V.Ratha, Human Resource Management, Prasana Publication, Chennai, 2004

Unit-: II: V.Ratha, Human Resource Management, Prasana Publication, Chennai, 2004

Unit-: III: V.Ratha, Human Resource Management, Prasana Publication, Chennai, 2004

Unit-: IV: V.Ratha, Human Resource Management, Prasana Publication, Chennai, 2004

Unit-: V: V.Ratha, Human Resource Management, Prasana Publication, Chennai, 2004

Reference Books:

1. V.Ratha, Human Resource Management, Prasana Publication, Chennai, 2004
2. Aswathappa Human Resources and Personnel Management - Tata MC Graw Hill 2012
3. R.D. Agarwal Dynamics of Personal Management in India.
4. Terry; L. Leap & M.D. Crino Personnel/Human Resource Management Macmillan

E - Materials:

1. www.whatishumanresource.com/human-resource-management
2. www.thebalancecareers.com/what-is-human-resource...
3. managementstudyguide.com/human-resource-management.htm
4. www.inc.com/.../human-resource-management.html

5. studiousguy.com/human-resource-management
6. www.humanresourcesedu.org/what-is-human-resources
7. www.tutorialspoint.com/human_resource_management/...
8. hbr.org/topic/human-resource-management
9. gurukpo.com/.../MBA/Human_Resource_Management.pdf

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	M	M	M
CO2	S	M	S	M	S	M	S	M	M	M
CO3	S	M	S	M	S	M	S	M	M	M
CO4	S	M	S	M	S	M	S	M	M	M
CO5	S	M	S	M	S	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M. A. English 2022-23 onwards - Affiliated Colleges - Annexure No.I

PROGRAMME OBJECTIVES

1. Understand and appreciate the text in an elaborate manner.
2. Learn the culture and the history of the nations.
3. Learn and understand social, political literary movements and uniqueness of communities.
4. Indigenous people, their culture, identity problems and endangered conditions of the earth.
5. To face NET / SET / TRB with language and literary skills.

PROGRAMME EDUCATIONAL OBJECTIVES

1. Able to differentiate the representations of authors in terms of theme, content background etc.
2. To familiarize the discourse of linguistics.
3. Learn the importance of the ethics and spirituality.
4. Understand the techniques of creative writing.
5. Acquaint with techniques and writing of print media.

PROGRAMME SPECIFIC OUTCOMES

1. Learn and understand the literary terms and forms.
2. Able to interpret the concepts of modernism and postmodernism.
3. Able to link the relationship between language and literature.
4. Understand and analyse the sufferings of the natives of different countries.
5. Subaltern thoughts are discussed via criticism.
6. Re-inforce students' literary competence.
7. Translation work is done.
8. Differentiate between feminism and womenism.
9. Learn and understand language teaching theories.
10. Understand the relevance of studying classic texts.

PROGRAMME OUTCOMES

1. Learn and interpret old style of English.
2. Able to represent different ages and their classes.
3. Able to communicate effectively with proper pronunciation.
4. Apply discipline to specific skills in learning creative performance.
5. Able to create ecological concern.
6. Able to create Motivational writings.
7. Re explore political, social and economic role in literature.
8. Circumstances for the formulation of diasporic communities can be learnt.
9. Get an idea of validity and reality.
10. Understand the changing trends of English literature and higher education.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.A. English Curriculum (Affiliated Colleges)

(For the students admitted during the academic year 2022–23 onwards)

PROGRAMME OBJECTIVES

The Programme aims to develop the ability of the student to critically examine and restate his/her understanding of literary texts, employing individual linguistic skills, engendering literary concepts and critical approaches to arrive at the core and essence of narratives. The learning process would also lead to a larger comprehension of global, national, social issues and thereby facilitate the students to address the issues proactively and gain a reasonable command of the language.

PROGRAMME OUTCOME

- On completion of the programme the student will be able to:
- Interpret his/her understanding of form, structure, narrative technique, devices and style.
- Analyze and apply various literary concepts and critical approaches.
- Appreciate the importance of English as an international language, to benefit from the achievements of other cultures in accordance with various life situations.
- Organize and integrate the acquired knowledge towards individualistic compositions.
- Present, appraise and defend arguments with conviction and confidence.

M.A. ENGLISH EMPLOYMENT AREAS

- 1** Corporate Communication
- 2** Communications Industry
- 3** Indian Civil Services
- 4** Journalism
- 5** Online Tutoring
- 6** Politics
- 7** Publication Houses
- 8** Public Relations
- 9** Research
- 10** TV & Media
- 11** Translation Agencies

M.A ENGLISH JOB TYPES

- 1** IELTS trainer
- 2** English Translator
- 3** Junior Parliamentary Reporter (English)
- 4** English Editor
- 5** Translator/Interpreter
- 6** English Teacher
- 7** Content Writer/Trainer
- 8** English Tutor
- 9** Customer Support Executive
- 10** English Proof Reader
- 11** English Language Specialist
- 12** Media Analyst
- 13** Stenographer (English)

The Course of Study and the Scheme of Examination – M.A. ENGLISH 2022-2023

Sl. No.	Study Components		Instructional. hrs / per week	Credits	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
SEMESTER I								
1.	Core	Paper- 1	6	4	British Poetry (Chaucer to 20th century)	25	75	100
2.		Paper- 2	6	4	American Literature	25	75	100
3.		Paper- 3	6	4	Indian Literature in English	25	75	100
4.		Paper- 4	6	4	Advanced Linguistics	25	75	100
Internal Elective for same major students								
5.	Core Elective	Paper-1	3	3	(To choose one out of 3) A. Indian Writing in Translation B. Fourth World Literature C. Folk Tale and Myth	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
6.	Open Elective	Paper-1	3	3	(To choose one out of 3) A. Literature for Social Transformation B. Green Cultural Studies C. Public Speaking and Creative Writing	25	75	100
			30	22		150	450	600
SEMESTER II						CIA	Uni. Exam	Total
7.	Core	Paper- 5	6	4	British Drama	25	75	100
8.		Paper- 6	6	4	Translation Theory & Practice	25	75	100
9.		Paper- 7	6	4	Contemporary Literary Theory - I	25	75	100
Internal Elective for same major students								
10.	Core Elective	Paper-2	5	3	(To choose one out of 3) A. Comparative Literature B. New Literature in English. C. Subaltern Literary Studies	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
11.	Open Elective	Paper-2	5	3	(To choose one out of 3) A. Technical Writing. B. Indian Diaspora Literature C. Journalism and Mass Communication.	25	75	100
12.	Field Study		-	2		100	-	100
13.	Compulsory Paper		2	2	Human Rights	25	75	100
			30	22		250	450	700

SEMESTER III								
14.	Core	Paper-8	5	4	Non- Fiction & Prose	25	75	100
15.		Paper-9	5	4	Research Methodology	25	75	100
16.		Paper-10	5	4	Contemporary Literary Theory - II	25	75	100
17.		Paper-11	5	4	African and Canadian Writings	25	75	100
Internal Elective for same major students								
18.	Core Elective	Paper - 3	5	3	(To choose one out of 3) A. Popular Literature B. Children’s Literature C. Preparatory Exam for NET/SET/TRB – Paper II	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
19.	Open Elective	Paper - 3	5	3	(To choose one out of 3) A. Soft Skills B Theorising Sexualities C. Preparatory Exam for NET/SET – Paper I	25	75	100
20.	MOOC courses		-	2		-	-	100
			30	24		150	450	700
SEMESTER IV								
21.	Core	Paper-12	6	5	World Literature in Translation	25	75	100
22.		Paper-13	6	4	Shakespeare Studies	25	75	100
23.		Paper-14	6	4	Single Author Study	25	75	100
24.	Core	Project	5	5	Project with Viva voce	100 (75 Project +25 viva)		100
Internal Elective for same major students								
25.	Core Elective	Paper - 4	4	3	(To choose one out of 3) A. Post-Colonial Studies B. Gender Studies C. English Language Teaching - Theory and Practice	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
26.	Open Elective	Paper - 4	3	3	(To choose one out of 3) A. Film Studies B. English for Media C. Fantasy Fiction	25	75	100
			30	24		150	450	600
			120	92				2600

THIRUVALLUVAR UNIVERSITY

M.A. ENGLISH – SYLLABUS for affiliated Colleges

UNDER CBCS - (With effect from 2022-2023)

SEMESTER-I

PAPER – 1

BRITISH POETRY (CHAUCER TO 20th CENTURY)

SEMESTER – I

CREDITS – 4

CATEGORY – CORE PAPER

NO.OF. HOURS\WEEK – 6

TOTAL HOURS – 78

COURSE CODE: DEN11

OBJECTIVES:

- To sensitize them to feel the pulse of poetic expression by making them understand and appreciate beat, rhythm, rhyme, etc.
- To enable them to understand the concepts related to Elizabethan 1, Metaphysical, Romantic, Victorian, Modern & Postmodern poetry, to name a few
- To make them appreciate poetry by critically analyzing the poems in terms of theme, content, background, etc.

UNIT PLAN:

- ❖ After studying student will be able to understand the background history of literature and language
- ❖ The student will be able to know how to appreciate and analyse the poetry
- ❖ The student will be able to know the beauty of the literary terms and forms

COURSE OUTCOME

- Students will be able to learn the metaphysical poets and their style of writings.
- Students will be able to know the love and lust towards opposite gender
- Students will be able to differentiate the various types of sonnets
- Students will be able to appreciate the beauty of the nature and imagination
- Students will be able to understand the romantic life of the poets
- Students will be able to differentiate the changes of language and style

UNIT I: Introduction

Teaching Hours – 15

1. a) What is poetry?
b) Metrical & free verse-kinds of poetry.
c) Poetic justice, Poetic License, Poetic diction, Poetic devices, Figures of speech, etc.
d) Themes Of poetry e) Appreciation of poetry.

UNIT II: POETRY (DETAILED)

Teaching Hours - 17

Geoffrey Chaucer	:	The love Unfeigned
William Shakespeare	:	Sonnet 147

John Milton	:	Light
John Donne	:	Canonization
Andrew Marvel	:	To His Coy Mistress
(Non-Detailed)		
Edmund Spenser	:	Epithalamion
George Herbert	:	The Pulley

UNIT III: (DETAILED)

Teaching Hours - 15

William Wordsworth	:	Tintern Abbey
P. B Shelly	:	Ode to Skylark
John Keats	:	Ode on a Grecian Urn
Christina Rossetti	:	Christmas Eve
(Non-Detailed)		
ST Coleridge	:	The Rime of an Ancient Mariner
Robert Browning	:	Andrea Del Sarto

UNIT IV: (Detailed)

Teaching Hours -16

T.S Eliot	:	Ash Wednesday
W. B. Yeats	:	Sailing to Byzantium
Philip Larkin	:	Toads
Alexander Pope	:	On a Certain Lady at Court
Carol Ann Duffy	:	1) Valentine 2) Prayer
(Non-Detailed)		
Elizabeth Jennings	:	The Old Woman
Norman McCraig	:	Stars and Planets

UNIT V: (NON-Detailed)

Teaching Hours -15

Thomas Gunn	:	You got to go
Seamus Haney	:	Blackberry Picking
RS Thomas	:	Peasant
Charles Tomlinson	:	A rose for Janet

REFERENCE

1. Arthur Quilter Couch, Ed., *The Oxford Book of English Verse* (1250-1900). Oxford: OUP, 1923.
2. Bird, Ed., *Books of Ballads*. London: Longmans, 1967.
3. Grierson & Smith, *Critical History of English Poetry*. London : OUP, 1970
4. Wilson, *Shakespeare's Sugared Sonnets*. London: CUP, 1974.
5. Heath Stubbs & Wright, *Faber Book of Twentieth Century verse*. London: Faber & Faber, 1975
6. Palgrave, Ed., *Golden Treasury of the best songs and lyrical poems in the English language*. London: OUP, 1977.
7. Roberts, Ed., *Faber Book of Modern verse*. London: Faber & Faber, 1979.
8. Roberts, Ed., *Faber Book of Modern Verse*. London: Faber & Faber, 2000

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	S	S	L	S	M
CO2	S	M	S	S	M	S	M	S	M	S
CO3	S	M	M	S	S	S	M	M	S	S
CO4	S	M	S	S	M	L	S	S	S	M
CO5	S	S	S	S	M	S	S	S	L	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

PAPER - 2
AMERICAN LITERATURE

SEMESTER – I

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS- 78

COURSE CODE: DEN12

OBJECTIVES:

- To enable the students to have an overview of major authors who have given significant contributions to the development of American literature.
- The social and political events that have influenced the literary movements can be understood by the study of representative authors.

UNIT PLAN

- ❖ The student will be able to understand the themes of the poem
- ❖ The student will know the concept of modernism and post modernism
- ❖ The student will be able to apply the aesthetic sense of poetry
- ❖ The student will know the culture and history of the United States

COURSE OUTCOME

- Students will be able to know the prominent women writers
- Students will be able to distinguish the various thinking of American society
- Students will be able to understand transcendentalists and naturalists
- Students will be able to learn the seclusion temper and patriarchal society
- Students will be able to examine the reality of working classes and middle classes living in cities

UNIT I: POETRY (DETAILED)

Teaching Hours - 16

Walt Whitman	:	When the Lilacs Last Bloom'd
Robert Frost	:	After Apple Picking
Allen Ginsberg	:	Howl
Emily Dickinson	:	1. knows how to forget! 2. Success is Counted Sweetest
Wallace Stevens	:	The Idea of Order at Key West
Langston Hughes	:	The Negro speaks of River out of work

(Non-detailed)

Anne Bradstreet	:	Contemplations
Edward Taylor	:	1) The soul's Groan to Christ for succor 2) Christ's Reply.

UNIT II: PROSE (DETAILED)**Teaching Hours - 15**

Ralph Waldo Emerson	:	1) Self-Reliance
	:	2) The American Scholar

(Non-detailed)

Maya Angelou	:	I know why the caged bird sings
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UNIT III: DRAMA (DETAILED)**Teaching Hours - 15**

Tennessee Williams	:	A Streetcar Named Desire
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(Non- Detail)

Edward Albee	:	A Cat on a Hot Tin Roof
Tony Kushner	:	Angels in America (Part-1)

UNIT IV: SHORT STORIES (NON-DETAILED)**Teaching Hours - 16**

Nathaniel Hawthorne	:	The Purloined Letter
John Updike	:	The Witness
Pearl S. Buck	:	The Quarrel
John Steinbeck	:	Flight
Eudore Welty	:	Worn Path

UNIT V FICTION (NON-DETAILED)**Teaching Hours - 16**

Eudora Welty	:	The Optimist's Daughter
John Barth	:	Lost in the Funhouse
Toni Morrison	:	Beloved

REFERENCE

- Bugsbu, C.W.E. *A Critical Introduction to Twentieth Century American Drama*. CUP, 1984.
- Allen, Paul Gunn. *"Studies in American Indian Literature"*. New York: Modern Language Association. 1983.
- Andrews, W., F. Foster, and T. Harris (eds.). *"The Oxford Companion to African American Literature"*. Oxford, 1997.
- Kim, H. Elaine. *Asian American Literature: An Introduction to the Writings and Their Social Context*. Pearson Longman, 2004.
- Kranser, David (ed). *A Companion to Twentieth Century American Drama*, Blackwell Publishing, USA, 2005.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	L
CO2	S	M	S	S	M	S	M	S	S	M
CO3	S	S	S	S	S	S	M	M	S	S
CO4	S	S	M	S	S	S	S	M	S	M
CO5	M	S	S	S	L	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

PAPER - 3
INDIAN LITERATURE IN ENGLISH

SEMESTER – I

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS- 78

COURSE CODE: DEN13

OBJECTIVES:

- To help the students appreciate the richness in Indian writing in English.
- To acquaint the students with the eminent Indian writers in English.

UNIT PLAN

- ❖ Students will be able to know the complete picture of Indian writers and their uniqueness
- ❖ Students will come to know the traditional and cultural background
- ❖ Students will acquire the idea about the customs and superstitious belief of Indians
- ❖ Students will realize the importance of spirituality in Indian writing

COURSE OUTCOME

- Students will be able to know the importance of translation in various works
- Students will know the sufferings and submissive conditions of people
- Students will know the childhood sufferings and search for identity through short stories
- Students will learn the myths and ethics of Indians
- Students will know how to write the script
- Students will be able to encourage by various motivational writings

UNIT I: POETRY (DETAILED)

Teaching Hours - 16

- | | | | |
|----|----------------|---|--------------------------------------|
| 1. | Aurobindo | : | Rose of God |
| 2. | Toru Dutt. | : | Lakshman |
| 3. | Nissim Ezekiel | : | A Very Indian Poem in Indian English |

(Non-Detailed)

- | | | | |
|----|-------------------|---|-------------------------|
| 1. | Shiv. K. Kumar | : | Indian Women |
| 2. | A.K Ramanujam | : | Epitaph on a Street Dog |
| 3. | Jayanta Mahapatra | : | Grandfather |
| 4. | Sarojini Naidu | : | Bird Sanctuary |

UNIT II: PROSE (DETAILED)

Teaching Hours - 16

- | | | |
|--------------------|---|-------------------------------------|
| Jawaharlal Nehru | : | Discovery of India-Through the Ages |
| Ananda Coomarasamy | : | Dance of Shiva |
| J.Krishnamurthi | : | The Rich and the Poor |

UNIT III: DRAMA**Teaching Hours - 14**

Badhal Sarkar	:	Mad Horse
Asif Chhribhhey	:	The Refugee

UNIT IV: FICTION (NON-DETAILED)**Teaching Hours - 16**

Shashi Deshpande.	:	That Long Silence
Anita Nair	:	Ladies Coupe
Gita Mehta.	:	River Sutra

UNIT V: CRITICISM**Teaching Hours - 16**

Meenakshi Mukherjee	:	"Nation, Novel, Language" in The Perishable Empire
Gajendra Kumar	:	"Kaleidoscopic Dimensions of Indo-Anglian Novel Criticism: From Colonialism to Post- Colonialism" from Indian English Literature: A New Perspective.
Barathamuni	:	From Natya and Rasa: Aesthetics of Dramatic Experience

REFERENCE

1. Karnad, Girish - *Collected Plays* – Vol. I. New Delhi : Oxford University Press, 2005.
2. Deshpande, Shashi_ *That Long Silence*-Penguin 1998
3. Biswal k. Jayant. *A Critical Study of the Novels of R.K.Narayan..* The comedy. Nirmalpublishers, New Delhi, 1987
4. Gajendra Kumar. *Indian English Literature: A New Perspective.* Sarup and Sons, New Delhi
5. *A history of Indian English Literature*: M.K. Naik (New Delhi : Sterling Publishers), 1985.
6. *Readings from Commonwealth Literature*: William Walsh (Oxford: Claredon Press), 1973.
7. *The Third World Literature*: Trevor James, London, 1986.
8. *An Anthology of Commonwealth Poetry*: C.D. Narasimhaiah (ed), (Madras: Macmillan), 1990.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	S	L
CO2	S	M	S	S	S	S	M	S	S	M
CO3	S	M	S	S	M	S	S	M	S	S
CO4	S	S	S	M	S	M	M	S	S	S
CO5	S	S	S	S	S	M	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

PAPER - 4
ADVANCED LINGUISTICS

SEMESTER – I

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS- 78

COURSE CODE: DEN14

OBJECTIVES

- To enrich learners with the knowledge of the scientific study of language and to provide insights into the nature of language.
- To familiarize learners with the discourse of linguistics and to provide exposure to the variety of theoretical and practical manifestations of linguistics.
- To enable students to gain an informed approach on how language interfaces with literatures as well as with societal concerns and also to show how it fits into the discipline of cognitive sciences.

UNIT PLAN

- ❖ Students will be able to understand the importance of language
- ❖ Students will learn how the language has emerged
- ❖ Students will understand the systematic approach of language

COURSE OUTCOME:

- Students will be able to follow the proper pronunciation of the words
- Students will be able to learn how to communicate effectively in various places
- Students will be able to easily know the difference between linguistics and non- linguistics
- Students will be able to link the relationship between language and literature
- Students will be able to enjoy the dialects of various places and persons
- Students will be able to think about the multi- lingualism

UNIT I:

Teaching Hours - 13

Nature of Language: Human and non-human systems of communication; Design features of language, Linguistics form (free and bound), Saussurean Dichotomies, Psychology of language, Language and the Brain, Language and Mind.

UNIT II:

Teaching Hours - 17

Phonetics and Phonology: Articulatory, Auditory and Acoustic Phonetics. The Anatomy and Physiology of Speech. Phonetic Transcription. Initiation of Speech. Consonants and Vowels and their Classification. Supra segmental elements. Acoustic Characteristics of Speech. Phoneme, Phonology- all Processes and Features .

UNIT III:

Teaching Hours - 15

Morphology: Morph, Morpheme, Allomorph, Morphological processes, Compounds, Analyzing Morphological Structure, Word classes, Morphological Properties of English verbs, Word Formation.

UNIT IV: Syntax and Semantics

Teaching Hours - 17

Phrase Structure Grammar, Transformational grammar, Rules and Constraints on rules, Theory of Govt. and Binding: Universal Grammar, Innateness Hypothesis, Types of meaning, Semantic Relations , Pragmatics.

UNIT V: APPLIED LINGUISTICS**Teaching Hours - 16**

- a) Stylistics : The relationship of language to literature, Style and Function, Poetic discourse, narrative discourse and dramatic discourse.
- b) Language Disorders : The brain and Language organization, Aphasia, Dyslexia, Dysgraphia, Clinical Syndromes.
- c) Lexicography : Monolingual dictionary, Inter-lingual dictionary, Structure and Equivalences, Problems of Untranslatability, General and special purpose dictionaries.

REFERENCES

- Agnihotri, R.K. and Khanna, A.L. (ed.), 1994. *Second Language Acquisition: Socio-cultural and Linguistic Aspects of English in India*. New Delhi: Sage Publications. (ed.), 1995. *English Language Teaching in India: Issues and Innovations*. New Delhi: Sage Publications.
- Aitchison, J. 1995. *Linguistics: An Introduction*. London: Hodder & Stoughton.
- Akmajian, A., Demers, R., Farmer, Harnish, R. 1990/1996. *Linguistics: An Introduction to Language and Communication* Cambridge, -Massachusetts: MIT Press. (Indian reprint, 1996, Prentice Hall).
- Atkinson, M., Kilby, D. & Rocca, I. 1982. *Foundations of General Linguistics*. London: George
- Allen & Unwin Carr, P. 1999. *English Phonetics and Phonology An Introduction*

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	S	M	S	L	S
CO2	M	S	S	S	L	M	S	S	M	L
CO3	M	S	S	M	L	M	S	L	M	S
CO4	M	S	S	M	L	L	M	S	S	S
CO5	M	S	S	L	S	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

CORE ELECTIVE

PAPER 1

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. INDIAN WRITING IN TRANSLATION

SEMESTER – I

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS- 39

COURSE CODE: DEEN15A

COURSE OBJECTIVE

- This evokes a concentrated imaginative awareness of experience or a specific emotion
- In prose we can see the technique of language that exhibits a natural flow of speech and grammar
- It can be viewed as an exploration of meaning and identity in the turmoil of changing social structure
- It demonstrates that the author supported the struggle from the point of the field hands
- It highlights the failing values present in the Post-Independence Indian Society.

UNIT PLAN

- ❖ It has tremendous appeal for children and it is the best way of exhibiting their love for the language.
- ❖ It lays the foundation for the appreciation of the beauty of language. The rhythm of these poems helps the students to acquire natural speech rhythm
- ❖ It enables the learners to extend their knowledge of vocabulary and structures and to become more proficient in the four language skills.
- ❖ It develops the ability of speaking English correctly and fluently. The main aim is to develop the language ability of the students.

COURSE OUTCOME – Students will be able to

- demonstrate the understanding of the social and artistic movements that have shaped theatre and dance as we know it today.
- apply discipline to specific skills in learning creative performance. Analyze and interpret texts and performances both in spoken and written form.
- encourage economy of setting, concise narrative and the omission of a complex plot: character is disclosed in action and dramatic encounter but is seldom fully developed.
- distinguish the short story is often judged by its ability to provide “a complex” or justifying treatment.
- acquire knowledge and comprehension of major texts and traditions of language and literature written in English as well as their social, cultural, theoretical and historical contexts.

UNIT I : POETRY**Teaching Hours - 9**

Kabir	:	Poems 1,2,12,36,36 from One Hundred poems of Kabir
Kalidasa	:	Meghadutam
Mirabai	:	I sing for him Joyfully
Amir Khusrau	:	Colour me in Colours of Love
Amrita Pritam	:	The Revenue Stamp

UNIT II: PROSE**Teaching Hours - 8**

Samarth Ramsay	:	Dasbodh
Sarathkumar Mukopathyaya	:	Gulabjamun
Sivasankarapillai	:	In the Flood
Motilal Jotwani	:	A desire to see the sky

UNIT III: DRAMA**Teaching Hours - 8**

Mohan Rakesh	:	<i>Half-way House</i>
Indira Parthasarathy	:	<i>Nandhan Kathai (Tr. C.T.Indira)</i>

UNIT IV: SHORT STORY**Teaching Hours - 7**

Khushwant Singh	:	Karma.
Pudumai Pithan	:	Faith
Mahim Bora	:	Kathanibarighat

UNIT V: FICTION**Teaching Hours - 7**

Pazhamalai	:	<i>Sanangalin Kathai</i>
Irawati Karve	:	<i>Yugunta</i>

REFERENCE

1. Mukherjee, Meenakshi - *The Perishable Empire* - UK: Oxford University Press, 2004.
2. Sivasankari - *Knit India Through Literature* – Vol. II & III. Chennai: East West Books Pvt. Ltd, 2004.
3. Arvind Krishna Mehrotra, ed. - *An Illustrated History of Indian Literature in English* - New Delhi: Permanent Black, 2003
4. Kumar, Dilip. D. - *Contemporary Tamil Short Fiction* - Madras: Manas East West Books, 2005.
5. *One hundred poems of Kabir* translated by Rabindranath Tagore: Chronicle books.
An imprint of DC publishers, New Delhi, 2003

WEB SOURCES

Songs of Kabir Tr by Rabindranath Tagore:

<<http://www.sacred-texts.com/hin/sok/index.htm>>

Mahim BoraKathanibarighat:

<https://indianreview.in/fiction/kathanibarighat-mahim-bora-assamese-short-stories-translated-lalit-saikia/>

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	M	M	L	M	M
CO3	S	S	S	S	M	S	S	S	M	M
CO4	M	S	S	S	S	S	S	S	S	S
CO5	M	M	S	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

CORE ELECTIVE

PAPER 1

B. FOURTH WORLD LITERATURE

SEMESTER – I

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS- 39

COURSE CODE: DEEN15B

OBJECTIVE

- To make the student acquaint the Knowledge about the Marginalized and exploited.
- To understand the exploitation of the Aboriginal population.

UNIT PLAN

- ❖ Students will be able to know the indigenous nature of the people.
- ❖ Students will come to know the socio-economic condition of the people.
- ❖ Students will understand the concept of fourth world literature.

COURSE OUTCOME

- Students will be able to know the sufferings of the natives of different countries.
- Students will be able understand the desires and longings of natives
- Students will be able to come to know the dream and dark side of the people
- Students will be able to learn and apply what is Fourth World Literature.
- Students will be able to get the knowledge of Fourth World Literature.

UNIT 1:

Teaching Hours - 8

N. Scott Momaday - Introduction to Fourth World Literature - world council of Indigenous peoples in 1972 - Native people of America

UNIT 2:

Teaching Hours - 8

Aboriginals of Australia - dark side of the dream : Australian literature and the post Colonial mind.

UNIT 3:

Teaching Hours - 7

Patricia Frances Graces : Maoris, Literature of New Zealand

UNIT 4:

Teaching Hours - 7

George Copway : Indigenous First Nations Literature of Canada

UNIT 5:

Teaching Hours - 9

Dalit literature and tribal literature of India.

Aarjundangle : *Poisoned bread*

Om Prakashvalmiki : *Joothan*

REFERENCES:

1. Hodge, B. and Mishra, V. (1991) *Darksideofthedream: Australianliteratureandpostcolonialmind*, Allen and Unwin, Sidney, Australia .
2. Illaiah, Kancha. *Post- Hindu India : A discourse on Dalit- bahun, socio- spiritual and scientific revolution*. New Delhi: sage Publications India pvt. Ltd. 2009.
3. Mani, Braj Ranjan. *Debrahmanizing history :Dominanceand resistance*. New delhi manohar publishers, 2008

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	M	S	L
CO3	S	S	S	S	S	S	S	S	S	M
CO4	S	M	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

CORE ELECTIVE

PAPER 1

C. FOLK TALE AND MYTH

SEMESTER – I

CREDITS – 3

CATEGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS- 39

COURSE CODE: DEEN15C

COURSE OBJECTIVES

- King Arthur wanted the knights in his court to be considered equal. He did not want to fight
- The Metamorphosis almost never depicts love affairs or loving relationship that end happily
- It believed that those who pray to Lord Varadya and touch the two sacred lizards on their way are relieved from chronic diseases.
- Of the aesthetic values of modern critics connected with the general school of mythical view myth seems to be out-and-out rational.

UNIT PLAN

- ❖ He tells the company about his occupation as combination of itinerant preaching, selling promises for salvation.
- ❖ He gives a similar sermon to every congregation and then breaks out of his selling relics which he readily admits to the listening pilgrims as fake.
- ❖ King Arthur wanted the knights in his court to be considered equals: he did not want them fighting over status or rank.
- ❖ The Round Table since it was round represented Chivalry in its highest form.
- ❖ In this the narrator prays to the gods for inspiration, lays out his theme and states his intentions to write a single continuous poem. Secondly the narrator describes the creation of the world. The only survivors were Deucalion and Pyrrha, Pious people.

COURSE OUTCOME

- Students will be able to know folklore and myth.
- Students will be able understand folk literature.
- Students will be able to come to know the culture of the Greek and Italian writers.
- Students will be able to learn and apply richness of Folk Literature.
- Students will be able to get the knowledge about myth criticism.

UNIT I

Teaching Hours - 9

Geoffrey Chaucer	:	The Pardoner's Tale
Pindar	:	Olympia XI (Trans. By Richmond Lattimore)
Christopher Marlowe	:	The Passionate Shepherd to His Love
Sir Walter Raleigh	:	The Nymph's Reply to the Shepherd

UNIT II

Teaching Hours - 8

Phyllis Briggs (Retold)	:	King Arthur and the Knights of the Round Table
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UNIT III

Ovid : Metamorphoses – Book VIII (Lines 1-60)

Teaching Hours - 7**UNIT IV****Teaching Hours - 9**

Herman Hesse

: Siddhartha

Mark Twin

: A Genuine Mexican Pug

Julian Huxley

: The Sacred Lizard

Aesop

: 1) The Town Mouse and The Country Mouse

: 2) The Fox and the Grapes

: 3) The Goatherd and the Wild Goats

UNIT V**Teaching Hours - 6**

M.H. Abrams

: *Introduction to Myth, Folklore*

A. Joseph Dorairaj

: *Theories of Myth: From Cassier to Frye*

B. Das

: *Myth Criticism and its Value***REFERENCE**

1. Kearns, George. *Macmillan Literature Series: English and Western Literature*, Glencoe Publishing Company, California, 1984.
2. Briggs, Phyllis. *King Arthur and the Knights of the Round Table*, Dean and Sons Ltd., London, 1984.
3. Abrams, M.H. and Geoffery Galt Harpham, *A Glossary of Literary Terms*, Cengage Learning, 2012.
4. Dorairaj, A. Joseph, *Myth and Literature*, Folklore Resources and Research Centre, 2003.
5. Ed. Rajnath, *Twentieth Century American Literature*, Arnold Heinemann Publisher, 1977.
6. Hesse, Hermann, *The Glass Bead Game*, Vintage Books, 2000.
7. Ed. Cong, Raymond, *African Tales*, Evans Brothers Ltd., 1967.
8. Narayanan, R.K. *Swami and Friends*, Indian Thoughts Publications, 2008.
9. Mccullough, Kelly, *Web Mage*, Berkley Publications, 2006

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	M	M
CO2	S	S	S	S	M	S	S	SM	M	L
CO3	S	S	S	S	M	SL	S	S	S	S
CO4	S	S	S	S	S	M	M	L	S	S
CO5	S	S	S	M	L	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

**OPEN ELECTIVE
PAPER 1
(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)**

A. LITERATURE FOR SOCIAL TRANSFORMATION

SEMESTER – I

CREDITS – 3

CATEGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS- 39

COURSE CODE: DNEN16A

OBJECTIVE

- To help students understand the relevance of Literatures for Social Transformation
- To enable students understand the society through the prescribed texts

UNIT PLAN

- ❖ Students will understand the link between literature and society
- ❖ Students will be able to know the importance of ethics and spirituality
- ❖ Students will understand the mythological characters and imagination
- ❖ Students will come to know the ethical values and punishment for sinners by god

COURSE OUTCOME

- Students will be able to know the conditions of pre- independent India
- Students will be able to realize the contemporary situation in society
- Students will be able to know how the materialistic world dominates humanism
- Students will be able to know the nature of knowledge and what is essential for students to learn
- Students will be able to understand the conditions and sufferings of the working classes

UNIT I :POETRY

Teaching Hours - 8

William Blake –From ‘Auguries of Innocence’ To see a world in a grain of sand..... shall never be belov’d by men (26 lines)

P.B. Shelley – *Prometheus Unbound*

Ogden Nash – Bankers Are Just Like Anybody Else Except Richer

UNIT II: PROSE

Teaching Hours - 10

John Ruskin – Unto this Last

Henry Newman – The Idea of a University

UNIT III: FICTION (SHORT STORY)**Teaching Hours - 8**

O’Henry	–	The Cop and The Anthem
Liam O’Flaherty	–	The Sniper
Tayeb Salih	–	A Handful of Dates
Luigi Pirandello	–	War
Samuel Johnson	–	The Lure of Lottery

UNIT IV: DRAMA**Teaching Hours - 5**

Anton Chekhov	–	The Cherry Orchard
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UNIT V: GREAT ORATORIES**Teaching Hours - 8**

Abraham Lincoln	–	Gettysberg Speech
Mahatma Gandhi	–	Women Not The Weaker Sex
Jawaharlal Nehru	–	Tryst with Destiny
William Shakespeare	–	Mark Antony (Julius Ceasar)

BOOK FOR REFERENCE

- Rene Wellek – *Literature and Society*
- Malik & Raval, “*Law and Social Transformation in India*”, Allahabad Law Agency.
- Dr. G.P. Tripathi, “*Law and Social Transformation*”, Central Law Publications.
- Mark Clapson, “*Suburban Century: Social Change and Urban Growth in England and the United States*”.
- David Braybrooke Bryson and Brown Peter K. Schotch, “*Logic and the Tragic of Social Change*”, Oxford University.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	S	S	L	L
CO2	S	M	M	M	M	S	S	S	S	L
CO3	S	S	S	S	S	M	M	L	S	S
CO4	S	S	S	S	S	S	M	M	M	M
CO5	S	S	S	S	S	S	M	S	S	L

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

**OPEN ELECTIVE
PAPER 1
B. GREEN CULTURAL STUDIES**

SEMESTER – I

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS- 39

COURSE CODE: DNEN16B

OBJECTIVES

- To expound to the learners the interdisciplinary nature of the course and to sensitise the learners on grave ecological concerns
- To render a historical perspective of the said criticism
- To familiarize the learners with the western eco-critical tools and to expose the learners to the relevant literature in the eco-critical realm
- To synthesise the western eco-critical tools with the eastern oiko poetic sensibilities
- To facilitate the understanding of eco-feminist theory and practice

UNIT PLAN

- ❖ Students will be able to understand the importance of nature
- ❖ Students will come to know how nature has been worshipped by human
- ❖ Students will be able to know about the concept of green studies.
- ❖ Students will understand the relationship between human beings and nature

COURSE OUTCOME

- Students will be able to learn about the endangered conditions of the earth.
- Students will be able to get awareness and concentrate on the welfare of human life.
- Students will be able to understand the connectivity between women and nature.
- Students will be able to know about the sufferings and the strength of nature.
- Students will be able to get the beautiful landscapes and heritage of Tamil writings.

UNIT 1 INTERDISCIPLINARITY

Teaching Hours - 8

1. Joe Moran's *Interdisciplinarity*
2. Arne Naess' *Ecology, Community and Life style*
3. Sri. L.C. Jain's *Eco-spirituality For Communal Harmony*
4. Eco-spirituality
5. Fritjof Capra's *The Web Of Life*

UNIT 2 ECOCRITICAL STIRRINGS

Teaching Hours - 7

1. Jonathan Bate's *The Song Of The Earth*
2. *The Green Studies Reader*
3. *The Ecocriticism Reader*

UNIT 3 INDIAN CLASSICAL OIKO POETICS

Teaching Hours - 8

1. The Abhijnanasakuntalam of Kalidasa
2. P.T. Srinivasa Iyengar's "*History Of The Tamils*"
3. A.K. Ramanujan's "*The Interior Landscape*"
4. Tolkaappiyam: Akatti Naiiyal
5. Tinai

UNIT 4 WORDSWORTH, EMERSON, THOREAU AND ECO-CRITICISM

Teaching Hours - 8

1. William Wordsworth's "*The Prelude*"
2. Jonathan Bate's "*Romantic Ecology*"
3. Selected Essays, Lectures and Poems of Ralph Waldo Emerson
4. Twentieth Century Interpretations of Walden
5. Lawrence Buell's *The Environmental Imagination*

UNIT 5 ECO-FEMINISM

Teaching Hours - 8

1. Universal Declaration of the Rights of Mother Earth
2. Karen J. Warren- *Introduction to Eco-feminism*
3. Vandana Shiva- *Women in the Forest*
4. Margaret Atwood- *Surfacing*
5. Susan Hawthorne- *Earth's Breath*

REFERENCE

- Adamson, Joni. *American Indian Literature, Environment Justice and the Ecocriticism*. Tucson: The University of Arizona Press, 2001.
- Adhikary, Qiran. *Feminist Folktales from India*. Oakland: Masalai Press, 2003. Print.
- Ali, Salim. *The Fall of a Sparrow*. New Delhi: Oxford University Press, 1985.
- Atwood, Margaret. *Surfacing*. New York: Anchor Books, 1998.
- Bate, Jonathan. *Romantic Ecology*. London and New York: Routledge, 1991.
- *The Song of the Earth*. London: Picador, 2000.
- Benedict XVI, Pope. *Caritas In Veritate*. Trivandrum: Carmel International Publishing House, 2009.
- Braun, Bruce and Noel Castree. *Remaking Reality*. London: Routledge, 1998.
- Buell, Lawrence. *The Environmental Imagination*. London: Harvard University Press, 1995.
- Carson, Rachel. *Silent Spring*. London: Penguin books ltd, 2000. Print.
- Clark, Timothy. *The Cambridge Introduction to Literature and the Environment*. New York: Cambridge, 2011.
- Coomaraswamy, Ananda. K. *Dance of Shiva*. New Delhi: Sagar Publications, 1982.
- Coupe, Lawrence. *The Green Studies Reader*. London and New York: Routledge, 2000.
- Dalai Lama, His Holiness & *The Universe in a Single Atom*. London: Little Brown, 2005.
- Dreese, Donelle N. *Ecocriticism*. New York: Peter Lang Publishing, Inc &, 2002.
- Eiseley, Loren. *The Unexpected Universe*. University of Pennsylvania: Bison Books, 1972.
- Garrard, Greg. *Ecocriticism*. New York: Routledge, 2004.

- Gatta, John. *Making Nature Sacred*. New York: Oxford University Press, 2004.
- Glotfetty, Cheryl and Harold Fromm, eds. *The Ecocriticism Reader*. Athens, Georgia: University of Georgia Press, 1996.
- Hawthorne, Susan. *Earth's Breath*. Spinifex Press, 2010. Print.
- Killingsworth, Jimmie. M. *Walt Whitman and the Earth*. Iowa City: University of Iowa Press, 2004.
- Kurup ONV. *This Ancient Lyre*. New Delhi: Sahitya Akademi, 2005.
- Mies, Maria and Vandana Shiva. *Ecofeminism*. New Delhi: Kate for Women, 1993
- Ramanujan, A. K. *A Flowering Tree and other oral tales from India*. New Delhi: Penguinbooks. 1997. Print.

E-RESOURCES

- Harding, Stephen. *What is Deep Ecology?*
<[http://www.schumachercollege.org.uk/learningresources/ what-is-deep-ecology](http://www.schumachercollege.org.uk/learningresources/what-is-deep-ecology)>. Web.
- Proposal of Bolivia to Rio+20. *Universal Declaration of the Rights of Mother Earth*. <<http://motherearthrights.org/universal-declaration/>>. Web.
- Roy, Arundathi. *The Greater Common Good*
- <<http://www.outlookindia.com/article.aspx?207509>>. Web.

WEBSITES

www.ecofem.org/journal
www.spiritoftrees.org/
www.navdanya.org/
www.ecofem.org/
www.resurgence.org/
www.bhoomimagazine.org/
www.greenbeltmovement.org
www.successconsciousness.com

MAGAZINES

"Bhoomi"
 "Environment" [USA]
 "Environment Action" [UK]
 "Life Positive" [India]
 "National Geographic"
 "Resurgence" [UK]
 "Sierra" [USA]
 "The Ecologist Asia" [India]
 "The Ecologist" [UK]

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	M	M
CO2	S	S	S	S	S	S	S	M	M	M
CO3	S	S	S	S	S	M	M	S	S	S
CO4	S	S	S	S	S	M	S	S	S	M
CO5	S	S	S	S	S	M	S	L	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

**OPEN ELECTIVE
PAPER 1**

C. PUBLIC SPEAKING AND CREATIVE WRITING

SEMESTER – I

CREDITS – 3

CATEGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS- 39

COURSE CODE: DNEN16C

OBJECTIVES

- To help students understand the techniques of Creative Writing
- To give practice in Writing
- To enable students write any Creative Form of Literature

UNIT PLAN

- ❖ Students will be able to understand the features of writings
- ❖ Students will be able to understand how to proof read and edit
- ❖ Students will be able to become the best writer with unique styles
- ❖ Students will understand the taste of poem

COURSE OUTCOME

- Students will be able to learn how to appreciate and analyze the poem
- Students will be able to get an idea of how to write poem
- Students will be able to receive the adequate knowledge about the paragraph writing
- Students will be able to become a good writer after getting the ideas about writing methods
- Students will be able to know how to differentiate between fiction and non- fictional writings.

UNIT I

Teaching Hours - 8

Writing and Thinking
Finding Ideas
Thinking about purpose, audience and tone
Arranging Ideas
Writing a First Draft Evaluating & Revising
Proof reading and publishing
Lateral Thinking

UNIT II

Teaching Hours - 7

Writing a Poem
Poetic Analysis
Literary Devices
Exercises

UNIT III**Teaching Hours - 8**

Non – Fictional Writing
 Paragraph Structure
 Writing an Introduction
 Writing a Conclusion
 Exercises

UNIT IV**Teaching Hours - 8**

Writing a Short Story
 Pre-Writing
 Basic Elements
 Basic Framework
 Exercises

UNIT V**Teaching Hours - 8**

Screenplay Writing / Writing a Play
 Literary Techniques
 Production
 Evaluation Pattern to be evolved

REFERENCE

- *Elements of writing* (Complete Course) James L. Kinneavy, John E. Warriner Austin: HBJ, 1993
- *Elements of Writing* (Fourth Course) James L. Kinneavy, John E. Warriner Austin: HBJ, 1993
- Rudolf f. Verdure and Kathleen S. Verdure: *The Challenge of Effective Speaking*, Thomson Wadsworth 13th ed., 2006.
- Stephen King, *On Writing*. www.amazon.net.
- Kamath, M.V *Professional Journalism*. New Delhi: Vikas Publication.
- Edward De Bono, *Six thinking hats*, Little Brown and company.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	L
CO2	S	M	M	M	S	S	S	S	S	S
CO3	M	M	M	L	S	S	S	S	S	L
CO4	S	S	S	S	S	M	L	S	S	S
CO5	S	S	S	S	S	S	M	S	S	L

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

SEMESTER II

PAPER - 5

BRITISH DRAMA

SEMESTER – II

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS – 78

COURSE CODE: DEN21

COURSE OBJECTIVES

- This course seeks to aid the students in the acquisition of communication skills.
- The course will demonstrate the proficiency in oral communication.
- The students will also acquire and develop histrionic skills.

UNIT PLAN

- ❖ They will demonstrate proficiency in specific skills like: acting, directing, choreography, play writing or dramaturgy.
- ❖ They will be able to analyze, interpret and evaluate the dramatic literature and theatrical productions.
- ❖ Students in drama and theatre arts will learn the importance of responsibility to their community.

COURSE OUTCOME – Students will be able to

- apply discipline – specific skills to the creation of performance
- Draw connections between theatrical practices and social contexts in both modern and pre-modern periods.
- Demonstrate proficiency in specific skills like: acting, directing, choreography, play-writing or dramaturgy.
- Analyze, interpret and evaluate the dramatic literature and theatrical productions.
- Appreciate different types of drama.

UNIT – I: BRITISH DRAMA UP TO 17TH CENTURY

Teaching Hours - 16

1. Introduction to the development of British drama
2. Christopher Marlowe - *Doctor Faustus (Detailed)*
3. Ben Jonson - *Everyman in His Humor (Non-detailed)*

UNIT II: UPTO 19TH CENTURY

Teaching Hours - 16

1. Oscar Wilde - *The Importance of Being Ernest (Detailed)*
2. Harold Pinter - *The Birthday Party (Non-detailed)*

UNIT – III: 20TH CENTURY UPTO 1950

Teaching Hours - 16

1. T.S.Eliot - *Murder in the Cathedral (Detailed)*
2. Bernard Shaw - *Saint Joan (Non-detailed)*

UNIT – IV: 20TH CENTURY AFTER 1950**Teaching Hours - 15**

1. Peter Shaffer - *Amadeus (Detailed)*
2. Tom Stoppard - *Rock n Roll (Non-detailed)*

UNIT – V: TEXT FOR SEMINAR**Teaching Hours - 15**

1. John Webster - *The Duchess of Malfi*
2. Oliver Goldsmith - *She Stoops to Conquer*
3. Sheridan - *The School for Scandal.*
4. Agatha Christie - *The Mouse Trap*

REFERENCE

1. Colin Chambers; Mike Prior. *Playwrights' Progress : Patterns of Postwar British Drama*. Amber Lanes Press.1987.
2. Dan Rebellato. *1956 and All that : The Making of Modern British Drama*. Routledge. 1999.
3. Elizabeth Hale Winker . *The Function of Song in Contemporary British Drama*. University of Delaware Press.1990.
4. Frances M. Kavenik. *British Drama, 1660-1779: A Critical History* .Twayne.1995.
5. Gabriele Griffin. *Contemporary Black and Asian Women Playwrights in Britain*. CUP. 2003.
6. John Russell Taylor. *Anger and After : A Guide to the New British Drama*. Penguin Books. 1963.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	M	S	S
CO2	S	S	S	S	S	S	M	S	S	M
CO3	S	M	M	M	S	S	S	S	M	L
CO4	S	S	S	S	S	L	S	S	S	L
CO5	S	S	S	S	S	L	S	S	S	L

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

PAPER – 6

TRANSLATION THEORY AND PRACTICE

SEMESTER – II

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS – 78

COURSE CODE: DEN22

OBJECTIVE

- To make the students learn about the history of translation.
- To understand the challenges and identify the problems of translation.
- To carry out translation exercises.

UNIT PLAN

- ❖ Knowing the base of translation.
- ❖ To recognize the impact and aspects of translation.
- ❖ To understand the target language and its art of process, products and reproduction of translation.

COURSE OUTCOME – Students will be able to

- know about the history of translation and its practice.
- interpret of SL and TL can be done.
- learn translation and its process.
- understand the problem and solution of the translation and the equivalence of the translation can be learned.
- create practice of Translation.

UNIT I

Teaching Hours - 16

A Brief History of Translation

Translation Theory and its Aspects

UNIT II

Teaching Hours - 18

Translation Procedure

Interpretation of the Source Language (SL) Text and Transfer of meaning and communicative effects to the Target Language (TL) Text

UNIT III

Teaching Hours - 13

Is Translation an Art or Science?

Translation and Reproduction, Process and Product

UNIT IV

Teaching Hours - 16

Problems in Translation

Fidelity and Truth in Translation

Complete Equivalence vs. Creativity

Literal and Free Translation – Translation – Creation, Transcription and Creative Translation

UNIT V

Teaching Hours - 15

The Practice of Translation

(Exercise from Literary Translation)

1 from Tamil to English and 1 from English to Tamil

REFERENCE

- Eugene A. Nida and Charles R. Taber – *The Theory and Practice of Translation*
- Susan Bassnett and Mequire – *Translation studies*
- Newmark Peter – *Approaches to Translation*
- Susan Bassnett and Lefevere Andre – *Translation, History and Culture*
- H.Lakshmi – *Problems of Translation*

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	M	L
CO2	S	S	S	S	S	S	M	M	L	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	L	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

PAPER - 7

CONTEMPORARY LITERARY THEORY - I

SEMESTER – II

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS – 78

COURSE CODE: DEN23

OBJECTIVES

- To help the students understand literary theory as a system to critically interpret literary texts.
- To enable the students to understand the broad spectrum of thought that is covered by literary theory and also to enhance their literary research.

UNIT PLAN

- ❖ Enhances the students to develop critical skills, analysis and many other communication skills-oral and written.
- ❖ The students are finally equipped with various tools, techniques and strategies of interpretation.

COURSE OUTCOME – Students will be able to

- reinforces the student's literary competence.
- develop an independent critical persona.
- understand the various types of theories
- learn 20th Century Literary Theories.
- acquire and apply the knowledge of Contemporary Literary Theory.

UNIT I

Teaching Hours - 16

New Criticism

Russian Formalism

UNIT II

Teaching Hours - 16

Psychoanalysis

Archetypal Criticism

UNIT III

Teaching Hours - 16

Reader Response Theory

Phenomenological Criticism

UNIT IV

Teaching Hours - 15

Bakhtin

Eco criticism

UNIT V

Teaching Hours - 15

Modernism

Post-Modernism.

REFERENCE

1. Barry, Peter, *Beginning Theory* (Routledge, London, 2010).
2. Selden, Raman. *A Reader's Guide to Contemporary Literary Theory*. (Pearson, Singapore, 2009).
3. Lodge, David and Nigel Wood (ed.). *Modern Criticism and Theory* (Pearson, Essex, 2008).
4. Waugh, Patricia. *Literary Criticism and Theory*. (Oxford University Press, Oxford, 2008).

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	M
CO2	M	S	S	S	S	S	M	S	S	S
CO3	S	S	S	S	S	S	S	M	M	L
CO4	S	S	S	S	S	S	M	M	L	S
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

**CORE ELECTIVE
PAPER 2
A. COMPARATIVE LITERATURE**

SEMESTER – II

CREDITS – 3

CATEGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEEN24A

OBJECTIVES:

- To acquaint students of literature with a knowledge of using comparison as a tool of criticism.
- To help students have a broad outlook on literature as Comparative Literature involves 'Mutual Illumination'

UNIT PLAN

- ❖ To go beyond mere comparative study of texts to include issues of nation, caste, race, gender, region, culture etc.
- ❖ In the analysis of texts as well as issues related to the history of print and publishing also form topics studied under the rubric of Comparative Literature.
- ❖ To enable students to explore research areas in the core subjects of thematology, genealogy, literary history, literary influence, and reception, besides related fields of performance studies, theatre studies, film studies etc.

COURSE OUTCOME – Students will be able to

- know about the definition and Origin of the Comparative Literature.
- influence and Imitation of the subject is taught.
- link between Comparative Literature and the literary History is exposed
- identify the different genres in comparative literature.
- Understand the history of comparative literature.

UNIT-I:

Teaching Hours - 13

Definition

of the term Comparative Literature – National Literature – World Literature and Comparative Literature – French School and American School, German School and Russian School.

UNIT-II:

Teaching Hours - 13

Influence and Imitation – Unconscious Imitation and Conscious Influence – Translation – Influence Studie

s and Analogy Studies – Comparing Dante's The Divine Comedy with Sri Aurobindo's Savithri (The Book of Forest in The Mahabharatha)

UNIT-III:**Teaching Hours - 12**

Epoch, Period and Generation – the Link between Comparative Literature and History of Literature – The difference between Epoch, Period and Generation

UNIT-IV:**Teaching Hours - 14**

Genres – Comparing two Texts on the basis of Form – Comparing Novels, Plays and Poems – Variations – a Drama and an Epic also can be compared based on the Common Qualities – Comparing Burns with Bharathidasan (Burns’ 1. Bessy and Her Spinning Wheel 2. Banks of Crea 3. As I went out on May Burning 4. Broom Resoms 5. Auld Rob Morries with Bharathidasan’s translated version of Tamizhachiyin Katti) and Bacon with Valluvar, Kamban with John Milton.

UNIT-V:**Teaching Hours - 13**

Thematology – Comparing Works on the basis of Themes – Defining terms like Motif, Leitmotif – Characters and Situations. In addition to these, the teacher can illustrate the Study of Comparative Literature by Comparing Nathaniel Hawthorne’s *The Scarlet Letter* and *Ananda*. V.R. Ananthamurthy’s *Samskara*, Shakespeare’s *Antony and Cleopatra* with Dryden’s *All for Love*, Gayathri Spivak’s *Death of a Discipline*

TEXT BOOKS:

1. Brooks, Cleanth and Robert Penn Warren. *Modern Rhetoric*. Atlanta: Harcourt,Brace& World, 1958. Print.
2. Mohan, Devinder. *Comparative Poetics: Aesthetics of the Ineffable*. New Delhi: Intellectual Publishing House, 1988. Print.
3. Peck, John and Martin Coyle. *Practical Criticism*. New York: Palgrave, 1995.Print.
4. Daiches, David. *Critical Approaches to Literature*. Kolkata: Orient Longman, 2006. Print.
5. Spivak, Gaythri Chakravorthy. *Death of a Discipline*. Columbia: Columbia University Press, 2003. Print.

REFERENCES:

- Subramaniam, N, Srinivasan, Padma & Balakrishnan G.R. eds. *Introduction to the Study of Comparative Literature Theory and Practice*. Tamilnadu: Teesi Publications, 1997. Print
- “*Comparative Literature*”, Ed :Bijay Kumar Das, Atlantic Publishers, 2012.
- “*Glimpses of Comparative Literature*”, Ed :Pradhan Pam Prakash, Atalntic Publishers.
- “*Studies in Comparative Literature*”, Ed: Mohit K. Ray, Atlantic Publishers.
- “*India and Comparative Literature: New Insights*”, Ed: R.K. Dhawan and Sumita Puri, Prestige Books Publishers.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	S	S
CO2	M	S	S	S	S	S	M	S	S	S
CO3	S	S	S	S	S	S	S	M	L	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	L	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

**CORE ELECTIVE
PAPER 2
B. NEW LITERATURE IN ENGLISH**

SEMESTER – II

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEEN24B

OBJECTIVES:

- The course aims to develop the students in a comprehensive understanding of the finest works English, belonging to post-colonial countries.
- To familiarize with some of the greatest writers and cultures in those countries.

UNIT PLAN

- ❖ Critically examines the New Literature thoughts and pain expressed through the various work.
- ❖ Poetry discusses the cultural pain of the people.
- ❖ The expression of Woman to her child are expressed.
- ❖ Psychological thoughts on Telephone Conversation.
- ❖ Modernity is experienced through the narration.

COUSE OUTCOME – Students will be able to

- experience the poetry from various countries such as Canada, Australia and New Zealand.
- understand the Alienation among the works of the writers who belongs to different regions
- know Criticism of the New Literature.
- find out the outcome of New Literature in English.
- distinguish various types of poetry, prose, drama in New Literature.

UNIT I - POETRY

Teaching Hours - 15

DETAILED: CANADIAN POETRY

Desi Di Nardo	:	Summer Sonata
Mark Strand	:	The Story of Our Lives

AUSTRALIAN POETRY

Judith Wright	:	Woman to Child
Jennifer Maiden	:	Tactics
Elizabeth Campbell Donaldson	:	Days

NON- DETAILED: AFRICAN POETRY

Wole Soyinka	:	Telephone Conversation
Derek Walcott	:	A Far Cry from Africa

NEW ZEALAND POETRY

Katherine Masfield	:	A Little Boy's Dream
Faye Kilday	:	Do You hear the Angel Speaking

UNIT II – PROSE

Teaching Hours - 12

Stuatr Hall	:	Cultural Identity and Diaspora
Nadine Gordimer	:	Nobel Prize Acceptance Speech

UNIT III – DRAMA

Teaching Hours - 12

Uma Parameswaran	:	<i>Rootless but Green are the Boulevard Trees (Detailed)</i>
Mahasweta Devi	:	<i>Mother of 1084 (Non-Detailed)</i>

UNIT IV – FICTION**Teaching Hours - 13**

JM Coetzee	:	<i>Disgrace</i>
Peter Kelly	:	<i>The History of the Kelly Gang</i>

UNIT V – CRITICISM**Teaching Hours - 13**

Louis Dudek	:	<i>Poetry in English</i>
E.H. McCormick	:	<i>Close of a Century</i>

REFERENCE

- Narasimaiah, C.D Ed, *An Anthology of Commonwealth Poetry*, Macmillan Publication, 2013.
- J O Donnell, J.O. Maragaret, *An Anthology of Commonwealth Verse*, Blackie and Sons Publication, 2004.
- Hall, Stuart, *Colonial Discourse and Postcolonial Theory – A Reader*, Harvest Wheatsheaf Publication, 2009.
- Gordimer, Nadine, www.nobelprize.org/nobel_prize/literature/laureates/1991/gordimer-lecture.html, *Gordimer – lecture.html*, 1991.
- Parameswaran, Uma, *Sons must Die and Other Plays*, Prestige Books, 2006.
- Devi, Mahasweta, *Mother of 1084*, Seagull Books, 2011.
- Coetzee, J.M, *Disgrace*, Vintage Publications , 2000.
- Kelly, Peter, *The History of the Kelly Gang*, Faber Publications, 2012.
- Walsh, William, *Readings in Commonwealth Literature*, Clarendon Press Publication, 2005.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	L	S	S	S	M	M
CO2	S	S	S	S	M	L	S	S	S	S
CO3	S	S	S	S	M	S	S	S	M	L
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

**CORE ELECTIVE
PAPER 2**

C. SUBALTERN LITERARY STUDIES

SEMESTER – II

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEEN24C

OBJECTIVES

- To introduce students to that literature that has been sidelined down the ages.
- To familiarize the students with the theme of the Subaltern.
- To picturise the painful feelings of the oppressed.

UNIT PLAN

- ❖ Experience of the Socially, Politically, economically neglected people can be understood.
- ❖ Modern Subaltern culture will be exposed.
- ❖ Identification of Gender discrimination in the given works.
- ❖ Subaltern thoughts are discussed via Criticism.

COURSE OUTCOME – Students will be able to

- re-explore the political, social and economic role in literature.
- understand the feelings of the exploited.
- analyse the political role in the subaltern literature.
- critically examine different text and its theme.
- introduce the subaltern studies.

UNIT I: POETRY

Teaching Hours - 15

John Betjeman	:	A Subaltern's Love Song
Mervyn Gooneratne	:	There was a Country
Langston Hughes	:	The Negro Speaks of Rivers
Syed Amanuddin	:	Don't Call Me Indo – Anglian
Mervyn Morris	:	Judas

UNIT II: PROSE

Teaching Hours - 15

Homi.K. Bhabha	:	The Location of Culture
Dipesh Chakrabarty	:	A Small History of Subaltern Studies : 2000 from Habitation of modernity Essays in the wake of Subaltern studies pp (3-19)
Salman Rushdie	:	Imaginary Homelands Chapter – I

UNIT III: DRAMA

Teaching Hours - 11

Dolores Prida	:	Beautiful Senioritas
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UNIT IV: FICTION**Teaching Hours - 11**

Benjamin : Jasmine Days (translated by Shanaz Habib)

UNIT V: CRITICISM**Teaching Hours - 13**

K. Nirupa Rani : Gender and Imagination in Bapsi Sidhwa's Fiction

Mulkraj Anand : The Source of Protest in my novels
(from "Creating Theory" ed. Jasbir Jain)

Gyan Prakash : Subaltern Studies as Postcolonial Criticism

REFERENCE

- Dipesh Chakrabarty, *A Small history of Subaltern studies*:2000. Habitation of modernity: Essays in the wake of subaltern studies. Chicago: el of Chicago p, 2002.
- Ranajit Grhe : *On Some Aspects of the Historiography of colonial India*. 1982.
- *Mapping Sub studies & the post colonial Ed*. Vinayak Chatuoudi London:2000.
- Spivak, Gayatri Chakraborti. "*Subaltern Studies: Deconstructing Historiography*." *Ed*.
- Ranjith Guha, "*Writings on South Asian History and Society Vol IV*. OUP, 1985.
- Gramsci, Antonio. "*History of the Subaltern Clases, Prison Notebooks Vol.II*, (ED.&Tr.) Joseph A. Buttigieg, Columbia UP, 1966.
- Fanon, Frantz. "*Black Skin, Whote Masks*, Grove, !967.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	M	L
CO3	S	S	S	S	S	S	S	S	L	S
CO4	M	S	S	S	S	M	M	S	L	S
CO5	S	S	S	S	S	S	S	M	M	L

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

OPEN ELECTIVE

PAPER 2

A. TECHNICAL WRITING

SEMESTER – II

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DNEN25A

OBJECTIVES

- To introduce students to various styles and methods in technical writing
- To train students in skills required for a technical communicator

UNIT PLAN

To train students in using basic online packages and applications as tools of technical Writing.

COURSE OUTCOME – Students will be able to

- Understand styles and methods in Technical Writing.
- Locate and evaluate the use online packages and appliances effectively.
- display the skills required for a technical communication\
- use visuals effectively and integrate the components of accuracy, brevity and objectivity in Technical Writing
- apply the knowledge of Technical Writing in their profession.

UNIT 1 INTRODUCTION

Teaching Hours - 15

1. What is Technical Writing?
2. Difference Between Technical and Academic Writing
3. The Scope of Technical Writing
4. The Role and Essential Skills of a Technical Communicator

UNIT 2 GUIDELINES AND GRAMMAR IN TECHNICAL WRITING

Teaching Hours - 14

1. Basic Patterns and Elements of the Sentence
2. Common Grammar, Usage, Punctuation Problems
3. Writing with Clarity and Precision
4. The Fog Factor

UNIT 3 THE WRITING PROCESS

Teaching Hours - 14

1. Audience Analysis
2. Task Analysis
3. Writing and Editing (Using Track Changes)
4. Communicating with Visuals

UNIT 4 - APPLICATION OF TECHNICAL WRITING – I Teaching Hours - 11

1. Writing Proposals
2. Technical Reports: Survey – Report

UNIT 5-APPLICATION OF TECHNICAL WRITING – II Teaching Hours - 11

1. Users' Manuals
2. Writing for the Web

BOOKS FOR REFERENCE

1. Blake, Gary and Robert W. *The Elements of Technical Writing*. Macmillan Publishers, 1993
2. Blicq, Ronald, S and Lisa Moretto. *Technically Write!*. Prentice Hall, 2004.
3. Marnell, Geoffrey. *Essays on Technical Writing*. Burdock Books, 2016
4. Reddy, Devaki and Shreesh Chaudhary. *Technical English*. Macmillan, 2009.
5. Rizvi, Ashraf M. *Effective Technical Communication*. Tata McGraw-Hill, 2006.
6. Samson, C Donald. *Editing Technical Writing*. Oxford UP, 1995.

ELECTRONIC RESOURCE

- Business Writing – Clarity, UK

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	M
CO2	S	S	S	S	S	S	S	M	S	L
CO3	L	M	M	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

OPEN ELECTIVE

PAPER 2

B. INDIAN DIASPORA LITERATURE

SEMESTER – II

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DNEN25B

OBJECTIVE

- Definition and types of Diaspora – Waves of Migration Patterns of Diaspora – Major Diaspora Communities & Popular terms in Diaspora.
- Definition and types of migration – patterns of migration – domestic and global migration – impact of migration.
- Ethnicity and identity of Diaspora context – forming of identity – major components of ethnicity – identity detainment and amalgamation.

UNIT PLAN

- ❖ The root of Diasporic thoughts
- ❖ The broken feeling of the homelessness.
- ❖ Pictorial effect of global migration.
- ❖ Rootless identity of the diasporic communities.

COURSE OUTCOME – Students will be able to

- introduce the definition and scope of the Indian Diaspora Literature.
- Understand the meaning and usage of the term “diaspora literature”.
- Link Diasporic Communities feelings from the various part of the countries throughout the world.
- examine the circumstances of Diasporian.
- learn the theories of Diasporic Literature.

UNIT I – DIASPORA THEORY

Teaching Hours - 16

Diaspora – Origin, Definition and Scope

Salman Rushdie: *Imaginary Homelands* from Rushdie's Imaginary Homelands

Jana Evans Braziel and Anita Mannur (ed.). *Modernity, Globalism, and Diaspora. from Theorizing Diaspora : A Reader, Wiley, 2003.*

Stuart Hall: *Cultural Identity and Diaspora* (In Williams, Patrick & Laura Chrisman eds. Colonial Discourse & Postcolonial Theory:

A Reader. Harvester Wheatsheaf, 1993)

UNIT II – POETRY**Teaching Hours - 13**

A.K. Ramanujan- “Small Scale Reflections on a Great House”
 R. Parthasarathy – “Home Coming”
 Agha Shahid Ali: “Srinagar Airport”, “Of Snow”, “Memory”,
 (form The Final Collections, Orient Blackswan, 2004).

UNIT III – FICTION**Teaching Hours - 10**

Khaled Housseine : *The Kite Runner*
 V.S. Naipaul : *The Mystic Masseur*

UNIT IV – DRAMA**Teaching Hours - 14**

Lorraine Hansberry – *A Raisin in the Sun*
 Julia Cho – *The Architecture of Loss*
 Pearl Cleage – *Flyin’ West*
 Silvia Gonzalez – *The Migrant Farm worker’s Son*

UNIT V – SHORT STORIES**Teaching Hours - 12**

Gita Hariharan: *Ghosts of Vasumaster*
 Jhumpa Lahiri: *Unaccustomed Earth*
 Sunetra Gupta: *Memories of Rain*
 Chitra Banerjee Divakurni: *Sister of my heart*

REFERENCE

1. English Literature Voices of Indian Diaspora- Malti Agarwal.
2. DIASPORA Theory and Translation - Himadri Lahiri Ed. By Allen Hibbard. Pub Orient Blank Swan.
3. Writers of the Indian Diaspora-Jasbir Jain.
4. Migration and Diaspora in Mordan Asia. Sunil Amirth.
5. Translational Migration: The Indian Diaspora Ed. William Safran, Ajaya Kumar Sahoo, Brij V. All. South Asia Edition.
6. Indian Diaspora in the Caribbean : History, Culture and Identity- Ed by Rattanland Hangloo.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	L
CO3	S	S	S	S	S	M	M	S	L	M
CO4	S	S	S	S	M	L	M	S	M	S
CO5	S	S	S	S	S	S	S	L	L	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

OPEN ELECTIVE

PAPER 2

C. JOURNALISM AND MASS COMMUNICATION

SEMESTER – II

CREDITS – 3

CATEGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DNEN25C

OBJECTIVES

- To enable the students to get knowledge of the press, its history and other media.
- To know the uses and Importance of the Mass Media.
- To get the knowledge of Print Media.
- To evaluate the worthiness of Media.

UNIT PLAN

- ❖ The role of Print Media
- ❖ Culture and characteristics design of newspaper.
- ❖ To input the techniques and writings of Media
- ❖ Evaluating the documentary record of the movie.
- ❖ Critical examine of the Advertisement.

COURSE OUTCOME – Students will be able to

- about the history of the print media.
- differentiate the Characteristic of the Newspaper and visual media.
- acquire the Techniques and writings of the Print Media.
- introduce the importance of the mass media in the society.
- apply the knowledge of journalism and mass media.

UNIT I: HISTORY AND IDEOLOGIES OF PRINT MEDIA Teaching Hours - 13

The Press Council Act – 1978
News under Emergency
The Centenarian Newspapers in India
Ethics of a Newspaper

UNIT II: CHARACTERISTICS OF A NEWSPAPER: Teaching Hours - 13

Headlines
Interviews
Features
Letters to the Editor
Cartoons and Caricatures

UNIT III: TECHNIQUES OF WRITING FOR THE PRINT MEDIA

Teaching Hours - 13

Report Writing
The Role of an Editor
Qualities of an Interviewer
Book Review
Film Review

UNIT IV: HISTORY AND STUDY OF FILMS**Teaching Hours - 13**

The Arrival of Talkies

Lumiere Brothers and the Evolution of Cinematography

Documentary and Short Films

National Film Festival

UNIT V: USES AND IMPACT OF MASS MEDIA ON SOCIETY**Teaching Hours - 13**

Radio Journalism

Television Journalism

The Film Industry

The web Media

REFERENCE

1. *Journalism Theory and Practice*: B.N. Ahuja, Sultan Chand Pub, New Delhi
2. *Mass Communication in India* :Keval K. Kumar, Jaico Publishing House
3. *Basic Journalism* :Rengasamy Parthasarathy, Macmillan publications.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	M	M	S	S	S
CO4	S	S	S	S	S	S	M	S	S	M
CO5	S	S	S	S	S	S	M	S	S	L

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

**SEMESTER III
PAPER - 8**

NON-FICTION AND PROSE

SEMESTER – III

CREDITS – 4

CATAGORY – CORE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEN31

COURSE OBJECTIVES

- To familiarize the student with the essays of Francis Bacon, his-epigrammatic style and aphorisms.
- To acquaint the student with the Holy Bible, its language and the Utopia as an ideal state.
- To enjoy autobiographical elements of Charles Lamb's essays, his unique style, pathos and humor, the personal essay of the Romantic age.
- To probe the philosophical thought of Russell, the Post Colonial aspects as highlighted in George Orwell.
- To acquaint the students with the critical views of T.S. Eliot on the metaphysical poets like Donne and assimilate their literary content
- To impart the role of humor in everyday life - how an ordinary incident acquires philosophical dimensions in G.K Chesterton.

UNIT PLAN

- ❖ To understand the enrichment of English vocabulary and religious connotation of the period.
- ❖ To learn More's positive views on an Ideal State.
- ❖ To evaluate More as an essayist of the Middle English Period.
- ❖ To enjoy the Auto-biographical style of Lamb and Huxley.
- ❖ To understand the pathos in Lamb.
- ❖ To critically appreciate the humor in Lamb and Hazlitt.

COURSE OUTCOME – Students will be able to

- learn the writing style from Russell's model and the value of lateral thinking.
- enjoy the humor of Orwell's Writings.
- critically evaluate the Post Colonial issues presented in Orwell's essay.
- estimate T.S. Eliot as a scholarly critic.
- learn about the greatness of the Metaphysical poets like Donne.

UNIT 1 - BRITISH LITERATURE-NON – FICTION

Teaching Hours - 13

<i>Great Contemporaries</i>	-	Winstn Churchill (Detailed)
<i>Seven Pillars of Wisdom</i>	-	T.E. Lawrence (Detail)
<i>Life of Mr. Richard Savage</i>	-	Samuel Johnson (Non- Detail)

UNIT 2- AMERICAN LITERATURE- NON – FICTION Teaching Hours - 13

<i>In Cold Blood</i>	-	Thumam capote (Detail)
<i>Two Kinds of Truth</i>	-	Michael Connelly (Detail)
<i>White trash</i>	-	Nancy IsenBery (Non-Detail)

(The 400 – Year untold History of class in America)

UNIT 3- INDIAN WRITING IN ENGLISH-NON- FICTION Teaching Hours - 13

<i>India After Gandhi</i>	-	Ramachandra Guha (Detail)
<i>An ordinary person's Guide to Empire</i>	-	Arundhadhi Roy (Detail)
<i>Freedom at Midnight</i>	-	Larry Collins and Dominique Lappierre (Non-Detail)

UNIT 4- COMMONWEALTH LITERATURE -NON- FICTION

Teaching Hours - 13

<i>Descent into Chaos</i>	: Ahmed Rashid (Detail)
<i>Reading Lolita in Tehran</i>	: A Memoir Books - AzarNatisi (Detail)
<i>The Home that was Our country</i>	: A Memoir of Syria-Alia Malek(Non-Detail)

UNIT 5- CHINESE NON-FICTION

Teaching Hours - 13

<i>The Soong Dynasty</i> - Sterling Seagrame (Detail)
<i>Factory Girls; From village to city in a changing China</i> - Leslie T. Chang (Detail)
<i>Haunted by Chaos: China's Grand Strategy from Mao Zedong to Xi</i> – SulmaanWasif Khan(Non-Detail)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	L
CO2	S	S	S	S	S	S	M	M	L	L
CO3	S	S	S	S	S	S	L	M	M	S
CO4	L	S	S	S	S	S	S	S	M	M
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

PAPER -9

RESEARCH METHODOLOGY

SEMESTER – III

CREDITS – 4

CATAGORY – CORE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEN32

OBJECTIVES

- To help students prepare a Dissertation of their own
- To prepare students for quality research in future
- To train students in using parenthetical documentation as recommended in MLA Hand Book

UNIT PLAN

- ❖ To learn regarding the concept, definition and variable.
- ❖ Experimental Design of Independent and Dependence of Variables
- ❖ Giving an idea of Validity and Reality.
- ❖ To collect the Data and how to represent them.
- ❖ Giving the vivid Software and Paper format.

COURE Outcomes – Students will be able to

- introduce the Definitions, Variables and Research questions, etc.
- explore the Research Design, the difference between Quantative and Qualitative Research.
- learn the Concept of Measurement.
- interpret the data and Layout of research.
- Know the usage of the sources in research.

Unit– I

Teaching Hours - 12

Research and Writing

Plagiarism and Academic Integrity

Unit– II

Teaching Hours - 12

The Mechanics of Writing

Unit– III

Teaching Hours - 13

The Format of the Research Paper Abbreviations

Unit– IV

Teaching Hours - 13

Documentation: Preparing the list of Works Cited

Unit– V

Teaching Hours - 15

Documentation: Citing Sources in the text

REFERENCE

1. Modern Language Assn. Of America, “*M.L.A Hand Book*”, Macmillan. 8th edition.
2. Anderson, Durston & Poole, “*Thesis & Assignment Writing*”, Easter Limited, New Delhi. 1970 rpt. 1985.
3. Parsons C J, “*Thesis & Project Work*”, Unwin Brothers Ltd., Gresham Press. 1973.
4. Rajanna, Busangi, “*Fundamentals of Research*”, American Studies Research Centre, 1983.
5. *Research Methodology* – C.R. Kothari

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	L
CO3	S	S	S	S	M	M	M	M	S	S
CO4	M	M	S	S	S	S	S	S	L	S
CO5	S	S	S	S	S	S	M	M	L	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

PAPER - 10

CONTEMPORARY LITERARY THEORY – II

SEMESTER – III

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEN33

OBJECTIVES

- The aim of this course is to familiarize students with major trends in twentieth century literary Theory in order to explore ongoing debates in literary criticism and their application in critical practice.
- Students would be expected to acquaint themselves with the principal hypotheses and reading strategies of the following schools to see how each critical practice includes and excludes issues relevant to other practices.

UNIT PLAN

- ❖ Enhances the students to develop critical skills, analysis and many other communication skills, oral and written.
- ❖ The students are firmly equipped with various tools, techniques and strategies of interpretation.

COURSE OUTCOME: Students will be able to

- reinforce the student's literary competence.
- develop an independent critical persona.
- understand the various types of literary theories.
- introduce theories in the 20th century literature.
- know contemporary literary theories.

UNIT I

Teaching Hours - 15

Structuralism, Post structuralism and Deconstruction

(Barthes, Lacan, Derrida, Foucault)

UNIT II

Teaching Hours - 13

Marxism and Ideological Criticism

UNIT III

Teaching Hours - 13

New Historicism and Cultural Materialism

UNIT IV**Teaching Hours - 12**

Post – colonialism

UNIT V**Teaching Hours - 12**

Feminism

LGBTQ studies.

TEXT BOOKS

- Barry, Peter. *Beginning Theory* (Routledge, London, 2010)
- Selden, Raman. *A Reader's Guide to Contemporary Literary Theory*. (Pearson, Singapore, 2009)

REFERENCE1. Lodge, David and Nigel Wood (ed.). *Modern Criticism and Theory*

(Pearson, Essex, 2008)

2. Waugh, Patricia. *Literary Criticism and Theory*. (Oxford University Press, Oxford, 2008)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	S	S	S	L
CO2	S	S	S	S	L	S	S	M	M	M
CO3	S	S	S	S	S	S	L	L	M	M
CO4	S	S	S	S	S	S	L	L	M	M
CO5	S	S	S	S	S	L	L	S	M	M

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

PAPER -11

AFRICAN AND CANADIAN WRITINGS

SEMESTER – III

CREDITS – 4

CATAGORY – CORE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEN34

OBJECTIVES

- To make the students acquainted with the emerging literatures of the particular countries.
- To know more about the exploited people.
- Open up new avenues for their future research work.

UNIT PLAN

- ❖ Pictorial representation of the pain of the people.
- ❖ Exposure to thoughts of the oppressed.
- ❖ Reaction of the Colonized people.
- ❖ Seeking for recognition.

COURSE OUTCOME – Students will be able to

- explore the pain in the struggles of Africans.
- understand the situation of Women in the Colonies.
- examine the reaction of the Colonizers against the capture is sketched.
- know the plight of Colonial people for the trade of the Capitalist is highlighted.
- show pictorial representation and how colonizers are exploited.

UNIT – I: POETRY (DETAILED STUDY)

Teaching Hours - 15

Okot Bitek	–	My Husband's Tongue is Bitter (selection from Song of Lawino)
J.P.Clark	–	Casualties – Part – II
Gabriel Okara	–	You Laughed and laughed and laughed
Daniel David Moses	–	Inukshuk
Margaret Atwood	–	Journey to the Interior
Sir Charles G.D. Roberts	–	The Solitary Woodsman

UNIT – II: PROSE (DETAILED STUDY)**Teaching Hours - 15**

Brian Chikwava	–	<i>Seventh Street Alchemy</i>
Mary Watson	–	<i>Jungfrau</i>
Uma Parameswaran	–	<i>16th July</i>
Renee Hulan	–	<i>Everybody Likes the Inuit</i>

UNIT – III: DRAMA**Teaching Hours - 10**

Joan Macleod	–	<i>Toronto, Mississippi</i>
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UNIT – IV: FICTION**Teaching Hours – 12**

Margaret Laurence	–	<i>The Stone Angel</i>
L.M. Montgomery	–	<i>Anne of Green Gables</i>
Chinua Achebe	–	<i>Things Fall Apart</i>

UNIT – V: CRITICISM**Teaching Hours - 13**

John Povey	–	The Novels of Chinua Achebe
Northrop Frye	–	“Conclusion to A Literary History of Canada” The Bush Garden: Essays on the Canadian Imagination. Pp.213-252.
Richard Wright	–	Blue Print for Negro Writing

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	L	S	S	S
CO2	M	M	S	S	L	S	S	S	M	S
CO3	S	S	S	S	S	S	S	M	M	M
CO4	S	S	S	S	S	M	M	L	M	L
CO5	S	S	S	S	S	S	S	L	L	M

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

CORE ELECTIVE

PAPER –3

(to choose one out of 3)

A. POPULAR LITERATURE

SEMESTER – III

CREDITS – 3

CATEGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEEN35A

COURSE OBJECTIVE

- To make learners aware of the popular works in literature and what made those works popular.
- To expose the learners to the salient features of literature.
- To enable readers to appreciate the popular works in literature
- To expose the changing trends in English literature.

UNIT PLAN

- ❖ To understand modern literature
- ❖ To emphasize the reading skill
- ❖ Struggles and the progress of Malala
- ❖ The conflict of rootless souls.

COURSE OUTCOME - Students will be able to

- aware of the new features of literature.
- understand the changing trends in English literature.
- appreciate the works in literature from the point of view of the refugees.
- know about popular works in literature and what made those works popular.
- examine different genres in Popular Literature.

UNIT 1

Teaching Hours - 13

Tuesdays with Morie – Mitch Albom
Roadless Travel – M. Scott Peck
The Monk Who Sold His Ferrari – Robin Sharma

UNIT 2

Teaching Hours - 13

An Unexpected Gift – Ajay K. Pandey
I Too Had A Love Story – Ravinder Singh
You are Trending In My Dreams – Sudeep Nagarkar

UNIT 3**Teaching Hours - 13**

Something I Never Told You – Shravya Bhinder
Jonathan Livingston Seagull – Richard Bach
Count Your Chickens Before They Hatch – Arindam Chaudhuri

UNIT 4**Teaching Hours - 13**

I Am Malala – Malala Yousafzai
The Last Girl: My Story of Captivity, and My Fight Against The Islamic State – Nadia Murad
Long Walk to Freedom – Nelson Mandela

UNIT 5**Teaching Hours - 13**

Controversially Yours – Shoaib Akhtar
Always Another Country: A Memoir of Exile and Home – Sisonke Msimang
This Divided Island: Stories from the Sri Lankan War - Samanth Subramanian

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	M
CO2	S	S	S	S	S	M	M	L	S	S
CO3	S	M	M	M	S	S	S	M	M	L
CO4	S	S	S	S	L	M	S	S	S	S
CO5	S	S	S	S	S	M	L	L	L	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

CORE ELECTIVE

PAPER -3

B. CHILDRENS LITERATURE

SEMESTER – III

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEEN35B

OBJECTIVES

- To expose students to apparently simplistic narratives that have become important area of literary/cultural scholarship in recent times.
- To let the students acquire knowledge about children's poetry.

UNIT PLAN

- ❖ To enable students to get a glimpse of worldwide trends in children's prose
- ❖ To let the students aware of the variety of children's fiction
- ❖ To enable the students to understand and appreciate world drama meant for children
- ❖ To enlighten students about the richness of folk tales and wonder of comic strips

COURSE OUTCOME - Students will be able to

- understand the important of nature.
- motivate to visualise a world devoid of fears
- understand the contrast between worlds of childhood and reality
- learn to appreciate how the poet deals with a simple idea in an extraordinary way.
- inspire by the thought and words of true genius
- appreciate the importance of honest work and responsibility

UNIT I – POETRY

Teaching Hours - 15

Lewis Carroll	–	A Strange Wild Song
Robert Louis Stevenson	–	1. The Flowers
		2. Night and Day
Sylvia Plath		1. Balloons
Edward Lear		2. The Owl and the Pussy cat

UNIT II – PROSE

Teaching Hours - 13

Anne Frank	–	<i>The Diary of a Young girl</i>
TetsukoKuroyanagi	–	Totto Chan: <i>The Little Girl at the Window</i> (Translated by Dorothy Britton)
Abdul Kalam	–	<i>Inspiring Thoughts</i>

UNIT III – DRAMA**Teaching Hours - 8**

Vijay Tendulkar
UNIT IV – FICTION

– “*The King and the Queen want Sweet*”
Teaching Hours - 15

Laura Ingalls Wilder	–	<i>Little House on the Prairie</i>
C.S Lewis	–	<i>Chronicles of Narnia- The Lion, Witch and the Wardrobe</i>
Harriet Beecher Stowe	–	<i>Uncle Tom’s Cabin</i>
Markus Zusak	–	<i>The Book Thief</i>
J.R.R Tolkein	–	<i>The Hobbit</i>
Mark Twain	–	<i>The Prince and the Pauper</i>

UNIT V – FOLK LITERATURE, FAIRY TALES AND COMIC STRIPS**Teaching Hours -14**

Perrault’s Fairy Tales	–	1. <i>Cinderella</i> 2. <i>Little Red Riding Hood</i> 3. <i>Hansel and Gretel</i>
L.Frank Baum	–	<i>The Wonderful Wizard of OZ</i>
Jataka Tales	–	1. <i>The Monkey’s Heart</i> 2. <i>The Talkative Tortoise</i> 3. <i>The Mosquito and the Carpenter</i> [Translated by Ellen C.Babbit]
Herge	–	<i>Tintin ; The Secret of the Unicorn</i>
Lee Falk	–	<i>The Story of the Phantom</i>

REFERENCE ITEM: BOOKS

1. *A Child’s Garden of Verses: Selected Poems-* Robert Louis Stevenson, Simon &Schuster Books for young readers
2. *The Diary of a Young Girl-* Anne Frank, Bantam Publishers,1993
3. *The Little Girl At the Window-* Tetsuko Kuroyanagi (Translated by Dorothy Britton), Kodansha Publishers, USA, 2011
4. *Inspiring Thoughts –*Abdul Kalam, Penguin Books, 2017
5. *Little House on the Prairie-* Laura Ingalls Wilder, Penguin Publishers,
6. *Chronicles of Narnia- The Lion, the Witch and the Wardrobe* , U.K Chidlren’s Publishers,2010
7. *Uncle Tom’s Cabin-* Beecher Stowe- Fingerprint Publishing, 2019
8. *The Book Thief –* Markus Zusak, Random House, UK,
9. *The Hobbit-* J.R,R,Tolkein, Harper Collins, 2011
10. *The Complete Jataka Tales*, Translated by Edward Byles Cowell, Jazzybee Verlag Publishers, 2016
11. *Tintin: The Secret of the Unicorn-* Herge, Egmont Publishers, 2011
12. *Phantom Series-* Lee Falk, Harper Collins, 1973

E-MATERIALS:

1. <https://www.poemhunter.com>
2. <https://www.lieder.net>
3. <https://www.genius.com>
4. <https://www.poetryfoundation.org>

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	S
CO2	M	M	M	L	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	M	M
CO4	S	S	S	M	M	L	S	S	S	S
CO5	S	S	S	S	S	S	M	M	M	L

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

CORE ELECTIVE

PAPER -3

C. PREPARATORY EXAM FOR NET/ SET/TRB – PAPER-II

SEMESTER – III

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DEEN35C

OBJECTIVE

- To enable students to face NET/SET and PG-TRB examinations.
- To help the students gain knowledge and assist them in gaining knowledge of the major and minor writers of every age.
- To teach the various literary terms that are employed in various genres of literary works.
- To inform the students of the various schools of poetry and literary movements.

UNIT PLAN

- ❖ Concentration on Periodical writings.
- ❖ American literature and New literature writings will be given an outlook
- ❖ Criticism to Contemporary theory will be focused

COURSE OUTCOME - Students will be able to

- learn about the importance of the Chaucer to the Shakespearean age.
- appreciate the important features of the Romantic and the Victorian period.
- acquaint the knowledge over the Modern and Contemporary Period.
- introduce the American Literature and develop the knowledge in the field of translation studies too.
- explore the various forms of Criticism and the contemporary Theories.

UNIT I

Teaching Hours - 13

Chaucer to Shakespeare

Jacobean to Restoration

UNIT II

Teaching Hours - 13

Romantic Period

Victorian Period

UNIT III**Teaching Hours - 13**

Modern Period

Contemporary Period

UNIT IV**Teaching Hours - 15**

American Literature

New Literature in English (Indian, Canadian, African, Australian)

English Language Teaching

Translation Studies

UNIT V**Teaching Hours -11**

Classicism to New Criticism

Contemporary Theory

REFERENCE

- D. Benet E., and Samuel Rufus. *NET. SET..GO....English*. N.p.,2014.
- Masih, K. Ivan. Et.al. *An Objective Approach to English Literature: For NET. SET.JRF.SLET AND Pre-Ph.D*
- *Registration Test*. New Delhi . Atlantic Publishers, 2007.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	S	S	S	S	M	S	L
CO3	S	S	S	S	S	M	M	M	S	S
CO4	M	M	S	S	S	S	S	S	S	L
CO5	S	S	S	S	S	S	S	SL	L	M

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

OPEN ELECTIVE

PAPER -3

(to choose one out of 3)

A. SOFT SKILLS

SEMESTER – III

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DOEN36A

OBJECTIVE

- To enhance the language skill of the learner
- To provide LSRW skills.
- To build the Fluency of the learner.

UNIT PLAN

- ❖ The capability of fluency in students is analyzed.
- ❖ Emphasis on LSRW skills.
- ❖ Role of Public speaking and telephonic conversation.
- ❖ Highlighting Business presentation.

COURSE OUTCOME - Students will be able to

- recap the language skills, Grammar, Vocabulary, Phrase, Clause and sentences.
- build his fluency gradually.
- acquaint with LSRW skills and can also develop his Non- Verbal Communication.
- introduce how to teach LSRW methods.
- learn about the importance of Business Etiquette.

UNIT – I

Teaching Hours - 13

Recap of language skills – Speech, Grammar, Vocabulary, Phrase, Clause, Sentence.

UNIT – II

Teaching Hours - 13

Fluency building

What is fluency- Why is fluency important – Types of Fluency – Oral fluency – Reading fluency – Writing fluency – Barriers of Fluency – How to develop Fluency.

UNIT- III**Teaching Hours - 15**

Principles of Communication: LSRW in communication.

What is meant by LSRW skills – Why it is important – How is it useful – How to develop the skills?

Oral – Speaking words, articulation, speaking clearly.

Written communication – Generating ideas/ gathering data organising ideas, Setting goals, Note taking, Outlining, Drafting, Revising, Editing and Proof reading.

Non-Verbal Communication – Body Language, Signs and symbols, Territory/ Zone, Object language

UNIT – IV**Teaching Hours - 12**

Etiquettes for Public Speaking (extempore and lectures), Interviews and Group Discussions, Telephone conversations and Business Meetings.

UNIT – V**Teaching Hours - 12**

Etiquettes for Business presentations – Team presentations and Individual presentation.

REFERENCE

1. Powell. *In Company*.
2. MacMillan. Cotton, et al. *Market Leader*.
3. Longman. Pease, Allan. 1998. *Body Language*:
4. *How to Read Others Thoughts by their Gestures*. Suda Publications. New Delhi.
5. Gardner, Howard. 1993. *Multiple Intelligences: The Theory in Practice*: A Reader Basic Book. New York.
6. De Bono, Edward. 2000. *Six Thinking Hats*. 2nd Edition. Penguin Books.
7. De Bono, Edward. 1993. *Serious Creativity*. Re print. Harper Business.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	M
CO2	S	S	S	S	S	S	S	S	S	L
CO3	S	S	S	S	S	S	S	S	S	M
CO4	S	S	S	S	M	M	L	S	S	S
CO5	S	S	S	S	S	S	L	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

OPEN ELECTIVE

PAPER -3

B. THEORISING SEXUALITIES

SEMESTER – III

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DOEN36B

OBJECTIVES

- To demonstrate an awareness of biological, social, and grammatical gender as being three different categories.
- To give a basic awareness of struggles and attainment of people with alternative sexualities in civil rights in various parts of the world
- To help the students view with skepticism the simplistic conflation of biological sex with socially and culturally conditioned gender

UNIT PLAN

- ❖ Defining the types of genders.
- ❖ The poetic mysticism of the female.
- ❖ The grace of feminism from the modern writers.
- ❖ Contribution of women writers on uplifting women.

COURSE OUTCOMES – Students will be able to

- appreciate, if not accept the viewing of gender as a continuum
- critically analyze different gender self-identification preferences such as transgender and inter-genders rather than seeing the polar genders male and female as the only 'natural' ones
- show sensitivity to the legal and social persecution faced by persons belonging to the LGBTQ or simply, Queer, community in societies across the world and view their rights as human rights
- exercise an enhanced openness and honesty when encountering/ generating discourse on matters of sexuality and gender roles
- understand the genres of theorizing sexualities in different literature.

UNIT I: INTRODUCING SEXUALITY

Teaching Hours - 15

Sexological types: Sexual classifications, sexual development, sexual orientation, gender identity, sexual relationship, sexual activities, paraphilias, atypical sexual interests

Psychoanalytic drives: Freud and Lacan.

Bristow, Joseph, Introduction, *Sexuality: The New Critical Idiom Series*. 1997. 2nd ed.

London: Routledge, 2011.1-11, Print.

Butler, Judith. *Introduction, Bodies That Matter: On the discursive Limits of "Sex."*

London: Routledge, 1993.xi –xx

UNIT II – POETRY

Teaching Hours - 15

The songs of songs – the sufi and Bhakthi Tradition – the concepts of adhavbhaav

Shakespeare : Sonnet 73 That time of the year

Emily Dickinson : Her breast is fit for pearls

Adrienne Rich : Diving into the deck

Walt Whitman : The wounded Dresser

Siegfried Sassoon : The Last Meeting

UNIT III – PROSE

Teaching Hours - 14

Manoj Nair : Rite of Passage

Chimamanda N. Adichie : On Monday of Last Week

Mukul Kesavan : Nowhere to Call Home

Shyam Selvadurai : Cinnamon Gardens

Ismat Chughtai : The Quilt

UNIT IV DRAMA

Teaching Hours -12

Edward Albee : *Who is Afraid of Virginia Woolf*

Amiri Baraka : *Most Dangerous man in America*

UNIT V FICTION

Teaching Hours - 9

Moses Tulasi : *Walking the Walk*

REFERENCE

1. De lauretis, Teresa, *Technologies of gender: esaay on theory, Film and Fiction*, Bloomington: Indiana Up, 1987. Print
2. Dollinmore, Jonathan, *Sexual Dissidence:Augustine to Wilde, Frued to Foucalt*, Oxford Clarendon, 1991. Print.
3. Foucault, Micheal. *A History of Sexuality, 3vols*. Trans. Robert Hurley. New York: Vintage, 1978. Print.
4. Kapoor, Shekar, dir. *Bandit Queen*. Perf. Seema Biswas, Nirmal Pandey, Rakesh Vivek.
5. 1004. DVD. Film.
6. Mehta, Deepa, dir. *Fire*. Perf. Shabana Azmi, Nandita Das, Karishma Jhalani. 1996.DVD. Film.
7. Meht, Hansal, dir.Aligarh.Script. *Apurva* Asrani. Pref.Manoj Bajpayee and Rajkummar Rao.2016. DVD.
8. Nair, Manoj. "Rite of Passage." *Yaraana: Gay Writing from India*. Ed. Hoshang Merchant. New Delhi: Penguin, 1999.171-79. Print.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	M	L
CO3	S	S	S	S	S	S	M	S	S	M
CO4	S	S	S	S	S	S	M	M	M	L
CO5	M	M	M	S	S	S	S	S	L	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

OPEN ELECTIVE

PAPER -3

C. PREPARATORY EXAM FOR NET/ SET/TRB – PAPER-I

SEMESTER – III

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 5

TOTAL HOURS – 65

COURSE CODE: DOEN36C

OBJECTIVE

- To enable students to face NET/SET and PG-TRB examinations.
- To help the students gain knowledge and assist them in gaining knowledge of the Logic and Reasoning Ability.
- To teach the students about Data interpretation.
- To inform the students of the various aspects of Information and Communication Technology.

UNIT PLAN

- ❖ Identification of reasoning
- ❖ Deduction of logical Coherence
- ❖ Mathematical reasonings are developed.
- ❖ Error analysis are concentrated.

COURSE OUTCOME – Students will be able to

- know about the Teaching and Research Aptitude.
- attempt the Comprehension passages and understand the Communication patterns.
- introduce to Mathematical Reasoning, Logical Reasoning and General aptitude.
- interpret the data and learn the various aspects of Information and Communication Technology.
- understand the higher education system and eligibility examinations.

UNIT- I

Teaching Hours - 13

Teaching Aptitude
Research Aptitude

UNIT- II**Teaching Hours - 13**

Comprehension

Communication

UNIT- III**Teaching Hours - 13**

Mathematical Reasoning and Aptitude

Logical Reasoning

UNIT- IV**Teaching Hours - 13**

Data Interpretation

Information and Communication Technology.

UNIT- V**Teaching Hours - 13**

People, Development, and Environment

Higher Education System.

REFERENCE

1. Kaur, Harpeet- *NTA UGC NET/SET/JRF – Paper 1 Teaching and Research Aptitude*, Oxford Publishers. 2019.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	L
CO2	S	S	S	S	S	S	M	M	M	L
CO3	S	S	S	S	S	M	M	S	S	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

SEMESTER IV

PAPER - 12

WORLD LITERATURE IN TRANSLATION.

SEMESTER – IV

CREDITS – 5

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS – 78

COURSE CODE:DEN41

OBJECTIVES

- Translation theory helps the students to learn it as an interdisciplinary study and to borrow from the various fields of study that supports translation
- It helps the students to learn the theory of description and application of translation to interpret and localize.
- It disseminates literatures around the world

UNIT PLAN

- ❖ Making the students to enjoying Classical Literature.
- ❖ Inducing the habit of reading Khalil Gibran.
- ❖ An Introduction to the concept of Oedipus complex
- ❖ The outlook of short stories in translated works

OUTCOME – Students will be able to

- help the students to work in various fields of translation studies, comparative literature and world literature.
- know the importance of Classical literature.
- understand the classical world literature.
- challenge the hegemony of English in world literature
- make the students to learn the political values and emphasis on global processes over national traditions.

UNIT I – POETRY

Teaching Hours - 14

Virgil : *The Aeneid*, Book IV (438-563)

UNIT II – PROSE

Teaching Hours - 16

Khalil Gibran : *The Prophet* (prose – poetry essays)

Viktor Schklovsky : *Art as a Technique*

Goethe : *Shakuntala*

UNIT III – DRAMA**Teaching Hours - 16**

Sophocles : *Oedipus Rex*
 Goethe : *Faust – Part I*

UNIT IV – SHORT STORIES**Teaching Hours - 16**

Charles Perrault : Blue Beard
 Juan Manuel : The Man who Tamed a Shrew
 Giovanni Baccaccio : The Stone of Invisibility
 Eliza Oreszkowa : Do You Remember?
 Emile Verhaeren : The Horse Fair at Opdrop
 Louis Couperus : About Myself and Others
 Hans Christian Anderson : What the Old Man does I always Right
 Jonas Lie : The Story of a Chicken

UNIT V – FICTION**Teaching Hours - 16**

Fyodor Dostoevsky : *Crime and Punishment*
 Albert Camus : *The Outsider*

REFERENCE

1. Virgil, *The Aeneid*, [Net source} The Internet Classics Archive: Classic. Merit.edu./Virgil/Aeneid.html, 2015.
2. Kahlil Gibran, *The Prophet*, Rupa, 2002.
3. Viktor Schklovsky, *Art as Technique*, [Net source]: paradise. caltech. edu / ist4lectures / Viktor_Sklovsky. “Art_as_Technique”:.pdf, 2015.
4. Sophocles, *Oedipus Rex*, Dover Publications; Unabridged edition, 2012.
5. Goethe, *I Faust – part*, RHUS Publications, 1988.
6. Gealdine McCaughrean, *Classic Stories Around the World*, Leopard Books, 1996.
7. Fyodor Dostoevsky, *Crime and Punishment*, Penguin, 2003.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	M	M
CO3	S	S	S	S	S	S	S	S	M	M
CO4	S	S	S	S	S	M	M	M	L	S
CO5	S	S	S	S	M	M	M	M	L	S

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

PAPER – 13

SHAKESPEARE STUDIES

SEMESTER – IV

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS – 78

COURSE CODE: DEN42

COURSE OBJECTIVES

- To know about the English folklore and Shakespeare's use of illusions in the form of fairies.
- To know about the use of catharsis in tragedy through the character of Hamlet.
- To enable students to learn about the history of Henry IV presented in the art form of drama.
- To enable students learn about political intrigue, power struggles, war and the plight of impassioned lovers.
- To make students learn about the varieties of interpretations on the works of Shakespeare and encourage them to critically appreciate his work.

UNIT PLAN

- ❖ Marriage, themes, Hippolyta, Egeus, Lysander, chastity, comic fantasy, four lovers, bewitched, fairies, love, jealousy.
- ❖ Tragedy, Oedipus complex, revenge, ghost, avenging father's death.
- ❖ Dramatic battle, father, son, strained relationship, rebellion.
- ❖ East West clash, honor, reason versus emotion, power struggle.
- ❖ Interpretation, critical analysis, critical theory applied on Shakespeare's work, structuralism, Marxism, feminism.

COURSE OUTCOME - Students will be able to

- learn how Shakespearean comedy is interwoven with obstacles, misunderstanding, jealousy, disguise which ultimately leads to fictional nature of the characters in the play.
- understand how Shakespeare has used revenge tragedy extensively to make the audience learn and correct themselves through Aristotle's principle of catharsis.
- examine the genre of Historical plays of Shakespeare. Shakespeare's inspiration from chronicles of Holinshed to draw plots for his Historical plays is vividly presented in such a way that it will make even commoners learn about their king's history.
- expose the struggle between reason and emotion, the clash of east and west and the very definition of honor, while all the way they are exposed to political intrigue, power struggle and struggle between the lovers.
- know about the detailed character sketch of Shakespearean plays.

UNIT I

Teaching Hours - 18

Sonnets

Sonnets – 12,65,86,130 (**Detail**)

Comedies

Much Ado About Nothing Winter's Tale

UNIT II			Teaching Hours - 14
Tragedy	<i>Othello (Detail)</i>		
UNIT III			Teaching Hours - 14
Roman	<i>Coriolanus (Detail)</i>		
UNIT IV			Teaching Hours -14
History	<i>Henry IV Part I (Detail)</i>		
UNIT V			Teaching Hours -18
SHAKESPEARE CRITICISM			

Modern approaches – mythical, archetypal, feminist, post – colonial, New Historicist;

A.C. Bradley (extract) Chapter V&VI and the New Introduction by John Russell Brown in **Shakespearean Tragedy** by A.C. Bradley, London, Macmillan, Third Edition, 1992

Wilson Knight Macbeth and the Metaphysic of Evil (1976, V.S. Seturaman & S. Ramaswamy **English Critical Traditon Vol. I.** Chennai, Macmilla).

Stephen Greenblatt Invisible Bullets: Renaissance Authority and its Subversion, Henry IV & Henry V, in **Shakespearean Negotiations.** New York: Oxford University Press, 1988

Also in **Political Shakespeare: New Essays in Cultural Materialism.** Eds. Jonathan Dollimore and Alan Sinfield Manchester University Press, 1994

Ania Loomba Sexuality and Racial Difference in **Gender, Race, And Renaissance Drama,** Manchester UP, 1989.

REFERENCE

1. Stephen Greenblatt, ed., 1997. **The Norton Shakespeare**, (Romance & Poems, Tragedies, Comedies), W.W. Norton & Co., London.
2. Bradley, A.C., 1904, **Shakespearean Tragedy**, Macmillan, London.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	M
CO2	M	M	S	S	S	S	S	S	S	L
CO3	S	S	S	S	S	S	S	S	S	L
CO4	L	M	M	M	S	S	S	S	S	S
CO5	S	S	S	S	M	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

PAPER – 14

SINGLE AUTHOR STUDY

SEMESTER – IV

CREDITS – 4

CATEGORY – CORE

NO.OF. HOURS\WEEK – 6

TOTAL HOURS – 78

COURSE CODE: DEN43

OBJECTIVE

- To make the students learn the various forms of genre of a single author
- To make the students explore the works of Rabindranath Tagore.

UNIT PLAN

- ❖ The poetic outburst of Tagore
- ❖ Tagore's foreseeing in his works.
- ❖ Global views of Tagore's Modernity in his writings.
- ❖ The sound exposure and experience of the Tagore's dramatic views.
- ❖ The style of Tagore's writings in his novels

COURSE OUTCOME students will be able to

- expose to the poetry, drama essay and short stories of Tagore
- examine the essays of Tagore
- Experience the rich themes and characterization in the plays of Tagore.
- Explore the writing style of Tagore in the Short stories.
- understand the style of Tagore in his Novels.

UNIT I – POETRY

Teaching Hours - 18

Gitanjali – Song Offerings 1996
The Broken Heart

UNIT II ESSAY (NON-DETAIL)

Teaching Hours - 14

Literature
Five Elements
Ancient Literature
Modern Literature
Literature of the People
Tribute to Great Lives

UNIT III DRAMA (DETAILED)**Teaching Hours - 14**

Sacrifice
The Untouchable Woman (Non-Detail)
Raja O Rani
Malini
Muktadhara (1992)

UNIT IV - SHORT STORY (NON DEATILED)**Teaching Hours - 14**

My Lord, the Baby
Kahini
The Post Master
Kabuliwallah
Subha
The Babus of Nayanjore

UNIT V NOVEL (NON-DETAIL)**Teaching Hours - 18**

The Wreck
The Bachelor's Club
Gora

REFERENCE

1. Chatterji, David. *World literature and Tagore*: Visva Bharati, Ravindra- Bharati. Santiniketan: Visva Bharati, 1971.
2. Kripalani, Krishna. *Rabindranath Tagore: A Biography* London: Oxford University Press, 1962.
3. Tagore, Rabindranath. *Selected writings on literature and Language*. Ed. Sisir Kumar Das and Sukanta Chaudhuri. (2001). New Delhi: Oxford University Press. 2010.
4. Chaudhuri, Sutapa. *Reading Rabindranath: The Myriad Shades of Genius*.
5. Dalta, Rama: Seely, Clinton (2009). *Celebrating Tagore: A collection of Essays*. Allied Publishers. ISBN 9788184244243.
6. Dutta, Krishna: Robinson, Andrew (1997). *Rabindranath Tagore: An Anthology of his learning* contribution to South Asian studies.
7. The Roy, Kshitis, *Rabindranath Tagore: A life story Publications Divison Ministry of Information & Broadcasting*, 2017.
8. *The Complete works of Rabindranath Tagore* (All short stories, poetry, Novels, Plays & Essays) Edit. General Press- 18 Oct 2019

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	M	S	S
CO2	M	M	S	S	S	S	S	S	L	L
CO3	S	S	S	S	S	S	S	S	L	L
CO4	S	S	S	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

CORE ELECTIVE

PAPER - 4

(to choose one out of 3)

A. POST COLONIAL STUDIES

SEMESTER – IV

CREDITS – 3

CATEGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 4

TOTAL HOURS – 52

COURSE CODE: DEEN44A

OBJECTIVES OF THE COURSE

- To introduce the students to some key theoretical formulations in the field
- To help develop an awareness of issues – social, political, cultural and economic – relating to the experience of colonial and after
- To encourage dialogue on conditions of marginality and plurality and to question metanarratives

UNIT PLAN

- General Introduction and Critical terms
- Deduction of opposition to the Colonizer's approach
- Poetical anecdote post colonial thoughts.
- To give the vast experiences of the marginalized through drama.

COURSE OUTCOMES students will be able to

- Analyze texts using key concepts and theories in the field
- Interrogate dominant discourse in texts influenced by colonial ideologies
- Appreciate texts emerging from postcolonial nations
- Engage with the interplay of issues of race, colour, caste and gender in a neo – colonial world
- Challenge social inequalities existing in colonized regions and communities in the age of post colonialist.

UNIT 1 – ESSAYS

Teaching Hours - 10

Edward Said Introduction (from *Orientalism*)

Robert J.C. Young Post – colonialism (from *Post - colonialism: An Historical Introduction*)

Ania Loomba Defining the Terms: Colonialism, Imperialism, Neo-Colonialism, Post-colonialism (from Chapter 1 “*Colonialism/Post – colonialism*”)

UNIT 2 –PROSE**Teaching Hours - 10**

Nadine Gordimer *The Train from Rhodesia* (from *The Harper Anthology of Fiction*)

John Kelly *We are All in the Ojibway Circle* (*The Faber Book of Contemporary Canadian Short Stories*)

Witi Ihimaera *The Whale* (from *The Harper Anthology of Fiction*)

UNIT 3 – POETRY**Teaching Hours - 10**

Lisa Bellear : Women's Liberation

Judith Wright : At Cooloola

Derek Walcott : Ruins of a Great House

Garbriel Okara : Piano and Drums

UNIT 4 – DRAMA**Teaching Hours - 11**

Wole Soyinka : *Death and the King's Horseman*

Louis Nowra : Radiance

UNIT 5 – FICTION**Teaching Hours - 11**

Jhumpa Lahiri : Unaccustomed Earth (from *Unaccustomed Earth*)

Chimamanda N. Adichie : *Americannah*

BOOKS FOR REFERENCE

1. Ashcroft, Bill. *On Post-Colonial Futures: Transformations of Colonial Culture*. Continuum, 2001.
2. Ashcroft, Bill, et al. *Post-colonial Studies: The Key Concepts*. 2nd ed., Routledge, 2007.
3. Barker, Francis. Et al. editor. *Colonial Discourse/Postcolonial Theory*. Manchester UP, 1994.
4. Bayard, Caroline. *The New Poetics in Canadian and Quebec: From Concretism to Post-Modernism*. University of Toronto Press, 1989.
5. Bennett, Bruce, editor. *A Sense of Exile*. Centre for Studies in Australian Literature, 1988.
6. Chew, Shirley, and David Richards, editors. *A Concise Companion to Postcolonial Literature*. Wiley Blackwell, 2010.
7. Irvine, Lorna L. Sub/version: *Canadian Fiction by Women*. ECW Press, 1986.
8. Jahabegloo, Raman. *Indian Revised: Conversations on Continuity and Change*. Oxford UP, 2008.
9. Juneja, Om Prakash. *Post Colonial Novel: Narratives OF Colonial Consciousness, Creation*, 1995.

10. King, Bruce. *New National and Post-Colonial Literatures: An Introduction*. Clarendon Press, 1996.
11. Kudchedkar, Shirin and Jameela Begam, editors. *Canadian Voices*, Pencraft, 1996.
12. Lazarus, Neil, editor. *The Cambridge Companion to Postcolonial Literary Studies*. Cambridge UP, 2004.
13. Nkosi, Lewis. *Tasks and Masks: Themes and Styles of African Literature*. Longman, 1981.
14. Pandey, Sudhakar. *Perspectives on Canadian Fiction*. Prestige Books, 1994.
15. Schwarz, Henry and Sangeeta Ray. *A Companion to Postcolonial Studies*. Blackwell, 2000.
16. Soyinka, Wole. *Art, Dialogue and Outrage: Essays on Literature and Culture*. Methuen, 1993.
17. Tanti, Melissa et al., editors. *Beyond "Understanding Canada": Transnational Perspectives on Canadian Literature*. U of Alberta Press, 2017.
18. Walder, Dennis. *Post-Colonial Literatures in English: History, Language and Theory*. Blackwell, 1998.
19. Blackwell, 1998.
20. young, Robert J.C. *Post - colonialism: An Historical Introduction*. Blackwell, 2001.

JOURNALS

1. *ARIEL: A Review of International English Literature*
2. *Journal of Commonwealth Literature*
3. *Postcolonial Studies*
4. *Wasafiri*

WEB RESOURCES

1. http://www.mohamedrabee.com/books/book1_3985.pdf
2. <http://www.udel.edu/ArtHistory/ARTH435/Ashcroft.pdf>
3. [http://faculty.ksu.edu.sa/Nugali/English%20461/Post - colonialism.pdf](http://faculty.ksu.edu.sa/Nugali/English%20461/Post-colonialism.pdf)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	M	M	S
CO2	S	S	S	S	M	M	M	L	S	S
CO3	S	S	S	S	S	S	S	S	M	L
CO4	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	L	L	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

CORE ELECTIVE

PAPER - 4

B. GENDER STUDIES

SEMESTER – IV

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 4

TOTAL HOURS – 52

COURSE CODE: DEEN44B

OBJECTIVES

- To make students familiarize themselves with different waves of feminism, demonstrate logical reasoning regarding the perception of the female sex by the male. Beginning of the second wave of feminism.
- A lecture which emphasizes the need for a woman to own a room and money to be able to write. Brings an understanding of women's plight in the male dominated society.
- Women's struggle to succeed amidst the stereotypes, especially that of Virginia Woolf whilst suffering from man's dominance.
- A rewriting of mythological stories. Revisiting myth and presenting them through the feminist eyes.
- A symbolic representation of women trapped in a male body to portray the real.
- Oppression of women at the hands of men through a transgender

UNIT PLAN

- ❖ Second wave feminism, treatment of women through history.
- ❖ Money and room as initial needs for women's success
- ❖ Revisit myth, *Draupadi* standing against men.
- ❖ Rewriting myth, *Mahabharata*, Divakaruni's voice of *Panchali*.
- ❖ Struggle of transgender, representing women in the grasp of men.

COURSE OUTCOME students will be able to

- Learn as to how the second wave of feminism kick- started its course with the publication of *The Second sex*. Women's struggle throughout history is brought out.
- Distinguish between feminism and womenism. Womenism as a separate entity to bring out the double suppression of black women in the hands of white and black men.
- know the plight of women who are physically harassed to keep them under the control of men. However they are revisited in recorded history to stand against men, despite their physical indifference,
- understand the importance and the role of myth in the control of women throughout history while also learning a need to rewrite the changes in the myth via *Panchali* from *The Mahabharatam*
- explore the struggles of transgender so as to face problems from within and also from the society to find their own identity, an identity crisis marred constantly due to the bias in society towards the classification of sex.

UNIT 1**Teaching Hours - 10**

Simone de Beauvoir *Introduction: The Second Sex*
 Virginia Woolf *A Room of One's Own* (Chapter I & VI)
 Elaine Showalter extract from *Woolf and the Flight into Androgyny*

UNIT 2**Teaching Hours - 10**

David S Gutterman "Postmodernism and the Interrogation of Masculinity" (From *Theorizing Masculinities* ed. Michael Kaufman, Harry Brod)
 Bell hooks *Black Women: Shaping Feminist Theory*
 Judith Butler *Interiority to Gender Performatives* (from *Gender Trouble*)

UNIT 3**Teaching Hours - 10**

Mahasweta Devi : *Draupadi* (Short Story)
 Maya Angelou : *Still I Rise* Our Grandmothers
 Adrienne Rich : *When We Dead Awaken: Writing as Revision*

UNIT 4**Teaching Hours - 11**

Chitra Bannerjee Divakaruni : *The Palace of Illusions*
 Laura Esquivel : *Malinche*

UNIT 5**Teaching Hours - 11**

Manobi Bandyopadhyay : *A Gift of Goddess Lakshmi* (trans. Jhimli Mukerjee Pandey & Manobi Bandhopadhyay)
 Alice Walker : *In Search of Mother's Garden*

BOOKS FOR REFERENCE

1. Gilbert, Sandra & Susan Gubar. *Madwoman in the Attic: The Woman Writer and the Nineteenth-Century Literary Imagination*. Yale Nota Bene, 2000.
2. James, Joy and T Denean Sharpley-Whiting. Eds. *The Black Feminist Reader*. Blackwell, 2000.
3. Rahman, Momin and Stevi Jackson. *Gender and Sexuality: Sociological Approaches*. Polity Press. 2010.
4. Rooney, Ellen. Ed. *The Cambridge Companion to Feminist Literary Theory*. Cambridge UP, 2008.
5. Schneir, Miriam. Ed. *The Vintage Book of Feminism: The Essential Writings of the Contemporary Women's Movement*. Vintage, 1995.
6. Tharu, Susie & K Lalitha. *Women Writing in India*. Oxford UP, 1991

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	S	S	S
CO2	M	M	L	S	S	S	S	S	M	M
CO3	S	S	S	S	S	S	S	S	M	M
CO4	M	M	M	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	L	L	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

CORE ELECTIVE

PAPER - 4

C. ENGLISH LANGUAGE TEACHING – THEORY AND PRACTICE

SEMESTER – IV

CREDITS – 3

CATAGORY – CORE ELECTIVE

NO.OF. HOURS\WEEK – 4

TOTAL HOURS – 52

COURSE CODE: DEEN44C

OBJECTIVES

- To acquaint students with the history of the English Language
- To help students learn the essential aspects of ELT and the different types of language testing and evaluation

UNIT PLAN

- ❖ The role of Translation method and Audio-lingual methods
- ❖ Importance of teaching methods.
- ❖ To exercise Language learning theories.
- ❖ To inculcate testing and evaluation.
- ❖ Role of education in technology.

COURSE OUTCOME students will be able to

- introduce how to teach the English Language Teaching across India.
- know to several teaching Methods.
- Expose to different language teaching theories.
- apply language testing and Evaluation.
- Use Teaching learning aids for effective class

UNIT I - ENGLISH LANGUAGE TEACHING IN INDIA

Teaching Hours - 11

Grammar Translation Method

Reform Movement

Direct Method

20th Century Trends (Situational methods)

Audio-Lingual Method

Communicative Approach

UNIT II OTHER TEACHING METHODS**Teaching Hours - 11**

Total Physical Response

The Silent Way

Suggestopedia

Community Language Learning

Community Language Teaching

Natural Approach

UNIT III LANGUAGE LEARNING THEORIES**Teaching Hours - 10**

Behaviorism

Cognitive Approach

Natural Approach and their Educational Implications

Principles of Syllabus Construction

Structural Syllabus, Situational Syllabus, Notional Syllabus

UNIT IV LANGUAGE TESTING AND EVALUATION**Teaching Hours - 10**

Kinds of Tests, Aptitude, Proficiency, Achievement

Different Types of Multiple Choice – Questions

Evaluation

- a) Formative
- b) Summative
- c) Norm-based
- d) Criterion- based

UNIT V USE OF TEACHING AIDS INCLUDING EDUCATIONAL TECHNOLOGY**Teaching Hours - 10**

Language Laboratory

Audio-Visual

Aids

OHP-Black Board

Map and Charts

Computer etc.

REFERENCE

1. Jack C. Richards & Theodore S. Rodgers. *Approaches and Methods in Language Teaching*
2. Harria David. P *Testing English as Second Language*
3. Howatt. A. P. R. *A History of English Language Teaching*
4. Nunan. D. *Syllabus Design*
5. Wilkins, D. A. *Notional Syllabus*
6. Little word, W.T. *Communicative Language Teaching*

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	S	S	M	L
CO2	L	M	M	M	S	S	S	S	S	S
CO3	S	S	S	S	M	M	M	M	S	S
CO4	S	S	S	S	S	M	M	M	S	S
CO5	S	S		S	S	S	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

OPEN ELECTIVE

PAPER - 4

(to choose one out of 3)

A. FILM STUDIES

SEMESTER – IV

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS -39

COURSE CODE: DOEN45A

OBJECTIVES

- To introduce students to the evolution of films and to significant movements in cinema.
- To help students analyze films as an art form, using film language, editing, camera angles and movements as well as the sound in cinema.

UNIT PLAN

- ❖ To enable students to study various forms of representation in films.
- ❖ To enable students to analyze the relationship between literature and films through adaptations
- ❖ To enhance the students understanding of representation in cinema through the prescribed texts

COURSE LEARNING OUTCOMES students will be able to

- trace the evolution of cinema and major film movements critically.
- Analyze cinema from various perspectives.
- identify various technical aspects of cinema.
- Appreciate and develop an academic discourse on cinema.
- Analyze the relationship between films and literature through adaptations

UNIT 1 EVOLUTION OF FILMS

Teaching Hours - 8

Evolution of films from still to moving pictures

Evolution of films from black and white to colour

Evolution of films from silent movies to talkies Texts to be discussed: Lumière Brothers *The Arrival of a Train* George Melies *A Trip to the Moon* Edwin Porter *The Great Train Robbery* (1903) Dadasaheb Phalke *Growth of a Pea Plant*

UNIT 2 HOW TO READ A FILM

Teaching Hours - 8

Film Language – aspect ratio, mis-en-scène, montage, etc.

Editing – montage, jump cut, cross cut, fade, dissolve, iris in/out, etc.

Cinematography-camera movements and angles

Sound-diegetic and non-diegetic sound

UNIT 3 GLOBAL CINEMATIC MOVEMENTS

Teaching Hours - 8

Italian Neo-realism -Vittorio De Sica *Ladri di Biciclette*

French New Wave -François Truffaut *Les quatre cents coups*

Iranian New Wave- Jafar Panahi *Offside*

Indian Parallel Cinema- Satyajit Ray *Pather Panchali*

UNIT 4 REPRESENTATION IN INDIAN CINEMA

Teaching Hours - 8

Tom Emme *Our Mexican Aparatha*

Mari Selvaraj *Pariyerum Perumal*

Karan Johar *Ajeb Dastaan Hai Ye* from Bombay Talkies
Zoya Akhtar *Sheila Ki Jawaani* from Bombay Talkies

Alankrita Shrivastava *Lipstick Under My Burkha*

UNIT 5 ADAPTATIONS

Teaching Hours - 7

Vishal Bharadwaj *Maqbool*

Danny DeVito *Matilda*

REFERENCE

1. Abrahams, Nathan, et al. *Studying Film*. Arnold: Hodder Headline Group, 2001.
2. Aitken, Ian. *European Film Theory and Cinema: A Critical Introduction*. Edinburgh University Press, 2001.
3. Andrew, Dudley. *Concepts in Film Theory*. Oxford University Press, 1984.
4. Bazin, Andre. *What is Cinema? Vol. I*. University of California Press, 2005.
5. Bhaskar, Ira. 09 Apr 2013,
6. *The Indian New Wave*. Routledge Handbook of Indian Cinemas. edited by K. Moti Gokulsing and Wimal Dissanayake. Routledge, 2019. pp.19-34
7. Buckland, Warren, editor. *Film Theory and Contemporary Hollywood Movies*. Routledge, 2009.
8. Butler, Andrew. *Film Studies*. Pocket Essentials, 2005.
9. Dixon, Wheeler Winston and Foster, Gwendolyn. *A Short History of Film*. Rutgers University Press, 2018.

10. Elsaesser, Thomas, and Malte Hagener. *Film Theory: An Introduction Through the Senses*. Routledge, 2010.
11. Hutcheon, Linda. *In Defence of Literary Adaptation as Cultural Production*. *Media Culture Journal*, Vol. 10, no. 2, May 2007.
12. <http://journal.media-culture.org.au/0705/01-hutcheon.php>Kuhn.
13. Annette, Guy Westwell. *A Dictionary of Film Studies*. OUP, 2012.
14. Monaco, James. *How to Read a Film: The World of Movies, Media, and Multimedia: and Language, History, Theory*. Oxford University Press, 2000.
15. Nichols, Bill. *Movies and Methods*. University of California Press, 1976.
16. Nichols, Bill. *Engaging Cinema: An Introduction to Film Studies*. W. W. Norton and Company, 2010

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	S	S	S
CO2	S	S	S	M	M	L	S	S	S	S
CO3	S	M	M	M	M	S	S	S	S	L
CO4	S	S	S	S	S	S	S	S	M	M
CO5	S	S	S	S	S	M	M	M	M	L

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

OPEN ELECTIVE

PAPER - 4

B. ENGLISH FOR MEDIA

SEMESTER – IV

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS -39

COURSE CODE: DOEN45B

OBJECTIVES

- Introduction to Mass Media
- Mass media is a form of communication that reaches a large people in a short time. For e.g.: TV, Newspaper, Radio and so on to communicate to the people. It very easy to reach all the people.
- Types of news analysis: News analysis may be for sentiment or business motive. It may be spoke or in the written form.
- Reviews: To design articles, advertisement, business, column, letters and novels.
- Report in the media English about the crime, election, sports and news. It can be in different font and style.
- Writing and learning – writing the news in English and editing it, it can be easily communicated to the public.

UNIT PLAN

- ❖ Introduction to media in English, definition of media, function
- ❖ Types of news in English, speaking in English and writing in English
- ❖ Reviews of media in English, editing, articles, novels and letters.
- ❖ Crime, public election, public matters, font, caption and style.
- ❖ Writing the news in English editing with grammar, to communicate easily to public.

COURSE OUTCOME Students will be able to

- Introduce to the essence of the Mass media and its definitions and its function.
- learn the News Analysis and its types.
- know about the review, editorial columns etc.
- understand Different kinds of reports are taught like election, crime report etc.
- Apply Writing and editing of T.V, Radio,print media etc.

UNIT I INTRODUCTION TO MASS MEDIA

Teaching Hours - 8

Definition of Mass Media - Functions - Public Opinion

UNIT II TYPES OF NEWS ANALYSIS

Teaching Hours - 8

Hard and soft news - Expected and Unexpected News - Box News -

Follow up news - Scoop - Filters - News Analysis and Evaluation.

UNIT III REVIEWS**Teaching Hours - 8**

Editorial - Columns - Articles - Reviews - Features – Letters

UNIT IV REPORTS**Teaching Hours - 8**

Reporting - Crime, Court, Election, Legislative, Sports, Investigative -

Font, Caption, Style - Emphasis of News and Reports - Principles of Editing.

UNIT V**Teaching Hours - 7**

Writing and Editing - TV/Radio-News and News Headlines,

Documentaries, TV/Radio Features

REFERENCE

1. Keval J.Kumar – *Mass Communications in India* (Bombay: Jacco 1981)
2. MacBride – *Many Voices, One world* (London: Kagan Press, 1980)
3. D.S.Metha – *Mass Communication and Journalism*
4. James M.Neel – *News Writing and Reporting*

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	S	S	M
CO2	S	M	M	M	M	S	S	S	S	L
CO3	S	S	S	S	M	M	L	M	S	S
CO4	M	M	M	S	S	S	S	L	S	S
CO5	M	M	S	S	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

OPEN ELECTIVE

PAPER - 4

C. FANTASY FICTION

SEMESTER – IV

CREDITS – 3

CATAGORY – OPEN ELECTIVE

NO.OF. HOURS\WEEK – 3

TOTAL HOURS – 39

COURSE CODE: DOEN45C

COURSE OBJECTIVES

- To introduce students to various definitions of fantasy fiction
- To improve the imagination of students.
- To introduce students to the history of fantasy fiction

UNIT PLAN

- ❖ To Sketch the growth of fantasy Fiction through ages.
- ❖ To Build their imagination through the story.
- ❖ To realize the importance of creativity.
- ❖ To built socialization

COURSE OUTCOMES

- On successful completion of the course, students will be able to
- Demonstrate a basic understanding of the sub-genre of fantasy fiction
- Identify the genre and features of fantasy fiction
- Discuss the evolution of fantasy fiction
- Evaluate and discuss a work of fantasy fiction using prescribed texts
- Discuss the socio-cultural contexts and their impact on works of fantasy fiction.

UNIT 1

Teaching Hours - 8

Introduction to Fantasy Fiction

Evolution of Fantasy Fiction

UNIT 2

Teaching Hours - 8

Ursula K Le Guin Dragonfly

UNIT 3**Teaching Hours - 8**Nnedi Okarofo - *Akata Witch***UNIT 4****Teaching Hours - 8**Terry Pratchett - *The Colour of Magic***UNIT 5****Teaching Hours - 7**Robin Hobb - *Assassin's Apprentice***REFERENCE**

1. Card, Orson Scott. *The Infinite Boundary*.
2. *How to Write Science Fiction and Fantasy*. Writers' Digest Books. 1990.
3. Dalton, A. J. *Sub Genres of British Fantasy Literature*. Luna Press Publishing, 2017.
4. Hume, Kathryn. *Fantasy and Mimesis*. Methuen, 1984.
5. Mendelsohn, Farah, Edward James. *A Short History of Fantasy*. Middlesex University Press, 2009.
6. Reid, Robin Anne. *Women in Science Fiction and Fantasy (Vol. 1 & 2)*. Greenwood Press, 2009.
7. Sinclair, Frances. *Fantasy Fiction*. School Library Association, 2008.
8. Tableford, Brian. *The A to Z of Fantasy Literature*. The Scarecrow Press, Inc., 2009.
9. Swinfen, Ann. *In Defense of Fantasy: A Study of the Genre in English and American Literature Since 1945*. Routledge & Kegan Paul, 1984

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	S	S
CO2	M	M	S	S	S	S	S	L	L	S
CO3	S	M	M	M	S	S	S	S	L	S
CO4	S	S	S	S	M	M	S	S	M	M
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome**S – Strong , M – Medium, L – Low (may be avoided)**

THIRUVALLUVAR UNIVERSITY
BACHELOR OF ARTS - B.A. ENGLISH DEGREE COURSE
CBCS PATTERN

(With effect from 2022-2023)

Programme Objectives: (5 Points)

1. To acquaint students with the classics of literature.
2. To develop appreciation of literary texts.
3. To make them understand the vocabulary of literature.
4. To make them Learn language through literature.
5. To make them understand the fundamentals of English grammar.

Programme Educational Objectives: (5 Points)

1. To develop interest towards literature.
2. To develop social & linguistic awareness through Literature.
3. To improve communication skills in English.
4. To develop soft-skills to meet corporate needs.
5. To make them refined and responsible human beings.

Programme Specific Outcomes: (10 points)

On completing the course the students will be.

1. Able to understand and appreciate the language of literary works.
2. Able to communicate confidently in real life's situation.
3. Able to write in flawless language.
4. Able to interpret different genres.
5. Able to face the competitive job market.
6. Able to develop their personality.
7. Able to develop attitude in challenging situations.
8. Able to acquire analytical skills.
9. Able to comprehend the nuances of life.
10. Able to develop leadership qualities.

Programme Outcomes: (10 Points)

1. Able to have a holistic understanding of English literature.
2. Able to develop a sense of social responsibility.
3. Able to have environmental awareness.
4. Able to preserve cultural values.
5. Able to develop compassion for fellow human beings.
6. Able to learn lessons from the prescribed texts.
7. Able to motivate others.
8. Able to appreciate the positive traits.

9. Able to empower the weak towards betterment.

10. Able to live and motivate others to live.

The Course of Study and the Scheme of Examinations

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-1	5	3	Indian writing in English	25	75	100
4.	III	Core Theory	Paper-2	5	3	Advanced English Grammar	25	75	100
5.	III	ALLIED -1	Paper-1	6	3	Literary forms and glossary of terms	25	75	100
6.	III	PE	Paper-1	6	3	Professional English I	25	75	100
7.	IV	Environmental Studies		2	2	Environmental Studies	25	75	100
Sem. Total				36	22		175	525	700
SEMESTER II							CIA	Uni. Exam	Total
8.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9.	II	English (CE)	Paper-2	4	4	Communicative English I	25	75	100
10.	III	Core Theory	Paper-3	5	3	British Literature I	25	75	100
11.	III	Core Theory	Paper-4	5	3	American literature (classical and modern literature)	25	75	100
12.	III	ALLIED-1	Paper-2	6	5	Social History of England	25	75	100
13.	III	PE	Paper-2	6	3	Professional English II	25	75	100
14.	IV	Value Education		2	2	Value Education	25	75	100
15.	IV	Soft Skill		2	1	Soft Skill	25	75	100
Sem. Total				36	25		200	600	800

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER III							CIA	Uni. Exam	Total
16.	I	Language	Paper-3	6	4	Tamil / Other Languages	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-5	4	4	British literature II	25	75	100
19.	III	Core Theory	Paper-6	5	4	Introduction to English Phonetics	25	75	100
20.	III	ALLIED-2	Paper-3	5	3	History of English literature I	25	75	100
21.	IV	Skill based Subject	Paper-1	2	2	Skills for Employment	25	75	100
22.	IV	Non-major elective	Paper-1	2	2	Language skills and communication I	25	75	100
Sem. Total				30	23		175	525	700
SEMESTER IV							CIA	Uni. Exam	Total
23.	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
24.	II	English	Paper-4	6	4	English	25	75	100
25.	III	Core Theory	Paper-7	5	4	British literature III	25	75	100
26.	III	Core Theory	Paper-8	4	3	History of English Language	25	75	100
27.	III	ALLIED-2	Paper-4	5	5	History of English Literature II	25	75	100
28.	IV	Skill based Subject	Paper-2	2	2	Writing for special purpose	25	75	100
29.	IV	Non-major elective	Paper-2	2	2	Language skills and communication II	25	75	100
Sem. Total				30	24		175	525	700
SEMESTER V							CIA	Uni. Exam	Total
30.	III	Core Theory	Paper-9	5	4	British literature IV	25	75	100
31.	III	Core Theory	Paper-10	6	4	Shakespeare	25	75	100
32.	III	Core Theory	Paper-11	6	4	Literary Criticism.	25	75	100
33.	III	Core Theory	Paper-12	6	4	Subaltern Literature	25	75	100
34.	III	Internal Elective	Paper-1	4	3	(to choose one out f two) A. Children Literature B. Journalism	25	75	100
35.	IV	Skill based Subject	Paper-3	3	2	Content writing	25	75	100
Sem. Total				30	21		150	450	600
SEMESTER VI							CIA	Uni. Exam	Total
36.	III	Core Theory	Paper-13	5	4	Contemporary Literature	25	75	100
37.	III	Core Theory	Paper-14	5	4	Indian Writing in Translation	25	75	100
38.	III	Core Theory	Paper-15	5	3	New Literatures in English	25	75	100
39.	III	Compulsory Project	Paper-16	5	5	Group / Individual Project	25	75	100
40.	III	Internal Elective	Paper-2	4	3	(to choose one out f two) A. English Information	25	75	100

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
						Technology B. Film appreciation and book review			
41.	III	Internal Elective	Paper-3	3	3	(to choose one out f two) A. English for Specific Purpose B. Creative Writing	25	75	100
42.	IV	Skill based Subject	Paper-4	3	2	English Language Teaching	25	75	100
43.	V	Extension Activities		-	1		100	-	100
Sem. Total				30	25		275	525	800
Grand Total					140				4300

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Electives	3	3	9	100	300
	Core	15	(3-5)	54	100	1500
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	43		140		4300

THIRUVALLUVAR UNIVERSITY
B.A. ENGLISH

SYLLABUS
UNDER CBCS
(With effect from 2022-2023)

SEMESTER I

PAPER - 1

INDIAN WRITING IN ENGLISH

OBJECTIVES:

- To understand the various features of Indian Literature in English.
- To get a glimpse of the regional literatures in English.
- To make the students be aware of the superstitious practices in Indian culture.
- To inculcate the spiritual and moral values from the Indian Sages.
- To analyze the aspects of Indianness in Indian writing in English.

SYLLABUS

Unit -1 :Poetry

- 1. A very Indian poem in Indian English- Nissim Ezekiel
- 2. Coromandel Fishers - Sarojini Naidu
- 3.Home Coming-R.Parthasarathy.

Unit-2:Poetry

- 1.Of Mothers among other things-A.K.Ramanujam
- 2.An Old Woman – ArunKolatkarr

Unit-3:Prose

- 1.The Child's Return- Rabindranath Tagore
- 2.The Portrait of a Lady-Kushwant Singh
- 3.Vivekananda's World Mission-Bhabani Bhattacharya

Unit-4: Drama

- 1.Nagamandala-Girish Karnad

UNIT-5: NOVEL

- 1.The White Tiger – Aravind Adiga

COURSE OUTCOME

UNIT I

Students will be able to examine the concepts of Indian English Poetry.
Students will be able to comment on the humor in A Very Indian Poem in English.
Students will be able to understand the life of fishermen community
Students will be able to grasp the in-depth ideas about the poem Home Coming.
Students will be able to know about Autobiographical Poem.

UNIT II

Students will be able to appreciate the poem Of Mother, among other Things.
Students will be able to identify different images of the Mother.
The students will be able to understand the sense of loss of identity in immigrants
Students will be able to analyze the reality of a beggar Old Woman.
Students will be able to understand the style of Indian Poetry.

UNIT III

Students will be able to scrutinize the writing style adopted by Kushwant Singh.
Students will be able to understand Tagore as a short story writer.
Students will be able to identify the writing style of Bhabini Bhattacharya .
Students will be able to inculcate the moral ideas of Swami Vivekananda.
Students will be able to evaluate Bhabini Bhattacharya as an essayist.

UNIT IV

Students will be able to analyze the plot Nagamandala.
Students will be able to know about the writing style of Girish Karnad.
Students will be able to understand the superstitious beliefs in Indian culture .
Students will be able to know about the significance of marital relationship .
Students will become familiar with popular myth.

UNIT V

Students will be able to understand the concept of globalization.
Students will be able to absorb the importance of family.
Students will be made aware of corruption in India

WEB SOURCES:

<https://khanindradutta.wordpress.com/2019/02/27/nissim-ezekiels-poem-very-indian-poem-in-indian-english-complete-poem/>
<https://www.poetrynook.com/poem/homecoming-0>
<http://e4english-corner-sasha.blogspot.com/2013/11/an-old-woman-by-arun-kolatkars-poem-and.html#:~:text=In%20Arun%20Kolatkars%20poem%2C%20%22An,land%20from%20which%20she%20comes.&text=The%20old%20woman%20tightens%20her,She%20is%20persistent.>
<http://www.ncert.nic.in/ncerts/l/kehb101.pdf>
<https://archive.org/details/in.ernet.dli.2015.463117/page/n13/mode/2up>
<https://archive.org/details/whitetigernovel00adiga/page/n9?q=the+white+tiger+arvind+adiga>

REFERENCE TEXT BOOKS

Karnad, Girish Raghunath. Nagamandala. Oxford University Press, 1990.

**CORE THEORY
PAPER – 2**

ADVANCED ENGLISH GRAMMAR

OBJECTIVES

Students will be able to understand the basics of Grammar.

To understand how to use Grammar correctly.

To learn to be confident in using advanced Grammar.

To write English without grammatical errors.

To gain confidence in learning English.

UNIT 1

Parts of speech –Noun –Pronoun-Adjective-Verb-Adverb-Conjunction-Preposition-Interjection-
Definition-Types-Examples

UNIT 2

Types of Sentences-Statement-Interrogative-Exclamatory-Imperative

UNIT 3

Sentence Pattern-Types-SV-SVO-SVC-SVA-SVOO-SVOC-SVOA

UNIT 4

Tenses- Subject -Verb-Concord

UNIT 5

Phrases And Clauses-Definition And Types

REFERENCE TEXTBOOKS

1. DR. M R Kumaraswamy, C.Chidambaram, P.Karthi. Grammar and Composition. Madurai: Print, 2019.
2. Hewings, Martin. Advanced English Grammar. New Delhi: Cambridge University Press, 1999.

COURSE OUTCOMES

UNIT I

Students will be able to get distinct ideas on all the parts of speech.

Students will be able to understand Parts of Speech and their types.

Students will be able to use Parts of Speech with relevant Examples.

Students will be able to examine the usage of Parts of Speech in various contexts.

Students will be able to identify the different ways to adopt Parts of Speech.

UNIT II

Students will be able to know about the Types of sentences.

Students will be able to understand Statement sentence with illustrations.

Students will be able to know Interrogative sentence with illustrations.

Students will be able to identify Imperative sentence with illustrations.

Students will be able to understand Exclamatory sentence with illustrations.

UNIT III

Students will be able to know about Sentence Pattern and its types.

Students will be able to recognize the different types of Sentence Pattern.

Students will be able to identify the different ways to adopt Sentence Pattern.

Students will be able to examine the correct usage of Sentence Pattern.

Students will be able to distinguish the Sentence Pattern with the help of illustrations.

UNIT IV

Students will be able to know about Tense and its kinds.

Students will be able to understand and use Tenses in day to day life.

Students will be able to know about Subject and its Usage.

Students will be able to be familiar with Concord.

Students will be made aware of Verb and its Kind.

UNIT V

Students will be able to understand Phrases.

Students will be able to absorb noun, verb, adjectival and prepositional phrases.

Students will be made aware of Definitions of Clauses and its types.

Students will be able to comprehend Clauses with illustrations.

Students will be able to distinguish Clauses with the help of illustrations.

LITERARY FORMS AND TERMS

OBJECTIVES

- To expose the learners to the most common elements of literature.
- To examine different genres of literature.
- To scrutinize the various Literary Forms
- To understand the characteristics of Poetry, Prose, Drama and Novel.
- To Understand different literary terms.

UNIT I: POETRY

1. What is Poetry?
2. The Lyric
3. The Sonnet
4. The Elegy
5. The Epic
6. The Ode

UNIT II : PROSE

1. The Essay
2. The Short Story
3. Biography
4. Autobiography

UNIT III: DRAMA

1. The Tragedy
2. The Comedy
3. Tragi-Comedy
4. The One-act play
5. The Absurd Drama

UNIT IV: NOVEL

1. Historical Novel
2. The Picaresque Novel
3. The Stream of consciousness Novel

UNIT V: LITERARY TERMS

Allegory, Comic Relief, Dramatic Monologue, Farce, Euphemism, Expressionism, Satire, Plot, Melo Drama, Irony, Soliloquy.

BOOKS FOR STUDY AND REFERENCE:

1. Prescribed text – A Glossary of Literary Terms. M.H. Abrams – Macmillan Publishers India Ltd. (Trinity -Laxmi Publications, Chennai)
2. Nair, K R Ramachandran. *Literary Forms*. Chennai: Emerald, 1995. print.

COURSE OUTCOMES

UNIT I

Students will be able to understand how poetry requires a different writing style.
Students will be able to get, in-depth ideas of Poetry.
Students will be able to understand the traits of Lyric, Ode, and Sonnet.
Students will be able to examine Elegy and Epic.
Students will be able to scrutinize different kinds of Poetry.

UNIT II

Students will be able to understand prose answering with distinct style.
Students will be able to know the characteristics of Short Story.
Students will be able to understand the ideas behind Essay.
Students will be able to understand the basic traits of Biography.
Students will be able to know about Autobiography in detail.

UNIT III

Students will be able to understand Drama as a Genre with distinct style.
Students will be able to distinguish Tragedy and Comedy as a separate genre.
Students will be able to understand Tragi - Comedy.
Students will be able to examine characteristics of One Act Play.
Students will be able to absorb the principles of the Absurd Drama.

UNIT IV

Students will be able to understand the Characteristics of Novel.
Students will be able to know about Historical Novel.
Students will be able to be familiar with Picaresque Novel.
Students will be made aware of The Stream of Consciousness Novel.
Students will be able to absorb the characteristics of various types of Novels

UNIT V

Students will be able to understand few important Literary Terms.
Students will be able to absorb the basic ideas of Plot, Melodrama and Irony.
Students will be made aware of Euphemism, Expressionism and Satire.
Students will be able to comprehend Allegory, Comic Relief and Dramatic Monologue.
Students will be able to identify the usages of Literary Terms.

SEMESTER II

CORE THEORY PAPER – 3

BRITISH LITERATURE I

OBJECTIVES

1. To expose the students to the beginning of modern literature
2. To introduce students to metaphysical and neoclassical poetry
3. To know the style of Bacon's essays
4. To expose the students to the social life of 17th century people
5. To learn the form ,allegorical novel .

UNIT 1:Poetry

The hymn to God, the Father-John Donne

Song for St.Cecilia's Day-John Dryden

The Collar – George Herbert

UNIT 2:Poetry

How soon hath time-John Milton

Ode to Solitude-Alexander Pope

On My First Sonnet – Ben Jonson

UNIT 3:Prose

Of Friendship

Of Studies

Of Books -FrancisBacon

UNIT 4:Drama

The Shoemaker's holiday -Thomas Dekker

UNIT 5:Novel

The Pilgrim's Progress - John Bunyan

COURSE OUTCOME

UNIT I

The students will be able to

1. Identify the characteristic features of metaphysical poetry
2. Critically appreciate the poem, “Hymn to God, the Father”
3. Analyse the theme of “Song for St. Cecilia’s Day”
4. Identify the neoclassical elements found in the prescribed poems
5. Understand Dryden as a neoclassical poet

UNIT II

The students will be able to

1. Understand Milton’s greatness as a poet
2. Understand how one has to wait for the right time to accomplish great works
3. Appreciate the grand style of Milton
4. Understand Pope as the representative poet of neoclassicism
5. Appreciate the value of simple life

UNIT III

The students will be able to

1. Understand the three fruits of friendship
2. Know the purpose of studying
3. Understand the advantages of studying
4. Understand the greatness of books
5. Appreciate the style of Bacon

UNIT IV

The students will be able to

1. Understand the social life of 17th century England
2. Critically appreciate the play, The Shoemaker’s Holiday”
3. Analyse the characters of the Play
4. Know how war leads to disability of persons
5. Understand the class system of English People

UNIT V

The students will be able to

1. Understand Pilgrims Progress as an Allegory
2. Appreciate the theme of salvation.
3. Understand that the road to Heaven is not easy, the cost is great,
4. Know that the true Christian must be willing to pay the cost no matter what.
5. Know that man is full of sin, but this does not keep him from attaining glory.

WEB SOURCES:

1. <https://www.poetryfoundation.org/poems/44115/a-hymn-to-god-the-father>
2. <https://www.poetryfoundation.org/poems/44185/a-song-for-st-cecilias-day-1687>
3. <https://www.poetryfoundation.org/poems/44360/the-collar>
4. <https://www.poetryfoundation.org/poems/44744/sonnet-7-how-soon-hath-time-the-subtle-thief-of-youth>
5. <https://www.poetryfoundation.org/poems/46561/ode-on-solitude>

6. <https://www.poetryfoundation.org/poems/44455/on-my-first-son>
7. <https://www.fulltextarchive.com/page/Essays2/>
8. <https://www.fulltextarchive.com/page/Essays3/>
9. <https://emed.folger.edu/sites/default/files/EMEDWorkshop-ShoeHol.pdf>
10. http://bunyanministries.org/books/pp_full_text.pdf

**CORE THEORY
PAPER – 4**

AMERICAN LITERATURE

OBJECTIVES

1. To introduce the major works of American authors and their intellectual philosophies to students of Literature.
2. To portrait different periods and movements of American Literature
3. To make our students familiar with American thoughts and lifestyle.
4. 4.To direct students' ardent attention towards the development of their knowledge about American Literature
5. To project their fancy for lyrical gaiety of top American poets
6. To channelize their academic vision to grasp more about the American Drama and Fiction

UNIT-1: Poetry

1. Robert Lowell – Children of Light, The Holy Innocents
2. Carl Sandburg – Chicago
3. William Stanley Merwin - Green Fields, Another River
4. Robert Frost – Stopping by Woods on a Snowy Evening

UNIT-2: Poetry

1. Walt Whitman – O captain, My Captain
2. Emily Dickinson – I Felt a Funeral in My Brain
3. Edgar Allan Poe – Sonnet – Silence
4. Wallace Stevens – Anecdote of the Jar

UNIT-3: Prose

1. Martin Luther King – I have a Dream
2. Ralph Waldo Emerson – Self-Reliance

UNIT-4: Drama

1. Arthur Miller – Death of a Salesman

UNIT-5: Fiction

1. Ernest Hemingway – The Old Man and the Sea

TEXT BOOKS

UNIT-1:

1. American Poetry of the Twentieth Century, Edited by Richard Gray, Cambridge University Press
2. A textbook of American Literature, Edited by Board of Editors, Sarah Publishers

UNIT-2:

1. An Anthology of Poems, Edited by C. Subbaian, Emerald Publishers

UNIT-3:

1. American Literature, An Anthology of Prose, Edited by Dr. P. Marudanayagam, Emerald Publishers
2. American Literature, Edited by Prof. G. Venkatesalu, Manimekala Publishing House

UNIT-4

1. Death of a Salesman :Arthur Miller , Penguin UK Edition
2. A Student Handbook to The Plays of Arthur Miller ,Bloomsbury Publishing India Ltd.

UNIT-5:

1. The Old Man and the Sea, Ernest Hemingway, Maple Press Classics Publishers – Complete and Unabridged
2. Ernest Hemingway's The Old Man and the Sea , P.G. Rama Rao – The New Atlantic Critical Studies

REFERENCE ITEMS: BOOKS, JOURNAL

1. A Text Book of The Old Man and the Sea , Dr. V. Alexander, Mahaam Publishers
2. American Literature, Edited by Prof. G. Venkatesalu, Manimekala Publishing House
3. A Short History of American Literature, Krishna Sen and AshokeSengupta, Orient Black Swan Publisher
4. American Literature, NandanaDutta, Edited by Pramod K Nayar, Orient Black Swan Publisher
5. Studies in American Literature,MalikaarjunPatil, Atlantic Publishers
6. Modern American Literature, Edited by RajeshwarMittapalli and Claudio Gorlier, Atlantic Publishers
7. Walt Whitman – Selected Poems : A Critical Evaluation, Dr. S. Sen, Unique Publishers
8. A History of American Literature, Sathish Kumar, LakshmiNarainAgarwal Publishers
9. The Oxford Companion to American Literature, James D. Hart, 6th Edition, Oxford University Press
10. A Short History of American Literature, Edited by William Peterfield Trent, Cambridge University Press

E- MATERIALS

1. <https://www.theatlantic.com/w.s.merwin>
2. **Error! Hyperlink reference not valid.**
3. **Error! Hyperlink reference not valid.**
4. <https://www.poeticside.com/poets/w.s.merwin>
5. <https://www.cliffnotes.com/americanwriters>
6. <https://www.poeticside.com/poets/w.s.merwin>
7. <https://www.poemanalysis.com/americanpoets>
8. <https://www.whitmanarchive.org>

9. <https://www.enotes.com/americanwriterspoets>
10. <https://www.bl.uk/collections>
11. <https://www.beamingnotes.com/americananddramatists>
12. <https://www.britannia.com/americanliterature>
13. <https://www.sparknotes.com/americanpoets>
14. <https://www.imagination.com/americanliterature>
15. <https://www.gradesaver.com/americanwriters>

COURSE OUTCOME

UNIT-1

1. Students will be able to grasp the lyrical richness embedded in American Poetry
2. Students will be able to understand the modern American writer like Merwin and his thoughts related to Environment
3. Students will come to know the great American Poets like Frost, Lowell and Sandburg and their works.
4. Students will be able to develop a taste of American poetry and thus they further read and understand.
5. Student will search for related poems written by these great poets to develop further knowledge on poetry

UNIT-2

1. Students will be able to admire and try to emulate the literary expertise of Walt Whitman, Emily Dickinson, Edgar Allan Poe and Wallace Stevens
2. the student will come to know the literary terms available in the American poetry
3. the student will get inspiration from Walt Whitman and his knowledge about India
4. the student will read further about these great poets
5. the student will develop a taste to study the lifestyle of American people

UNIT-3

1. the student will be able to judge the supremacy of American output
2. the student will come to know the great prose writers of American Literature Emerson and Martin Luther King
3. the student will understand the real thoughts of the American writers
4. the student will get inspiration through these works and it will kindle him or her to read more
5. the student will understand the philosophy of these writers.

UNIT-4

1. The student will be able to judge the supremacy of American drama
2. The student will come to know the great dramatist of American Literature Arthur Miller
3. The student will understand the real thoughts of the American dramatists in general
4. The student will get inspiration through this drama and it will kindle him or her to read more dramas of American Literature
5. The student will understand the usage of language in the drama

UNIT-5

1. The student will be able to judge the supremacy of American fiction
2. The student will come to know the great fiction writers of American Literature Ernest Hemingway
3. The student will understand the real thoughts of the American fictions and sea life
4. The student will get inspiration through this fiction and it will kindle him or her to read more fictions of American Literature
5. The student will understand the real concept of lifestyle of Americans.

THE SOCIAL HISTORY OF ENGLAND

Social History of England

Objectives

1. To provide a profound background to the Social History of England.
2. To provide an extensive knowledge of English Social life.
3. To help them appreciate, relish and enjoy the programme.
4. To provide them a knowledge of the major trends in English society.
5. To provide the students with hands on information to appreciate the other papers in English literature.

UNIT I

The Hundred Years of War (1337-1453), The War of the Roses. The Black Death & The Peasants Revolt. The Church – The Monasteries - The grammar schools, public schools, Education - The Printing Press – Its Significance

UNIT II

Social Life of During:

The Renaissance, The Reformation, The Spanish Armada - The Elizabethan - Theatre and Audience – The Rule of Queen Elizabeth I – A Golden Period – The East India Company

UNIT III

Colonization, The Stuarts – King James Authorized Version of the Bible – The Civil War, The Puritan Rule, The Restoration England - The Royal Society – The Glorious Revolution

UNIT IV

Queen Anne's England – The War of American Independence – Religious Movements – Humanitarian Movements – The French Revolution

UNIT V

The Victorian Age – Reform Bills – The Chartist Movement - The Modern Age – The Cold War – The Origin and Growth of Political Parties in England.

Outcomes:

On completing the course the students will be able to

Unit I

1. Understand the background of English Social Life
2. Acquire thorough knowledge of calamities which affected the English People
3. Know the yearly period of education in England
4. Know the advent of the printing press
5. Know the role of the press

Unit II

1. Acquire knowledge of renaissance and its meaning
2. Know how the Renaissance influences art
3. Understand the term Reformation and Spanish Armada
4. Appreciate Elizabethan Period and its Literature
5. Know about the East India Company

Unit III

1. Understand What is Colonization
2. Know the history of the Bible Translation
3. Understand the term Civil War
4. Understand the Life in Puritan and Restoration Period
5. Know about the Royal Society and glorious Revolution

Unit IV

1. Have a knowledge of Queen Anne
2. Know the war of American Independence
3. Learn about the religious movements
4. Aware of humanitarian movements
5. Know what is French Revolution

Unit V

1. Understand Queen Victoria's England
2. Learn about the reform Bills
3. Learn about the Chartist movement and modern age
4. Learn what is Cold War
5. Learn about the Political Parties in England

REFERENCE:

1. Trevelyan, G.M English Social History, Longmans, London, 1958,
2. Subramaniam, M.V Social History of England, Wardha Publishing House, Madras 1972.

SECOND YEAR

SEMESTER III

CORE PAPER - 5

BRITISH LITERATURE II

Objectives

1. To acquaint the students with the transformation of literature from Neoclassicism to Romanticism
2. To make the students familiar with the poems of Romantic age
3. To understand the essays of Charles Lamb and Oliver Goldsmith
4. To understand the characteristic features of Anti Sentimental Comedy
5. To expose the students to Genres, Travelogue and Bildungsroman

UNIT - I: POETRY

1. Lines written a few Miles above Tintern Abbey - William Wordsworth
2. Ode to The West Wind - P B Shelly

UNIT - II: POETRY

1. Ode on a Grecian Urn - John Keats
2. Kublakhan - Samuel Taylor Coleridge

UNIT - III: PROSE

1. A Dissertation Upon Roast Pig - Charles Lamb
2. A City Night Piece - Oliver Goldsmith

UNIT - IV: DRAMA

1. The Rivals - Richard Brinsley Sheridan

UNIT - V: NOVEL

1. Robinson Crusoe - Daniel Defoe
2. Jane Eyre - Charollette Bronte

Course Outcome:

Unit I

The students will be able to understand :

1. William Wordsworth as a Nature Poet
2. Autobiographical element found in Tintern Abbey
3. P.B. Shelly as a Revolutionary Romantic poet

4. Literary devices used in Ode to the West Wind
5. The theme of regeneration in Ode to the West Wind

Unit II

The students will be able to

1. Characteristic features of Romantic age
2. Appreciate Keats as a poet who is Known for his Odes
3. Understand “beauty is Truth, truth beauty” with reference to Ode on a Grecian Urn
4. Understand Samuel Taylor Coleridge as a romantic poet
5. Analyze the supernatural element in Kublakhan

Unit III

The students will be able to

1. Know the essayists of the Romantic Age
2. Appreciate Charles Lamb as an essayist
3. Analyze the humour in “A Dissertation Upon Roast Pig
4. Understand Oliver Goldsmith as an essayist
5. Critically analyze the essay, “A City Night Piece”

Unit IV

The students will be able to understand

1. Rivals as an anti sentimental comedy
2. Why Lydia wants to marry a poor man
3. The idea of malapropism
4. The concept of duel
5. How does Falkland’s plan backfire

Unit V

The students will be able to

1. Analyze Robinson Crusoe as a Travelogue
2. Know whether Robinson Crusoe changed at the end of the novel
3. Critically analyze Jan Eyre as a Gothic novel
4. Undersand how Jane Eyre fits into romantic Literature
5. Analyze the character of Jane Eyre

Text Book and Reference material

Palgrave , F.T Palgrave’s Golden Treasury, Oxford Publisher,1997

Web Source:

<https://www.poetryfoundation.org/poems/45527/lines-composed-a-few-miles-above-tintern-abbey-on-revisiting-the-banks-of-the-wye-during-a-tour-july-13-1798>

<https://www.poetryfoundation.org/poems/45134/ode-to-the-west-wind>

<https://www.poetryfoundation.org/poems/44477/ode-on-a-grecian-urn>

<https://www.poetryfoundation.org/poems/43991/kubla-khan>

<https://www.bartleby.com/380/prose/491.html>

<http://www.blupete.com/Literature/Essays/Best/GoldsmithCity.htm>

<http://www.gutenberg.org/files/24761/24761.txt>

<https://www.planetebook.com/free-ebooks/robinson-crusoe.pdf>

<https://www.gutenberg.org/files/1260/1260-h/1260-h.htm>

CORE PAPER - 6

INTRODUCTION TO ENGLISH PHONETICS

OBJECTIVES

1. Students are exposed to the Evaluation of English Language at a deeper level, updating communication using language in spoken medium and written medium.
2. Students get enriched with information about understanding English phonetics and on general phonetics.
3. To make students understand Illustrations facilitating readers' comprehension of the subject both in Orthography and in Phonetic transcription.
4. Students are taught about intricacies of articulating English sounds enabling them to speak better.
5. Students are exposed to the use of modern technology stressing the importance of speech using mobile phone, radio, tape recorder, multimedia, etc.,

SYLLABUS

UNIT – I

OBJECTIVES

1. To develop Students' ability to use English in real life situations.
2. To understand the written text and be able to use Skimming and Scanning Skills.
3. To understand the necessary connection between meaning and its sound.
4. To learn and use the different meanings of English words appropriately.
5. To distinguish human language from animal communication. To distinguish evolution of language between biological evolution and historical evolution of individual languages mediated by cultural transmission.

Introduction know Language - Arbitrariness - Duality - Displacement - Cultural Transmission.

UNIT – II

OBJECTIVES

1. To develop knowledge about English Phonetics with respect to received pronunciation [British English], and general American English and be able to read and produce phonemic transcriptions and transcriptions of intonation pattern.
2. To understand the system of sound and sound combination.
3. To understand how sounds are produced, transmitted and perceived.

4. To distinguish phonemes and allophones, to know the structure of English Syllable and the different types of stress.
5. To know assimilation, elision, linking and to distinguish between strong and weak forms.
6. To study how sounds are produced with articulators- Study of acoustic production of various articulations- to study how the listeners perceive linguistic auditory aspects and understand signals.

Phonetics - Phonology - Branches of Phonetics - Organs of Speech.

UNIT – III

OBJECTIVES

1. To investigate the Brain's representation for speech production using Univariate and multivariate representation.
2. To learn the process of speaking which involves parts of our body.
3. To learn the stages of speech sound production – to learn how the movement of speech organs modify the air in order to produce a given sound.
4. To differentiate between Vowels and Consonants.
5. To enhance reading and writing skills of all syllables in English word – to recognize and remember the vowels as a subset of letters as distinguished from consonants – the rules and spelling patterns for short and long vowels, final vowels, unaccented vowels, silent vowels and irregular spellings.

Phonatory System and Articulatory System - Classification of Speech Sound - Consonants - Vowels.

UNIT – IV

OBJECTIVES

1. To know the unit of sonority – degree of air flow – constriction of articulators – resonance of one sound segment in relation to another.
2. To know the structure of syllable – sonority peaks and optional edges – three elements –

the onset, the nucleus and the coda.

3. To know the vocalic consonant in the American pronunciation.
4. To know the unique productive qualities of spoken consonant sound- functions as the core, nucleus of a syllable.
5. To pronounce consonant sound in isolation, in words and in sentences correctly.
6. To experiment and investigate the degree of assimilation as it occurs in abutting consonants under varying conditions.
7. To identify the style of pronunciation often varying regionally or Socio-economically constructing dialogues.
8. To identify the melodic pattern of an utterance that conveys different expressive meaning and variation in the pitch of the voice.

Syllable and Syllabic Structure - Onset - Nucleus - Coda - Syllabic Consonants - Consonant Clusters - Abutting Consonants - Word accent - Rhythm and intonation.

UNIT – V

OBJECTIVES

1. To know the manner of articulation-the configuration and interactions of the articulators when making a speech sound.
2. To locate the origin of sound at which the speech organs come together in producing a speech sound.
3. To know the different types of place of articulation.
4. To know the different phonetic sound of English letter corresponding to its pronunciation.
5. To learn the notes of how the spoken words are pronounced using special phonetic symbols of the International Phonetic Alphabet [IPA].

Place and Manner of articulation - Phonemic transcription.

References:

1. S. K. Verma and N. Krishnaswamy Modern Linguistics: An Introduction. New Delhi : OUP, 1989.28
2. H. A. Gleason: Linguistics and English Grammar. New York: Holt, Rinehart & Winston.Inc., 1965.
3. Radford A, Atkinson M, Britain D, Clahsen H and Spencer A: Linguistics - An Introduction. Cambridge University Press, Cambridge, 1999
4. Robins R H: General Linguistics: An Introductory Survey, Longman Group Limited, London:1971
5. Fasold R. W. And Connor-Linton J (ed.): An Introduction to Language and Linguistics, Cambridge University Press, Cambridge, 2006.
6. Daniel Jones: The Pronunciation of English. New Delhi: Blackie and Sons, 1976 A. C. Gimson. An Introduction to the Pronunciation of English. London: Methuen, 1980.
7. J. D. O'Conner. Better English Pronunciation. New Delhi: CUP, 2008. T. Balasubramanian. A Textbook of English Phonetics for Indian Students. New Delhi:Macmillan, 1981.
8. T. Balasubramanian. English Phonetics for Indian Students: A Workbook. New Delhi: Macmillan.
9. ABERCROMBIE, D., Elements of General Phonetics, Edinburgh, Edinburgh University Press, 1967.
10. BANSAL, R.K. AND J.B. HARRISON, Spoken English for India, Second Edition, Madras, Orient Longman, 1972.
11. GIMSON, A.C., An Introduction to the Pronunciation of English, London, Edward Arnold, 1962.
12. HEFFNER, R., General Phonetics, Madison, University of Wisconsin Press, 1949.
- JONEW, DANIEL, The Pronunciation of English, Eight Edition, Cambridge, Cambridge University Press, 1956.
13. _____, The Phoneme: Its Nature and Use, Cambridge, Heffer,1950.
14. _____, An English Pronouncing Dictionary, London, Dent, 1917; ELBS, 1968.
15. LADEFOGED, P., A Course in Phonetics, New York, Harcourt Brace Jovanovich, 1975.
16. Vir Aggarwal & V.S.Gupta., Handbook of Journalism and Mass Communication. Concept Publishing Company, New Delhi.
17. Puri. G.K. Competition Success: Review Communication. New Delhi: Sudha Publication.
18. Roy, Baron, Beginner's Guide to Journalism, New Helhi: Pushtak Mahal, 2003.
19. Parthasarathy, Rangaswami. Basic Journalism, Macmillan Publications, New Delhi, 1984 Print.

ALLIED -2

PAPER- 3

HISTORY OF ENGLISH LITERATURE I

Course Objectives

- 1 To provide an extensive background to the course
- 2 To introduce the eminent writers of English Literature
- 3 To expose the students to the magnum opuses of the literary masters
- 4 To prepare the students to undergo the course thoroughly
- 5 To provide the nuances of the history of English Literature

UNIT - I

Introduction to English Literature - Old English Secular Poetry Beowulf - Old English War Poems - Old English Prose Writings - Old English Grammar - Old English dialects, The Age of Chaucer - Geoffrey Chaucer - His Life and Career - The Canterbury Tales, The Sonneteers - Wyatt - Surrey - Daniel , Dryden - Spenser as a Sonneteer and Shakespeare's Sonnets - Major poets in the Elizabethan Age - Spenser and Shakespeare - Their works

UNIT - II

Prose in Elizabethan Age: Roger Ascham - The Chronicles of the tudor period - Hall - Holinshed - The Bible - Wycliffe, Tyndale, Coverdale - King James I' s authorized version of the Bible. Francis Bacon - Literary Criticism - Sir. Philip Sydney's Apologie for Poetry - Puritanism - Ben Jonson - - The origin and growth of English Drama - Mysteries, Miracles, Moralities, Interludes - The first English Comedy and Tragedy.

UNIT - III

The University Wits - George Peale- Thomas Kyd - Christopher Marlowe - Robert Greene - Thomas Nash - Thomas Lodge - John Lyly - William Shakespeare - Life of Shakespeare - The four periods of Shakespeare's dramatic career - His contemporaries and successors - Elizabethan Prose Fiction, The Puritan Writers - John Bunyan, John Milton, George Herbert, Sir Thomas Browne - The Metaphysical poets - John Donne & Others

UNIT - IV

The Restoration Age: Poetry: John Dryden & Samuel Butler: Drama: The Comedy of Manners - William Congreve - Wycherley - Thomas Shadwell - Dryden. Augustan Age - Alexander Pope as a poet , Critic - Addison and Steele - Doctor Johnson, Goldsmith - Sheridan - Henry Fielding - Tobias Smollett, Lawrence Sterne, Horace Walpole

UNIT - V

Pre Romantic and the Romantic Age: Goldsmith - Thompson - Gray - Burns - Blake - William Wordsworth - S.T Coleridge - Lord Bryon - P.B Shelley and Keats - Charles Lamb - Hazlitt, De Quincey , Jane Austen, Sir Walter Scott.

Text Books

1. A History of English Literature by DR. A. Shanmugakani, Harrows Publications
2. An Outline History of English Literature by W.H Hudson, Mahaam Publishers
3. A.C Ward: Twentieth Century English Literature
4. Authur Compton - Rickett: History of English Literature

Reference Items: Books, Journal

An Outline History of English Literature by Hudson, Mahaam Publishers

E - Materials

Course out Come:

1. Students are able to have a vast knowledge in History of English Literature down the ages
2. Students are exposed to the major movements, changes and impacts in history.
3. The students gain confidence in their course of study.
4. It helps them in the long run to take up the competitive examination.
5. It enables them to pass in the entrance tests when they go for higher studies.

SKILLS BASED SUBJECT

PAPER - 2

SKILLS FOR EMPLOYMENT

Course Objectives

1. Learn what a group is and how individuals interact in a group
2. Know why interviews are held and what they are looking for
3. Have a good understanding of what students' own priorities are in a job
4. Appreciate the importance of etiquette for a successful cause
5. Examine how work attitudes relate to job performance.

UNIT - I

1. Skills for Group Discussion
2. Leadership and problem-solving skills

UNIT - II

1. Purpose of Interviews
2. Before and after the Interview

UNIT - III

1. Preparing a Resume
2. Writing a cover Letter
3. Answering FAQs about you and your family

UNIT - IV

1. Answering FAQs about likes and dislikes
2. Answering FAQs on justifying candidature
3. Answering FAQs on priorities, attitudes and biases

UNIT – V

1. Workplace etiquette
2. Values and Ethics
3. Culture
4. Gender equality

Course out Come

Student is able to prepare her\him self

Unit - I

1. The student will be able to know types of GD
2. The student will be able to know about GD
3. The student will be able to know how to prepare for GD
4. The student will be able to understand leadership and problem solving skills
5. The student will be able to develop leadership and problem solving skills

Unit - II

1. The student will be able to discuss the purpose of interviews
2. What are the techniques the student will be able to follow at the time of interviews
3. The student will be able to know their strengths and weakness
4. The students will be able to focus purpose of interviews
5. The student will be able to concentrate do and don'ts while attending the interviews

Unit - III

1. The students will be able to know how to lay out the details in a CV
2. The student will be able to learn how to organize information in a cover letter
3. The student will be able to come to know how to write a covering letter
4. The student will be able to know FAOS about their family members
5. The student will be able to learn how to answer questions about themselves and their family.

Unit - IV

1. The students will be able to grasp the workplace etiquette.
2. The student will come to know values and Ethics
3. The student will be able to discuss culture issues.
4. The students will be able to know equal rights of boys and girls
5. The students will come to know about the empowerment of women

Unit - V

1. The students will be able to know one's likes and dislikes
2. The student will be able to understand their attitude.
3. They will become familiar with things they need to talk about and answer questions
4. They will be able to answer the question about the suitability of the job.
5. The student will be able to understand positive qualities that are valued at work.

Reference

Co, Lina Mukhopadhyay &. *Polyskills: A course in communication skills and life skills*.
Chennai:
Foundation, 2012. print.

NON-MAJOR ELECTIVE

PAPER- 1

LANGUAGE SKILLS AND COMMUNICATION I

Course Objectives

- To improve the ability of speaking skills.
- To provide training in developing the interpersonal skills.
- To develop communicative skills
- To make students confident in dealing with communicative skills
- To facilitate students practical and social knowledge through conversations

UNIT - I

1. Meeting people
2. Exchanging greetings
3. Introducing, others, giving personal information, taking about people animals and places

UNIT - II

1. Answering telephone, asking for someone
2. Making enquiries on the phone
3. Dealing with wrong number
4. Taking and leaving messages

COURSE OUTCOMES

UNIT - I

1. Students will be able to know how to behave while meeting people.
2. Students will be able to understand the ways of exchanging greetings.
3. Students will be able to introduce them to a group of people.
4. Students will be able to understand how to introduce others in any situation.
5. Student will be able to understand how to give personal information in a coherent way.

UNIT - II

1. Students will be able to know how to converse over phone.
2. Students will be able to know how to enquire over phone in formal situation
3. Students will be able to know how to deal with wrong numbers in telephone.
4. Students will be able to know how to take and leave message after a telephonic conversation.
5. Students will be able to develop the skill of answering over phone.

Text books:

Mastering communication skills and soft skills

SEMESTER IV

COREPAPER- 7

BRITISH LITERATURE III

Objectives

The students learn

1. what makes the Victorian period unique in literature
2. the key themes of Victorian literature
3. to appreciate the plays of Victorian age
4. why this age is considered as the age of novels
5. to appreciate the novels of Dickens, Thomas Hardy and George Eliot.

SYLLABUS

UNIT - I: POETRY

1. Ulysses - Alfred Tennyson
2. The Scholar Gypsy - Mathew Arnold

UNIT - II: POETRY

1. Dover Beach - Mathew Arnold
2. My Last Duchess -Robert Browning

UNIT - III: POETRY

1. On Falling in Love-R.L. Stevenson
2. On Liberty-John Stuart Mill

UNIT - IV: DRAMA

1. The Importance of Being Ernest - Oscar Wilde

UNIT - V: NOVEL

1. Pickwick Papers -Charles Dickenson
2. The Mayor of Casterbridge- Thomas Hardy
3. Silas Marner - George Eliot

Course outcome:

Unit I

The students will be able to understand

1. the theme of Ulysses
2. Ulysses as a dramatic monologue
3. Character of Ulyses
4. What does the scholar gypsy symbolize
5. The “strange disease of modern life”

Unit II

The students will be able to understand

1. My Last Duchess as a dramatic monologue
2. Critical appreciation of the poem My Last Duchess
3. Describe the social custom according to “My Last Duchess “ - Ferrara by Robert Browning
4. Theme of Darkling Thrush
5. Mood of the poem Darkling Thrush

Unit III

The students will be able to

1. Know the novelist R.L. Stevenson as a poet
2. Critically appreciate the poem On Falling in Love.
3. Analyze the poem On Liberty
4. Comprehend the style of John Stuart Mill’s Poetry
5. Understand the social life of 19th Century.

Unit IV

The students will be able to

1. Identify targets of Wilde's satire and analyze the treatment of these targets.
2. Discuss the idea of art for art's sake.
3. Identify the pun central to the play and analyze its meaning
4. Answer who is the blocking figure in The Importance of Being Earnest?
5. Answer what precisely is a Bunburyist?

Unit V

The students will be able to:

1. Identify who Charles Dickens was.
2. Summarize the characters and events of *The Pickwick Papers*.
3. understand that true happiness is achieved only through reciprocated love
4. See the tremendous impact that one person's life can have on the many people with whom he comes in contact.
5. Consider whether man or fate controls one's destiny.

Text Book and Reference material

Palgrave , F.T Palgrave's Golden Treasury, Oxford Publisher, 1997

Web Source

<https://www.poetryfoundation.org/poems/43606/the-scholar-gipsy>

<https://www.poetryfoundation.org/poems/43588/dover-beach>

<https://www.poetryfoundation.org/poems/43768/my-last-duchess>

<https://deriv.nls.uk/dcn6/7869/78693125.6.pdf0>

<https://www.gutenberg.org/files/34901/34901-h/34901-h.htm>

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<http://www.gutenberg.org/files/580/580-0.txt>

<https://www.fulltextarchive.com/page/The-Mayor-of-Casterbridge-by-Thomas-Hardy/>

<http://www.gutenberg.org/files/550/550-0.txt>

COREPAPER - 8

HISTORY OF ENGLISH LANGUAGE

Objectives

The students are expected to know

1. General characteristics of English language
2. Development of vocabulary and change of meaning
3. Foreign influences on English language
4. Evolution of American English and standard English
5. Development of English as World language

SYLLABUS

UNIT - I

1. Characteristic features of English Language
2. Indo European Family of Languages

UNIT - II

1. The Growth of English Vocabulary
2. Change of Meaning

UNIT - III

1. History of English Spelling, Pronunciation and Dictionaries
2. Growth of Standard English

UNIT - IV

1. Contribution of Foreign languages
 - a. Latin
 - b. Greek
 - c. French
2. American English

UNIT - V

1. American English
2. English as world language

Course Outcome:

Unit I

Students will be able to know the

1. Characteristic features of English language like heterogeneousness, effect of loss of inflexions, simplicity of inflexions, gender system of English and development of periphrases
2. Indo European family of languages
3. Grimm's law
4. Verner's law
5. English as part of Indo European family of languages

Unit II

The students will be able to understand

1. various methods of development of vocabulary
2. words coined by imitation, abbreviation, initials, back formation
3. words coined by suffixes and prefixes, syncopation, telescoping, metaanalysis, etc.
4. various methods of change of meaning
5. change of meaning listed by F.T. Wood,,

Unit III

The students will be able to understand

1. the impact of influences of foreign languages
2. the influence of Latin language
3. greek influence
4. French influence

Unit IV

The students will be able to understand

1. The history of English spelling
2. Reason for discrepancy between spelling and pronunciation
3. Development of dictionaries
4. Growth of Standard English
5. Received pronunciation

Unit V

The students will be able to understand

1. The reason for the development of American English
2. New coinages
3. Differences between American English and British English'
4. Evolution of English as world Language
5. Impact of English as universal language

ALLIED -2

PAPER- 4

HISTORY OF ENGLISH LITERATURE II

Course Objectives

- 1.To provide an extensive background to the course
2. To introduce the eminent writers of English Literature
- 3 .To expose the students to the magnum opuses of the literary masters
- 4 .To prepare the students to undergo the course thoroughly
- 5 .To provide the nuances of the history of English Literature

SYLLABUS

UNIT - I

1. The Victorian Age:
2. Poetry: Tennyson, Browning, Arnold and Hopkins.
3. Prose: Macaulay calyces Ruskin - Arnold - Walter Pater - R.L Stevenson:
4. Drama: Oscar Wilde
5. Fiction: Dickens, Thackeray - Mrs. Gaskell - Willkie Collins, Charlotte Bronte - George Eliot - Thomas Hardy - Author Canonon Doyle - Rudyard Kipling

UNIT - II

1. The Pre- Raphaelite Movement: Dante Gabriel Rossetti - Morris - Swinburne:
2. Georgian Poets: John Masefield, Walter de la More, Blunden, Housman, W.H Davies; Lascelles Abercrombie

UNIT - III : TWENTIETH CENTURY

1. Poetry: W. B Yeats, T. S Eliot - W. H Adden - Stephen Spender - Dylan Thomas - C.D Lewis, Ted Hughes - Philip Larkin
2. Prose: G.K Chesterton, Robert Lynd - A.G Gardiner, Lytton Strachey - T.E Lawrence - Hilairie Belloc.

UNIT - IV: DRAMA

1. Drama: Bernard Shaw - John Galsworthy - J. M Synge - Sean O' Casey - J.M Barrie - T.S Eliot - Christopher Fry - Beckett - John Osborne - Harold Pinter
2. Fiction: Arnold Bennett - H.G Wells - Graham Greene - Joseph Conrad - Somerset Maugham - E.M Forster - D.H Lawrence - Aldus Huxley - James Joyce - Virginia

Wolf - George Orwell - P.G Wodehouse - Kinsley Amis - John Braine - William Golding

UNIT - V : 21ST CENTURY

1. **Poetry:** Carol Ann Duffy, Kathleen Raine, Edward Bond
2. **Prose:** Monica Ali, Martin Louis Amis, Diana Athill
3. **Fiction:** Margaret Allen, Paul Adam, Douglas Adam, J.K Rowling, Salmon Rushdie
4. **Drama:** Samantha Ellis, Christine Dennison, Alan Bennett & Angela Clarke

Course Out Come

1. Students are able to have a vast knowledge in History of English Literature down the ages
2. Students are exposed to the major movements, changes and impacts in history.
3. Students gain confidence in their course of study.
4. It helps them in the long run to take up the competitive examination.
5. It enables them to pass in the entrance tests when they go for higher studies.

Text Books

Unit - 1,2,3,4:

A History of English Literature by DR. A. Shanmugakani, Harrows Publications

An Outline History of English Literature by W.H Hudson, Mahaam Publishers

A.C Ward: Twentieth Century English Literature

Author Compton - Rickett: History of English Literature

Unit - 5

<https://oxfords.com>

<https://www.britanica.com>

Reference Items: Books, Journal

An Outline History of English Literature by W.H Hudson, Mahaam Publishers

E - Materials

<https://oxfords.com>

<https://www.britanica.com>

SKILL BASED SUBJECT

PAPER - 2

Writing for Specific Purpose

Course Objectives

1. To create a passion for writing in English for special purposes
2. Enable students to learn the techniques of writing
3. To learn the situations and choose the right type of words and wages
4. To create and develop creative interest and encourage them to write on their own
5. To help them become more competent and confident writers

SYLLABUS

UNIT - I

- Getting started
- Gaining control
- Writing for a Diverse Audience
- Organizing your thought
- Managing the purpose of writing
- Overcoming the Writer's Block.

UNIT - II

- Making your message Accessible
- The subject time
- Beginning
- Endings
- Headings
- Graphic Devices
- Bullets

UNIT - III

- An easy to read style
- Strengthening a weak memo
- Writing for special purpose
- The executive summary
- Clear Instructions

UNIT - IV

- Good well letters
- Letter of congratulations
- Thank you notes
- Letter of apology
- Letter of recommendation
- Delivering welcome news

UNIT- V

- Letter of complaint
- Responses to letters of complaint
- Letter of request
- Persuasion : some practical pointer
- Shaping a persuasion message
- Sales letter
- International correspondence
- Message for email

Course Out Comes :

Student is able to prepare her\him self

Unit I

1. To start with work
2. Learns the methodical approach
3. Able to focus on the task
4. Gains control and get involved in the specific work
5. Understands the need of the reading
6. Gain control on writing and get involved in the specific work

Unit II

1. Learn to organize ideas and write
2. Known how to draft the message
3. Write the revised message
4. Known to edit the draft after proof-reading
5. Learn to overcome the writer's block.

Unit III

1. Construct subject .Arrange the key lines of the message in a captive way.
2. Include the punctuation marks in the right place
3. Learn to use the tense in the items in the menu bar like headings endings bullets and graphic devices
4. Makes the message accessible
5. Learn to incorporate the special effect

Unit IV

1. Read their writing and make it clear
2. Analyze the structure and word choice
3. Able to give helpful information
4. Known to write quick, clear and direct
5. Learn to write an easy with specific style.

Unit V

1. Learn to deliver un- welcome news
2. Responses to letter of complaints
3. Shape a persuasive message
4. Draft Sales letters
5. Interact with international correspondence

Text Book :

Reference: Effective business writing Maryann PIOTROWSKI, Harper Collins publisher.
Inc. NY 10022

NON-MAJOR ELECTIVE

PAPER - 2

LANGUAGE SKILLS AND COMMUNICATION II

Course Objectives

1. To enable the students to improve both ability to communicate and develop linguistic competence in language.
2. To study a language and various transferable skills as a part of this course

UNIT - I:

1. **Getting people's attention and interrupting**
2. **Giving instructions and seeking clarification**
3. **Making requests, asking for directions and giving directions.**

UNIT - II:

1. Inviting, accepting and refusing invitation.
2. Apologizing and responding to an apology.
3. Congratulating and responding to congratulations.
4. Asking for, giving and refusing permission.

COURSE OUTCOMES

UNIT I

1. Students will be able to use expressions to get someone's attention.
2. Students will be able to mention connecting word while giving instruction.
3. Students will be able to know the ways of making request, asking for directions, and also giving directions.
4. Students will be able to know how to give instruction and seek clarification.
5. Student will be able to grasp the procedures while present dialogues for any situation.

UNIT II

1. Students will be able to know how to invite, accept and refusing invitation.
2. Students will be able to develop the formal and informal ways for accepting and declining invitation.
3. Students will be able to know how to congratulate and how to respond to congratulations.
4. Students will be able to know how to ask, give and refuse permission in both formal and informal situations.
5. Students will be able to learn how to apologize and respond to apology

Text books:

KamleshSadam and SusheelaPunitha. Spoken English:
A Foundation Course (Part I). Orient black swan. 2014

SEMESTER V

CORE PAPER - 9

BRITISH LITERATURE IV

Course Objectives

1. To introduce Twentieth century British literature.
2. To comprehend the development of trends in British literature.
3. To view British literature in its socio-cultural and political contexts.
4. To understand the theme, structure and style in twentieth century British literature.
5. To learn interpretative techniques like modernism and post-modernism in order to apply in the literary texts of various genres.

SYLLABUS

UNIT - I: POETRY

1. Second Coming - W.B Yeats
2. Tollund Man - Seamus Heaney
3. A Prayer for My Daughter- W.B.Yeats

UNIT - II: POETRY

1. God's Grandeur - Gerald Manley Hopkins
2. The Hound of heaven- Francis Thompson

UNIT - III: PROSE

1. The function of a Teacher- Betrand Russell
2. Bookshop Memories - George Orwell
3. Notes on the English character - E.M.Foster

UNIT - IV: DRAMA

1. Pygmalion - G.B.Shaw

UNIT - V: NOVEL

1. Lord of the Flies - William Golding
2. 1984 - George Orwell

COURSE OUTCOMES

Unit - I

1. Students will be able to understand the coming of a new ominous reality.
2. Students will be able to understand the themes of the poems of W.B. Yeats with reference to "The Second Coming".
3. Students will be able to know the background of Irish literature with reference to Seamus Heaney.
4. Students will be able to understand the violence and murders in Northern Ireland with reference to "Tollund Man".
5. Students will be able to recognize the love of a father for his daughter through the poem "Prayer for My Daughter".

Unit - II

1. Students will be able to understand the theme of the poems of G.M. Hopkins.
2. Students will be able to appreciate the literary genre, Sonnet.
3. Students will be able to understand man's lack of awareness and his insensitivity to nature.
4. Students will be able to classify the poem, "Hound of Heaven" as an ode.
5. Students will be able to understand the pursuit of a sinner by a loving God.

UNIT - III

1. Students will be able to understand the role of a teacher in the society.
2. Students will be able to appreciate the responsibility of a teacher.
3. Students will be able to understand various kinds of people and their behaviour.
4. Students will be able to understand the idea of undeveloped heart.
5. Students will be able to understand the ways and means of expressing emotions through characters.

Unit - IV

1. Students will be able to appreciate G. B. Shaw as a Dramatist
2. Students will be able to understand various social issues in the plays of G.B. Shaw with reference to "Pygmalion"
3. Students will be able to understand the teacher- student relationship
4. Students will be able to recognize the sense of humour in the plays of G. B. Shaw.
5. Students will be able to understand the distinct social class system.

Unit - V

1. Students will be able to know the theme of the novels of William Golding with reference to “Lord of the Flies.”
2. Students will be able to understand the concept of bestial instinct and savagery.
3. Students will be able to understand the suitability of the novel for film making.
4. Students will be able to understand the concept of totalitarianism
5. Students will be able to understand how the views in the novels are relevant in the current scenario.

TEXT BOOKS AND E- MATERIALS

Poetry down the Ages 2004. Orient Longman

George Bernard Shaw's **Pygmalion**. New York: Chelsea House **Publishers**, 1988.

Golding, William, and Edmund L. Epstein. **Lord of the Flies: A Novel**. New York: Perigee, 1954.

Orwell, George. **1984**. London: Secker and Warburg, 1949.

<https://www.gradesaver.com/the-second-coming/study-guide/poem-text>

<https://www.poetryinternational.org/pi/poem/23607/auto/0/0/Seamus-Heaney/THE-TOLLUND-MAN/en/tile>

<https://www.poetryfoundation.org/poems/44395/gods-grandeur>

<https://www.bartleby.com/236/239.html>

<http://www.askliterature.com/prose/functions-of-a-teacher-by-bertrand-russell/>

https://orwell.ru/library/articles/bookshop/english/e_shop

<https://sex-british.com/notes-on-the-english-character-e-m-forster/>

CORE PAPER - 10

SHAKESPEARE

Objectives

1. To make students understand the characteristics of Shakespearean tragedy
2. To stress the significance of filial love
3. To enable the students to appreciate the qualities of Shakespearean comedy
4. To show how Shakespeare excels as poet
5. To give a brief introduction to Shakespearean criticism

SYLLABUS

UNIT - I & II- King Lear

Unit III - A Midsummer Night' Dream

Unit IV - Sonnet 116, 130

Unit V - Shakespeare Criticism:

A Midsummer Night' Dream: The Round Table Characters of Shakespeare's Plays

A C Bradley Lecture VII

Course Outcome

Unit I and II

Students will be able to

1. grasp how Lear suffers from children's ingratitude
2. appreciate the innocence of Cordelia
3. appreciate the significance of fool
4. understand how hamartia leads to fall
5. understand the role of fate

UNIT - III

Students will be able to understand

1. Characteristic features of a romantic comedy
2. To appreciate the world of magic
3. The significance of love
4. Appreciate the role of Puck
5. Appreciate the role of songs

UNIT - IV

Students will be able to understand

1. the characteristics of sonnets
2. Shakespeare's views on love
3. Shakespeare's affection for the dark lady
4. The poetic language of Shakespeare

UNIT -V

Students will be able to understand

1. Hazlitt as a critic
2. Greatness of Shakespeare as playwright
3. Critically appreciate Midsummer Night's Dream as a comedy
4. Dequincy's views on Macbeth
5. Why the porter Scene is introduced after Duncan's death

CORE PAPER - 11
LITERARY CRITICISM

Objectives

1. Understand the relationship between literature and criticism
2. Understand Aristotle's concept of Tragedy
3. Understand that the end result of novel as the whole man alive
4. Understand T.S. Eliot as a modern critic
5. Understand current literary theory

UNIT - I

- Poetics - Aristotle

UNIT - II

- Preface to Lyrical Ballads -William Wordsworth

UNIT - III

- Why the Novel Matters D.H.Lawrence
- Tradition and the Individual Talent -T.S.Eliot

UNIT - IV

- New Criticism Structuralism- Post structuralism

UNIT - V

- Feminist Criticism - Post-Colonialism - Eco criticism

Course Outcome:

Unit I

The students will be able to understand

1. Aristotle's concept of tragedy
2. six formative element in tragedy
3. Aristotle's Plot, character and tragic hero
4. Functions tragedy

Unit II

The students will be able to

1. understand the genesis of the Preface to the Lyrical Ballads
2. know key concepts conversed in the Preface to the Lyrical Ballads

3. have Wordsworth's views on themes, subject matter, function & diction of poet

Unit III

1. Why does the novel matter?
2. How Lawrence highlight the superiority of the novel over other forms of literature
3. What according to Lawrence are the supreme old novels
4. The relation between tradition and individual talent
5. The concept of objective correlative

Unit IV

The students will be able to understand

1. John Crowe Ransom as a pioneer of New Criticism
2. The theory of new criticism
3. Ferdinand de Saussure as forerunner of Structuralism
4. The difference between new criticism and structuralism
5. The theory of post structuralism

- Unit V Feminist Criticism - Post-Colonialism - Eco criticism

The students are able

1. to assess the different concept of Feminist Criticism
2. To get identify the different impact of post colonialist features in literature
3. To learn Eurocentric concepts of criticism
4. To distinguish between impact of orientalism and European imperialism.
5. To understand the parallel between feminist criticism and eco criticism.

TEXTS

Reference books:

- Barry, Peter. *Beginning Theory*. Manchester University Press 2009.
- [Hans Bertens](#). *Literary Theory: The Basics*, 2013
- [M.H. Abrams](#) et al. *A Glossary of Literary Terms* 11th Edition.
- English Literary Criticism and Theory by M.S .Nagarajan
- BOOK: English Critical Texts : D.J Enright Ernst De Chickera

CORE PAPER - 12
SUBALTERN LITERATURE

Objectives

1. To know the themes of subaltern poetry
2. To critically analyse the poems of subaltern literature
3. To know the theme of marginalization in Chinua Achebe's *The Sacrificial Egg* and Mahaswetha devi's *Draupadhi* .
4. To appreciate the plays of subaltern playwrights, Asif Currimbhoy and Wole Soyinka
5. To know the theme of hegemony in the novels of Amitav Ghosh and Khalid Hosseini

SYLLABUS

UNIT - I

Poetry

1. *The Dying Eagle* by E.J. Pratt
2. *Why have you left the Horse Alone* by Mahmoud Darwish
3. *Telephone Conversation* by Wole Soyinka

UNIT - II

Non Fiction

Nickel and Dimed by Barbara Ehrenreich

UNIT - III

Short stories

1. *The Sacrificial Egg* by Chinua Achebe
2. *Draupadhi* by Mahaswetha Devi

UNIT – IV

Drama

1. *Dumb Dancer* by Asif Currimbhoy
2. *Death and the King's Horseman* by Wole Soyinka

UNIT –V

Fiction

1. *Hungry Tide* by Amitav Ghosh
2. *The Kite Runner* by Khalid Hosseini

Course Outcomes

Unit I

The students will be able to

1. Analyze the theme of loss of power
2. Know the inevitability of younger generations overthrowing the older ones
3. Analyse myth and history in Mahmoud Darwish's poem, "Why have you left the horse alone"
4. Understand the pain of exile

5. Understand the theme of racial discrimination

Unit II

The students will be able to

1. understand the complications that arise from trying to survive on a minimum- job

Realize that work is not a way out of poverty, but a physically and emotionally damaging state in which the economic laws of supply and demand often simply don't apply.

2. Understand that low-wage workers are forced to fight an uphill, or even impossible, battle:
3. understand that their problems stem not from individual weaknesses or laziness but from entrenched structural issues that make working your way out of poverty excruciatingly difficult.

Unit III

The students are able to understand

1. the tug-of-war between Western influences and native traditions and beliefs.
2. Through Julius, that even decades of colonialism are incapable of erasing the rituals and beliefs of a people
3. The concept of emptiness and loss.
4. That Draupadi is an ironic tale of exploitation and struggle faced by a woman for being born in a low birth
5. And explore the traumas undertaken by the women protagonists to resist and survive.

Unit IV

The students are able to understand

1. How the psychological thriller, Dumb Dancers incorporate the element of valour from the Mahabharata,
2. the stigma and struggle attached with mental illnesses, expressed through the traditional *dance* form, kathakali.
3. the mingling of Western and Yoruban elements in Death and the King's Horseman
4. the universality of the theme of cultural responsibility
5. The values of Yoruban society

Unit V

The students will be able to understand

1. The Environmental problems which are often underestimated by the majority of mankind in Hungry Tide.
2. Corruption and bureaucracy as disease, which develops quickly, but takes a lot of time, efforts and determination to recover from it
3. The necessity of Responsibility.
4. The theme of betrayal The Kite Runner

5. The life of guilt moving towards redemption

Text Book and Web Source

1. https://www.k-state.edu/english/westmank/spring_00/SOYINKA.html
2. <https://english2302.files.wordpress.com/2016/08/the-sacrificial-egg.pdf>
3. Currimboy, Asif. Dumb Dancers. Culcutta: Writers Workshop, 1992.
4. Ehrenreich, Barbara. Nickel and Dimed. Picador, n.d.
5. Gosh, Amitav. The Hungry Tide. Harper Collins, n.d.
6. Hosseini, Khaled. The Kite Runner. Bloomsbury Publishing , n.d.

INTERNAL ELECTIVE

PAPER - 1

(to choose one out of two)

A. CHILDREN LITERATURE

Objectives

1. To make the students read a broad range of children's literature from Fairy tales to recent books
2. it gives students appreciation about their own cultural heritage as well as those of others;
3. it helps students develop emotional intelligence and creativity;
4. to explore new vocabulary, to internalize grammar and linguistic structures,
5. to motivate the students to develop the habit of reading

SYLLABUS

UNIT - I

1. Little Women - Louisa May Alcott

UNIT - II

1. Anna of Green Gables (Book I)- Anne Montgommz

UNIT - III

1. Harry Potter and the Philosopher's Stone -J . K.Rowling

UNIT - IV

1. The Ugly Duckling - Hans Christian Andersen
2. Hansel and Gretel - Grimm's Fairy Tales

UNIT - V

1. C.S.Lewis- On Three ways of Writing for Children
2. Philip Pullman - On Children's Literature and the Critics Who Disdain It (From Daemon Voices: On Stories and Storytelling).

Course outcome:

Unit I

The students learn

1. Young woman's struggle between familial duty and personal wor

2. The danger of gender stereotyping
3. To find happiness through daily activities and dreams
4. The importance of being genuine
5. What they deserve depends on how hard they work

Unit II

The students are able to understand

1. How being good leads to problems
2. The traditional roles and propriety
3. The underlying moral character of Anne
4. How new moral codes perplex the traditional ones
5. Anne's vision of future

Unit III

The students are able to understand

1. How Harry learns that he is a wizard
2. Harry's first experience of wizarding
3. The character of Hermione Ganger and Professor Quirrell
4. The Significance of Harry's eleventh birthday
5. The importance Harry's vision on the Mirror Erised

Unit IV

The students will be able to:

1. identify and describe the moral of the story, The Ugly Duckling
2. analyze the characters of the story.
3. analyze the elements of a fairy tale.
4. Understand how to manage problematic situations
5. compare and contrast fairy tales

Unit V

The students understand

1. it's in the fantasy literature that we find a sense of sub-creating a world and the tales that inhabit it that both reveal and delight.
2. that it is a wrong conception that one is behind in his reading and one is ahead,
3. that there isn't a complete and unbridgeable gap between the books of the children, and the grown-
4. That we grow up by moving along a sort of timeline, like a monkey climbing a stick.
5. They should not criticize anyone for reading children's fiction

Web Source:

<https://www.catholicculture.org/culture/library/view.cfm?recnum=9117>

Alcott, Louisa May. Little Women. Fingerprint Publishing, n.d.

Montgomery, L M. Anna of Green Gables. Penguin UK, n.d.

Rowling, J K. Harry Potter and the Philosopher's Stone. Bloomsbury Press, n.d.

INTERNAL ELECTIVE

PAPER - 1

B. JOURNALISM

Objectives:

- 1) To give students a better understanding on the development of history journalism in global and Indian context.
- 2) Introduce students the concept related to News and Journalistic practice
- 3) Ignites knowledge of professional Journalism and helps students to strengthen the underpinnings of journalism.
- 4) Stimulates the students on getting knowledge about how newspaper encourages photo-journalism development.
- 5) Prepares students as a good reporter and capable interpreter of society
- 6) Imparts knowledge of sciences and history of arts to make one's way up in a world to meet out increasingly demanding competence in the field of journalism.
- 7) Modality prepares a student to learn how to write editorials columns and feature articles.

SYLLABUS

UNIT - I

History - Definition of News - News sources - News Values - Role and functions of Journalism - Canons of Journalism.

UNIT - II

Reporter - News Editor - Sub Editor - Anatomy of Editing - Language and Style - Organisation and Structure of the News paper.

UNIT - III

Introduction to Copy Editing - Preliminary Copy Editing - Design and Specimen Pages.

UNIT - IV

On Screen Copy Editing - Preparing Text for typesetter - Illustrations - Proof.

UNIT - V

House Style

- House Style and Preliminary Pages
- Cross references
- Date and Time
- Spelling and Punctuations
- Title Page
- Content List
- List of Illustrations

Literary Material

- Running Heads
- Page Number
- Heading
- Footnotes and Endnotes
- Tables
- Appendixes
- Glossaries

References:

1. Mencher, Melvin; News Reporting and Writing; 7th edition; (1997); Columbia Univ.Press
2. Ed. Boyce, George; Curran, James; Wingate, Pauline; Newspaper History from the 17th century to the present day; (1978); Sage
3. Wilson, John; Understanding Journalism; (1996); Routledge
4. Mazumdar, Aurobindo; Indian Press and Freedom Struggle; (1993); Orient Longman
5. Parthasarthy, Ramaswamy; Here is the News; (1994); Streling
6. Brumley and O'Malley; A Journalism Reader, (1997); Routledge
7. Howard, T; New: A Reader; (1991); OUP
8. Williams, Framcos; Dangerous Estate: (1957); Longman

9. Dhavan, Rajeev; Only the Good News; (1987); bharat Enterprises
10. Sarkar, R.C.S; The press in India; (1984); S. Chand & Co. Ltd.
11. Raghavan, G. N. S; PTi Story; (1987); Indraprastha Press
12. Rao, Amiya and Rao, B.G.; The Press she could not whip; (1977); Popular Prakashan
13. Srinivasan. R.; Crusaders of the 4th Estate; (1989); Bhartiya Vidya Bhavan
14. Smith, Anthony; The News an International History; (1979); Thames and Hudson
15. Hohenberg; The professional Journalist
16. Ahuja, B.N., Theory and Practice of Journalism, Surject Publications, Delhi, 1979
17. Gunning, Robert, The Technique of Clear Writing, McGraw-Hill Book Co., New York.
18. Johnson, Stanley and Julian Hariss, The Complete Reporter, The MacMillan Co., New York, 1942.
19. Lent, John A. (ed), The Asian Newspaper's Reluctant Revolution, The State University Press, Ames Iowa, 1977.
20. Murthy, Nadig Krishna, Indian Journalism, Prasaraanga, University of Mysore, 1966.
21. Natrajan, J., History of Indian Journalism. The Publications Division Government of India.
22. Parikh, R.D., The Press and Society, Popular Prakshan, Bombay, 1965.
23. Parthasarathy, Rangaswami, A Hundred Years of the Hindu; The epic story of Indian Nationalism, Kasturi and Sons Ltd., Madras/
24. Sahni, J.N., Truth About the Indian Press, Allied Publishers, Bombay, 1974.
25. Sethi, Patanjali, Professional Journalism, Orient Longman, Bombay, 1974.
26. Wolseley, Roland E. (ed.), Journalism in Modern India, Asia Publishing House, Bombay, 1964.

Web Source:

copac.ac.uk:

copac@mimas.ac.uk

SKILL BASED PAPER SUBJECT

PAPER - 3

CONTENT WRITING

Course Objective

Expose students of English literature to the world of 'ideation and creation'. By providing a platform for writing contents for Advertisement, Websites, Product descriptions and Social media contents (for clients to express, inform, entertain or persuade the audience/ readers) enhances the artistic and analytic function of the student.

Course Outcome

Content Writing will play a vital role in the era of "start ups". With technical expertise along with good writing skills can provide a great career opportunity to a student.

Unit I

Introduction

Writing for special purpose- nuances of technical writing- digital age writings- SEO- target identification and focus- various platforms. Types of Content Ads., Blogs, E-Books etc., Publication Platforms.

Unit II

Writing Tools, Tips, & Techniques.

Unit III

Advertising Objectives- Category of Ads. - Strategy - layout- language.

Unit IV

Social media and present day platforms. Social media tools.

Unit V

Content Writing Exercises, Commercials, Social Advertisements, Short films, Projects as teams.

Text Book

Reference Books.

- [Kristina Halvorson](#). *Content Strategy for the Web*.
- [Mark W. Schaefer](#). *The Content Code: Six essential strategies*. 2015.

- **Goddard Angelo.** *The language of Advertising.* **1998.**
- **Caston Julia.** *Creative writing: A Practical Guide.* **1998.**
- **Krikpan John.** *Good Style writing for Science.* 1992.

SEMESTER VI

COREPAPER -13

CONTEMPORARY LITERATURE

Course Objectives

1. To introduce a wide range of contemporary literature.
2. To understand the variety of existing literary culture.
3. To expose the students to know the development of English language.
4. To expose the students to know to variety of characters
5. To promote the students to read contemporary literature.

Syllabus

UNIT - I: POETRY

1. Rain - Don Patterson
2. Wedding - Alice Oswald

UNIT - II: POTERY

1. Though My Mother was Already Two Years Dead (Long Distance II)- Tony Harrison
2. Lonely Moon- Sandra Feldman

UNIT - III: PROSE

1. Through the Tunnel- Doris Lessing
2. Once Upon a Time- Nadine Gordimer

UNIT - IV: DRAMA

1. The Humans- Stephen Karam
2. England People Very Nice- Richard bean

UNIT - V: NOVEL

1. Life of pi- Yann Martel

2. The Alchemist- Paulo Coelho

COURSE OUTCOMES

UNIT I

1. Students will be able to understand contemporary American poetry with reference to Don Patterson.
2. Students will be able to analyze why Patterson love all films that starts with rain.
3. Students will be able to understand the poetic techniques used by Alice Oswald.
4. Students will be able to know how art attempts to make a sense of the transformation after wedding.
5. Students will be able to understand the transformation that love creates in one's life.

UNIT II

1. Students will be able to understand contemporary English literature with reference to Toni Harrison.
2. Students will be able to recognize the universality of motherhood.
3. Students will be able to understand how dead people live in the memories of people alive.
4. Students will be able to critically analyze the theme of loneliness.
5. Students will be able to have a glimpse of Jewish literature with reference to Sandra Feldman.

UNIT III

1. Students will be able to understand contemporary English short story with reference to Doris Lessing.
2. Students will be able to know the historical context of the short story "Through the Tunnel".
3. Students will be able to know the psychological implications of imaginary fears.
4. Students will be able to understand the South African literature with reference to Nadine Gordimer.
5. Students will be able to fix the story, "Once Upon A Time" in the frame work- bed time stories.

UNIT IV

1. Students will be able to understand the contemporary British drama with reference to Richard Bean.
2. Students will be able to know the existing racism among ethnic groups.

3. Students will be able to understand the theatre techniques used.
4. Students will be able to understand the contemporary American drama with reference to Stephen Karam.
5. Students will be able to know the concept of familial drama.

UNIT V

1. Students will be able to know the contemporary Canadian literature with reference to Yann Martel.
2. Students will be able to appreciate the story of an Indian teen ager with a Bengal Tiger in a life boat after a ship wreck.
3. Students will be able to understand the contemporary Brazilian literature with reference to Paulo Coelho.
4. Students will be able to comprehend the role of symbols and omens in one's life.
5. Students will be able to understand the suitability of the novels for film making.

TEXT BOOKS AND E- MATERIALS

<https://poets.org/poem/rain-0>

<https://www.poetrybyheart.org.uk/poems/wedding/>

<https://poets.org/poem/long-distance-ii>

<https://www.poemhunter.com/poem/lonely-moon-5/>

<https://www.bartleby.com/topics/through-the-tunnel>

[https://archive.org/stream/GordimerOnceUponATime/Gordimer Once Upon a Time djvu.txt](https://archive.org/stream/GordimerOnceUponATime/Gordimer%20Once%20Upon%20a%20Time_djvu.txt)

Martel, Yann. **Life of Pi**. New York: Harcourt, Inc., 2001.

Coelho, Paulo. **The Alchemist**. San Francisco: HarperSanFrancisco, 1998. Print.

CORE PAPER -14

INDIAN LITERATURE IN TRANSLATION

Course Objectives

1. To introduce the student to the polyphony of modern Indian literature in translation.
2. To understand the multi-faceted nature of cultural identities in the various Indian literature in translation.
3. To compare literary texts produced across Indian regional landscapes to seek similarities and differences in thematic and cultural perspectives.
4. To explore images in literary productions that express the writer's views on their society.
5. To enable the students to understand and appreciate the richness and complexities of the respective languages and their literature.

Syllabus

UNIT - I: POETRY

1. Kurunthogai Verse 40 (poem: “**Red Earth and pouring rain**”): What could my mother be to yours)- Translated by Dr. Jayanthasri Balakrishnan
2. The modern woman by Bharathiyar. (puthumai Pen)
3. Thirukkural - The Possession of love

UNIT - II: NON-FICTION

The five steps to success by Yandamoori Veerandranath

UNIT - III

1. Chemmeen - Thakazhi Sivasankara Pillai (Translated by Anita Nair)
2. Grachar Gochar - Vivek Shenbag (Translated by Srinath Prerur)

UNIT - IV

1. Sakunthalam - Kalidasa

2. EvamIndrajith - Badal Sarkar (Translated by GirishKarnad)

UNIT - V

1. Bridges - Sivashankari (Translated by Krisnan)
2. The Bait - Mahim Bora (Translated by LalithSaika)

COURSE OUTCOMES

UNIT I

Students will be able to

1. Learn the universal qualities of pure love irrespective of caste, creed and society.
2. Appreciate the poetic style and the indigenous metaphor
3. The concept of modern woman by Bharathiyar
4. The significance of selfless love
5. Thiruvalluvar as universal poet

UNIT II

Students will be able to know

1. how to overcome anger, laziness , fear and complexes
2. How to develop their leadership qualities
3. How to develop their relationships
4. Indian culture and tradition
5. Able to face life with confidence

UNIT III

- 1.Students will be able to understand the myths about chastity.
- 2.Students will be able to understand the customs, taboos, beliefs and rituals of fishermen community.
- 3.Students will be able to understand the socio-cultural background of India with reference to VivekShenbag.
- 4.Students will be able to face problems after marriage.
- 5.Students will be able to raise voice against domestic violence.

UNIT IV

1. Students will be able to understand the importance of culture depicted in the epic *Mahabaratha*.

2. Students will be able to develop a taste for language and literature with reference to *Sakuntalam*.
3. Students will be able to understand the sign of true love.
4. Students will be able to learn the genre absurd play and the stream of consciousness technique.
5. Students will be able to explore Sartrean existentialism.

UNIT V

1. Students will be able to understand Assamese literature with reference to Mahim Bora.
2. Students will be able to visualize the concept of first love.
3. Students will be able to know the importance of rural life.
4. Students will be able to know the practices and rituals of the Tamil ancestors.
5. Students will be able to understand the concept of birth and death.

TEXT BOOKS AND E MATERIALS

<https://www.worldcat.org/title/sins-of-appus-mother/oclc/309143>

<https://talesntunes.wordpress.com/2017/12/11/book-review-chemmeen-english-translation/>

<https://indianreview.in/fiction/indian-review-assamese-literature-the-bait-mahim-bora-translated-lalit-saikia/>

<https://www.worldcat.org/title/kalidas-abhigyan-shakuntalam/oclc/643914898>

Badal Sarkar, EvamIndrajith - translated by GirishKarnad. Oxford University Press, London 1974 Print.

<https://www.worldcat.org/title/bridges-paalangal/oclc/229343130>

https://www.academia.edu/9958506/TRANSLATION_OF_CLASSICS

COREPAPER -15

NEW LITERATURES IN ENGLISH

Course Objectives

1. To introduce the finest works in English belonging to various countries.
2. To give insight into the dogma free world of spiritualism.
3. To enable the students to analyze literary works from different environment and different cultures.
4. To show how English language has become a tool against colonialism.
5. To give an objective view of dichotomies in society.

UNIT - I: POETRY

Australia - A.D.Hope

Your Children are Not Your Children - Khalil Ghibran

UNIT - II: POETRY

A Far Cry From Africa - Derek Walcott

House and Land - Allen Curnow

UNIT - III: PROSE

A Black Grand Mother - Sally Morgan

Novelist as a Teacher - Chinua Achebe

UNIT - IV: DRAMA

Death and the King's Horseman - Wole Soyinka

UNIT - V: NOVEL

Cry, the Beloved Country - Allen P

COURSE OUTCOMES

UNIT I

1. Students will be able to understand the background of Australian literature with reference to A.D.Hope.
2. Students will be able to understand the satire in the poems of A.D.Hope.
3. Students will be able to understand the use of symbolism through the poem "Australia".

4. Students will be able to understand parental narcissism as a toxic quality through the poem “Your Children are not Your Children”.
5. Students will be able to know importance of children’s individual views and independent ideologies are not influenced by their parents.

UNIT II

1. Students will be able to understand the feelings of displacement through the poem “House and Land”.
2. Students will be able to know the New Zealand literature.
3. Students will be able to feel the state of immigrants.
4. Students will be able to understand the racial and cultural tensions in Africa.
5. Students will be able to understand the concept of colonialism.

UNIT III

Students will be able to understand how race plays an important role in works of African writers.

Students will be able to know the definition of emotional journey.

Students will be able to understand the importance of journey and its benefits.

Students will be able to understand how a writer takes up the role of a teacher.

Students will be able to differentiate post-colonial and western writers.

UNIT IV

1. Students will be able to understand the richness of the African literature.
2. Students will be able to develop taste for the techniques of drama with reference to *Death and the King’s Horseman*.
3. Students will be able to understand the concepts of anti-colonialism.
4. Students will be able to understand the background and rituals of Yoruba community.
5. Students will be able to analyze that the play as a bridge between African and European culture.

UNIT V

1. Students will be able to witness the background status of South Africa.
2. Students will be able to know the international attention to South Africa’s tragic history.
3. Students will be able to capture the extremes of human emotions.
4. Students will be able to comprehend African’s hope for their freedom from hatred, poverty and fear.
5. Students will be able to understand that the novel is a journey from rural life to urbanization.

TEXT BOOKS AND E MATERIALS

Soyinka, Wole. Death and the King's Horseman Norton critical edition. New York : Norton, 2003.

Paton, Alan. Cry, the Beloved Country. New York, N.Y: Scribner, 2003. Print.

<https://www.studymode.com/subjects/a-black-grandmother-by-sally-morgan-page1.html>

<http://mrhuman.weebly.com/uploads/2/1/5/1/21516316/thenovelistasteacher.pdf>

<https://cdn.auckland.ac.nz/assets/press/all-books/pdfs/2017/Appendix%20to%20Allen%20Curnow%20Collected%20Poems.pdf>

<https://poets.org/poem/far-cry-africa>

<https://sahyadriliterature.blogspot.com/2018/08/poem-analysis-of-australia-by-a.html>

<https://poets.org/poem/children-1>

INTERNAL ELECTIVE

PAPER - 2

(to choose one out of two)

A. ENGLISH FOR INFORMATION TECHNOLOGY

Objectives:

1. To make students familiar with internet and its usage
2. To help them learn the basic ways of exploring internet
3. To enhance their knowledge of using multimedia.
4. To improve their knowledge of computer in learning and teaching English
5. To enable them create their own blogs and web page

UNIT - I

1. World Wide Web & Email, Internet
2. Searching the Internet & Search FAQ's
3. The Internet as Resource Bank and classroom tool

UNIT - II

1. Introduction to NET (I)
2. Introduction to NET (II)
3. Writing Projects
4. Email projects and discussion lists

UNIT - III

Activities

1. Making news
2. Eco-tourism
3. Mystery Postcards
4. Classified ads
5. Puzzle Maker
6. Reviewing a website

UNIT - IV

Tools for Online works

1. Blogs and Wikis
2. Web Quest
3. Recent multimedia applications in everyday life.

UNIT - V

1. Professional development online
2. Listserv FAQs
3. Teaching online
4. Teaching development resources

Course Outcome:**Unit 1:**

- 1 Student is able to use internet.
- 2 Learn to send and receive e-mails
- 3 Identify similar problems and know the ways to solve through FAO's
- 4 Incorporate the required material from the web resource bank in learning English
- 5 Exchange ideas using e-mail

Unit 2:

- 1 Learn the history of computer and its gradual development till date.
- 2 Get educated in online quiz and enrich their knowledge
- 3 Get their educational resource materials.
- 4 Involve in creating and publishing their articles.
- 5 Know to participate in online discussion and get their doubts clarified

Unit 3:

- 1 Students are able to compose news and upload
- 2 They are able to locate popular places of tourism and learn their ecological significance
- 3 Learn to create postcards and develop related knowledge
- 4 Learn to draft classified ads for practical benefits
- 5 They are able to construct puzzles and derive English language knowledge

Unit 4:

- 1 To create blogs and wikis
- 2 Know to use web page
- 3 Learn to apply multimedia in their web based activities
- 4 Learn to edit content in wikis
- 5 Know to operate playstore and download different apps

Unit 5:

- 1 Analyse content wise websites
- 2 Know to browse profession related websites
- 3 Have discussion and exchange ideas
- 4 Get educated new techniques in teaching learning
- 5 Improve their teaching learning in class rooms situation
- 6 Get familiarized with ICT

Prescribed Text

The Internet and the Language Classroom - A Practical Guide for Teachers - II Edition -
Gavin Dudency , Cambridge University Press, 2007.

INTERNAL ELECTIVE

PAPER - 2

B. FILM - APPRECIATION AND BOOK REVIEW

Objective:

- 1 To sensitize students in the nuances of cinema.
- 2 To introduce the semiotics of cinema to students
- 3 To introduce theories relevant to film appreciation
- 4 To expose students to the world of film language
- 5 To direct the massive influence of cinema towards the positive

UNIT - I

1. Film appreciation : An introduction
2. Reading the visual and visualizing the text: Film Language

UNIT - II

1. Cinema : Aesthetics, Religion and politics
2. A Classic film is a critique of the medium

UNIT - III

- 1 What's in a Name?
- 2 Brevity is the soul of wit
- 3 How you say a thing
- 4 Acting is believing

UNIT - IV

1. Watching the recommended movies and writing reviews

UNIT - V

Reading books and writing Reviews

1. Becoming by Michelle Obama
2. A walk to remember by Nicholas Sparks
3. Three women , three ponds by Sudha Murthy
4. One Indian girl by Chetan Bhagat

Course outcome

UNIT I:

1. Students is able to get an overall view of cinema as a massive influence in the society
2. Understand semi-idiomatic expressions coined through movies

3. Differentiate regional movies from World Cinema
4. Classify the important feature of cinema
5. Learn to appreciate film language

UNIT II:

- 1 Learn the basics of film - language and venture on to higher level.
- 2 Become knowledgeable in the trained areas of signs, codes and syntax of film-language
- 3 Identify the circuit of film experience connected to different fields of social political and religious life
- 4 Become more knowledgeable at cultural, social and political levels
- 5 Appreciate the interactive process between the visual and the viewer

UNIT III:

1. Differentiate the main text from multiple sub- texts.
2. Understand that cinema is used not only an entertainment but as laughter therapy
3. Develops positive attitude
4. Establish revolutionary ideas against the odds of life
5. Appreciate the effects of sound and music

UNIT IV:

1. Interpret the different concepts of the movie.
2. Apprehend the art and culture depicted through movie
3. Enlist the number of techniques used in cinema.
4. Get trained to choose apt titles and catchy phrases to be used.
5. Analyze the plot- structure of the movie

UNIT V:

1. Develop the habit of book reading
2. Know the nuances and techniques of reading
3. Learn their intricacies of characterization
4. Learn to analyze the book critically
5. Analyze the plot-structure of the movie

Text Prescribed

1. Prof.N,Ilango,*Film- Appreciation for Beginners*, Manimekala Publishing House, Madurai, 2017.

BOOK RECOMMENDED:

- 1 Becoming by Michelle Obama
- 2 A walk to remember by Nicholas Sparks
- 3 Three women , three ponds by Sudha Murthy
- 4 One Indian girl by Chetan Bhagat

Movies Recommended:

1. Harry Potter, goblet of Fire directed by mike Newell
2. The Chronicle of Narnia directed by Andrew Adamson
3. Jungle Book, directed by Jon Favreau
4. Gandhi ,directed by Richard Attenborough
5. Ten Commandment directed by Cecil B.Demille
6. The Hound of Baskervilles directed by Sidney Lanfield
7. Schindler's List directed by Steven Spielberg

INTERNAL ELECTIVE

PAPER - 3

(to choose one out of two)

A. WRITING FOR SPECIFIC PURPOSE

Course Objectives

1. To create a passion for writing in English for special purposes
2. Enable students to learn the techniques of writing
3. To learn the situations and choose the right type of words and wages
4. To create develop creative interest and encourage them to write or them own
5. To help them become more competent and confident writers

UNIT - I

- Getting started
- Gaining control
- Writing for a Diverse Audience
- Organizing your thought
- Managing the purpose of writing
- Overcoming the writer's Block.

UNIT - II

- Making your message Accessible
- The subject time
- Beginning
- Endings
- Headings
- Graphic Devices
- Bullets

UNIT - III

- An easy to read style
- Strengthening a weak memo
- Writing for special purpose
- The executive summary
- Clear Instructions

UNIT - IV

- Good well letters

- Letter of congratulations
- Thank you notes
- Letter of apology
- Letter of recommendation
- Delivering welcome news

UNIT - V

- Letter of complaint
- Responses to letters of complaint
- Letter of request
- Persuasion : some practical pointer
- Shaping a persuasion message
- The sales letter
- International correspondence
- Message for email

Reference: Effective business writing Maryann PIOTROWSKI, Harper Collins publisher. Inc. NY 10022

Course Out Comes (five outcomes for each units should be mentioned)

Student is able to prepare her\him self

Unit - I

1. To start with work
2. Learns the methodical approach
3. Able to focus on the task
4. Gains control and get involved in the specific work
5. Understands the need of the reading
6. Gain control one writing and get involved in the specific work

Unit II

1. Learn to organize ideas and write
2. Known how to draft the message
3. Write the revised message
4. Known to edit the draft after proof-reading
5. Learn to overcome the writes block.

Unit III

1. Construct subject arrange the key lines of the message in a captive way.
2. Include the punctuation marks in the right place
3. Learn to use the tens in the items in the menu bar like headings endings bullets and graphic devices
4. Makes the message accessible
5. Learn the incorporate the special effect

Unit IV

1. Read their writing and make it clear
2. Analyze the structure and word choice
3. Able to give helpful information
4. Known to write quick clean and direct
5. Learn to write an easy to read style.

Unit V

1. Learn to deliver un- welcome news
2. Responses to letter of complaints
3. Shape a persuasive message
4. Draft sales letters
5. Interact with international correspondence

INTERNAL ELECTIVE

PAPER - 3

B. CREATIVE WRITING

Course Objectives

1. To know the process of beginning and growth of English language.
2. To know about various innovative ways of using English language in verbal and non-verbal communications.
3. To write clearly effectively and creatively and adjust writing style appropriately, to the content the context and nature of the subject
4. To write travelogues and advertisements
5. To write scripts for TV and Radio programmes

UNIT - I

1. Various kinds of writing
2. The creative Impulse, Creative ability
3. Tools and Techniques

UNIT - II

1. Poetry
2. Prose
3. Features and non - features
4. Writing for the Media

UNIT - III

1. Sketching the plot, conflict, climax, resolution
2. Character Sketch
3. Action Description
4. Dialogue

UNIT - IV

1. Travelogue
2. Writing Advertisements
3. Writing for Newspapers

i) News ii) Articles

UNIT - V

1. Writing Documentaries

2. Writing for Television and Radio

Course Outcomes

Unit I

1. The student will be able to know various dimensions of creativity
2. The student will be able to develop creative impulse ability Geniuses and talent
3. The student will be able to grasp the tools and techniques of creative writing
4. The student will be able to appreciate the tools and techniques of writing
5. The student will be able to appreciate the talent of geniuses

Unit II

1. The student will be able to grasp the lyrical richness of the poetry
2. The student will come to know the literary devices of the poetry
3. The student will be able to understand the features of prose
4. The student will be able to focus on the multiple features of creative writing.
5. The student will be able to know the principles of writing for digital media.

Unit III

1. The student will be able to understand the different elements and attributes of drama
2. The student will be able to understand various genres of fiction
3. The student will be able to analyze the character speech
4. The student will be able to form dramatic devices used in conjunction with the episodic and climactic plot forms
5. The student will be able to form action description in creative writing.

Unit IV

1. The students will be able to write a Photographic Description of places
2. The students will be able to highlight the Various Attractions.
3. The students will be able to give some cultural background of the places
4. the students will be able to write catchy advertisements
5. the students will be able to write articles for newspapers

Unit V

1. Students will be able to understand documentaries
2. Students will be able to write documentaries
3. The Students will be able to write scripts for Television programmes
4. The students will be able to write scripts for radio programmes
5. The students will be able to organize TV and Radio programmes.

References

Creative writing - Person by Dev

Ailsa Cox: Writing Short Stories.

Thomas S. Kane: The Oxford Essential Guide to Writing.

William Strunk, Jr. and E. B. White: The Elements of Style.

William Zinsser: On Writing Well: The Classic Guide to Writing Nonfiction.

**SKILL BASED SUBJECT
PAPER - 4**

ENGLISH LANGUAGE TEACHING - ELT

Course Objectives

1. To acquaint the learner with the theories and practices of teaching English.
2. To explain various methods of teaching and learning the English language.
3. To make our students familiar with teaching processes involved in English language teaching.
4. To learn the natural approach in communicative English
5. To make the student learn the competence based language teaching
6. To channelize their academic vision towards the language teaching and learning in a better way

UNIT - I

1. A Brief History of Language Teaching
2. Language Teaching Innovations
3. Objectives of Teaching English

UNIT - II

1. Interference and Transfer from the Mother Tongue
2. Listening Activities
3. Techniques in Teaching - Speaking
4. Barriers of Effective Communication

UNIT - III

1. Methods and Approaches in Teaching English
2. Translation Methods
3. Direct Methods
4. Bilingual Approaches
5. Situational Approaches
6. Eclectic Approaches

UNIT - IV

1. Communicative Language Teaching
2. Cooperative Language Teaching
3. Content - Based Language Teaching
4. Task-Based Language Teaching

UNIT - V

1. English Language Teaching in India
2. English as a World Language
3. English for Specific Purposes
4. Technological Influences on English
5. Media and Cyber Influences on English

Text Books

Unit-I:

1. Howatt, A. P. R., A History of English Language Teaching, Oxford: OUS
2. Stern, H. H., Fundamental Concepts of Language Teaching. Oxford: OUS

Unit-II:

1. David Nunan, Language Teaching Methodologies, Prentice Hall Publishers
2. Mackay, Ray. A Basic Introduction to English Language Teaching. Oxford: OUS

Unit III:

1. Jack. C. Richards and Theodore S. Rogers, Approaches and Methods in Language Teaching, 2nd Edition, Cambridge: Cambridge University Press
2. Halliday, M. A. K. Language on Social Semiotic, London : Edward Arnold

Unit- IV:

1. S P Dhanavel. English Language Teaching in India - The Shifting Paradigms. McGraw Hill Education Publisher
2. Slavin, R. Cooperative Learning: Theory, Research and Practice. 2nd Ed. New York: Prentice Hall

Unit - V:

1. Widdowson, H. Learning Purpose and Learning Use. Oxford: OUS
2. Wrenn, C.L. The English Language. Delhi: Vikas Publishing House Pvt Ltd.

Reference Items: books, Journal

1. Penny Ur, A Course in English Language Teaching. Cambridge: Cambridge University Press
2. Diane Larsen - Freeman and Marti Anderson. Techniques & Principles in Language Teaching. Oxford: OUS
3. Navita Arora. English Language Teaching - Approaches and Methodologies. Mcgrawhill Publisher
4. Dr. Praveen M Jain. Methodology of Teaching English - Tools, Techniques and Methods. Raj Publications

5. Dr. Meena Sehrawat and Dr. Subodh K. Jha. English Language Teaching. Lakshi Publishers
6. M L Tickoo. Teaching and Learning English - A Sourcebook for Teachers and Teacher - Learners. Orient Blackswan Publishers
7. Widdowson, H.G., Teaching Language as Communication. Oxford: OUS
8. Ashok Kumar. English Language Teaching: New Perspectives. Oxford: OUS
9. Jeremy Harmer. The Practice of English Language Teaching - 5th Ed with DVD. Pearson Publishers
10. Dr. Adi Ramesh Babu. English Language Teaching and Learning - Problems and Remedies. Pointer Publishers.

E- Materials

1. <https://eltbylinablog.wordpress.com>
2. <https://eltnotes.wordpress.com>
3. <https://medium.com/eltnotes>
4. <https://talimenam.blogspot.com>
5. <https://www.eltnotes.blogspot.com>
6. <https://www.teachingenglish.org.uk>.
7. <https://www.scribd.com>
8. <https://opencourse.uoa.org>
9. <https://news.collindelt.com>
10. <https://en.m.wikipedia.org>
11. <https://www.eltresearchbites.com>
12. <https://eltnotesfrombelow.org>
13. <https://shop.scholastic.co.uk/elt>
14. <https://eltaypwip.org>.webnotes
15. <https://www.cambridge.org.elt>

Course Out Comes

After studying

Unit - I

1. the student will be able to understand the brief history of language learning
2. the student will be able to know that language can be acquired as a skill not as a knowledge
3. the student will come to know the various innovative methods available in learning and teaching the language
4. the student will be able to develop a taste for language learning and teaching
5. the student will understand the objectives of teaching and learning English

Unit - II

1. the student will be able to understand the mother tongue influence on the English language and how to avoid this as this is a major problem for non native English speakers

2. the student will come to know the various listening activities as listening plays a very vital role in learning any language
3. the student will get inspiration to learn native English language with correct accent
4. the student will learn the techniques of spoken English
5. the student will remove the barriers that come across in effective communication

Unit - III

1. the student will be able to understand the methods and approaches in teaching English
2. the student will understand the translational method to learn the language
3. the student will get inspiration through the direct methods of learning the language
4. the student will understand the bilingual, situational and eclectic approaches of learning the language
5. the students by learning these approaches and methods easily learn the language.

Unit - IV

1. the student will be able to learn various methods of learning the language
2. the student will come to know the basis of communicative language teaching
3. the student will understand the cooperative language teaching
4. the student will get inspiration through the task-based and content-based teaching of English language
5. the student will be able to approach the learning of a language in an easy manner through learning these teaching methodologies

Unit - V

1. the student will be able to understand the status of English in the world as English has become a world language
2. the student will come to know the usage of English language in specific purposes related to all fields
3. the student will understand the methods of approaches practiced in India to teach the English language
4. the student will get inspiration through the various influences like technology, media and cyber on the English language
5. the student will be able use the language in all specific purposes

THIRUVALLUVAR UNIVERSITY

M.A. HISTORY

SYLLABUS

UNDER CBCS

(With effect from 2022-2023)

The Course of Study and the Scheme of Examination

Sl. No.	Study Components		ins. hrs / week	Credit	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
SEMESTER I								
1.	Core	Paper- 1	6	4	Social and Cultural History of Tamil Nadu from sangam age to 1565 C.E.	25	75	100
2.		Paper- 2	6	4	Social and Cultural History of India up to C.E 1526	25	75	100
3.		Paper- 3	6	4	Social and Cultural History of India from C.E. 1526 to C.E.1773	25	75	100
4.		Paper- 4	6	4	India and her Neighbours since C.E.1947	25	75	100
Internal Elective for same major students								
5.	Core Elective	Paper-1	3	3	(To choose one out of 3) A. Intellectual History of India B. Archives Keeping C. Economic History of India up to 1526. C.E	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
6.	Open Elective	Paper-1	3	3	(To choose one out of 3) A. Contemporary History of Tamil Nadu from C.E.1947 to C.E. 2001 B. Introduction to Tourism C. Constitutional History of India from C.E.1773 to C.E. 1947	25	75	100
			30	22		150	450	600
SEMESTER II						CIA	Uni. Exam	Total
7.	Core	Paper- 5		4	Social and Cultural History of Tamil Nadu from C.E 1565 to C.E 2000	25	75	100
8.		Paper- 6	6	4	Social and Cultural History of India from C.E. 1773 to C.E. 2000	25	75	100
9.		Paper- 7	6	4	General Studies for Competitive Examinations	25	75	100
Internal Elective for same major students								
10.	Core Elective	Paper-2	5	3	(To choose one out of 3) A. Administrative History of India B. Introduction to Archaeology	25	75	100

					C. Economic History of India from C.E.1526 to C.E. 1857			
External Elective for other major students (Inter/multi disciplinary papers)								
11.	Open Elective	Paper-2	5	3	(To choose one out of 3) A. The Indian National Movement B. Panchayat Raj C. The Constitution of India	25	75	100
12.	*Field Study		-	2		100	-	100
13.	Compulsory Paper		2	2	Human Rights	25	75	100
			30	22		250	450	700
SEMESTER III						CIA	Uni. Exam	Total
14.	Core	Paper- 8	6	5	History of World Civilizations (Excluding India) – Ancient Period	25	75	100
15.		Paper- 9	6	4	Historiography	25	75	100
16.		Paper-10	6	4	History of Europe from C.E.1789 to C.E.1919	25	75	100
17.		Paper-11	6	4	History of the USA from C.E.1900 to C.E. 2000	25	75	100
Internal Elective for same major students								
18.	Core Elective	Paper-3	3	3	(To choose one out of 3) a. An Introduction To Numismatics b. Islamic History And Culture From C.E.500 To C.E.750 c. History of Modern Japan from C.E.1900 to C.E.2000	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
19.	Open Elective	Paper-3	3	3	(To choose one out of 3) a. History of Freedom Struggle inTamil Nadu b. Contemporary History Of India From C.E 1947 To C.E 2002 c. The Dravidian Movement sinceC.E1947	25	75	100
20.	**MOOC Courses		-	2				100
			30	25		150	450	700
SEMESTER IV						CIA	Uni. Exam	Total
21.	Core	Paper-12	5	4	Research Methodology in History	25	75	100
22.		Paper-13	5	4	History of World Civilizations (Excluding India) Medieval and Modern Period	25	75	100
23.		Paper-14	5	4	International Relations since C.E 1919	25	75	100
24.	Core	Project	5	5	Project / Dissertation with Viva-Voce – (Compulsory)	100 (75 Project +25 viva)		100
Internal Elective for same major students								
25.	Core Elective	Paper-4	5	3	(To choose one out of 3) a. An Introduction to Musicology	25	75	100

					b. Islamic History and Culture from C.E.750 to C.E.1258 c. History of Modern China from C.E.1900 to C.E.2000			
External Elective for other major students (Inter/multi disciplinary papers)								
26.	Open Elective	Paper-4	5	3	(To choose one out of 3) a. Contemporary History of the World b. Intellectual History of Tamil Nadu c. Women Development In Tamil Nadu From A.D.1900 To A.D.2000	25	75	100
			30	23		150	450	600
			120	92				2600

* Field Study

There will be field study which is compulsory in the first semester of all PG courses with 2 credits. This field study should be related to the subject concerned with social impact. Field and Topic should be registered by the students in the first semester of their study along with the name of a mentor before the end of the month of August. The report with problem identification and proposed solution should be written in not less than 25 pages in a standard format and it should be submitted at the end of second semester. The period for undergoing the field study is 30 hours beyond the instructional hours of the respective programme. Students shall consult their mentors within campus and experts outside the campus for selecting the field and topic of the field study. The following members may be nominated for confirming the topic and evaluating the field study report.

- (i). Head of the respective department
- (ii). Mentor
- (iii). One faculty from other department

**Mooc Courses

Inclusion of the Massive Open Online Courses (MOOCs) with two credits available on SWAYAM, NPTEL and other such portals approved by the University Authorities.

THIRUVALLUVAR UNIVERSITY

M.A. HISTORY

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SEMESTER-I

PAPER - 1

SOCIAL AND CULTURAL HISTORY OF TAMILNADU

FROM SANGAM AGE TO C.E 1565

Objectives

Recent researchers in the ancient history of Tamilnadu has brought to light the glory of the cultural past of the Tamils. The students will acquire knowledge about the Social and cultural aspects of the Tamil Society from the Sangam Age to A.D 1565 in this paper.

UNIT-I

Physical features of Tamilaham – Location – Areas and boundaries – Climate – Major soil distribution – Alluvial – Red – Black – Desert Soils – Major cultivable crops – Natural Vegetation and wild life - Sources – Sangam Age – Sangam Literature – Socio, Economic and Religious life.

UNIT-II

Invasion of Kalabhras (Dark Age) – Establishment of Pallavas rule in Kanchi – Society, Economy, Religious condition during Pallavas- Pallavas Contribution to Art and Architecture - Art and Architecture –Education – Bhakthi Movement.

UNIT-III

First Pandiyan Empire – Society, Economy, Culture, Art and Architecture – Rise of Imperial Cholas – Society – Economy and Culture – Art and Architecture.

UNIT-IV

Establishment of Second Pandiyan Empire – Society, Economy and Culture under Second Pandiyan Empire– Art and Architecture.

UNIT-V

Muslim Invasion (Malik Kafur) – Society, Economy and Culture Establishment of Madurai Sulatanate - Vijayanagar rule – Society – Economy – Culture, Art and Architecture.

Course Outcome:

Unit 1 : The students were enabled to understand the Physical features of Tamilnadu

Unit II : The students realized the dark age of Tamil Nadu - The students will know about the style of Art and Architecture and the contribution of Pallavas in various fields

Unit III : The study enhances the students the growth of Tamil Nadu in the middle ages

Unit IV : The students were given an insight of reestablishment of Pandiyan Empire

Unit V : The overall growth of Tamil Nadu which attracted the Muslim invasion from the Northern India and the establishment of Madurai Sultanate and the Vijayanagar Empire.

Books for Reference:

1. Balasubramanian. C - The Status of Women in Tamilnadu during the Sangam Age, 1976.
2. Devanesan. A - History of Tamilnadu, 1977.
3. Mahalingam .T.V - Administration and Social life under Vijayanagar, 1940.
4. Dr.Minakshi. C - Administration and Social life under the Pallavas,1977
5. Nagaswamy. R - Studies in South Indian History and Culture.
6. Pillay. K.K - A Social History of the Tamils.
7. Srinivasa Aiyengar - History of the Tamils, 1929. M.A. History: Syllabus (CBCS)

PAPER - 2
SOCIAL AND CULTURAL HISTORY OF INDIA
UPTO C.E. 1526

Objectives

This paper aims at understanding various cultural heritages of our ancient India and to preserve our entity in the present trend of changing cultural phenomenon

UNIT-I

Pre History – Proto History of India – Races in India - Sources of Ancient Indian History – Indus Valley Civilization – Early and Later Vedic Culture –Position of Women – India in the 6th Century BEC – Birth of Jainism and Buddhism and their Principles.

UNIT-II

Establishment of Maurya Dynasty – Chandra Gupta – Bindusara and Asoka – Art and Architecture and Society – Ashoka embraces Buddhism - Ashoka's Dharma- India between 2nd century BC to 3rd century A.D. – Brahminical Cultural Revival – Gandhara and Madura School of Art.

UNIT-III

Guptas – Golden Age of Guptas - Art and Architecture – Religion and Society – Paintings – Sculpture – Education – Astro- Physics during Guptas - Literature Advent of the Arabs – Social Change and life. – Revival of Hinduism -

UNIT-IV

Establishment of Delhi Sulthanate – Slave – Khilji – Tughlaq – Sayyad – Lodi Dynasties Social Condition during Delhi Sultanate – Slave System - Literature - Art and Architecture – Advent of Moghuls.

UNIT-V

Bhakti Movement – Alwars and Nayanmars – Gurunanak – Kabir – Sufi Movement – Social and Culture life Under Vijayanagar rule-Art and Architecture.

Unit I : The students will be enlightened about the Indian culture and history and the foundation of new religious philosophy

Unit II : Mauryas were the first dynasty almost the entire subcontinent and the propagation of Buddhist philosophy in the Oriental countries. New techniques of art and architecture

Unit III: The revival of Hinduism and it is recorded as the Golden period in Indian History

Unit IV: The students will know how the Muslim rule in Delhi was governed

Unit V : The revival of Hinduism in South India and Sikhism in Punjab; Muslim reform movement in North India – The rule of Vijayanagar empire in South India.

Books for Reference:

1. Chandra, Satish, Essays on Medieval Indian History, Oxford University press, New Delhi 2004
2. Chandra, Satish, Medieval India from Sultanate to Mughal Part1 1206 to 1526, Murnad publications New Delhi 1975.
3. Majumdar R.C. An Advanced History of India Macmeillan India.
4. Rizvi S.A. The Wonder that was India Vol.II Penguin Books New Delhi 2000.
5. Sathyanathaiyer.R. A Political and Cultural History of India Vol.1, S.Viswanathan Printers and Publishers Chennai.

PAPER - 3

SOCIAL AND CULTURAL HISTORY OF INDIA FROM C.E. 1526 TO C.E.1773

Objectives

To help the P.G. Students to acquire the Knowledge of various dimensions of the life style of the people of India from 1526 to 1773.

UNIT-I

India Under Mughals - Sources – Babur – Humayun –Akbar – Jehangir – Shajahan – Aurangzeb - Social and Cultural Conditions – The Ruling Class- Manzabdars, Jagirdars, Zaminadars – Peasants – Status of Women – Religion – Din i – Ilahi – Sur Dynasty

UNIT-II

Cultural condition under the Mughals – Literature – Education – Painting – Music –Art and Architecture.- Indo Persian style

UNIT-III

Establishment of Maratha rule - Social and cultural History of Marathas.

UNIT-IV

Age of Religious Reformers – Impact of Religious reforms on Sikhs – Hindus – Muslims.

UNIT-V

Advent of Europeans – Portuguese - Dutch – French and English – Rivalry of French and English - Growth of Indology – Social and Cultural Policy of the East India Company – Activities of Christian Missionaries – Growth of Humanitarianism.

Unit I : Elaborates the insight of the Mughals regarding their contribution

Unit II : Students will be enlightened about the rich contribution of the Mughals

Unit III : How the Marathas established their power during the Imperial Mughal period

Unit IV : Students will be given to understand the contribution of religious leaders

Unit V: The advent of Europeans changed the course of Indian History and the contributions of Christian Missionaries in the field education, literature and health.

Books for Reference:

1. Chandra, Satish: Essays on Medieval Indian History, Oxford University Press, New Delhi, 2004.
2. Chandra, Satish: Medieval India from Sultanate to Mughal - Part - I, 1206-1526, Haranand Publications, New Delhi, 1975.
3. Habib and Nizami: Delhi Sultanate, Indian History Congress Publications, New Delhi, 1970.
4. Luniya, B.N: Indian History and Culture, New Delhi, 1980.
5. Mahajan, V.D: History of Delhi Sultanate, Sultan Chand, New Delhi, 2000.

6. Majumdar R.C: An Advanced History of India, Macmillan India, Ray Choudari, H.C & Datta, K.K. New Delhi, 1970.
7. Qureshi Ishtiaque Hussain: Administration under the Delhi Sultanate, Kitab Bhavan, New Delhi, 1980.
8. Rizvi, S.A.A: The Wonder that was India, Vol-II, Penguin Books, New Delhi, 2000.
9. Sharma, L.P: History of Medieval India 1000-1740, Konark Publishers Pvt Ltd, New Delhi, 1994.
10. Sherwani, H.K: The Bahmanis, New Delhi, 1972.

PAPER - 4

INDIA AND HER NEIGHBOURS SINCE C.E.1947

OBJECTIVES

After India became independent, it made constant endeavors for regional cooperation. Even at international level the regional associations have fostered faster economic growth, peace and co-operation. This paper offers insight into India's effort to cultivate good neighborly relations and confidence building in the improvement of relations with the neighbors. The formation of SAARC is a typical example of regional co-operation which the students of modern history are expected to be familiar. This paper fulfills the need.

UNIT-I

India and Pakistan – Areas of Conflict – Kashmir and Border issues – Afghan Crisis – Its Impact on Indo- Pak Relations – Kargil War – Terrorist attacks in India – Recent trends in the Indo-Pak relationship.

UNIT-II

India and China – Nehru and Chou en Lai – Strains and the process of Normalization – Tibetan Issues – India and Nepal – Economic Cooperation.

UNIT-III

India and Bangladesh – Areas of Cooperation and Crisis – India and Bhutan Insurgency in the North Eastern states – India and Burma – Historical Ties.

UNIT-IV

Indo-Sri Lanka Relations – Ethnic problem in Sri Lankan – Peace Process – Indian and Maldives – Political and Cultural ties.

UNIT-V

Regional Organizations – India's role in the NAM – SAARC and its Activities – Its Future – SAPTA – Nuclearization of South Asia – Its impact.

Course Outcome:

Unit I : The students will be taught on why and how the partition made enmity.

Unit II : The students were given an insight about the two great nations in the world and their relationship

Unit III: Students will be taught how India helped Bangladesh to attain freedom and the contribution of Indra Gandhi. The relationship between Bhutan and Burma.

Unit IV: The ethnic problem in Srilanka and the India's drive for peace in Srilanka and the relationship between India and Maldives

Unit V: Regional organizations towards peace and prosperity

Books for Reference:

1. Bipan Chandra: India After Independence, 1947-2000. Penguin Books, New Delhi, 2000
2. Chaitanya, Mishra: "Indo-Nepal Relations: A View from Kathmandu", Sage Publications, New Delhi, 1993.
3. Dixit,J.N.: Assignment Colombo, Konark Publishers, New Delhi, 1998.
4. Dixit,J.N.: Indian Foreign Policy and Its Neighbours, Gyan Publishing House, New Delhi, 2001.
5. Deb Arinda : Bhutan and India: A Study in Frontier Political Relations.
6. Dutt, V.P.: India's Foreign Policy in Changing World, Vikas Publishing House, New Delhi, 1993.
7. Muhammed Shamsul Haq: Bangladesh in International Politics, Sterling Publishers, 1993.
8. Nanda, B.R. (ed): Indian Foreign Policy: The Nehru Years.
9. Palanithurai, G. & Mohanasundaram,K: Dynamics of Tamil Nadu Politics in Sri Lankan Ethnicity, Northern Book Centre, New Delhi, 1993.
10. Phadis Urmila: Maldives: Winds of Change in the toll state.
11. Ramesh Thakur: The Politics and Economics of India's Foreign Policy.
12. Sathis Kumar (ed): Documents of India's Foreign Policy (1974) The Macmillan co., Delhi, 1977.
13. Shelton U.Kodikara (ed): Dilemmas of Indo-Sri Lanka Relations.
14. Sisir Gupta, K: Kashmir: A Study in India – Pakistan Relations.

CORE ELECTIVE

PAPER 1

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. INTELLECTUAL HISTORY OF INDIA

Objectives

The aim of the paper is to make the students familiar with the life, career, ideals and principal life of the intellectuals of the 20th Century India. The intellectuals of 20th Century India played a crucial role in shaping the course of events which culminated in the attainment of India's independence. The younger generation is expected to take them as role models in developing their own personality.

Unit – I

Political Thinkers :- Surendranath Banerjee – Gopalakrishna Gokhale – Thilak- Mahathma Gandhi - B.R.Ambedkar- Jawarhalal Nehru – Indira Gandhi.

Unit – II

Social Thinkers:- Rajaram Mohanray Veerasailingam Panthalu- Jothiba Phule- Muthulakshmi Reddi –E.V.Ramasamy- Mother Theresa.

Unit –III

Religious Thinkers:- Dayanath Saraswathi –Ramakrishna Paramahamsa-Swami Vivekananda – Sri Saiyed Ahmed Khan.

Unit –IV:

Socialist and communists Thinkers M.N.Ray – S.A Dange – E.M.S Namboodripad Singaravelar –Jeeva

Unit –V:

Literary Thinkers :- Rabindranath Tagore - Mohmed Iqbal – Subramanya Bharathi Thiru-Vi-Ka- Sarojini Naidu –Bharathidasan.

Course Outcome:

Unit I : It enhances the ideologies of the Indian political thinkers

Unit II : This unit enables the students about the contribution of the great social thinkers in India

Unit III : The students will be given an insight of the various religious thinkers and their ideas about the religion

Unit IV: The students will be enabled to the new political ideologies during the later 19th and 20th Centuries

Unit V: The contributions of great souls whose contributions towards literature

Books for Reference:

1. Ahluwalia, B.K &: Sardar Patel – rebel and ruler, Akbe Group, New Delhi 1981, Shashi Ahluwalia
2. Bharathi : Mahatma Gandhi, Man of the Millennium, S.Chand & Co, New Delhi, 2000
3. D.K. Publications : On Periyar, Chennai.
4. Gopalakrishnan, M.D.: Periyar, Father of Tamil Race, Emerald Publishers, Chennai.
5. Grover, B.L.& Grovers, S.: A New Look at Modern Indian History, (From 1707 to the Modern Times), S.Chand & Co, New Delhi, 2006.
6. Nanda, B.R.: Jawaharalai Nehru Rebel and Statesman, Oxford University Press, Delhi, 1995.
7. Naravane, V.S.: Modern Indian Thought, Orient Longman, New Delhi, 1978.

CORE ELECTIVE
PAPER 1
B. ARCHIVES KEEPING

Objectives

1. To define the birth of records and practice of archives keeping
2. To examine different types of preservation techniques
3. To understand explicate the rules to access the records in archives
4. To elucidate the different types of documentation procedures
5. To realize the importance of national and state archives

Learning activities

1. Preparing assignment by using government records
2. Field trip to Tiruchirappalli Archives
3. Field Work in Madras State Archives
4. Experts opinion on Documentation procedure
5. Practical knowledge on records management

Unit – 1

Definition of Archives – Creation of Archives –Uses of Archives – Archives and Library - Various types of Archives – Materials used for creation – Birth of a document

Unit – 2

History of Archives in Europe and India - Preservation techniques – Enemies of Records – Rehabilitation of Records – Functions of Archivist

Unit – 3

Functions and Administration: Role of IT in the development of Archives – Rules relating to accession of records in Archives – Appraisal of Records- Retention Schedule – Compilation and Publication

Unit – 4

Various aspects of records management such as Documentation practices and filing system, life cycle of a file and nature of modern records – Classification of records and methods of control on mass production

Unit – 5

National Archives of India and Tamil Nadu State Archives – Requirement of Record Room – Administration of Tamil Nadu Archives – Saraswathi Padasala of Tanjore – Jesuits Archives in Shenbaganur – Field Work

General Course outcome:

The students will be given to understand the importance archives in the study of history and its allied subjects. How to maintain the documents and the preservation techniques will be taught in this subject.

Books for Study:

1. Reference Books

- 1 D. Thiyagarajan, Archives Keeping, Madurai. (Unit - 1 to 5)
1. Cook, Michael, Archives Administration, Dawson UKI Ltd.
2. Hodson, John, VK, An Introduction to use of Public Records, Oxford Clarendon Press, 1934.
3. Jenkinson Hilary, An Introduction to use of Public records, Oxford Clarendon Press, 1934.
4. Kahn, Gilbert, Filing System and Record Management, New York, 1971.
5. Mac Millan, David (ed), Archives, Techniques and Functions in a Modern Society, Sydney, 1957.
6. Muller, Samuel, Feith, JA, Frunin, R, Manual for the arrangement and description of Archives, Train from the Dutch, New York.

CORE ELECTIVE

PAPER 1

C. ECONOMIC HISTORY OF INDIA UP TO 1526. A.D

Objectives

Economics without History has no root. History without Economics has no fruit. This clearly indicates the value of Economics. So, it is necessary to introduce this paper to the students of History. Further, as History is the record of the past events, the students of History must know the economic condition of Ancient India. This paper would turn the mind and heart of the students to create Healthy and Wealthy India in Future.

UNIT-I

Early Vedic Age – Later Vedic Age – Economic condition – Trade and Means of Transport – Foreign trade in early times – Maritime trade – India's trade relationship between India and Egypt.

UNIT-II

Economic condition of North India from 6th Century BEC. 4th Century BEC. – Sisunaga and Nanda Period – Mauryas – Kushanas.

UNIT-III

Economic conditions under Sathavahanas – Guptas – Harsha – Rashtrakutas.

UNIT-IV

Economic condition of South India – Sangam Age – Pallavas – Cholas – Pandyas – Chalukyas.

UNIT-V

Economic condition under Delhi Sultanate.

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Course Outcome:

Unit I : The students will understand the India's trade with other countries in the ancient period

Unit II : India's economic growth between 6th and 4th Century BEC

Unit III : India's economy during the later half of the ancient period

Unit IV: The students will be given an insight of the economic conditions in the Southern India

Unit V: Economic condition of India during the Delhi Sultanate

Books for Reference:

1. Appa Durai : Economic Conditions in South India, Vol I & II, University of Madras, Madras 1936.

2. Bhargava, P.L.: India in the Vedic Age, S.Chand & Company, New Delhi, 1970.
3. Meera Abraham: Medieval Merchant Guilds, New Delhi Publications, 1988.
4. Dr.Minakshi, C : Administration and Social Life under the Pallavas, University of Madras, 1977.
5. Nilakantasastri, K.A.: The Colas, University of Madras, Madras, 1984.
6. Nilakantasastri, K.A.: A History of South India from Pre-Historic times to the fall of Vijayanagar, Oxford University Press, 1966.
7. Tripathi, R.S.: History of Ancient India, Motilal Banarasi das Publishers, Banares, 1981.
8. Romesh Dutt: Economic History of India, Govt. of India Publications Division, New Delhi, 1976.
9. Salepore, R.N.: The Early Indian Economic History, Tripathi Publications, 1973.
1. 10.Srinivasan, T.M.: Irrigation and Water Supply, New Era Publications, 1991.
2. 11.Sathianathaier, R.: A Political and Cultural History of India, Vol.I, S.Vishwanathan Printers & Publishers, Chennai, 1999.

OPEN ELECTIVE

PAPER 1

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. CONTEMPORARY HISTORY OF TAMIL NADU FROM C.E..1947 TO C.E.2001

Objectives

This paper aims at making the students to acquire critical knowledge about the current History of Tamilnadu. The students may develop an analytical approach towards Socio Economic development of contemporary Tamilnadu. The students from other discipline will understand the present day condition of Tamilnadu

UNIT-I

Tamilagam under Congress Rule: Pre - Rajaji Period C.Rajagopalachari - K.Kamaraj - M.Bhakthavatsalam - Their achievements - Social - Economic - Educational Policies.

UNIT-II

Tamilagam under D.M.K Rule : Emergence of DMK and its Ideology - Policies - C.N.Annadurai - M.Karunanidhi - Social - Economic - Languages Policies - Role of Communist Party.

UNIT-III

Tamilagam under AIADMK Rule : Rise of ADMK - M.G.Ramachandran - V.N.Janaki - J.Jayalalitha - Socio and Economic Policies - Higher and Professional Education.

UNIT-IV

Growth of press and media in Tamilnadu - Film and Politics - Its Impact on Tamilnadu - Development of Information Technology - Its Impact on the Society and Economy.

UNIT-V

Social - Cultural - Economic development of Tamilnadu 1947 - 2001.Social Legislation and Social Welfare measures - Cultural Progress - Developments of Arts and Fine Arts - Women development - Progress of Higher Education and Industry.

Course outcome:

Unit I : The students were elaborated their insight regarding the Congress rule in Tamilnadu

Unit II : The emergence of DMK and its ideology will be taught in this unit

Unit III : This unit taught the students how the matinee idols came to power in Tamilnadu

Unit IV: This unit taught how the media popularizes the conditions of Tamilnadu and take it to the general public

Unit V: This unit taught the students about the overall growth the conditions of womenfolk and higher education and Industry in Tamilnadu

Books for Reference:

1. Aruna, Alladi : Kamarajar Ore Vazhikati, (In Tamil), Madhivanan Publications Pvt Ltd, Chennai,2002.
2. Chellam, V.T : Tamilagam History and Culture, Thirumalai Book House,Chennai, 1984.
3. Devanandan, P.D : The Dravida Kazhagam, A Revolt against Brahmanism, Christian Institute for the study of Religion and Society, 1960.

4. Hard Grave, R : The Dravidian Movement, Popular Prakasam, Bombay, 1965.
5. Jagadeesan, P. : Marriage and Social Legislations in Tamilnadu, 1990.
6. Kandaswamy, P. : The Political Career of K.Kamaraj, Concept Publishing Company, New Delhi, 2001.
7. Kapur, R.P : Kamaraj, The Iron Man, Deepak Associates, Pvt Ltd, New Delhi, 1966.
8. Muthusamy, M.S : K.Kamaraj : A Socio Political Study, Tamilnadu Academy of Political Science, Madras, 1988.
9. Raju Kalidoss : History and Culture of the Tamils , Vijay Publications,Dindigul, 1976.
10. Rajayyan, K. : History of Tamilnadu (1565 – 1982) , Raj Publishers, Madurai, 1982.
11. Spratt, P. : DMK in Power, Nichiketa Publications Ltd, Bombay, 1970.
12. Subramanian, N. : Social and Cultural History of Tamilnadu, A.D.1336-A.D1984, Ennes Publications, Udumalpet, 1999.
13. Thandavan, R. : All India Anna Dravida Munnetra Kazahagam, Tamilnadu Academy of Political Science, Madras University, 1987.
14. Thandavan, R. : Dr.J.Jayalalitha - A Phenomenon, Academy of Public Affairs, Anna centre, Madras University, 1996.

OPEN ELECTIVE

PAPER 2

B. INTRODUCTION OF TOURISM

Objectives

A student with a strong sense of history and a very strong historical background is best suited to the field of tourism. The chief prospect for the students of history are greater compared to others with not so similar a background. The introduction of 'Principles of Tourism' as an elective subject will facilitate the students knows the basics of tourism and will enthuse their interests in the tourism industry.

UNIT-I

Tourism: Definition, Nature and Meaning – Need for Tourism – Origin and Growth of Tourism – Tourism through the ages – Domestic and International Tourism – Basic components of Tourism (Local, Transport and Accommodation).

UNIT-II

Tourism as an Industry: Government Policies – Tourism and Economy – Social, Cultural and Environmental impact of Tourism.

UNIT-III

Kinds of Tourism : Historical Tourism – Cultural Tourism – Heritage Tourism – Religious Tourism – Eco Tourism – Modern concepts in India on Tourism : Entertainment Tourism – Medical Tourism – Educational Tourism – Pleasure and Sports Tourism.

UNIT-IV

Cultural and Historical Resources: Art and Architecture, Historical, Monuments, Sculpture, painting, handicrafts, fairs and festivals.

UNIT-V

Religious Resources: Places of Pilgrimage – Hindu, Muslim, Christian, Jain, Buddhists and Sikhs – Temples, Mutts, Mosques, Churches and Gurdwaras – Shrine, Samadhis, Stupas and Darghas – Historical, Cultural, Religious and Natural Places of Interest in India and Tamilnadu.

Books for Reference:

1. Babu, A.Satish : Tourism Development of India, A.P.H.Publishing Corporation, New Delhi, 1998.
2. Bhatia, A.K.: International Tourism : Fundamentals and Practices, Sterling Publishers Pvt. Ltd, New Delhi, 1911.
3. Bhatia, A.K. : Tourism Development : Principles and Practices, Sterling Publishers Pvt. Ltd., New Delhi, 1989.
4. Bhatia, A.K. : Tourism in India – History and Development, sterling publishers Pvt.Ltd., New Delhi, 1978.
5. Coltman, Micheal.M : Tourism Marketing, Van Nostrand Reinhood, New York, 1989.
6. Gill, Pubpinder, S: Tourism : Planning and Management, Anmol Publications Pvt. Ltd. New Delhi, 1997.

7. Panda, Tapan, K, Sitikantha Mishra and Birsaj Bhusan Parida(Eds,) : Tourism Development: The Socio-Economic and Ecological Perspective, Universities Press, Hyderabad, 2004.
8. Selvam, M: Tourism Industry in India, Himalaya Publishing House, Bombay, 1989.
9. Mishra, Lavkush: Religious Tourism in India, New Delhi, 1990.

OPEN ELECTIVE

PAPER 3

C. CONSTITUTIONAL HISTORY OF INDIA FROM C.E.1773 TO C.E.1947

Objectives

The chief prospect for the students of history are greater compared to others with not so similar a background. The introduction of 'Constitutional History of India' as an elective subject will facilitate the students knows the development of constitution and will enthuse their interests in the history of India. The main objective of this study is to enable the students who are seeking to attend competitive examinations.

Unit - I

East India Company - Dual System in Bengal - Regulating Act 1773 – Pitt's India Act 1784 - Charter Acts of 1793, 1813, 1833 and 1853 - Causes and Effects of the Mutiny of 1857 on the Development of the Constitution - India under the Crown - Indian Councils Acts of 1861, 1892 - Minto - Morley Reforms 1909 - Central and Provincial Governments according to the Act of 1919.

Unit - II

Simon Commission's Report - Round Table conference and India's Reactions - Central Government According to 1935 - Provincial Governments according to the Act of 1935 - Provincial Autonomy - Constitutional Deadlock and August offer from Cripp's Mission to Mountbatten Plan - Indian Independence Act 1947 - Making of the Constitution of Indian - India's National Constitution - Union Executive - State Executive - Union Parliament - State Legislative - Union and States - Judiciary - Amendments of the Constitution - Development of Public Services - Local Government.

Unit - III

Rebellion against Company Rule in South India - The Vellore Mutiny - Revolt of 1857 - Act of 1858 – Queen's Proclamation 1858 - Social and Religious Reform Movements in the Second Half of the 19th Century - Birth of the Indian National Congress - Extremist movements of the Congress 1885 - Partition of Bengal 1905 - Movements Abroad for India's Freedom - Rise and Growth of Muslim Communalism in India - Home Rule Movement - Lucknow Pact - First World War - Dyarchy in the Provinces - Congress Reaction - Rowllat Act - Amristar Tragedy - Khilafat Agitation.

Unit - IV

Non Cooperation Movement - Swaraj Party - Simon Commission - Boycott of the Commission - Recommendations of the Commission - The Nehru Report – Jinnah's Fourteen Points - Lord Irwin's Proclamation - Civil Disobedient Movement - Repression by Government - Round Table Conferences - Resumption of Civil Disobedience Movement - Communal Award - Poona Pact - White Paper Reforms 1933 - Elections in 1937.

Unit - V

World War II and Constitutional Deadlock - Offer of the 8th August 1940 - Individual Satyagraha - Subash Chandra Bose and the Indian National Army - Proposals of Sir Stafford Cripps - The Great Uprising of August 1942 - C.R. Formula - Wavell Plan - Simla Conference - Declaration of Attlee and Wavell - Cabinet Mission Plan - Direct Action by the Muslim League - Establishment of Interim Government - Partition of India - Mountbatten Plan of 3rd July 1947 - Princely States and their Role in the Freedom Struggle - Factors Responsible for the Independence of India - Some Leaders of the Freedom Struggle.

Course outcome:

Unit I : This unit teaches the non major students to understand how we are governed by the acts

Unit II : This unit gives an insight during the Gandhian era and various activities during this period

Unit III : This unit elaborates how Indians struggled for freedom

Unit IV : This unit gives an sufficient information towards India's independence.

Unit V : This unit teaches the non-major students how India attained independence.

Reference Books

1. Agarwal, R.C. , and Bhatnagar ,Constitutional Development and National Movement of India,
2. Banerjee ,A. C, Constitutional History of India, Vol. I, Mukherjee & Co, Calcutta, 1948.
3. Basu ,D.D., Introduction to the Constitution of India, Lexis Nexis, 2015.
4. Busi, S. N., Dr. B. R. Ambedkar framing of Indian Constitution, 1 Edition, 2015.
5. Gupta, Dharma Chand, Indian National Movement and Constitutional Development, Vikas Publishing house Pvt. Ltd., Noida, 1983.
6. Gupta, Manik Lal, Constitutional developments in India, Atlantic Publishers, New Delhi, 1989.
7. Kieth, A. B, Constitutional History of India, Central Book Depot, Allahabad, 1961.
8. Pon Thangamani ,Indian Constitutional History – A. D 1773 to 1950, Ponnaiah Pathipakam, Chennai, 2001.
9. Pylee, M. V, Constitutional Government in India, Asia Publishing, Bombay, 1967. S. Chand &Company Ltd, New Delhi, 2006.
10. Singh, Sumita, Constitutional Development in British India, Pragun Publications, New Delhi, 1012.

SEMESTER II
PAPER - 5
SOCIAL AND CULTURAL HISTORY OF TAMIL NADU
FROM AD 1565 TO AD 2000

Objectives

To understand the developments of Tamil Society, Development of Tamil language, Culture and the advertisement in various titles Since the Nayak rule, that encompasses the service of Christian Missionaries for the Tamil Language and the Gradual advancement of Society through Social returns this work and Maratha rule:

UNIT-I

Nayak Society – economy – culture – Paintings and architecture.

UNIT-II

The European Missionaries – Service to Tamil Literature – Caldwell – G.U. Pope- Impact on Education.

UNIT-III

Tamil Nadu in the 19th and early 20th centuries Maraimalai Adigal – Thanithamizh Iyakkam – Kalyana Sundaram – Trade Union Movement.

UNIT-IV

Justice party – Theayagaraya Chetti –Introducing Reservation –Emergence of Self Respect Movement – EVR periyar – Dravidan Movement and Revival of the glory of the tamils.

UNIT-V

Development of Industries and Economic Progress – Social Welfare Schemes – Role of Press and Media – Empowerment of women – Achievements in the field of Education.

Course outcome:

Unit I : This unit bring to light the contributions of Nayaks to economy, culture and fine arts

Unit II : The contributions of Christian missionaries towards the development Tamil literature

Unit III : This unit gives an insight Tamilnadu during the 19th and 20th centuries and the growth of trade union movement

Unit IV : This unit narrates the emergence of reservation policies and the Dravidian movement

Unit V : This unit brings the student the overall growth of Tamilnadu and womenfolk.

Books for Reference:

1. Chellam , V.T. : Thamizhaga varalarum panpadum , Manivasagar pathippagam, Chennai, 2005.
2. Pillay k.k. : A Social History of the Tamils University of Madras, Madras, 1969.
3. Tamil Nadu History, Its people and culture for International Institute of Tamil Nadu Studies, Chennai, 2004.
4. Rajaraman, P: The Justice party, 1916-1937, Poompozhi Publishers, Madras, 1988.
5. Subramanian,P: Social history of the Tamils (1707-1947) D.K. Print world (p) ltd, New Delhi, 1999.

PAPER - 6

SOCIAL AND CULTURAL HISTORY OF INDIA FROM A.D.1773 TO A.D.2000

OBJECTIVES

Eighteenth, Nineteenth and Twentieth Century Indian History is replete with alien domination and repression and Indian resistance and development. The introduction of western concepts in agriculture, industry and education changed the course of Indian History. The study of this paper will lead to a clear understanding of the various facets of development that took place in the last two and a quarter century of Indian History.

UNIT-I

Education in British and Independent India: Traditional Hindu and Muslim Educational Systems – Patshalas and Madrasas – Introduction of Western Education – Wood’s Despatch – Universities of 1857 – Hunter Commission – Radha Krishna Commission – University Grants Commission: Its Contribution to Higher Education – Kothari Commission – New Education Policy of 1986 – Centres of Higher Education : Indian Institute of Technology, Indian Institute of Managements, National Institutes of Technology and other institutions – Engineering and Information Technology Education : Overview.

UNIT-II

Religious and Social Reform Movements in British India: Brahmo Samaj, Prathana Samaj, Satya Shodhak Samaj, Arya Samaj, Ramakrishnan Mission. Theosophical Society – Swami Narayana (Gujarat), Satnamis and Narayans Guru (Kerala) – Muslim Reform Movements: Deoband, Aligarh, Ahmadiyya, Barelwi and Ahl-i-Hadith Moverments – Sikh Reform Movements: Nirankari and Namdhari Movements – Parsi Reform Movement: Rehnuma-i-Mazdayaznan – Neo Buddhism “Navayana” of Ambedkar.

UNIT-III

Peasant Movements: European Planters and Indian Peasants – Agrarian Crisis during the British period – Kisan Sabha and Ekta Movements in U.P. –Mapilla Rebellion in Malabar – Bardoli Satyagraha in Gujarat – Great Depression and Agricultural Crisis In India – All India Kisan Congress – N.G.Ranga and Swami Shajanand – Karshaka Sangams of Malabar – Kisan Sabhas of Punjab and Bengal – Peasant Movement in Post Independent Tamil Nadu: Peasant and Cauvery, Krishna Water issue.

UNIT-IV

Trade Union Movements: Growth of Trade Union Movements from 1920 to 1947 – Trade Union Movements in Post-Independence India (1947-2001): Major Trade Unions M.A. History: Syllabus (CBCS) 18 – AITUC – BMS – INTUC – CITU – HMS – Trade Unions of Tamil Nadu: Progressive Labour front and Anna Thozhilalar Sangam.

UNIT-V

Art and Architecture: Colonial Art and Architecture – Post Independent India: Cultural Development – Sahitya Academy, Sangeet Natak Academy and Sangeet Kala Academy – Accomplished Classical Musicians and Classic Dancers – Painters and Sculptors of Modern India.

Course outcome:

Unit I : This unit brings to light the efforts of British towards the development of Education in India and the Indian Government's contribution in the field of education.

Unit II : This unit explains how religious and social reform movements took place in India

Unit III : This unit teaches the student about the Agrarian movement in India

Unit IV : This unit gives an insight of the trade union movements in India

Unit V : This unit elaborated the development of fine arts in India

Books for Reference:

1. Chandra, Bipin: India's Struggle for Independence, Penguin Books, New Delhi, 2000.
2. Chandra, Bipin: India since Independence, New Delhi, 2002.
3. Chandra, Bipin: Nationalism and Colonialism in Modern India, Orient Longman, New Delhi, 1999.
4. Majumdar, R.C. Ray Chaudhari, H.C. and Kalikinkar Datta: An advanced History of India, Macmillan Press, Madras, 1998.
5. Jones, Kenetah, W : Socio – Religious Reform Movements in British India, The New Cambridge History of India Series, Foundation Books, Cambridge University Press, New Delhi, 1994.
6. Sarkar, Sumit,,: Modern India 1885-1947, Macmillan Press, New Delhi, 2002.

PAPER - 7

GENERAL STUDIES FOR COMPETITIVE EXAMINATIONS

Objectives: A student with a strong sense of history and a very strong historical background is best suited to study various other dimensions of India apart from history to enable him / her to prepare for the competitive examination

UNIT: I

Geography The Earth-Atmosphere- various types of Soils - Minerals – Metallic and Non Metallic, Food Crops, Cash Crops - Flora and Fauna - Forests, Monsoons-Mountain ranges, Rivers, National highways, Airports-National Wild-Life Sanctuaries - Tribes in India.

UNIT: II

Indian Economy- Planning Commission, NDC - New Economic Policy, LPG Liberalization, Privatization, Globalization – Taxes - Currency System.

UNIT: III

Indian Polity - President, Parliament – Judiciary – Centre – state relation – state Government – Panchayat raj - Recent amendments.

UNIT : IV

Bio-technology – Nano Technology – Space research – Oceanography – plate tectonic – Natural Disaster Management.

UNIT : V

Present Day India and World; Indian States-Census, Flag, Emblem, River Valley Projects - Art & Music, Railways-Awards in India and World – Sports - Major Events in India and World - Who is Who - UNO.

Course outcome:

Unit I : This unit will enable the students to understand the physical geography of India

Unit II : This unit covers how the economy of India is distributed

Unit III : This unit gives an insight how the Union and State government were governed and also understand the Parliamentary democracy

Unit IV : This unit narrates the modern day technology and the growth of Science

Unit V : This unit teaches the meanings of our national flag, water savings, contributions of sports personalities and some of the major events in India and the world

REFERENCE BOOKS:

1. General studies UPSC and State Civil Services Preliminary Examinations, Unique Publishers.

2. General knowledge Manual, Pearson Publication.
3. India 2012, Publication Division, Government of India.
4. Geography of India, 'M' n 'M' series
5. Dutt and Sundaram – Indian Economy 6. Science and Technology-Spectrum Publications
6. 'The Hindu' National Newspaper
7. Civil Services Chronicle, Competitive Examination Monthly Magazine.

CORE ELECTIVE

PAPER 2

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. ADMINISTRATIVE HISTORY OF INDIA

Objectives: A student with a strong sense of history and a very strong historical background is best suited to study various other dimensions of India apart from history to enable him / her to prepare for the competitive examination

UNIT - I

Administration :- Meaning and scope of Administration – Origin and growth of Public Administration in India – Pre Mauryas – Mauriyan Administration – special reference to city Administration

UNIT – II

Ancient Indian Administration – Harsha – Guptas administrative policies – Introduction to Muslim Administrative systems – General Revenue, Land, Defence and judicial systems Administrative development in India under the British rule.

UNIT – III

Administrative functions in free India - Central Secretariat – Functions and role of the Ministries of Home affairs, Finance, Defence, Human Resource Development- Health, Law and External Affairs – Minister Secretary relationship – O & M in Central Governments.

UNIT – IV

Constitutional Authorities – The Finance Commission planning commission and Comptroller and Auditor General of India – Problems and issues in Central – State Administrative relation-inter Governmental issues.

UNIT – V

Administrative functions of Indian States – State Secretariat – State planning commission – Planning and Schemes – State Public Services – District Administration – Local self-Government.

Course outcome:

Unit I : This unit teaches the students about administrative efficiency of Indian rulers

Unit II : This unit covers various measures taken for better governance

Unit III : This unit teaches us how we are governed

Unit IV : This unit teaches the administrative functionaries in independent India

Unit V : This unit elaborates the functions of State governments in India

REFERENCES BOOKS:

1. B.B. Mishra, the Administrative History of India 1834 – 1947
2. History of Indian Administration vol-I Bharathiya Vidya Bhavan, 1968 B.N. Puri.
3. B.N. Puri, History of Indian Administration Vol-II, 1975.
4. The Evolution of Indian Administration, Agra, Lakshmi Narayan Agarwal, 1970.
5. Uma Meduri – Public Administration in the Globalisation Era , 2010
6. Bidyut Chakrabarty – Public Administration , Orient Longman Ltd , 2007

CORE ELECTIVE

PAPER 2

B. INTRODUCTION TO ARCHAEOLOGY

Objectives

The study of Archaeology through Epigraphy, Excavation and Numismatics, helps, to understand and rebuild, the history of ancient period. It is a base to post graduates and research students to collect various source materials to prepare and write any article, thesis or book.

UNIT-I

Aims and methods of Archaeology – Explorations – Different types of Excavation's- Pottery types and their importance.

UNIT-II

Early stone Age- A Brief survey of Paleolithic – Mesolithic and Neolithic culture of India.

UNIT-III

Harappa Culture – Chalcolithic culture of western and central India and Deccan – Early Iron Age culture – Painted Grayware and Megalithic culture – Northern Black Polished ware and Black red ware culture of south India.

UNIT-IV

Epigraphy – Its importance – Brahmi Script – Language and Types of inscriptions with special reference to South India.

UNIT-V

Numismatics – Its illustration – Coins of Guptas, Cholas, Pandyas and Vijaya Nagara rulers.

Course outcome:

Unit I : This unit elucidates the importance of archaeology to understand our past.

Unit II : This unit describes the growth of mankind to the students

Unit III : This unit describes the planning of cities and towns in ancient India and the growth of civilization

Unit IV : This teaches the students about the importance of learning to read the inscriptions engraved on the pillars, rocks and temple walls

Unit V : The study of coins will enable the students about the trade activities in India and maritime trade.

Books for Reference:

1. Asko Parpola : South Indian Megaliths, State Dept of Archeology, Tamilnadu.

2. Ekambaranathan, A: Principles and Methods of Archeological Excavation, & Ponnusamy Aranga (in Tamil),(Third Ed.) Kulamangalam Publishers, Chennai, 2002.
3. Magalingam, T.V.: Early South Indian palaeography, madras University.
4. Dr.Narashima Moorthy(ed): Studies in South India Coins, New Era Publication.
5. Narasimhan, B: Neolithic Cultures in Tamilnadu, Sundeep Prahasan New Delhi, 1980.
6. Ramachandran. K.S.: Bibliography on Indian Megaliths, The State Dept of Archaeology,Tamilnadu.
7. Dr.Raman, K.V.: Principles and Methods of Archaeology, Parthajan Publications, Chennai, 1988.
8. Rao, S.R.: Lothal and the Indus Civilizations, Asia Publishing House, Bombay, 1973.
9. Dr.Venkataraman.R: Indian Archaeology – A Survey, Ennes Publications, Udumalpet, 1999.

CORE ELECTIVE

PAPER 3

C. ECONOMIC HISTORY OF INDIA FROM C.E. 1526 TO C.E. 1857

Objectives

The main aim of introducing this paper is to create awareness among the students to know how Agriculture played a dominant role in India and the policies taken by the then governments to improve it. In addition to this, the industrial policies of East India Company, Transport and Communication developments from 1526-1857 certainly induce the students to come forward to work for the betterment of India.

UNIT-I

Economic condition under the Mughals _ Jagirdari – Zamindari – Manzabdari - Khalsa Land and Revenue Assignments – Land Revenue under Sher Shah – Land Tenures.

UNIT-II

Agriculture and Irrigation under the Mughals – Agriculture and Irrigation under the British – Introduction of Commercial crops in British Period.

UNIT-III

Industries – Impact of Industrial Revolution on British India – Policy and Development – Village, Small Scale and Large Scale Industries in Modern India – Famines in India and the Policy of the East India Company.

UNIT-IV

Trade and Commerce under the Mughals – Vijayanagar – Marathas – East India Company – British Traders.

UNIT-V

Transport and Communication – Development of Roadways – Water Ways – Railways.

Course outcome:

Unit I : This unit teaches how the Mughal rulers introduced a system of revenue administration.

Unit II : This unit elaborates the Agrarian conditions and the introduction of commercial crops

Unit III : This brings to light the growth of Industries during British period and Independent India

Unit IV; This unit will enable the students pertaining to trade and commerce

Unit V: This unit teaches the overall development of transports.

Books for Reference:

1. Bhattacharya, H: Aspects of India Economic History – 1750, Progressive Publications, Calcutta, 1980.
2. Chabiani, H.L: Economic Condition of India during the 16th Century, Delhi, 1929.
3. Chitnis, K.N.: Socio – Economic Aspects of Medieval India, Mrs. Chitnis, A1/23, Rambhat Colony, Poona, 1959.
4. Chopra, D.N. Puri, B.N.: A. Social, Cultural and Economic History of India, Vol III, Macmillan & Das, M.N. Company of India Ltd. New Delhi, 1974.
5. Datta, K.K: Survey of India's Social life and Economic condition in the 18th Century, Calcutta, 1961.
6. Irfan Habib: The Agrarian system of Mughal India A.D.1566 – A.D.1707, Asia publishing House, Bombay, 1963.
7. Mahalingam, T.V.: Administration and Social Life under Vijayanagar Vol I & II, Madras, 1969 & 1971.
8. Romesh Chandra Dutt: Economic History of India Vol.I & II, govt. of india Publications and Division, New Delhi, 1970.
9. Shireen Moosvi : The Economy of the Mughal Empire, Oxford University Press, New Delhi, 1980.

OPEN ELECTIVE

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

PAPER 2

A. THE INDIAN NATIONAL MOVEMENT

OBJECTIVES:

The objectives of the paper is to impart and imbibe in students values and lessons of the Indian National Movement, sacrifices made by nationalist leaders for the cause of freedom, prepare students for the state and central government competitive examinations, and to communicate the importance of safeguarding our freedom and national values.

UNIT-I:

South Indian Rebellion - Poligars and the British - The Vellore Mutiny of 1806, Causes, Course and Results.

UNIT-II:

The Revolt of 1857: Social, Religious and Political Cause - Course and Results - Role of Native Indian Rulers - Impact of the Revolt.

UNIT-III:

Indian National Congress - Moderates and Extremists - Partition of Bengal - Muslim League - Swadeshi Movement - Revolutionaries - Home Rule Movement - Role of Nationalist Press and Literature in the Indian National Movement.

UNIT-IV:

Gandhian Era - Satyagraha - Jallianwala Bagh - Non-Cooperation Movement - Swarajists - Salt Satyagraha - Round Table Conferences - Quit India Movement - British Missions - Partition and Independence.

UNIT-V:

Nationalist Leaders - Jawaharlal Nehru - Subash Chandra Bose - Sardar Vallabhai Patel - Maulana Abul Kalam Azad - Rajaji - Satyamurthy.

Course outcome:

Unit I : For the non- major students this unit will explain the struggle for freedom

Unit II : This unit covers the first war of Indian Independence in 1857

Unit III : The role of Congress towards achieving oneness is described in this unit.

Unit IV : The new phase of operation, ahimsa, is described

Unit V: This unit elucidates the role of national leaders

Books for Reference:

1. Bipin Chandra, Amales Tripathi and Barun De, Freedom Struggle, National Book Trust, 1994.
2. Bipin Chandra et al, India's Struggle for Independence, Penguin, 1989.
3. Sumit Sarkar, Modern India, Penguin, 1990.
4. V.D. Mahajan, Indian National Movement, S. Chand & Co, 1995.
5. S. Gopal, Jawaharlal Nehru - A Biography, New Delhi.
6. Bipin Chandra, editor, The Indian Left.
7. B.R. Nanda, Mahatma Gandhi - A Biography.
8. Chinnaiyan, The Vellore Mutiny.
9. S.N. Sen, Eighteen Fifty Seven, New Delhi, 1957.
10. J. Natarajan, History of Indian Journalism, New Delhi, 1955.

OPEN ELECTIVE

PAPER 2

B. PANCHAYAT RAJ

Objectives

The Constitution (73rd) Amendment Act, endowing PRIs with constitutional status, constitute a significant landmark in the evolution of grass root democratic institutions in India. It ensures full freedom to plan according to the local need and local potentials. The comprehensive framework provided now, will truly transform the rural economy and give a practical shape to people's participation in the process of economic development with social justice.

UNIT-I

Introduction of Panchayat Raj system in India- The Madras Panchayat System- people's participation in rural reconstruction.

UNIT-II

Aims and Objectives of Panchayat Raj system. Constitutional provisions of Panchayat Raj system- The 73rd and 74th Constitutional Amendment Act (CAA)

UNIT-III

Structure and functioning of Panchayat Raj institutions- Marginalized sections and their participation; Institutional mechanism and grassroots decision-making- Examining the administrative and political lacunae in the functioning of the Institution of Self-government

UNIT-IV

Natural resource management and Panchayat Raj institutions- NGOs, Panchayats and capacity-building initiatives- and decentralised planning and finance.

UNIT-V The role of Panchayat Raj institutions in villages and rural areas- Impact on the lives of the women.

Course outcome:

Unit I : This unit teaches the non-major students how effective local self - government functions

Unit II : This unit covers the main aims and objectives of Panchayat raj

Unit III : This unit gives an insight on the structure and functioning of Panchayatraj

Unit IV : This covers the role of resource management and the role of non-governmental organizations

Unit V : This unit explains the panchayat role and the emancipation of women.

Books for Reference:

1. Sanyal, B.M. India: decentralised planning, themes and issues Sanyal;
2 New Delhi: Concept, 2001.
- 3 Ray, C.N. Politics of Rural Development
- 4 3.Edited By Hooja, Rakesh Mathur, P.C. District and Decentralized Planning-
Jaipur: Rawat Publications, 1991
- 5 Pattanayak , Raimann (ed.) Local Government Administration Reform
6 -New Delhi: Anmol Publications, 2002.
- 7 Singh, S.K. Panchayati Raj Finances in Madhya Pradesh -new Delhi: concept
Publishing Company, 2004
- 8 Singh, J.L. Women and Panchayati Raj- -New Delhi: Sunrise Publication, 2005
- 9 Soni, Jasprit Kaur Governance of Panchayati Raj -New Delhi: Authors Press
Publishers of Scholarly Books, 2005
- 10 Taori, Kamal IAS Disaster management Through Panchayati Raj-New Delhi:
Concept Publishing Company, 2005
- 11 Edited by Sisodia, Yatindra Singh Functioning of Panchayat Raj System -New
Delhi: Rawat Publications, 2005
- 12 Venkatesan , V. Institutionalising Panchayati Raj in India -New Delhi: Concept
Publishing, 2002.
- 13 Ghosh , Buddhadeb & Girish Kumar State Politics and Panchayats In India-New
Delhi: Manohar Publishers, 2003.
- 14 Sudhakar , V. New Panchayati Raj System: Local Self-Government Community
Development -Jaipur: Mangal Deep Publications, 2002.
- 15 Rai, Manoj & Malini Nambiar etc.(eds.) The State of Panchayats:A Participatory
Perspective -New Delhi: Samskriti Publication, 2001.

OPEN ELECTIVE

PAPER 2

C. THE CONSTITUTION OF INDIA

OBJECTIVES

In a free and democratic country, the Constitution of the Nation is supreme and it governs the state. Being evolved after much deliberations and discussion, the Bundle of Statute contains the rules and nature of the legislature, its composition, structure of executive and the judiciary. Hence it is essential for every citizen of India to be aware of the same; in particular about the rights that is guaranteed and the duties to be performed by one and all. The objective of this paper is to enlighten the students about various aspects of the constitution under which they are governed.

UNIT-I:

Sources of the Constitution - Preamble - Salient features - Fundamental Rights and Duties - Directive Principles of State Policy.

UNIT-II:

The Union Executive: President, Vice-President, Prime Minister and the Council of Ministers - Powers and Functions - The Parliament: Rajya Sabha and Lok Sabha - Powers and Functions.

UNIT-III:

The Judiciary: The Supreme Court - Composition, Powers and Functions - High Courts in the States - Judicial System of States - Judicial Review - Important Judicial Decisions - Election Commission of India.

UNIT-IV:

The Government of the States: The Governor - Powers and Functions - Chief Minister and the Council of Ministers - The Public Service Commission - The State Legislature Council - Legislative Assembly - Powers and Functions - Election Commissions.

UNIT-V:

The Federal System: Relations between the Union and the States - Legislative, Administrative and Financial Relations - Amendments.

Course outcome:

Unit I : Every Indian should know about our Constitution which will help them for competitive examinations

Unit II : It describes the role of hierarchy in India

Unit III : This unit gives an insight about the functioning of the Indian judiciary

Unit IV: This elaborates the governance in the state and other commissions in India

Unit V: This unit describes the federal structure of our country

Books for Reference

1. Agarwal, R.C. : Constitutional Development and National Movement, S. Chand & Company Ltd., New Delhi, 2005.
2. Basu, D.D. : Introduction to the Constitution of India, Wadhwa and Company, Agra, 2005.
2. Grover, B.L. & Grover, S. : The Evolution of Indian Constitution and Freedom Struggle, S. Chand & Company Ltd., New Delhi, 1985.
3. Johari, J.C. : The Constitution of India, Sterling Publishers Private Limited, New Delhi, 2004.
4. Pylee, M.V. : India's Constitution, S. Chand & Company Ltd., New Delhi, 2005.

SEMESTER III

PAPER - 8

HISTORY OF WORLD CIVILIZATIONS (EXCLUDING INDIA) – ANCIENT PERIOD

Objectives

The main objective of this study is to provide the students of history, a well-balanced coverage of the all key factors comprising the world civilization excluding India. Also to help the students with broad based knowledge and understanding of the concept of evolution of Mankind and Culture through the ages and their impact on human lives today.

UNIT-I

Introduction – Definition of Civilization – Comparison between culture and Civilization – Origin and Growth of Civilization – Pre-Historic Culture – Paleolithic and Neolithic Culture.

UNIT-II

River Valley Civilizations – Egyptian Civilization – Mesopotamian Civilization – Sumerian, Babylonian, Assyrian and Chaldean Cultures.

UNIT-III

Persian Civilization – Hebrew Civilization.

UNIT-IV

Classical Civilization – Ancient Greece – Legacy of Greece Hellenistic Civilization – Ancient Rome – Roman Civilization.

UNIT-V

Chinese Civilization – Japanese Civilization – Maya, Aztec and Inca Civilizations.

Course outcome:

Unit I : This unit explains the students various civilizations of the world and their contributions to the progress of human lives.

Unit II : Students can understand and enhance their knowledge why all the civilizations sprang on the banks of rivers.

Unit III : Students understands the values of Persian and Hebrew civilizations and their contribution to world civilization.

Unit IV : The Study helps the students to appreciate the classic civilization of Greece and Rome and their contribution to the world civilizations.

Unit V: The students understands the values of Chinese, Japanese, Maya, Aztec and Inca civilizations

Books for Reference:

1. Burns, Ralph, et al: Western Civilizations.
2. Brinton, Christopher, Wolf: A History of Civilization, Vol I & II, Prentice – hall, Inc, Engle Winks, Wood, New Jersey, 1984.
3. Edward, d'Cruz, S.J: A Survey of world civilization, Lalvani Publishing House, Bombay, 1970.
4. Edward Macnall Burns ; Western Civilization – Their History and their Culture.
5. Gokhale, B.K.: Introduction to Western Civilizations, S.Chand & Co, Pvt.Ltd. New Delhi, 1973.
6. Israel Smith Calre : The Standard History of the World(10 Volumes), Standard historical Society, Cincinnati, 1931.
7. Judd, G.P: History of Civilization.
8. Phul, R.K.: World Civilization.
9. Swain, J.E.: A History of world civilization, Eurasia Publishing House, Pvt.Ltd., New Delhi, 1994.
10. Toynbee, A.J.: A study of History (12 Volumes)
11. Wall Blank, T.W.: Civilization – Past and Present Bailey, N.M.
12. Will Durant,: The story of Civilization (Vol.I & II)
13. Wesley Roehm, A.Morris, : The Record of Mankind, Webster & Edger B, Wesley, D.C. Edgar, B.Health and Company, Boston, 1952.

PAPER - 9

HISTORIOGRAPHY

Objectives

The aim of the paper is to inculcate the knowledge of history of history to the students of history in detail.

UNIT-I

History - Meaning – Definition – Nature and Scope – Value of History.

UNIT-II

History and Allied Studies – Types of History – Whether Science or Art

UNIT-III

Genesis and Growth – Greek - Roman Historiography – Medieval Arab Historiography

UNIT-IV

French and Finish Marxist historians – Evolution of Quantitative History – Modernism Post – Modernism.

UNIT-V

Indian Historiographers – Bana, Kalhana – Ferishta – Barani – Abul Fazl –VA Smith – K.P. Jayaswal – JN Sankar – DD Kosambi – K.A. Nilakanta Sasthri Sadhasiva Pandarathar –K K Pillay- N.Subrahmanian.

Course outcome:

Unit I : The students learns the meaning and definition of History and also the scope of History

Unit II : The students enhance their knowledge through the study on history and the allied subjects

Unit III: The students will have an insight on the growth of historiography

Unit IV: The students will be taught on quantitative and qualitative history

Unit V : The study helps the students to know the contributions of Indian Historiographers to the development of Historiography.

Books for Reference:

1. Rajayyan.K - History: Its theory and Method
2. Sabramanian.N - Historiography
3. Carr.E.H. - What is History?
4. Sheik Ali. B - History: Its Theory and Method

PAPER - 10

HISTORY OF EUROPE FROM C.E.1789 TO C.E.1919

Objectives

The History of Modern Europe is essential because many revolutionary changes that took place in Europe not deeply affected the people of Europe but also the whole world. For instance, the three principles like 'Liberty, Equality and Fraternity' of French Revolution paved the way for independence of many nations. Further, the study of this History makes the students to know how the leaders of European Nations struggled hard to achieve their goals. Above all, the study of the First World War makes the students to understand the values and importance of people and their democracy and democratic institutions.

UNIT-I

French Revolution – Causes, Course and results – Era of Napoleon.

UNIT-II

The Congress of Vienna – The Holy Alliance – Concert of Europe – Metternich – Revolutions of A.D. 1830 to A.D. 1848.

UNIT-III

Napoleon III – Third Republic of France – Unification of Italy – Unification of Germany.

UNIT-IV

The Eastern Question – Balkan Crises – Germany Between A.D. 1870 and A.D.1914

UNIT-V

First World War – Treaty of Versailles – Russian Revolution – League of Nations.

Course outcome:

Unit I : The ending of Divine Right theory during Louis XVI and the cause and course of the revolution

Unit II: The Congress of Vienna and the Concert of Europe where the student will learn about the role of Metternich and the consequent revolutions in France.

Unit III : The people come together to build a nation society in Germany and Italy

Unit IV: The student will know the trends happened in Europe in the later half of the 19th century and in the first phase of 20th Century.

Unit V: Europe during the First World War

Books for Reference:

1. Gooch, G.P: History of Modern Europe 1878 – 1919, S.Chand & Co, New Delhi, 1976.
2. Grant, A.J.& : Europe in 19th Century and 20th Centuries, Orient Longman, London, 1959, Temperly
3. Hayes, C.J.H.: Contemporary Europe Since A.D.1870, Surjeet Publications, New Delhi, 1981.
4. Hazan, C.D.: Modern,Europe Since 1789, S.Chand & Co, Ram nagar, New Delhi, 1998.
5. John Bowle : A History of Europe – A Cultural and Political Survey, Martin Seckar & Warburg Ltd., London 1979.
6. Ketelbey, C.D.M.: A History of Modern Times from 1789, Oxford University Press, Chennai, 1997.
7. Mahajan, V.D.: Modern Europe Since A.D.1789, S.Chand and Company Ltd, New Delhi, 1977.
8. Rao, B.V.: History of Modern Europe 1789-1992, Sterling Publishers Pvt. Ltd, New Delhi, 2002.
9. South Gate, G.W.: A Text Book of European History, 1756 to 1945, T.M.Dent & Sons Ltd, London, 1970.

PAPER - 11

HISTORY OF THE USA FROM C.E.1900 TO C.E. 2000

Objectives

This Paper helps the students to know the political, Economic, Scientific and Technological developments in the USA from A.D.1900 to A.D.2000

UNIT-I

Progressive Era - Theodore Roosevelt and the Square Deal Policy – Big Stick Policy – William Taft – Woodrow Wilson – New Freedom – Role of USA in the First World War.

UNIT-II

Warren k Hardinge – Washington Conference – Coolidge – Hoover – Great Depression – F.D. Roosevelt and New Deal – USA in the Second World War.

UNIT-III

Truman – Fair Deal – Truman Doctrine – N.A.T.O – Cold War – Eisenhower – S.E.A.T.O. – John.F.Kennedy – New Frontier – Civil Rights Movements – Martin Luther King.

UNIT-IV

L.B.Johnson – Great Society – Foreign Policy – Richard Nixon – Watergate Scandal – Ping Pong Diplomacy – Man on the Moon.

UNIT-V

America under President – Jimmy Carter – Ronald Reagan – George Bush (Sr) – Bill Clinton – Barack Obama.

Course outcome

Unit I : The student will know the growth of American progress under the dynamic leadership of its Presidents

Unit II: The problem of great depression and the rise of US of America will be taught to the students

Unit III: The post- World War Experience of the USA is taught to the students

Unit IV: Astronomical advances by the USA will be taught

Unit V: Recent Presidents of USA that will enable the students to understand the current situations.

Books for Reference:

1. Beard and Beard : New Basic History of the United States, New York, USA, 1985.
2. Dharmaraj, J.C. : History of the USA (1800-2002), Denshi Publication, Sivakasi, 2001.
3. Krishnamurthi : History of the United States of America, 1492-1965, Madurai Printers, Madurai, 1980.
4. Majumdar, R.K.& Srivastva, A.N.: History of the United States of America – From 1845 to Present Day, SBD Publishers and Distributors, New Delhi, 1998.
5. Marshall Smelser : American History – At A Glance, Barnes and Noble INC, New York, 1962.
6. Nambi Arooran, A, : History of the USA (Tamil), Tamilnadu Text Book Society Publication, Chennai, 1980.
7. Parkes, H.B. : The United State of America – A History, Scientific Book Agency, Calcutta, 1975.
8. Rajayyan,K. : A History of the USA, Madurai Publishing House, Madurai, 1978.
9. Ralph, W.Steen : The United States – A History, Prentice Hall, INC, Engle Wood, Cliffs, New Jersey, 1959.
10. Subramanian, N. : A History of the USA, Ennes Publication, Udumalpet, 1986.

CORE ELECTIVE

PAPER - 3

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. INTRODUCTION TO NUMISMATICS

Unit-I

Introduction - Evolution - materials used - language - size and shape - Art - Economic - Historical values of Numismatics.

Unit-II

Types of coins - Punch marked - Indian - Foreign - Roman Coins - Eastern Coins - Sathavahana Coins - Currency - Value.

Unit-III

Coins of vedic period - Sangam and Post Sangam - Chera - Later Chera -Chola - Pallava - Imperial Chola Coinage - Pandiyan Coinage - Coins of Sultanate and Mughals.

Unit-IV

Vijayanagar Coins - Coins of Nayaks - Maratha Coins - Coins of Arcot Nawabs - Indo French Coins - Indo Dutch Coins - Indo Danish Coins - The Coins of East India Company.

Unit-V

Coins of Indo British - Coins of free India - Some special types of coins - Historical values.

Books Recommended:

1. Chattopadhyaya, Brajadulal, Coins and Currency Systems in South India New Delhi, 1977.
2. Desikachari, T., "Numismatics with special relation to South India," QJMS., III, I, 1913, pp. 1 - 11.
3. Desikachari, T., "The Cholas and their Coinage", TA, Vol. II, No.2, 1914, pp. 1 - 19. B.A. History: Syllabus (CBCS) 46
4. Desikachari, T., "South Indian Epigraphy and Numismatics", Proceedings of the Madras Literary Society, 1916, pp.33 ff.
5. Desikachari, T., South Indian Coins, Trichinopoly, 1933.
6. Ganesh, K., The Coins of Tamilnadu, Bangalore, 2002.
7. Hultzsch, E., "South Indian Copper Coins", IA., xxi, 1892, pp. 321 - 26.
8. Irfan Habib, "Hoards and History", JNSI, 50, 1988, pp.50.
9. Kosambi, D.D., "Indian Numismatics, New Delhi, 1981, pp.123 - 127.
10. Krishnamurthy, R., "Sangam Period Pandya Coins with Tamil Brahmi Legends", JNSI, 47, 1985, pp. 45 - 47.
11. Krishnamurthy, R., "Kalabhra Coin with a Legend", JNSI, 48, 1986, pp.48.
12. Krishnamurthy, R., "Sangam Period Chera Coins", JNSI, 49, 1987, pp. 36 - 38.

13. Krishnamurthy, R., "Some Unpublished Silver Punch Marked Coins of the Pandyas", JNSI., Vol. 50., 1988, pp.25 - 27.
14. Krishnamurthy, R., "Coins of the Pallava King Mahendravarman I", JNSI., 50, 1988, pp. 33 - 34.
15. Krishnamurthy, R., "Selucid Coins from Karur", SSIC, Vol., 3, 1993, pp.19 - 28.
16. Krishnamurthy, R., Late Roman Copper Coins from South India, Karur and Madurai, Chennai, 1994.
17. Krishnamurthy, R., "Coins from Phoenicia found at Karur", SSIC., Vol., 4, 1994, pp. 19 - 28.
18. Krishnamurthy, R., Non Roman Ancient Foreign Coins from Karur in India, Chennai, 2000.
19. Krishnamurthy, R., "Some Unknown Ancient Greek Coins from Karur", SSIC, Vol. 11, 2001, pp. 53 - 56.
20. Rangachariar, T.M., and Desikachari, T., "Indo - Danish Coins", MJLS., 1888 - 89.
21. Sircar, D.C., "Silver Coins of Vasistiputra Satakarni", Epigraphia Indica, 35, 1965, pp. 247.
22. Vanaja, R., "The Madras Museum Collection of Punch - Marked coins, A Study", M. Litt Thesis (unpublished), University of Madras, Chennai, 1955.
28. Wheeler, R.E.M., "Roman Coins, first century B.C. to fourth century\
23. Champakalakshmi, R., Trade Ideology and Urbanization - South India 300 BC to AD 1300, Oxford, 1996.

CORE ELECTIVE

PAPER - 3

B. ISLAMIC HISTORY AND CULTURE FROM A.D.500 TO A.D.750

Objectives Islam is one of the major religions of the world. It had very humble beginnings in Arabia, but within a short period of time spread to many regions of the ancient world. The study of this paper will introduce the students to the beginnings of Islam, Its prophet, the teachings of Islam and the early Caliphates.

UNIT-I

Jahiliyya Period – Social, Cultural and Religious Life – Early Life of Prophet Muhammad.

UNIT-II

Prophethood – Teachings of Islam – Five Pillars – Quran and Hadith.

UNIT-III

Rightly guided Caliphs: Abu Bakr, Omar, Uthman and Ali – Social, Cultural and Religious Life between 571 and 661 A.D.

UNIT-IV

The Umayyads: Muawiyah – Abdul Malik – Walid and Omar Bin Abdul Aziz – Fall of the Umayyads.

UNIT-V

Contribution of the Ummayyads – Art and Architecture – Literature – Umayyad Administration.

Books for Reference.

1. Abbas : Civilization in Islam, Reference Press, New Delhi, 2005.

2. Ali, Syed Ameer: The Spirit of Islam, Idarah-i-Adabiyat-i-Delli, New Delhi, 1997.

3. Ali, Syed Ammer: History of the Saracens, Kitab Bhavan, New Delhi, 1995.

4. Arnold, Thomas, : The Legacy of Islam, Oxford University Press, 1980.

5. Hitti, Philip.K : History of Arabs, Macmillan India, New Delhi, 1974. 6. Zaydan, Jurji, : History of Islamic Civilization, Kitab Bhavan, New Delhi, 1978.

CORE ELECTIVE

PAPER - 3

C. HISTORY OF MODERN JAPAN FROM A.D.1900 TO A.D.2000

Objectives History of Modern Japan offers an interesting insight to students on the rapid progress of Japan in the 20th Century. Students are expected to learn and imbibe the spirit with which Japan could achieve such progress. The transformation of Japan into a technological super power will offer a good lesson to all learners about the importance of science and technology in the country's progress.

UNIT-I

Condition of Japan at the beginning of the 20th Century - Japan's position in East Asia - Anglo - Japanese Alliance of 1902 - Russo - Japanese War, 1904 - 1905 - Impact on Japan.

UNIT-II

Political developments in Japan 1900 - 1914 - Japan and the First World War - Twenty one Demands - Japan and the Treaty of Versailles.

UNIT-III

Japan and the Washington Conference - Japan's economic and financial condition During the inter-war period - Bank Crisis - Political developments - Expansion Policy - Invasion of Manchuria - Manchurian Crisis - Sino-Japanese Second war.

UNIT-IV

Japan and the Second World War - Japan's entry into the Asian Countries - Defeat of Japan in the war - Allied Occupation of Japan - reforms under allied occupation - End of Occupation - San Francisco Treaty.

UNIT-V

Post war Japanese politics - Economic Reforms - Scientific and Technological Developments - Japan in World Affairs - Japan at the end of the twentieth century.

Books for reference

1. Andrew Gordon : A Modern History of Japan from Tokugawa Times to the Present, Oxford University Press, 2002.
2. Clyde, Paul H.& Beers, Burton F.: The Far East - A History of Western Impacts and Eastern Responses, 1830-1977, Prentice Hall of India, New Delhi, 1985.
3. James, David H. : The Rise and Fall of the Japanese Empire.

4. Roy, Somendralal : A short history of the Far East in Modern Times, Basushree Book Stall, Calcutta, 1991.
5. Vinacke, Harold M. : A History of the Far East in Modern Times, Kalyani Publishers, New Delhi, 1982.
6. Website : <http://en.wikipedia.org/wiki/japan>

OPEN ELECTIVE

PAPER - 3

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. HISTORY OF FREEDOM STRUGGLE IN TAMILNADU

UNIT-I

Genesis of Freedom movement - The poligari Rebellion South Indian Rebellion, Vellore Rebellion - causes, course and results.

UNIT-II

Formation and Growth of Indian National Congress - Growth of western Education - Socio - Economic - religious Factors - Role of Press - Pre - Congress political Associations - British Birth of Indian National Congress - Tamilnadu in the congress sessions - Moderates and Extremists.

UNIT-III

Swadeshi Movement - Surat split - Extremist activities - Vanchinathan - Senbagaraman - Home rule Movement - Madras presidency Association - Role of Justice Party - consequences of Jallianwala Bagh Massacre.

UNIT-IV

Emergence of Gandhiji - Non - cooperation Movement - Civil Disobedience Movement - Swarajya Party - Non Statute Satyagraha - Vedaranyam salt Satyagraha - II world war - Quit India Movement - INA trials - Independent India.

UNIT-V

Tamil Nationalists - Thilliyadivathiram - Subramaniya Sivea - Bharathiyar Thirmilika Dr. P. Varadarajalu Naidu - S. Satyamurthy - Rukmani lakshmipathi - Rajaji - E.V Ramasamy - Satyamurthy - Kamaraj - Jothi Venkatachlam - Maragatham Chandrasekar.

Books for Reference

1. Baker, C. J - The politics of South India 1920 - 37, Cambridge University press, 1976.
2. Baker, C. J and Wash Book, D.A - South India - Political Macmillan company Ltd, New Delhi, 1975.
3. Copley, ARH - The political career of C. Rajagopalachari 1937 - 54, The Macmillian company of India Ltd, Madras, 1978.
4. Ganesan, A - The press in Tamilnadu and struggle for Freedom 1917 - 37, Mittal Publications, New Delhi, 1989.
5. Kandaswamy, P - The Political career of K. Kamaraj, concept publishing company, New Delhi, 2001.
6. Nambi Aroram, K - Tamil Renaissance and Dravidian Nationalism 1905 - 1944, Koodal Publishers, Madurai, 1980.
7. Pattabi Sitarammaya, B - History of India National Congress (1885 – 1935), The Congress Working Committee are the Occasion of 50th Anniversary of Congress, Madras, 1935.
8. Rajaramman, P - The Justice Party - A Histocial perspective 1916 - 37. Poom Pozhil Publishers, Madras - 1998.
9. Rajayyan, K - History Tamilnadu 1565 - 1982, Raj Publishers, Madurai, 1982.
10. Sivagnanam, M.P. - Viduthalaipporial Tamilzhagam, (Tamil) Vol. I and II. Poongodi pathippagam, Chennai, 2005.
11. Sundralingam, R. - Politics and Nationalist Awakening in South India 1852 - 1891, Rawat Publications, New Delhi, 1980.
12. Viswanathan, E.Sa, - The Political Career of E.V. Rana Sami Naicker, Ravi and Vasanth Publications, Madras. 1983

OPEN ELECTIVE

PAPER - 3

B. CONTEMPORARY HISTORY OF INDIA FROM A.D 1947 TO A.D 2002

UNIT- I

Framing of Indian Constitution - Constituent Assembly – Draft Committee Report – declaration of Indian Constitution – Process of National Consolidation and Integration of /Indian States – Role of Sardar Patel – Kashmir issue- Indo – Pak war 1948 .

UNIT – II

Nehru Era – First General Election of 1952. Five year plans – Democratic socialism and mixed Economy – Planning and land Reforms – Reorganizations of linguistic States 1956 - Kamaraj Plan and Bhuvaneswar Congress.

UNIT - III

India After Nehru – the role of Lal Bhahadur Sastri – Pak aggression – the treaty of Tashkant – Vision of New India – Indira Gandhi – Congress split – Economic Policy; Nationalization of Banks – Abolition of privy puse – 1971 – Mid-term poll – 20 point Programme – Authoritarian Politics – Total Revolution (J.P.Narayan – Allahabad Judgement. proclamation of emergency – Policies of Repression – General Election 1977 – New Political Alignment - Janata Party Govt. – Moraji Rule – breakup – Charansigh Premiership.

UNIT – IV

Re-emergence of Indira Gandhi – Election of 1980 – NAM Conference at Delhi – Panjab Crisis; Blue star operation-Assassination of Indira Gandhi – Era of Liberalism Prime minister ship of Rajiv Gandhi – New Economic Policy – Domestic policy – Nagaraphaliga and Panchayat Raj.

UNIT - V

National front Govt-V.P. Sing – Mandal commission - the issue of Rama Janna Boomi – fall of Govt. 1991 Election – Restoration of congress Regime – Narashimha Rao – Economic policies – the Role of Manmohan Singh as finance Minister – United front govt. Regionalism and instability in India.

REFERENCE BOOKS:

1. V.D. Mahajan - Contemporary History of India Chand & Company, New Delhi.Vol.I & II 2.
- Bepin Chandra - Contemporary History of India
3. Venkatesan - Contemporary History of India
4. C.P.Bhambhri - Indian Politics since Independence Vol : I , NewDelhi,1995
5. S.Gopal - Jawaharlal Nehru , A Biography , Vol:I ,1889- Cambridge , 1956
6. Palmar D.Norman - The Indian Political System , 2nd Ed.,Boston , 1971.
7. Partha Chatterjee - State and Politics in India , New Delhi , 2002
8. Publication Division - India : 40 years of Independence
9. Publciation Division - Era of Rapid Change , 1947 – 1971.

OPEN ELECTIVE

PAPER - 3

C. DRAVIDIAN MOVEMENT IN TAMIL NADU SINCE A.D.1947

UNIT-I

Meeting of Rajaji and Periyar 1949 - Split in Dravida Kazhagam and the birth of DMK - Young dynamic followers of C.N. Annadurai - New style in press - stage - film worlds - struggle of DMK - 1952 Elections - 1954 Bye election and support to Kamaraj - Kallakudi - Thiruttani - Devikulam Peermedu struggle - 1957 entry into election and 15 MLAs.

UNIT-II

1962 Elections - 50 MLAs - Good growth - Indo Chinese war - Defence of India Rules - Abandoning of separate Dravida Nadu demands - Anti Hindi and Anti price rise agitations - large scale unrest - 1964 - 65, 1967 - Elections - New Alliance formula of seat adjustment - DMK won and C.N. Annadurai became CM.

UNIT-III

The Administration and death of C.N. Annadurai - succession crisis and M. Karunanidhi becomes CM - various welfare measures - development activities - Congress split and DMK's support to Congress - I. Demand for state Autonomy - 1971 Elections - continuance of Alliance - M.G.Ramachandran and split in DMK - Birth of ADMK - Emergency and after math in Tamil Nadu.

UNIT-IV

Alliance Politics in Tamil Nadu - M.G.Ramachandran first ADMK Govt. 1977 - 80 - 1980 - 84 and 1984 - 88. Welfare measures and development activities of ADMK - Srilankan issue and political changes in Tamil Nadu - Death of M.G.Ramachandran 1987 and split in ADMK - return of ADMK to - administration 1989 - 91.

UNIT-V

Rajiv Gandhi's Assassination and Political changes 1991 - Ms. J. Jayalalitha as CM - References of welfare activities - charges and criticism - 1996 - Return of M. Karunanidhi as CM for the fourth time - Changed affiliations and alliance - Tamil Nadu under development path - software - IT and Tamil Nadu.

Reference Books:

1. Hard Grave, R: The Dravidian movement, Popular Prakasam, Bambay, 1965.
2. Subramanian, N. : Social and Cultural History of Tamil Nadu, AD. 1336 – AD. 1994, Ennes Publications, Udumalpet, 1999. 1.
3. Thandavan, R. : All India Anna Dravida Munnetra Kazhagam, Tamil Nadu Academy of Political Science, Madras University, 1987. 3. Spratt, P. : DMK in power, Nichiketa publication Ltd, Bombay, 1970.

SEMESTER IV

PAPER - 12

RESEARCH METHODOLOGY IN HISTORY

Objectives This paper aims to help the students to understand the methodology so as to pursue research in the field of Historical Studies.

UNIT-I

Definition – Meaning – Nature and Scope – Uses of History.

UNIT-II

Research Methodology – Selection of Topic Review of Literature, Objectives – Hypothesis – Collection of data – Types of data – classification of sources.

UNIT-III

Historical Criticism – External and Internal – Positive and Negative Criticism – Objectivity and Subjectivity in Using of History.

UNIT-IV

Questionnaire and Pilot Study – Evolution Techniques – Analyses.

UNIT-V

Footnotes – Importance and purpose of Footnotes – Endnotes – Bibliography – Annotated Bibliography – Appendix – Index.

Books for Reference

- 1.Reiner G.T. - History its purpose and method.
- 2.Collingwood, R.G. - The idea of history
- 3.Khan, S.A., - History and Historians of British India.
- 4.Majumdar, R.K.and Srivastava, A.N. – Historiography, Delhi.1975
- 5.Sen, S.P.(Ed) – Historians and historiography in modern Indian, 1973.

PAPER – 13

HISTORY OF WORLD CIVILIZATIONS (EXCLUDING INDIA) MEDIEVAL AND MODERN PERIOD

Objectives

The main objective of this study is to provide the students of history, a well balanced coverage of the all key factors comprising the world civilization excluding India. Also to help the students with broad based knowledge and understanding of the concept of evolution of Mankind and Culture through the ages and their impact on human lives today.

UNIT-I

Middle Ages: Rise and Spread of Christianity – The Papacy – Byzantine Civilization – Rise and Spread of Islam – Saracenic Civilization.

UNIT-II

Feudalism – Origin – Merits and Demerits – Crusades – Causes and Results – Monastic orders of Medieval Europe – Growth of Medieval Cities – Progress of Education and Rise of University.

UNIT-III

Transition to Modern Age – Renaissance – Causes – Renaissance in Italy – Results of Renaissance – Geographical Discoveries of 15th and 16th Centuries – causes, Course and Results – Reformation in Germany, France and Switzerland – Counter Reformation.

UNIT-IV

French Revolution and its impact – Romanticism – Industrial and Agrarian Revolutions – Causes, Course and Results – Revolutions of the 20th Century – China, Russia, Latin America.

UNIT-V

Nationalism Vs. Internationalism – League of Nations – United Nations Organization De-Colonization – Nelson Mandela Developments in Science and Technology – Philosophy, Arts and Literature during the Contemporary World.

Course outcome:

Unit I : This unit helps the students to understand the rise and spread of Christianity and Islam

Unit II : This unit teaches the students about the feudalism and its merits and demerits and the causes and courses of Crusades. This also elucidates the rise of Universities

Unit III : This unit gives an insight about renaissance and reformation and geographical discoveries and entering modern era

Unit IV : This unit describes the causes, course and results of French Revolution alongwith Industrial and Agrarian Revolutions.

Unit V: This unit teaches the students about the efforts of the countries to bring peace.

Books of Reference

1. Burns, Ralph et al: Western Civilizations.
2. Collier : The World's Great Events – 10 Volumes (An Indexed history of the World from earliest times to present day – Illustrated, P.F.& Son Company, New York, 1948.
3. Edward MacNall: Western Civilization – Their History and their Culture, W.W.Norton & Company, Inc New York, 1963.
4. Gokhale,B.K: Introduction to Western Civilization, S.Chand & Co, Pvt.Ltd, New Delhi.1973.
5. Israel Smith Clare: The Standard History of the World, 10 Volumes, Standard Historical Society, Cincinnati, 1931.
6. Judd, G.P.: History of Civilization
7. Phul, R.K: World Civilization
8. Swain,J.E.: A History of World Civilization, Eurasia Publishing House Pvt., Ltd., New Delhi, 1994.
9. Toynbee, A.J: A Study of History (12 volumes)
10. Wallbank, T.w.& Bailey, N.M: Civilization – past and Present.
11. Will Durant: The Story of Civilization(Vol I & II)
12. Wesley Rohem, A et al: The record of mankind, Health and Company, Boston, 1952.

PAPER - 14

INTERNATIONAL RELATIONS SINCE AD 1919

Objectives

There has been increasing internationalization of issues of mankind. Unless the student understand International Relations, they will not be familiar with International issues. This paper aims at training the students with development in International Relations and Diplomacy.

UNIT-I

Nature of International Relation – National Power and instruments for promotion of National Interests – Diplomacy.

UNIT-II

Inter war years – Reparation – Inter Allied debts – World Economic Crisis – Collective Security League of Nations – Rise of Dictatorship – Totalitarianism.

UNIT-III

Second World War – Peace Settlement – Military Alliances Emergence of Power Blocs – Cold War – UNO – Detente.

UNIT-IV

Disarmament and arms control – Disintegrating USSR – Emerging New World Order – Multi-polar Vs Uni-polar Concepts – Fight against Terrorism – Emergence of India and China.

UNIT-V

Present trends in International Associations (Role of International Associations such as Common Wealth – NAM, SAARC, OAU, ASEAN, G-18, G15, G-77 and European union).

Course outcome:

Unit I : This unit describes the efforts of national power and national interest.

Unit II : This unit explains the students regarding the war debts and world economic crisis and the rise of dictatorship

Unit III: The unit express about the Second World War and its aftermath.

Unit IV: This unit helps the student to know the meaning of disarmament and arms control and emergence new world order

Unit V: This unit helps the student to know the present scenario of maintain world peace and the role of international associations.

Books of Reference:

1. Paloner and Perkins: International Relations, 3rdEd, AITBS Publishers Delhi, 2000.
2. Schuman – F: International Politics 6th Ed. McGRaw Hill Book Company, New York, 1958.
3. Schleicher C P : International Relations, New Delhi. 1963.
4. Sen AK : International Relations Since 1919, S.Chand & Co., New Delhi 1993.
5. Wrisht Q : The Study of Internationl Relations, Appleton – Century crafts, New York, 1955.
6. Carr.E.H : International Relations between the two world wars, 1919-1939, New York, 1966.
7. Calvecoressi, P. : World Politics since 1945.
8. Moon, P.T. : Imperialism and World Politics , The Macmillan Company, New York, 1926.
9. Morgenthau, Hans.J: Politics among nations, The struggle for Power and Peace, New York, 1973.
10. Palmer and Perkins: International Relations, Third Ed, AITBS Publishers & Distributors, Delhi, 2000.
11. Prakash Chander & Prem Arora : International Relations, Cosmos Bookhive (p) Ltd. Gurgaon.
12. Schleicher, C.P : International Relations , New Delhi, 1963.
13. Schuman, F.: International Politics, 6th Ed, McGRaw Hill Book Company, New York, 1958.
14. Sen.A.K : International Relations since 1919, S.Chand & Co., Ltd, New Delhi, 1993.

PROJECT / DISSERTATION

WITH VIVA VOCE

GUIDELINES

The Project / Dissertation with Viva – Voce in M.A. Degree Course in History has to guide by the teachers who handle P.G. Classes in their respective Colleges. Students can choose a topic of their interest related to their subject in consultation with the respective teachers under whom they are assigned to work. The workload for guidance has to be treated on par with the teaching hours of two theory papers. Students have to submit the Project / Dissertation at least 15 days before the commencement of their Theory paper examinations. Students have to write the Project / Dissertation in not less than 40 and not more than 50 pages adopting the techniques of Research Methodology offered in the Semester. It has to contain 3 to 4 chapters apart from the introduction and conclusion. There shall be review of the progress of Project / Dissertation writing every week the teachers who guide the students so as to expedite the completion of the work.

EVALUATION OF THE PROJECT / DISSERTATION

The Project / Dissertation has to be awarded 100 Marks (External Evaluation 75 marks and Viva – Voce Examination 25 Marks). The External Evaluation and Viva – Voce Examination has to be done by involving the teachers from the neighbor institution within the jurisdiction of the University where P.G. History Program is offered.

CORE ELECTIVE

PAPER - 4

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. AN INTRODUCTION TO MUSEOLOGY

UNIT -1

Museology Definition - Objectives – History of Museum - Museum Architecture and Buildings.

UNIT – II

Kinds of Museum – Classification – National – Regional State b- District – Site – Private Museums.

UNIT - III

Functions of Museum - Storage – Conservation - Preservation Techniques – Education – Research .

UNIT – IV

Museum - Administration - Security - Museum Library – Legislative measures - Reproduction of Museum objects.

UNIT -V

Museum related organization – International – Indian Museums in the promotion of Tourism – study of select Museum in India - National Museum Delhi, Government Museum Chennai – Salar Jung Museum Hyderabad – Local Museum Vellore .

Reference Books:

- 1.Dr.V.Jayaraj-Museology – Heritage Management –Seawaves Printers,Chennai -86,2005
- 2.M.L.Nigam - Fundamentals of Museology, Deva Publications, Hyderabad,1985
- 3.Grace Morley- The Museum and its functions, Ed.Saifur Rahman dar,Lahore Museum ,Lahore,1981
- 4.Dr.V.Jayaraj- Handbook on conservation in Museums Published by the Commissioner of Museums,Chennai,1995
- 5.J.Smifa, J. Baxi and Vinod P. Dwivedi- Museum Storage, Modern Museum, V.P.Abbhinav Publications, New Delhi,1995
- 6.Baverjee.N.R. - Museum and culture Heritage in India Agam Kala Prakashan , New Delhi, 1990
- 7.Agarwal. V.S. - Museums studies, Prithivi Prakashan,Varanashi,1978
- 8.Grace Morley - Museum today,Lucknow,1981
- 9.Agarwal.O.P. - Care and Preservations of Museum Objects,1980
- 10.H.Sarkar - Museum and Museology, Sundeep Prakashan,New Delhi,1981

CORE ELECTIVE
PAPER - 4

B. ISLAMIC HISTORY AND CULTURE FROM C.E.750 TO C.E. 1258

Objectives

The Abbasid Caliphate witnessed tremendous growth in terms of its spread in Asia, Africa and Europe. The Abbasids made remarkable contribution to world civilizations, indeed they provided the needed link between the ancient and the moderns. A study of the paper will immensely help the students to understand Islamic history, culture and civilization better.

UNIT-I

Rise of the Abbasids – Saffah and Mansur - Harun Al-Rasheed – Mamun Al-Rasheed.

UNIT-II

Mutawakkil – Sultan Salahaddin Ayyubi – Crusades – Downfall of the Abbasids, Fatimids of Egypt – Obaidullah Al-Mahdi – Al-Mansur – Al-Muizz-Al-Aziz – Fall of Fatimids.

UNIT-III

Spain – Abdul Rahaman III – Spain Under the Arabs – Art, Architecture and Literature and Civilization in Moorish Spain – Cordova and Granada.

UNIT-IV

Islamic Civilization : Contribution to Science – Medicine, Astronomy and Mathematics – Chemistry and Ophthalmology – Famous Muslim Scientists.

UNIT-V

Art and Architecture – Literature and Philosophy – History, Historiography and Geography – Theology and Mysticism.

Books for Reference

1. Abbas: Civilization of Islam, Reference Press, New Delhi, 2005.
2. Ali, Syed Ameer: The Spirit of Islam, Idarah-i-Adabiyat-i-Delli, New Delhi, 1997.
3. Ali, Syed Amir : A Short History of the Saracens, Kitab Bhavan, New Delhi, 1995.
4. Arnold, Thomas: The Legacy of Islam, Oxford University Press, 1980.
5. Hitti, Phillip.K: History of Arabs, Macmillan India, New Delhi, 1974.
6. Zaydan, Jurji,: History of Islamic Civilization, Kitab Bhavan, New Delhi, 1978.

CORE ELECTIVE

PAPER - 4

C. HISTORY OF MODERN CHINA FROM A.D.1900 TO A.D.2000

Objectives

The History of Modern China helps the students to understand about the communist World in General and neighboring country in particulars.

UNIT-I

China under the Manchus - Boxer Movement - Reforms - Political, Social and Economic conditions - Fall of Monarchy - Revolution of 1911 - Dr.Sun Yat Sen.

UNIT-II

Yuan Shi Kai's Presidency - First World War and China - Twenty one Demands - The Paris Peace Conference and China - May Fourth Movement - War Lords - Washington Conference.

UNIT-III

The Kuomintang - Economic, Social, Intellectual and Cultural Progress of China upto 1931 - The Nationalist Government - Domestic Policies from 1929 - 33- Chiang- Kai Shek.

UNIT-IV

Second Sino - Japanese War - China and World War II - Growth of Communism - Civil War - Rise of Mao - Tse-Tung - People's Republic of Taiwan.

UNIT-V

The establishment of people's Republic of China - Political, Social and Economic and Cultural Revolution - Deng Ziao - Peng - Reorganization of Communism - 1982 Constitution - Foreign Policy upto 2000 A.D.

Books for Reference:

1. Ahamed , L.L : History of the Far East in Modern Time, S.Chand & Co. Ltd, Ram Nagar, New Delhi -55 , 1981.
2. Clyde and Beers : The Far East, Prentice Hall of India Pvt Ltd, New Delhi-1, 1977.
3. Chatterji , B.R : Modern China, Meenakshi Prakashan, Begum Bridge, Meerut, 1974.

4. Gupta. R.S : History of Modern China. Sterling Publishers, New Delhi-16, 1974.
5. Latourette, K.S : The Chinese, Their History and Culture.
6. Shiv Kumar & Jain : History of Modern China, S.Chand & Co. Ltd, Ram Nagar, New Delhi-55, 1981.
7. Rajaram.V. : History of China , Japan and South East Asia (In Tamil) , Tamilnadu Text Book Society, Chennai.
8. Vinack .C.Herald.M: A History of the Far East in Modern Times. Kalyani Publishers, New Delhi, 1982.
9. C.Y.Hsu : The Rise of Modern China, Oxford University Press, Hong Kong, 1983.

OPEN ELECTIVE

PAPER - 4

(TO CHOOSE ANY 1 OUT OF THE GIVEN 3)

A. CONTEMPORARY HISTORY OF THE WORLD

Course Objectives

1. To get an overview of the current world scenario and the issues of the past that lead to the present and to make out the differences between perceptions and realities of Cold War.
2. To introduce the importance of decision making and the role of culture in domestic and international relations amidst decolonization and emergence of new states.
3. To understand the components of national and different ideologies and the compatibility of tolerance and ideology among the world countries post industrialization.
4. To get an idea about globalization, environment and neo-liberalism; and also about the growth of economies of states in the post industrialization period.
5. To make use of the progression led by the scientific advancements and relatively complex organs: technology and policy.
- 6.

CONTEMPORARY WORLD HISTORY

OBJECTIVE: The contemporary world necessitates students to read and learn about historical developments in the post World War II era to understand the roots of these issues and accommodate themselves in the present. The primary goals of this paper are twofold: 1. To help students clearly understand the complexity of the daily issues and the difference between the rights of individual and society and confront them confidently and 2. To improve their critical thinking to analyze and accept the reality in any situation and the ability to defend their position towards any issue they may face.

The core idea of this paper is to enable the students to examine the political, economic and social factors that make up the world today. The course will focus on the events, conflicts, ideas and people that helped shape the modern world. It will also throw light on most complex issues such as: economies, resources, culture, religion, the military, demographics, geography, technology and other factors that affect government and individual objectives and decisions.

Unit-1:

Cold War

- a. Origin.
- b. Causes: The Orthodox view; the Revisionist view and the Objective view.
- c. Legacies of Cold War and Cold War Diplomacy.
- d. End of Cold War: Disintegration of Soviet Union and its economic deficiencies.

Unit-II:

Effects of Cold War

- a. Decolonization; Rise of new Independent states; Building new economic and political alliances with these states.
- b. End of West European Empires.
- c. The two Superpowers backing rival regimes; Change and continuity over time.
- d. Military Industrial Complexes and Alliances in Europe.

Unit-III:

Asia, Latin America, Africa, Eurasia and the Islamic World

- a. Asia since 1945: India; The birth of Communist China; China and Japan.
- b. Latin America since 1945: Argentina; Brazil; Mexico and Cuba.
- c. African Independence; Africa since 1960.
- d. The Middle East since 1945: Israel and the Arab World; Eurasia since 1990.

Unit-IV:

Globalization

- a. Origins of Contemporary Globalization: Identity, Mass Society and Technology.
- b. Environmentalism, Neo-liberalism and Transnational Organizations.
- c. Post Industrialization: Growth of economies in US, Europe, India and China.
- d. Rise of religious fundamentalism and nationalism in response to cultural, economic and political globalization.

Unit-V:

The Impact of Technology

- a. Revolution in Information, Communication, Transportation and Space Technology.
- b. Missile Technology: Inter Continental Ballistic Missiles (ICBMs), Multiple Independent Re-entry Vehicles (MIRVs) and Cruise Missiles.
- c. Nuclear Technology, Weapons and Arsenals.
- d. Strategic Nuclear Doctrines: Flexible Response, Mutually Assured Destruction (MAD) and Damage limitation; nuclear deterrents of Russia, France, China and the United Kingdom.

Course Out Comes

1. After the study of Unit-1, the student will be able to clearly understand the origins, causes and the legacy of Cold War, the diplomatic maneuvers during Cold War and the disintegration of USSR, which marked the end of Cold War.
2. After the study of Unit-2, the student will be able to understand the process of decolonization; the emergence of new independent states and their interaction with developed countries in terms of economic and political cooperation; the collapse of West European Empires and the alliance that the two Super powers had in Europe.
3. After the study of Unit-3, the student will be able to understand the situation in Asia, Latin America, Africa, Eurasia and the Middle East since 1945 and its development thereof.
4. After the study of Unit-4, the student will be able to understand the concept of globalization, environmentalism, neo-liberalism and transnational organizations. And know about the growth of economies in US, Europe India and China in the post industrialization period. He will also be able to understand the religious fundamentalism and nationalism.
5. After the study of Unit-5, the student will be able to understand the impact of revolution in Information, Communication, Transportation, Space, Missile and Nuclear Technologies. He will also be able to interpret the Strategic Nuclear Doctrines of various countries.

OPEN ELECTIVE
PAPER - 4
B. INTELLECTUAL HISTORY OF TAMIL NADU

UNIT-I

Political : Pasumpon Muthuramalinga Thevar - Thillaiyadi Valliyammai - Rettamalai Srinivasan - M.C. Raja - Rajaji - E.V. Ramasamy - Kalaingar Karunanidhi – Dr.M.G. Ramachandran, Puratchi Thalaivi Dr. J. Jayalalitha.

UNIT-II

Social : Ramalinga Adigal - Vallal Azagappan - Bharathidasan - Arcot Brothers - (AL & A.R. Mudaliar) Ida Scudder Ammaiyar - Jamal Mahammed – C. Abdul Hakeem Sahak.

UNIT-III

Religious : Joseph Constantine Beschi – Ziegch Balque - Vaikunta swamigal - Mrs. Anne Besant - Umaru Pulavar - Kirubanda Variyar - Swami Sahajananda.

UNIT-IV

Cultural : Seethkkadi - Ayodhya Das Pandithar - G. Subramaniam Iyer - Bharathiyar - M.S. Subulakshmi - Pattukottai Kalayna Sundaram - Aranthai Narayanan - Kannadasan - Padma Subramaniam - Justice M.M. Ismail – Sheik Chinna Sahab

UNIT-V

Scientific : G.D. Naidu - M.S. Swaminathan - Dr. Santappa - Dr. Abdul Kalam - N. Ramadurai

Books for Reference:

1. Paramarthalingam .C Religion social reform in Tamilnadu, Rajakumari publications, Madurai, 1997.
2. Sen, S.P. (Ed.,) Social and Religious reform movements in the 19th and 20th centuries, Calcutta Institute of Historical studies, 1979.
3. Pillai, K.K. Tamilaga Varalaru, Makkalum Panpadum (Tamil) International Institute of Tamil Studies, Chennai - 2004.
4. Rajayyak, K History of Tamilnadu (1585 - 1982) Raj Publishers, Madurai, 1982.
5. Viswanathan, E. Sa., The political career of E.V.R. Ravi & Vasanth Publication, Madras, 1983.
6. Siragnanam, M.P., Viduthalaiporil Tamilagam (Tamil) Vol. I & II, Poongkodi Pathipakkam, Chennai, 2005.
7. Kandaswamy The Political career of K. Kamaraj concept publishers, New Delhi.

OPEN ELECTIVE

PAPER - 4

C.WOMEN DEVELOPMENT IN TAMIL NADU FROM A.D.1900 TO A.D.2000

UNIT - I

Status and role of women - Feminist Theories - Feminism - position of women in Tamil Nadu.

UNIT - II

Traditional Tamil Society - women in sangam - muslim - modern period.

UNIT – III

Movements for Women in the 19th and 20th centuries - International women's year decade for women 1975 - 1985.

UNIT - IV

Women Organization - Social reform and welfare in Tamil Nadu Govt. policy on women 1947 to 2001.

UNIT – V

Women empowerment - social economic political challenges facing women - women at work - violence - personal law - women in panchayat raj - Women and Self Help Group - reservation for women in parliament.

Reference Books:

1. Kum Kum Sangari & Sudesh veid : Recasting women, Essay in Colonial History, Kali for women, 2006.
2. Sushila kaushik: Panjayat Raj in Action, Challenges in women's Role, Delhi, 1996.
3. Nivedita menon : Gender & Politics in India, New Delhi, OUP, 1999.
4. Madhu Vij : Women studies in India , A journey of 25 years, Rawat, 2014.

THIRUVALLUVAR UNIVERSITY
BACHELOR OF ARTS
B.A. HISTORY
DEGREE COURSE
CBCS PATTERN

(With effect from 2022- 2023)

The Course of Study and the Scheme of Examinations

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3	III	Core Theory	Paper-1	5	3	History of India upto 1206CE	25	75	100
4	III	Core Theory	Paper-2	5	3	History of India from 1206 to1707 CE	25	75	100
5	III	ALLIED -1	Paper-1	6	3	(to choose any 1 out of 4) 1. Outlines of Political Theory- I 2. Studies on States and Governments- I 3. Principles of Public Administration - I 4. Principles of Sociology- I	25	75	100
6	III	PE	Paper-1	6	3	Professional English– I	25	75	100
7	IV	Environmental Studies		2	2	Environmental Studies	25	75	100
				36	22		175	525	700
SEMESTER II							CIA	Uni. Exam	Total
8	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
10	III	Core Theory	Paper-3	4	3	History of India from 1707 to 1885CE	25	75	100
11	III	Core Theory	Paper-4	4	3	History of India from 1885 to 1947 CE	25	75	100
12	III	ALLIED-1	Paper-2	6	5	(to choose any 1 out of 4) 1. Outlines of Political Theory - II 2. Studies on States and Governments- II 3. Principles of Public Administration - II 4. Principles of Sociology – II	25	75	100
13	III	PE	Paper-2	6	3	Professional English – II	25	75	100
14	IV	Value Education		2	2	Value Education	25	75	100
15	IV	Soft Skill		2	1	Soft Skills	25	75	100
				36	25		200	600	800

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER III							CIA	Uni. Exam	Total
14	I	Language	Paper-3	6	4	Tamil / Other Languages	25	75	100
15	II	English	Paper-3	6	4	English	25	75	100
16	III	Core Theory	Paper-5	4	3	History of India from1947 to 2014 CE	25	75	100
17	III	Core Theory	Paper-6	4	3	History of TamilNaduupto 1336 CE	25	75	100
18	III	ALLIED-2	Paper-3	6	3	(to choose 1 out of 4) 1. Tourism - I 2. Indian Economy - I 3. Media Studies - I 4. Journalism– I	25	75	100
19	IV	Skill based Subject	Paper-1	2	2	Cultural Heritage of TamilNadu	25	75	100
20	IV	Non-major elective	Paper-1	2	2	(to choose 1 out of 2) 1. Fundamentals of Defence and Strategic Studies 2. National Movement in India	25	75	100
				30	21		175	525	700
SEMESTER IV							CIA	Uni. Exam	Total
21	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
22	II	English	Paper-4	6	4	English	25	75	100
23	III	Core Theory	Paper-7	4	3	History of TamilNadu from 1336 to 1806 CE	25	75	100
24	III	Core Theory	Paper-8	4	3	History of TamilNadu from 1806 to 2011 CE	25	75	100
25	III	ALLIED-2	Paper-4	6	5	(to choose 1 out of 4) 1. Tourism - II 2. Indian Economy - II 3. Media Studies - II 4. Journalism - II	25	75	100
26	IV	Skill based Subject	Paper-2	2	2	Human Rights Education	25	75	100
27	IV	Non-major elective	Paper-2	2	2	(to choose 1 out of 2) 1. Fundamentals of National Security 2. Indian Constitution	25	75	100
				30	23		175	525	700
SEMESTER V							CIA	Uni. Exam	Total
28	III	Core Theory	Paper-9	6	4	History of Europe from 1453 to 1789 CE	25	75	100
29	III	Core Theory	Paper-10	6	4	History of USA from 1861 to 1932 CE	25	75	100
30	III	Core Theory	Paper-11	6	5	History of China and Japan from 1900 to 2000 CE	25	75	100
31	III	Core Theory	Paper-12	6	4	Constitutional History of India from 1773 to 1950 CE	25	75	100
32	III	Internal Elective	Paper-1	3	3	[to choose 1 out of 3] 1. History of Freedom movement in	25	75	100

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
						TamilNadu from 1800 to 1947 CE 2. Women Development in TamilNadu from 1900 to 2000 CE 3. Archaeology –I			
33	IV	Skill based Subject	Paper-3	3	2	Competitive Examinations	25	75	100
				30	22		150	450	600
SEMESTER VI							CIA	Uni. Exam	Total
34	III	Core Theory	Paper-13	6	5	History of Europe from 1789 to 1945 CE	25	75	100
35	III	Core Theory	Paper-14	5	4	History of USA from 1932 to 2000 CE	25	75	100
36	III	Core Theory	Paper-15	5	4	International Relations since 1945 CE	25	75	100
37	III	Compulsory Project	Paper-16	5	5	Group / Individual Project	25	75	100
38	III	Internal Elective	Paper-2	3	3	[to choose 1 out of 4] 1. History of Science and Technology in India upto 1900 CE 2. Dravidian Movement in TamilNadu upto 1947 CE 3. History of the Arabs from 750 to 1258 CE 4. History of Russia from early times to 1917 CE	25	75	100
39	III	Internal Elective	Paper-3	3	3	[to choose 1 out of 4] 1. History of Science and Technology since 1900 CE 2. Dravidian Movement in TamilNadu since 1947 CE 3. An introduction to Museology 4. Archaeology –II	25	75	100
40	IV	Skill Based Subject	Paper-4	3	2	Growth of Panchayat Raj Institutions in TamilNadu	25	75	100
41	V	Extension Activities		-	1		100	-	100
				30	27		275	525	800
TOTAL					140		1100	3000	4100

Part	Subject	Papers	Credit	Total credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Electives	3	3	9	100	300
	Core	15	(3-5)	54	100	1500
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft Skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others/NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension	1	1	1	100	100
	Total	41		140		4300

THIRUVALLUVAR UNIVERSITY
B.A., (HISTORY)

SYLLABUS
UNDER CBCS
(With effect from 2022-2023)

SEMESTER - I

PAPER - 1

HISTORY OF INDIA UPTO 1206CE

Objectives

This paper aims at assessing the student's ability to

- (1) The Geography of India and Ancient Civilizations
- (2) The spread of religious in 6th Century and Alexandar invention
- (3) The economic, political, administration, art and architecture of Mourya.
- (4) The Golden age of Gupta administration, art and architecture
- (5) The invention of Muslims to India.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To learn the Geography Conditions, Indus and Vedic civilization

To know the Jainism and Budhism, raise of Magadha and important of Alexander Invention

To understand the administration of Murya, Sunga, Sathavagana

To Gain the Knowledge about the Gupta Empire, Harsha and Rashtrakuda

To learn about Arab Invention to Sindhu, importance of Muslim conquest to India

UNIT-I

Geography of India – Sources – Pre and Proto History - Indus Civilisation –Aryans – Vedic age –Vedic Literature - Epic Age – Varna System.

UNIT-II

Jainism - Buddhism – SixteenMahajanapadas – The rise of Magadha – India and Persia - Alexander's invasion of India

UNIT-III

Chandragupta Maurya and Bindusara - Asoka - Mauryan – Administration, Art and Architecture – The Sungas and Kanvas – The Satavahanas - The Bactrian Greeks, Sakas and Pahlavas.

UNIT-IV

Rise and fall of Kushana Empire – The Nagas – The Gupta Empire – The Vakatakas – Harsha Vardhana and his times – Northern India after Harsha – The Rashtrakuta Empire- The Chalukyas of Badami .

UNIT-V

Arab invasions of Sind – India on the eve of Muslim conquest – Rise and Fall of the Ghaznavids - Muhammad of Ghor.

MAPS:

1. Sites of Indus Civilization
2. Alexander's invasion - route
3. Asoka empire
4. Kanishka empire
5. Samudra Gupta empire
6. Harsha empire

REFERENCE BOOKS:

1. R.Sathiyannatha Iyer:History of India, Vol-I: S.Viswanathan& Co(PVT.) Ltd., 1975, Madras.
2. V.D. Mahajan:Ancient India, S. Chand & Co., 1981, New Delhi.
3. Dr.B.P. Saha& Dr.K.S.Behra :Ancient History of India, Vikas Publishing house, 1994, New Delhi.
4. R.C. Majumdar, H.C. Roy Chaudhri, K. Datta :An AdvancedHistory of India, Mac Millan India Ltd., 2004, New Delhi.
5. D.N. Jha:Ancient India, Manohar publishers, 2004, New Delhi.

CORE THEORY

PAPER – 2

HISTORY OF INDIA from 1206 to 1707 CE

Objectives

This paper aims at assessing the student's ability to

- (1) The growth and development of Muslim Administration in India
- (2) To learn Tughluq administration
- (3) To understand about Vijayanagara and Bahmani Kingdom.
- (4) The political conditions of Muslim Empire.
- (5) The Mughals art and architecture, Shivaji and Sikhism.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To know the beginning period of Delhi Sultanate Rule in India

To Explain the Tughluq Administration

To Understand the Administration, Art & Architecture of Delhi Sultanate

To learn about Explanation of Mughals rule in India

To understand Mughal Art & Architectures

UNIT-I

The Slave Dynasty - Qutb-ud-din Aibak – Sultan Iltutmish and his successors - Ghias-ud-din Balban and his successors – The Khilji Dynasty – Jalal-ud-din – Ala-ud-din – Qutb-ud-din Mubarak – Downfall of the Khilji Dynasty

UNIT-II

Tughluq Dynasty - Ghias-ud-din Tughluq – Muhammad-bin-Tughluq - Firoz Shah Tughluq and his successors – Downfall of the Tughluq Dynasty – The Sayyids and the Lodis of Delhi

UNIT-III

Administration, Socio - economic conditions under the Sultanate – Mongol invasions – The North-West frontier policy of the Sultanate – The provincial kingdoms – Vijayanagara empire - The Bahmani kingdom.

UNIT-IV

The Mughals – Afghan conquest and the establishment of the Mughal empire - India on the eve of Babur's invasion – Babur – Humayun – SherShah – The extension of the Mughal empire – Akbar the great – Jahangir.

UNIT-V

Shahjahan – Aurangzeb – Mughal Administration, Art and Architecture – The rise of Marathas- Chatrapati Shivaji – The rise of Sikhism

MAPS:

1. Ala-ud-din Khilji empire
2. Malik Kafur Southern expedition route
3. Mohammed-bin Tughluq empire
4. Vijayanagara empire under Krishnadeva Raya
5. Mughal empire under Akbar
6. Mughal empire under Aurangzeb

REFERENCE BOOKS:

1. R.C. Majumdar, H.C. Roy Chaudri & K.Datta: An Advanced History of India, Mac Millan India Ltd., New Delhi, 2004.
2. S.R. Sharma: The Crescent in India, Lakshmi Narain Agarwal, New Delhi, 1983.
3. L.P. Sharma: History of Medieval India, Konark Publishers Pvt. Ltd, New Delhi, 1997.
4. J.L. Mehta: Advanced Study in the History of Medieval India, Sterling Publishers Pvt. Ltd., New Delhi, 1983.

ALLIED - 1
PAPER - 1
OUTLINES OF POLITICAL THEORY - I

Objectives

This paper aims at assessing the student's ability to

- (1) To know the meaning, nature and significance of political theory.
- (2) The nature and elements of state and Government.
- (3) The theories of states.
- (4) The meaning and nature of sovereignty
- (5) The citizenship rights, duties, equality.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To introduce the nature and scope of political theory

To know the detail of state and Government

To understand the theory of state

To gain the information about the Sovereignty and its important

To know the citizenship rights and duties

UNIT – I

Nature, scope and importance of Political Science – Approach – Methodology – Political Science and other Social Sciences.

UNIT – II

State - Nature and Elements – State and Government – State and Society – State and Associations – State, Nation and Nationality.

UNIT – III

Theories of State - Divine Right theory – Theory of Force – Patriarchal theory – Matriarchal theory – Evolutionary theory – Social Contract theory.

UNIT – IV

Sovereignty - Meaning and Nature – Characteristics of Sovereignty – Kinds of Sovereignty - Austin's theory of Sovereignty – Pluralistic theory of Sovereignty.

UNIT – V

Citizenship - Rights - Duties – Liberty – Equality – Justice – Law.

REFERENCE BOOKS:

1. Eddy Asirvatham & K.K. Mishra, Political Theory. New Delhi: S. Chand & Company Co. 2004.
2. V. D. Mahajan, Political Theory: Principles of Political Science. New Delhi: S. Chand & Company. 2013.
3. A.C. Kapoor, Principles of Political Science. New Delhi: S. Chand & Co.2005.
4. R.C. Agarwal, Political Theory: Principles of Political Science. New Delhi: S. Chand & Company Ltd. 2002.
5. B.C. Rout, Political Theories: Concepts and Ideologies. New Delhi: S. Chand & Company Pvt.Ltd. 1987.
6. Amal Roy and Mohit Bhattacharya: Political Theory: Ideas and Institutions, Calcutta: The World Press, 2002.
7. J.C. Johari, Modern Constitutions, New Delhi: S. Chand & Co. 1990.

STUDIES ON STATES AND GOVERNMENTS - I

Objectives

This paper aims at assessing the student's ability to

- (1) The classification of states and their features.
- (2) Set up of Indian constitution and their functions
- (3) The theory of separation of powers.
- (4) The meaning and importance of suffrage.
- (5) The types of political parties and its role of Indian constitution

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To introduce the nature and scope of political theory

To know the detail of state and Government

To understand the theory of state

To gain the information about the Sovereignty and its important

To know the citizenship rights and duties

UNIT- I

STATE: Classification of States - Aristotelian Classification - Merits and Demerits of Unitary and Federal States - Problems of Federal State

UNIT-II

CONSTITUTION: Definition of Constitution - Classification of Constitutions - Framework of Government - Rights of the people - Duties of the people

UNIT- III

THEORY OF SEPARATION OF POWERS: Montesquieu views on Separation of Powers - Separation of powers in the American and the British context.

UNIT-IV

SUFFRAGE: Meaning of Suffrage - Types of Constituencies - Duty of Representatives - Representation of Minorities - Electorates

UNIT-V

POLITICAL PARTIES: Classification of Political parties - Role of Political parties - Defects of Political parties - Interest Groups - Pressure Groups

REFERENCE BOOKS:

1. Amal Roy and Mohit Bhattacharya: Political Theory: Ideas and Institutions, The World Press, Calcutta, 2002.
2. A. Appadurai: Substance of Politics: Oxford University Press, New Delhi, 1990.
3. C.F.Strong: Modern Political Constitutions, Sidgwick & Jackson Limited, London, 1973.

ALLIED – 1

PAPER – 3

PRINCIPLES OF PUBLIC ADMINISTRATION – I

Objectives

This paper aims at assessing the student's ability to

- (1) The nature and types of administration.
- (2) The organizational theories and its importance
- (3) The structures of organization theories in India.
- (4) The personal administration, associations and unions
- (5) The all financial administration of central and state government.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To learn about nature, scope and importance of public administration

To know the details of organizational theories of administration

To learn about the structure of organizations

To understand about personal administration, associations and unions

To explain the financial administration in India

UNIT –I

Nature, Scope and importance of Public Administration – Public Administration and other Social Sciences – Public Administration Vs Private Administration – New dimensions.

UNIT – II

Organizational Theories- Classical theory – Human Relations Theory – Systems theory – Principles of Organizations - Hierarchy – Span of Control – Unity of Command – Centralization and Decentralization.

UNIT – III

Structure of Organizations- Chief Executive – Line, Staff and Auxiliary agencies – Departments – Public Corporations – Independent Regulatory Commissions.

UNIT – IV

Personnel Administration- Recruitment - Training – Promotion – Retirement – Associations and Unions.

UNIT – V

Financial Administration- Budget – Types – Principles – Enactment of Budget-
Parliamentary Control over finance - Account and Audit – Financial Committees.

REFERENCE BOOKS:

1. VishnooBhagwan, Vidya Bhushan and Vandana Mohla, Public Administration,S.Chand& Co., New Delhi,2012.
2. J.K. Chopra, Public Administration, Unique Publishers (I) Pvt. Ltd., New Delhi, 2013.
3. A.R.Tyagi, Principles of Public Administration. Atmaram& Co., New Delhi. 1990.
4. Avasthi and Maheswari, Principles of Public Administration, Lakshmi Narain Agarwal, Agra, 2002.
5. S.R. Maheswari, Indian Administration, New Delhi: Orient Longman, 2006.
6. Arora and Rajni Goyal, Indian Administration, New Delhi: WishwaPrakashan, 2006.

PRINCIPLES OF SOCIOLOGY- I

Objectives

This paper aims at assessing the student's ability to

- (1) The definition, nature and scope of sociology.
- (2) The meaning and basic concept of sociology
- (3) The definition, character, types of social groups.
- (4) The culture and civilization, cultural uniformity and variability
- (5) The social institutions, nature and functions.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To know about the definition, nature and importance of sociology

To learn about basic concept of sociology, status and role

To learn the definition, Characteristics, types of social groups.

To understand the culture and civilization, cultural uniformity and variability

To gain the knowledge about Indian social institutions, Government nature and functions

UNIT-I

The Science of Sociology - Definition - Nature and Scope - Sociology as a Science - Its importance and relations to other Social Sciences.

UNIT-II

Basic Concepts of Sociology - Society - Community - Institution - Association - Social Group - Status and Role.

UNIT-III

Social groups - Definition - Characteristics - Types and Functions.

UNIT-IV

Culture - Definition - Characteristics - Elements - Functions - Cultural lag – Ethno-centrism - Culture and Civilization - Cultural Uniformity and Variability.

UNIT-V

Social Institutions- Marriage - Family – Religion - Education - Economy - Government - Nature and Functions.

REFERENCE BOOKS:

1. Inkeles Alex. What is Sociology? An Introduction to the Discipline and Profession, Englewood Cliffs: N.J. Prentice Hall, 1964.
2. Giddens, Anthony. Sociology, Cambridge: Polity, 2001.
3. Horton, B and Hunt, L. Sociology, New York: McGraw Hill Book Cp., 1984.
4. Johnson, Harry, M. Sociology: A Systematic Introduction, New Delhi: Allied Publishers, 1993.
5. Smelser, N.J. Sociology, New Delhi: Prentice Hall of India Ltd., 1993.

SEMESTER - II

CORE THEORY

PAPER – 3

HISTORY OF INDIA from 1707 to 1885 C.E.

Objectives

This paper provides a thematically arranged overview of the History of India from the beginning of the eighteenth-century. The first two units understand the advent of Europeans in India and examine the British colonial expansion in the eighteenth century in India. The third units proceed to discuss the consolidation of the colonial state power in nineteenth century India. The last two units introduce the major religious reform movements paved for Indian National movement and the growth the constitutional development in British India.

Learning Outcomes

After the successful completion of this Course, providing the student to acquire the knowledge of various dimensions and the student will be able to

- (1) Understand the advent of Europeans in India.
- (2) Examine the British Colonial expansion in India
- (3) Describe how the economic, political, administration reforms of colonial power.
- (4) Explain the social reform movements paved for Indian National Movement.
- (5) Discusses the growth of constitutional development in British India

UNIT-I

Later Mughals – Peshwas and their Administration- Advent of the Europeans – Portuguese, Dutch, Danish, French and English.

UNIT-II

Anglo - French rivalry - Carnatic wars - Battle of Plassey – Third Battle of Panipat – Battle of Buxar – Anglo-Mysore wars – Anglo-Maratha wars – Anglo-Burmese wars – Anglo-Afghan wars – Anglo-Sikh wars.

UNIT-III

Rise of British Power- Administrative reforms of Robert Clive, Warren Hastings, Lord Cornwallis, Lord Wellesley, Lord Minto, Lord Hastings, Lord William Bentinck, Lord Dalhousie, Lord Canning, Lord Lytton and Lord Ripon.

UNIT-IV

Socio – Religious Reform Movements – Brahmo Samaj, PrarthanaSamaj, Arya Samaj, Ramakrishna Mission and Theosophical society – Sanmarga Sangam –Vellore Revolt of 1806 - The 1857 Revolt – causes, course and impact – Factors leading to the formation of Indian National Congress.

UNIT-V

Constitutional Development from 1773 to 1861 - Regulating Act, Pitt's India Act, Charter Acts of 1793, 1813, 1833, 1853 - The Queen's Proclamation–Government of India Act of 1858, Government of India Act of 1861.

MAPS:

1. Portuguese settlements in India
2. Early English factories
3. British India under Warren Hastings
4. British India under Wellesley
5. British India under Dalhousie.
6. Places connected with the Revolt of 1857.

REFERENCE BOOKS:

1. Roy Chaudhry. S.C.: History of Modern India, Surjeet Publications, 2006, New Delhi.
2. Mahajan, V.D. : India since 1526. S. Chand & Co., Pvt. Ltd, 1984.New Delhi - 55
3. Agarwal, R.C.: Constitutional Development and National Movement of India. S. Chand & Co., Pvt., Ltd, 1988 New Delhi.
4. R. Sathianathaier: History of India - Vol. - III S. Viswanathan, Printers and Publishers, 1999, Chennai.
5. Anup Chand Kapur : Constitutional History of India, Niraj Prakashan, 1970, New Delhi.
6. Grover, B.L & Grover. S. : A New outlook on Modern Indian History, S. Chand & Co., Pvt. Ltd, NewDelhi - 55, 2005.

CORE THEORY

PAPER – 4

HISTORY OF INDIA from 1885 to 1947 C.E.

Objectives

This paper provides a thematically arranged overview of the History of India from the beginning of the nineteenth-century to the making of the republic India. The first two units addresses themes in the early history of Indian Nationalism, including the early phase of Indian National congress and moderate and extremist phase in Indian Nationalism. The last three units state that anti colonial resistance in British India, Gandhian Era in National movement and the communal politics in India, partition of India and Independence.

Learning Outcomes

After the successful completion of this Course, providing the student to acquire the knowledge of various dimensions and the student will be able to

- (1) Assess the growth of Indian Nationalism and early phase of Indian National congress
- (2) Explain the moderate and extremist phase in Indian Nationalism.
- (3) Know about the anti colonial resistances in British India
- (4) Learn Gandhian Era in National movement
- (5) Describe the communal politics in India, partition of India and Independence

UNIT- I

Factors for the growth of Nationalism - Formation of INC - Activities upto 1905 - Indian Councils Act of 1892.

UNIT- II

Administration of Lord Curzon–Partition of Bengal - Swadeshi Movement – Formation of Muslim League-Surat split - Extremist activities-Minto-Morley Reforms of 1909.

UNIT- III

First World War and its effects - Lucknow Pact - Home Rule Movement – Montague-Chelmsford Reforms Act - Rowlatt Act - Jallianwala Bagh massacre – Hunter Commission, 1919.

UNIT- IV

Gandhian Era - Champaran Movement - Non-Cooperation Movement - Swaraj Party - Simon Commission - Nehru Report - Jinnah's 14 points - Civil Disobedience Movement - Round Table Conferences - Government of India Act of 1935.

UNIT-V

Second World War and its effects - Two Nation Theory of Jinnah - Quit India Movement - Cabinet Mission - Mountbatten Plan - Partition and Independence.

REFERENCE BOOKS:

1. Grover, B., and Grover. S. - A New Look at Modern Indian History, New Delhi: S. Chand & Co., 2004.
2. Majumdar, R.C. and et. al. - An Advanced History of India, New Delhi, Macmillan, 2003.
3. Larry Collins and Dominique Lapierre - Freedom at Midnight, Delhi: Vikas publications, 1996.
4. Sumit Sarkar - Modern India, (1885 - 1947), New Delhi: Macmillan, 2001.
5. Bipan Chandra and et.al. - India's Struggle for Independence, New Delhi, Penguin, 2008.
6. Agarwal R.C. - Constitutional Development and National Movement of India, New Delhi: S. Chand & Co., 2005.
7. Venkatesan, G. History of Freedom Struggle in India, J.J. Publications, Madurai 1999.

ALLIED – 2

(To choose any 1 out of the given 4)

PAPER – 1

OUTLINES OF POLITICAL THEORY - II

Objectives

This paper introduces the students to the idea of political theory, its history and approaches, and this acquaints students with the constitutional design. This paper also provides basic understanding of the three different organs of government, namely, the Legislature, the Executive and the Judiciary including their nature, formation, functions and other related issues. This paper will also attempt to provide the students a comprehensive understanding on political parties and media.

Learning Outcomes

After the successful completion of this Course, providing the student to acquire the knowledge of various dimensions and the student will be able to

- (1) Know the meaning, nature and significance of political theory and Constitution
- (2) Discuss about the powers of legislative
- (3) Understand about the types of executive and its functions
- (4) Explains the importance and functions of Judiciary
- (5) Describe about political parties and Media.

UNIT – I

Constitution - Meaning and Nature – Essentials of a Good Constitution – Written and Unwritten Constitutions – Rigid and Flexible Constitutions – Merits and Demerits.

UNIT – I

Legislature - Adult Suffrage –Organisation of Legislature - Uni-cameral and Bi-cameral Legislatures – Composition of Lower House and Upper House – Powers of the Houses – Direct Legislation.

UNIT – III

Executive- Types of Executive - Parliamentary Executive – Presidential Executive – Plural Executive – Functions.

UNIT – IV

Judiciary - Importance, Functions and Independence of the judiciary – Rule of Law – Administrative Law – relationship with Legislature, Executive and Judiciary.

UNIT – V

Political Participation - Political parties – Pressure Groups – Public opinion-MassMedia – Electronic Media.

REFERENCE BOOKS:

1. Eddy Asirvatham & K.K. Mishra, Political Theory. New Delhi: S. Chand & Company Co. 2004.
2. Vidya Dhar Mahajan, Political Theory: Principles of Political Science. New Delhi: S. Chand & Company. 2013.
3. A.C. Kapur, Principles of Political Science. New Delhi: S. Chand & Co.2005.
4. B.C. Rout, Political Theories: Concepts and Ideologies. New Delhi: S. Chand & Company (Pvt.)Ltd. 1987.
5. Amal Roy and Mohit Bhattacharya: Political Theory: Ideas and Institutions, Calcutta: The World Press, 2002.
6. J.C. Johari, Modern Constitutions, New Delhi: S. Chand & Co. 1990.

STUDIES ON INDIAN STATES AND GOVERNMENTS - II

Objectives

The main objective of this paper is to provide basic orientation to the concepts of 'Constitution' and 'Constitutionalism' in India. This paper initiates the Students into the concept of fundamental rights and directive principles of State Policy. And also it provide basic orientation to various forms of government such as Union Government, State Government, and Local Government

Learning Outcomes

After the successful completion of this Course, providing the student to acquire the knowledge of various dimensions and the student will be able to

- (1) Understand the Indian constitution developments and their features
- (2) Analyse the fundamental rights and directive principles of State Policy
- (3) Discuss about the Union Government and their representatives
- (4) Evolution of State Government and their representatives
- (5) Know about the different types of Local Government and their bodies

UNIT-I

Introduction of the Indian Constitution- Philosophical foundations -Salient Features – The Preamble of the Indian Constitution - Citizenship in India - Constitutional Amendments in India

UNIT-II

Fundamental Rights and Directive Principles of State Policy - Nature and Scope and importance of Fundamental Rights - Nature, Scope and importance of Directive Principles of State Policy.

UNIT-III

Union Government - The President -The Vice-President - The Prime Minister, Cabinet and Council of Ministers. - Lok Sabha and Rajya Sabha - Supreme Court of India - Centre-State Relations

UNIT-IV

State Government - The Governor - The Chief Minister, Cabinet and the Council of Ministers - Legislative Assembly - Legislative Council - High Court

UNIT-V

Local Government - Urban Local Government - Corporations - Municipalities - Townships - Cantonments - Mayor - The 74th Constitutional Amendment - Rural Government - Balvanth Rai Metha and Ashok Metha Committees - District Panchayat - Panchayat Samiti - Village Panchayat - District Collector - 73rd Constitutional Amendment

REFERENCE BOOKS:

1. U.R Ghai: Indian Political System, Academic Publishing House, Jalandhar, 2000.
2. Harihara Das: Political System of India, Anmol Publications, New Delhi, 2000.
3. Kishore Sharma: Introduction to the Constitution of India, Prentice Hall of India, New Delhi, 2005.
4. S.R.Maheswari: Local Government in India, Lakshmi Narain Aggrawal, Meerut, 2005
5. J.R.Siwach: Dynamics of Indian Government and Politics, Sterling Publications, New Delhi 2005.
6. D.D.Basu: Introduction to Indian Constitution, Prentice Hall, New Delhi, 2005.

PRINCIPLES OF PUBLIC ADMINISTRATION – II

Objectives

This paper provides the historical evolution of Indian administration and features of the Indian constitution. The second and third units help the students to obtain a conceptual perspective on Union and State Government administration. The fourth unit will understand the principles and structure of district administration and local administration. The last unit increases the knowledge of the students about the all India civil services and staff associations.

Learning Outcomes

After the successful completion of this Course, providing the student to acquire the knowledge of various dimensions and the student will be able to

- (1) Evaluate the different types of administration.
- (2) Explain about the Union Government and its administration
- (3) Understand about State Government and administration
- (4) Analyze how the district administration and local Governments works
- (5) Explain broadly about All India civil services and staff associations

UNIT- I

Evolution of Indian Administration- Kautilya's Administrative system – Mughal Administration – British Administration – Indianisation of Public Services - Features of the Indian Constitution.

UNIT – II

Union Government and Administration- President – Executive – Legislature - Parliament – Judiciary – Cabinet Secretariat – Prime Minister's Office - Central Secretariat – Ministries and Departments.

UNIT – III

State Government and Administration- Union – State Administrative, Legislative and Financial relations - Governor – Chief Minister and Council of Ministers – Chief Secretary – State Secretariat – Directorates.

UNIT – IV

District Administration and Local Government- Changing role of District Collector – Union, State and Local relationship -Municipalities – Panchayat Raj institutions.

UNIT –V

Civil Service - All India Services – Central Services – State Services - Public Service Commissions- Union Public Service Commission – State Public Service Commissions– Staff Associations – Grievance -Redressal mechanism.

REFERENCE BOOKS:

1. Vishnoolal Bhagwan, Vidya Bhushan and Vandana Mohla, Public Administration, New Delhi: S. Chand & Co., 2012.
2. J.K. Chopra, Public Administration, Delhi. Unique Publishers (I) Pvt. Ltd., 2013.
3. A.R. Tyagi, Principles of Public Administration. Atmaram & Co., New Delhi. 1990.
4. Avasthi and Maheswari, Principles of Public Administration, Lakshmi Narain Agarwal, Agra, 2002.
5. S.R. Maheswari, Indian Administration, New Delhi: Orient Longman, 2006.
6. Arora and Rajni Goyal, Indian Administration, New Delhi: VishwaPrakashan, 2006.

PRINCIPLES OF SOCIOLOGY - II

Objectives

This paper provides the students the concepts, theories, and methods of the behavioural and social services. It introduces students to the basic social processes of society and patterns of social behaviour and also student can understand about social stratification and functions of social stratifications. The last unit describes the social change let to the social evolution.

Learning Outcomes

After the successful completion of this Course, providing the student to acquire the knowledge of various dimensions and the student will be able to

- (1) Explains the process of socialization and agencies of socialization.
- (2) Discuss about the meaning of social process
- (3) Understand about social stratification and functions of social stratifications
- (4) Describe how social change let to the social evolution.

UNIT-I

Individual and Society - Heredity and Environment - Socialization - Agencies of Socialization - Importance of Socialization.

UNIT-II

Social Process - Meaning - Types of Social Process - Associative and Disassociative Social Processes.

UNIT-III

Social Control - Meaning, Nature and Need of Social Control - Types of Social Control - Formal and Informal.

UNIT-IV

Social Stratification and Mobility- Meaning, Forms and Functions

UNIT-V

Social Change - Meaning - Factors of Social Change - Social Evolution - Social Progress - Modernization - Development.

REFERENCE BOOKS:

1. Bottomore, T.B. Sociology A Guide to Problems and Literature, New Delhi: Blakie and Sons (India) Ltd., 1979.
2. Shankar Rao, C.N. Sociology, New Delhi: S. Chand and Company Ltd., 1997.
3. Goode, W.J. Principles of Sociology, New Delhi: Tata McGraw Hill Publishing Co., Ltd. 1977.
4. Giddens, Anthony. Sociology, Cambridge, Polity, 2001.
5. Caplow, Theodore. Sociology, New Jersey, Prentice Hall, 1971.

SEMESTER - III
CORE PAPER - 5
HISTORY OF INDIA from 1947 to 2014 C.E.

Objectives

This paper provides the metrically arranged overview of the History of India from the beginning of 20th century to making of the Republic India and after 1947. The first two units highlighted in the Nehru Era, Indian Gandhi and treaty. The last three units covered that concept of J.P, Rajiv Gandhi and his policies and changing trends in modern India.

Learning outcome

1. To analyze the relationship between the before and after 1947
2. To learn Nehru era
3. Know about Indian Gandhi and his achievements
4. To learn J.P Narayanan and total revolution
5. Describe the patrician of India and various Governments.

UNIT-I

Nehru Era - Making of the Constitution - Integration and States Reorganisation – Five Year Plans - Foundation of India's Foreign Policy - Kashmir issue - Chinese aggression of 1962.

UNIT- II

Lal Bahadur Shastri - Domestic policy - Indo-Pakistan war of 1965 - Tashkent Accord - Indira Gandhi (1966-1975) - Internal reforms - Congress split - Indo-Soviet Treaty - Indo-Pak war of 1971 - Simla Agreement.

UNIT- III

Jayaprakash Narayan and Total Revolution - Emergency - Janata Government - Internal reforms and Foreign policy - Re-emergence of Indira Gandhi - Khalistan issue and Operation Blue Star.

UNIT-IV

Rajiv Gandhi - Programmes and Policies - SAARC - Rajiv-Jayewardene Accord - V.P. Singh and National Front Government - P.V.Narasimha Rao - New Economic Policy- Ayodhya issue.

UNIT-V

UF, NDA and UPA I&II - Vajpayee - Manmohan Singh -Coalition Governments - Changing trends in Economy, Education, Science and Technology - Foreign policy- Social development.

Reference Books:

1. Dutt, V.P. - India's Foreign Policy, New Delhi: Vikas Publications, 1993.
2. Grover, B.L., and Grover, S. A New Look at Modern Indian History, New Delhi: S. Chand & Co., 2004.
3. Mahajan, V.D., History of Modern India (1919 - 1982), New Delhi: Chand & Co. 2004.
4. Ramachandra Guha, India After Gandhi, Noida: Picador, 2008.
5. Christophe Jaffrelot, India Since 1950, New Delhi: Yatra Books, 2012.
6. Bipan Chandra, Mridula Mukherjee and Aditya Mukherjee - India after Independence, New Delhi, Penguin, 2008.
7. Venkatesan, G. History of Contemporary India, Rajapalayam: V.C. Publications, 2010.

CORE PAPER - 6
HISTORY OF TAMIL NADU UPTO 1336 C.E.

Objectives

This Paper introduces the students to understand the geographical factors of Tamil Nadu. The first two units' addresses themes in the early history of Tamil Nadu. The remaining three units state that Cholas, Pandyas and Muslim invasions and condition of South India

Learning Outcomes

1. To know about the ancient Tamil Nadu and other inventions
2. Describe the later Pallavas and their contributions
3. Understand the ancient Tamil rulers and their socio-economic conditions and so one
4. Analyse the pondyas of Madurai and Hoysalas in Tamil Nadu
5. Discuss about the Muslim invasions in South India

UNIT - I

Geography and its impact on the History of TamilNadu–Importance of Sources- Sangam Age- Chera, Chola and Pandyas - Their Feudatories- Political, Economic and Social conditions- Sangam Literature.

UNIT - II

Kalabhra Interregnum – Early and LaterPallavas - Administration - Economic and Social Life - Art and Architecture - Education and Literature - Bhakti cult.

UNIT - III

Imperial Cholas - Chola-Chalukyas, Chola-Pandyas and Chola -Rashtrakutas Relationship - Administration - Economic and Social life - Art and Architecture - Education - Literature.

UNIT - IV

Pandyas of Madurai -Relationship between Cholas and Pandyas - Later Pandya Empire– Marco Polo -Hoysalas in TamilNadu- Economic and Social conditions - Art and Architecture.

UNIT - V

Muslim invasions - Conditions in Southern India - Malik Kafur–Khusrukhan - Muhammad-bin-Tughlaq- Sultanate of Madurai - Impact of Muslim invasions

Reference Books :

1. CithraMadhavan, **History and culture of Tamil Nadu**, Vol.I, D.K.print world (P) Ltd., New Delhi, 2005.
2. Gopalan, R., **Pallavas of Kanchi**, university of Madras, Madras, 1928.
3. Gurumurthy,S., **Education in SouthIndia**, New Era Publications, Madras, 1979.
4. Kanagasabai Pillai, K., **Tamils 1800 years Ago**, Saiva Siddhanta Publishing Society, Madras, 1904.
5. Krishnaswami,A., **Topics in South Indian History**, Annamalai Nagar, 1978.
6. Meenakshi,C., **Administration and Social Life under the Pallavas**, University of Madras, Madras,1977.
7. NilakantaSastri, K.A., **The Colas**, University of Madras, Madras, 1935.,
8. NilakantaSastri, K.A., **The Pandyan Kingdom**, Swathi Publications, Madras, 1972.
9. NoboroKarashima, **South Indian History and Society**, Oxford University Press, Madras, 1984.**A concise History of South India -Issue and Interpretations**, Oxford University Press, Chennai, 2014.
10. Pillai, K.K., **TamilagaVaralarumPanpadum** (Tamil), International Institute of Tamil Studies, Chennai - 2002.
11. Rajamanickkanar.M.**PallavarVaralaru** (Tamil), South Indian Saiva Siddanta Book Publishing Society, Trinelveili, 1999.
12. Raman.K.V., **PandiyarVaralaru** (Tamil), Tamil Nadu, Text Book Society, Madras, 1977.
13. Sadasivapandarathar, T.V.,**PirkalaCholarVaralaru** (Tamil), Annamalai University, 1949.
14. Srinivasa Iyengar, P.T., **History of the Tamils**, Asian Educational Services, New Delhi, 1983.
15. Subramanian, N., **Socio-Cultural History of TamilNadu**, EnnesPublications, Udumalpet, 1999.
16. Vekataramanayya.N. **Early Muslim Expansion in South India.**, Annamalai University, 1943.
17. Thinakaran (Mrs),A.J **The second Pandyan empire**, Priya Printers, Coimbatore,1987.

ALLIED - 3
PAPER – 1
(To choose one out of 4)
TOURISM - I

Objectives

This Paper provides the historical evolution of Tourism and features concepts of Tourism. The First and Second units help the students to know about the Tourism. The third and fourth units covered the Improvement of National powers and sanctuaries the last unit increases the knowledge of the students about the policy of Tourism, Agencies and Tourism Guide.

Learning out comes

After the successful Completion of the course providing the student to acquire the knowledge of various dimensions and the students will be able to

- (i) Understand the history of Travel and Tourism
- (ii) To know Movement the Basic Components of Tourism, Resources, and Musium
- (iii) Discuss about the fairs and festivals
- (iv) Evolution of Religious centers
- (v) Discuss about the Tourism- policy Govt/Private Agencies.

UNIT - I

Definition of Tourism - History of Travel and Tourism through the Ages-Basic concepts in Tourism-Domestic and International.

UNIT - II

Basic components of Tourism- Scope -Impact of Tourism on Social, Economical, Cultural and Environment.

UNIT - III

Tourist resources in India with special reference to TamilNadu– Parkand Sanctuaries - Museum - Fairs and Festivals.

UNIT - IV

Religious tourism in India with special reference to TamilNadu- Places of Pilgrimage-Hindu, Muslim, Buddhism, Christian and Jain.

UNIT - V

Tourism Policy -Ministry of Tourism-State Tourism Department-Accommodation- Public and Private Agencies - WTO, TRAI, IATO, ITDC, TTDC – TourGuide - Foreign Exchange.

Reference Books:

1. A.K. Bhatia; Tourism development,principles and practices; Sterling publishers (P) Ltd., New Delhi.
2. Anand, M.M.; Tourism and Hotel industry in India; Sterling Publishers (P) Ltd., New Delhi.
3. Acharya Ram; Tourism and Cultural Heritage of India; ROSA Publications, Jaipur.
4. R.K. Sinha; Travel and Tourism Management; Dominant Publishers; New Delhi.
5. Ramila Chawla; Travel and Tourism Management - Dominant Publishers, New Delhi.
6. Prem Seth; Successful Tourism Management - Fundamental of Tourism; Sterling Publishers (P) Ltd., NewDelhi.
7. Nirmal Kumar; Tourism and Economic Development; APLL Publishing Corporation; New Delhi.

ALLIED - 3
PAPER - 2
INDIAN ECONOMY - I

Objectives

To enable the students to understand the salient features of Indian and occupational structure to assess the relative share of Agriculture industry and service sectors in the economy, and to analyse the benefits of planning. First and second units help the students to know the meaning and salient features of Indian economy and five year plans. Third and Fourth units covered the Agriculture role in Indian economy and Agricultural marketing fifth unit to know about Industries.

Learning Outcomes

After the successful completion of this course providing the students to acquire.

- (i) Evaluate the characters of Economy, Factors development
- (ii) Explain about the planning Commissions- performances
- (iii) Understand about Agriculture role (GNP) (APC) – Need and source
- (iv) Explain broadly Marketing Role of FC
- (v) Evaluates the importance and role of industry

UNIT - I

Meaning and Characteristics of Under-Development - Salient features of Indian Economy - Factors responsible for Development –Difference between Development and Growth - Comparison between India and other Developing countries like China, Pakistan, Taiwan, and Korea.

UNIT - II

Planning in India - Meaning, process and approaches - Five Year Plans - Objectives in general and targets and performances.

UNIT - III

Agricultural role in Indian Economy (Contribution to GNP, employment, etc.,) Problems of low productivity - Land Reforms - Need and Scope - The food problem and Green Revolution- Mechanisation - Desirability and feasibility.

UNIT - IV

Agricultural Marketing - Regulated Markets - Warehousing - Role of Agricultural Price Commission (APC) - Procurement Policy – BufferStock - Dual Pricing - Role of FC- . Agricultural Credit- Need and Sources.

UNIT - V

Industry and Its importance - Role of Small Scale Industry - Large Scale Industries (Iron & Steel, Cotton, Textiles, Sugar, Jute, Petro-chemicals, Tea, etc.,) Industrial Sickness - Causes and measures - Industrial Policy Resolutions (1956, 1985 & 1991)

Reference Books:

1. 1.Agarwal, A.N. Indian Economy, Vikas Publishing house , New Delhi.
2. 2.Dewett, Verma & Sharma: Indian Economics, S Chand & Co., New Delhi.
3. Jhingan .M.L.:Economics of development and planning, Konark publishers, New Delhi.
4. 4.Kindle berger : Economic Development, to the Mohammad conquest, Oxford University press, London.
5. Kanka, S.S: Human Resource Management, S. Chand & Co., New Delhi.
6. PramitChaudhury : The Indian Economy, Poverty and development, Vikas Publishing house, New Delhi.

ALLIED - 3
PAPER - 3
MEDIA STUDIES - I

Objectives

The Main objectives of this Paper to provide the media studies and concepts of Press Media – Radio – TV – Cinema – and New Media . The first and second unit covered press systems of India, broad caste systems of USA and UK – Third and Fourth unit covered TV and Cinema – Fifth unit covered evolution of Telephones Fax and internet, DTP, Computers & Video.

Learning Outcomes

After the successful completion of this course providing the student to acquire the knowledge of various dimensions and the

UNIT - I

Press - Press system in USA, UK - An overview of the Indian Press - Trends in mainstream and language press - Current developments - Influence of new media technologies on the Indian print media.

UNIT - II

Radio - A Comparative account of the world systems of broadcasting - USA, UK- Evolution of Radio and contemporary trends in India - Prachar Bharathi- Committees on Indian Broadcasting.

UNIT - III

Television - History of Television broadcasting in India - A comparison with UK and USA - Trends in Indian Television Industry - Various committees on Television.

UNIT - IV

Cinema - History of Cinema in the world - Cinema in India - Regional Cinema- Recent trends - Various organizations like Censor Board, Societies, Institutes and Awards.

UNIT - V

New Media - Evolution of telephones, allied media, fax, telex, internet, DTP, Computers, Interactive video.

Reference Books:

1. Communication and Culture - A world View, K S Seetharaman, Mc Graw Hill, New Delhi.
2. Communication Studies - An introductory Reader: John Corner, JermyHewthorn, Edward.
3. The process of communication - an introduction to theory and practice - David K S Berlo., Rinchart.
4. Many voices and one world - UNESCO Publications.

ALLIED - 3
PAPER - 4
JOURNALISM - I

Objectives

The main objectives of this Paper to provide the basic needs of Journalism and Functions concept of Newspapers- First and Second unit discussed about the Nature scope of Journalism and kinds of Journalism – Newspapers. Third and Fourth units covered Press in India – Evolution of Indian Press, Tamil Journalism. Fifth unit- review of News Papers and News Agencies.

Learning Outcomes

After the successful completion of this course providing the students to acquire

- (i) Understand the Journalism and role of Press
- (ii) Evaluate the students- kinds of Journalism, Press.
- (iii) Describe about the Tamil Journalism – National Movement
- (iv) To Know about the contribution of News Papers
- (v) Evolution of Press council- role of Press in socio cultural development

UNIT - I

Journalism- Nature, scope and functions - Role of press in democracy - Principles of Journalism.

UNIT - II

Kinds of Journalism - Newspapers, periodicals and specialized magazines, New Journalism, Development of Journalism, Community Journalism.

UNIT - III

Press in India - Evolution of Indian press - Bengal Gazette -Kesari-J.A.Hickey, Rajaram Mohan Roy, James Silk, Buckingham, Mahatma Gandhi, S.Sadanand, B.G.Horniman.

UNIT - IV

Tamil Journalism –Origin and growth - Factors for the growth of Tamil Journalism - Major Newspapers and Magazines of Tamil Nadu - Role of press in Nationalist Movement

UNIT - V

Review of Newspapers and periodical contents -Photo Journalism - Uses of Cartoons -Comic strips - News Agencies - UNI, PTI -Press Council - Role of press in socio-cultural development.

Reference Books:

1. Nadig Krishnamoorthy - **Indian Journalism**
2. Metha, D.S. - **Mass communication and Journalism in India**
3. Nagarajan, S.- **A History of press in India.**
4. Sharma, K.C.- **Journalism in Indian History, Growth and Development,**
Regal Publications, New Delhi,2009
5. Muniruddin- **History of Journalism**, Anmol Publications, New Delhi, 2005
6. Sambanthan, Ma.Su. - **Tamil IthaliyalChuvadugal** (Tamil),
TamilPathippagam, Chennai, 1990

SKILL BASED SUBJECT

PAPER - 1

CULTURAL HERITAGE OF TAMILNADU

Objectives

This paper provides the historical evolution of Cultural Heritage of Tamil Nadu. First and Second units help the students to obtain a knowledge of cultural Heritage- Sangam Age to Medieval Period- Third and Fourth units covered the Nayaks and Nawabs Arts- Fifth unit to know about the important Heritage centres of Tamil Nadu.

Learning Outcomes

After the successful completion of this Course providing the students to acquire

- (i) Evaluate the cultural Heritage of Tamil Country.
- (ii) Describe about the Education Art and Architecture.
- (iii) Explain about the Various dynasties rule-
- (iv) Evaluate the Islamic culture Christian Missionaries
- (v) To know about the heritage centres of Tamil Nadu.

UNIT - I

Definition - Cultural Heritage – Tamil Country - Sangam Age - Satavahana- Pallava - Chola - Pandya Periods - Art - Architecture.

UNIT - II

Medieval Period - Madurai Sultanate - Vijayanagar Period -Education, Art and Architecture.

UNIT-III

Nayaks - Marathas - Sultans - Poligars - Nawabs –Art and Architecture.

UNIT-IV

British Period - IslamicIntellectuals - Christian Missionaries - Contribution to Literature–Cultural Heritage - Art and Architecture.

UNIT-V

Important Heritage Centres of TamilNadu - Need for Conservation - Acts for Preservation of Monuments and Sites - Social customs - Folk art and crafts - Songs - Dances - Music and other fine arts - Places of Tourist attraction.

Reference Books:

1. Chellam, V.T: History and Culture of Tamilagam, Tirumala Book House, Chennai, 1984.
2. Rajayyan, K. History of TamilNadu(1565 - 1982), Raj Publishers, Madurai, 1982.
3. Subramanian, N. Social and Cultural History of TamilNadu A.D. 1336 - A.D. 1984, Ennes publications, Udumalpet, 1999.
4. Pillai, K.K. Social History of the Tamils, University of Madras, Madras, 1975.

NON-MAJOR ELECTIVE

PAPER – 1

(To choose 1 out of 2)

FUNDAMENTALS OF DEFENCE AND STRATEGIC STUDIES

Objectives

This paper provides the historical evolution of fundamental of defence the first and second units covered the conceptual formulations and history of welfare. Third and Fourth units covered Basic international- Peace. Fifth unit covered Mechanics of Peace.

Learning Outcomes

The main objectives of this paper

- (i) Is to provide basic concepts of Introduction of Defence.
- (ii) Historical evolution of Welfare
- (iii) To know about the basic relations of the countries Types of war.
- (iv) To evaluate the UNO
- (v) Know about the Mechanics of peace and types of Diplomacy.

UNIT-I

Introduction and Conceptual Formulations - The discipline of Defence and Strategic Studies - its subject contents - Contemporary relevance and significance - Basic concepts of war, battle, campaign, etc. -Definition of Security, Defence, Strategy, Peace, etc.

UNIT-II

History of Warfare - Historical evolution of warfare - its features and significance - Principles,causesand Functions of war - Types and scope of war.

UNIT-III

Basics of International Relations - Nature and scope of International Relations - features of International Political system - structure of International political system- Uni, Bi & Mult polar - Actors in International political system - state and non - state actors; world government (UNO) - Security features in International political system - collective security, Balance of power, hegemony, Regionalism, etc.

UNIT-IV

Introduction to Peace - Meaning and Definition of peace- typology of peace
- Approaches to peace - Disarmament, International law - Peace movement, peace research, Peace-making, Peace-building, Peace-keeping.

UNIT-V

Mechanics of peace -Role and functions of International organizations - League of Nations, United Nations Organizations - Amicable means to settle Inter-state conflicts - Diplomacy- scope and functions - Types of diplomacy

Reference Books:

1. Baranwal, S.P., Measures of Civil Defence in India - New Delhi, Guide - Publications, 1984.
2. Khera, S.S., India's Defence problems, New Delhi, Orient Longmans, 1968.
3. Waever, ole, National Security in perspective, New Delhi, Gian, 2003. .
4. Rao, PVR., Defence without Drift, Bombay, Popular Prakasan, 1970.

NON-MAJOR ELECTIVE
PAPER - 2
NATIONAL MOVEMENT IN INDIA

Objectives

This paper provides basic concept of National Movement- First and Second unit covered early Nationality response-INC- Moderates and extremists phase- Third and Fourth unit covered the emergence of Gandhi and conception of Pakistan. Fifth units covered Cripps Missions- Portion Independence

Learning Outcomes

After the successful completion of this course providing the student to acquire the knowledge of various dimensions and the students will be able to

- (i) Evaluate the early National Movement in India.
- (ii) Explain the Moderates in India
- (iii) Describe the various Acts
- (iv) Explain broadly the emergence of Gandhi
- (v) Analyze the final phase of National Movement

UNIT - I

Early Nationalist Response - Causes, course, nature and impact of the Revolt of 1857 - Peasant, Tribal and Religious Movements - Political Associations in Bengal, Bombay and Madras Presidencies before Indian National Congress

UNIT - II

Institutionalization of the National Movement - Factors responsible for the formation of the Indian National Congress - Origin of the Congress - Moderate Phase (1885-1905) - nature, ideology, politics and leaders - Minto-Morley Reforms Act.

UNIT - III

Extremist Phase (1905-1916)- Partition of Bengal - Surat Split - Swadeshi and Boycott Movement - Lucknow Pact - Montague-Chelmsford Reforms Act.

UNIT - IV

Emergence of Gandhiji - Rowlatt Act -Jalianwala Bagh Massacre - Khilafat and Non-Cooperation Movement -Swarajya Party - Simon Commission - Nehru Report- Civil Disobedience Movement - Round Table Conferences - Government of India Act, 1935 - Conception of Pakistan

UNIT - V

Final Phase - Provincial Governments - Lahore Resolution - Cripps Mission - Quit India Movement - Cabinet Mission - Mountbatten Plan - Partition - Independence.

References Books :

- 1.Tara Chand : History of Freedom Movement Vol. I - IV, Publications Division, Govt. of India, 1983.
- 2.Sumit Sarkar: Modern India, 1885 - 1947, MacMillan India Ltd, Madras, 1986.
3. Bipin Chandra and Others: India's Struggle for Independence, Penguin Books, 1990.

SEMESTER - IV
CORE PAPER - 7
HISTORY OF TAMILNADU from 1336 to 1806 C.E.

Objectives

To enable the students to understand the Administration of Vijayanagar Empire
Nayakas, Marathas and Nawabs of Arcot. European Settlements in Tamilnadu and Rebellion.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To learn the foundation of Vijayanagar Empire, the Sultanate of Madurai

To know the administration of Nayakas.

To understand the administration Palayagar , Arcot Nawab, Marathas of Gingee & Tanjore

To Gain the Knowledge about European settlements, Hyder Ali & Tipu Sultan of Tamilnadu

To learn about Tamil Rebellions.

UNIT - I

Vijayanagara Empire - Expansion in TamilNadu– Tamil country under
Krishnadevaraya– Administration, social, economic and cultural conditions.

UNIT - II

Nayaks of Madurai, Senji, Thanjavur and Vellore- Administration - Social and
Economic life- Education - Literature - Religion - Art and Architecture.

UNIT - III

The Marathas of Senji and Thanjavur- Social, Economic and Cultural
conditions - Sethupathis of Ramnad- Nawabs of Arcot - Administration and Society.

UNIT - IV

The advent of the Europeans - European settlements in TamilNadu- Carnatic
wars - Mysore wars in Tamil country.

UNIT - V

Poligar Rebellion –Pulithevan-DheeranChinnamalai -Kattabomman- South
Indian Rebellion of 1800-1801 - Vellore Revolt of 1806.

Reference Books:

1. Beauchamp, Henry & **Hindu Manners, customs and ceremonies**, Clarendon press, Abbe.T.A.Dubois, London, 1897.
2. KesavanVeluthat, **A political Structure of Early Medieval South India**, orient Longman Ltd, New Delhi, 1993.
3. KrishnasamyIyengar,S., **South India and her Muhammadan Invaders**, S.Chand& Co. (Pvt).Ltd.,New Delhi, 1921.
4. Krishnasamy,A. **The Tamil Country underVijayanagara**, Annamalai University Publication, 1964.
5. Mahaligam,T.V., **Administration and Social Life under Vijayanagar**, Vol-I & II University of Madras, Madras, 1940 & 1975.
6. Majumdar, R.C, **The History and cultural of Indian people**, Vols.VI to X, BharathiyaVidyabhavan, Bombay, 1976.
7. Malleson,G.B., **History of French in India (1674-1761 A.D)**, Longmans Green & Co., London,1868.
8. Noboru Karashima, **South Indian History and Society**, Oxford university press, Madras, 1984.
9. Sathiyanaithaiyer R., **History of the Nayaks of Madura**, University of Madras, Madras, 1980.
10. _____, **Tamilagam in the 17th Century**, Madras, 1956.
11. Venkataramanayya,N., **Early Muslim expansion in South India**, Annamalai University Publication, 1943.

CORE PAPER - 8

HISTORY OF TAMILNADU from 1806 to 2011C.E.

Objectives

To enable the students to understand the Administrative Policies of the British, Socio - Religious Reforms Movements in Tamilnadu, Role of Tamil Nationalists, Justice Party Administration, Linguistic Reorganisation of States and Tamilnadu under Dravidian Parties.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To know the administrative policies of British, Land Revenue, Judiciary

To Explain the Moderates & Extremists and Socio Religious Reforms Movements.

To Understand the Justice Party and its Administration.

To learn about Expedition of Linguistic Reorganisation of States

To understand the Dravidian Parties, Annadurai, Karunanidhi, MGR, Jayalalitha administration

UNIT-I

Administrative Policies of the British - Land Revenue - Ryotwari system - Judiciary - Education - Impact of Christian Missionaries

UNIT-II

Socio-Religious Reform Movements - Vaikuntaswamikal - Vallalar - Vedanayagam Pillai - Indian National Congress - Role of Tamil Nationalists - Moderates - Extremists - V.O. Chidambaram Pillai - Subramania Bharathi, Subramania Siva - Revolutionaries - V.V.SubramaniamIyer - Vanchinathan - Neelakanda Brahmachari- Chenbagaraman.

UNIT-III

Dyarchy in provinces - Justice Party and its Administration - E.V.Ramasami and Self Respect Movement - Civil Disobedience Movement - Quit India Movement - Indian Independence.

UNIT-IV

Linguistic Reorganisation of States - Rajaji - Kamaraj - Anti - Hindi agitation - - Assembly Election of 1967- Emergence of Dravidian Regime.

UNIT-V

TamilNadu under the Dravidian parties- Annadurai - Karunanidhi - MGR - Jayalalitha - Development of TamilNadu under Congress, DMK and AIADMK.

Reference Books:

1. Baliga B.S **Studies in Madras Administration**, 2Vols.
2. Balasundaram, N, **The Dravidian Movement in Madras.**
3. Hardgrave L.Robert, **The Dravidian Movement**, Bombay 1965.
4. Kandasamy.P, **The Political Career of Kamaraj**, Concept Publishing Company, New Delhi 2001.
5. NambiArooran.K, **Tamil Renaissance and Dravidian Nationalism.**
6. Paramarthalingam.C, **Religion and Social Reform in Tamil Nadu**, RajakumariPublication, Madurai, 1997.
7. Ramamurthi.P, **The Freedom Struggle and the Dravidian Movement.**
8. Sivagnanam.M.P, **Viduthalai PorilTamilagam (Tamil)** 2Vols, Poongkodi Pathippagam, Chennai, 2005.
9. Stalin Gunasekaran.T, **Viduthalai VelviyilTamilagam (Tamil)**, 2 vols.
10. Viswanathan.E.S.K, **The Political Career of EVR**, Ravi & Vasanth Publication,Madras 1983.

ALLIED - 4
PAPER - 1
(To choose 1 out of 4)
TOURISM - II

Objectives

To Enable the students to know about Growth and Development of Modern Tourism, International Organisation and Tourism, Travel management and Geography of India with reference to important Tourist attraction in India.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

- To introduce the Travel Agency and the main departments and function of Travel Agency.
- To know the detail of International Organisations in Tourism
- To understand the Tourism as an Information Management.
- To gain the information of National Economy and tourism.
- To know the geography of India and analyse the important tourist attractions in India.

UNIT - I

Growth and Development of Modern Tourism- Role of Travel Agency in Tourism-Role of State Govt. in promoting Tourism-Passport and Visa-Package tour.

UNIT - II

International Organisation and Tourism- International Union of Official Travel Organisation(IUOTO)-World Tourism Organisation (WTO)-Pacific Area Travel Association (PATA)- International Air Travel Transport Association(IATTA)- International Civil Aviation Organisation(ICAO).

UNIT - III

Travel Management- Tourism Principles- Practices and Ethics- Hotel Operation- Fares and Ticketing-Travel Agency-Tour Operation Management.

UNIT - IV

Tourism and National Economy- Economic Benefits-Development of Infrastructure and Regional Development.

UNIT - V

PanIndian Tourism Attractions - with special reference to Tamil Nadu

References Books:

1. A.K. Bhatia; Tourism development principles and practices; Sterling publishers (P) Ltd., New Delhi.
2. Anand, M.M.; Tourism and hotel industry in India; Sterling Publishers (P) Ltd., New Delhi.
3. Acharya Ram; Tourism and Cultural Heritage of India; ROSA Publications, Jaipur.
4. R.K. Sinha; Travel and Tourism Management; Dominant Publishers; New Delhi.
5. Ramila Chawla; Travel and Tourism Management - Dominant Publishers, New Delhi.
6. Prem Seth; Successful Tourism Management - Fundamental of Tourism; Sterling Publishers (P) Ltd., New Delhi.
7. Nirmal Kumar; Tourism and Economic Development; APLL Publishing Corporation; New Delhi.

ALLIED - 4
PAPER - 2
INDIAN ECONOMY - II

Objectives

To Enable the students to understand the Industrial Finance, Privatisation and Economic Reforms, Human Resource and Economic Development, Labour Economics and Foreign Trade.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To Explain about Industrial Finance , Development Financial Institutions , Foreign Capital, Various forms

To know about Privatisation and Economic Reforms, New Economic Policy, Economic Reforms ,Common Minimum Programme (CMP)

To learn about Human Resource and Economic Development, New population Policy, Unemployment, Poverty and Govt. Remedial measures

To Explain about Trade Unions ,Industrial Relations, Mechanisation and labour problems, Labour Legislations ,Social Security Schemes

To Understand India in the Global Market, Functions of IMF, IBRD and WTO.

UNIT-I

Industrial Finance - Need and sources of credit - Development Financial Institutions (IFCI, SFC, ICICI, IDBI, SIDBI, IIBI, EXIM Bank, etc.) Foreign Capital - Various forms (Foreign - Public Vs Private and Loans Vs. Investments, etc.,) FDI and FII.

UNIT-II

Privatisation and Economic Reforms - Public Vs. Private Sector - Debate, New Economic Policy (Liberalisation, Privatisation and Globalisation) - Economic Reforms Phase-I (1985-1990); Phase II 1991 &After - reforms pertain to the following policies- Fiscal, Monetary, Pricing, Industrial, Trade, Public Sector, External and Foreign Investment - Common Minimum Programme (CMP)

UNIT-III

Human Resource and Economic Development- Unique demographic features in India - Growth rate, density, Gender-wise and age-wise distribution, etc., - New Population Policy (Integration of Economic and Population Planning). Unemployment and Poverty - Remedial measures and Govt. Schemes like IRDP, Micro Finance, etc., Business Process Outsourcing (BPO) - Problems and benefits to India.

UNIT-IV

Labour Economics - Trade Unions - Industrial Relations - Industrial Disputes - Mechanisation and Labour problems - Labour Legislations - Social Security Schemes - recent policy changes - Contributory Pension Schemes, etc.,

UNIT-V

Foreign Trade and Balance of Payments - Position, Problems and measures to improve- India in the Global Market - Functions of IMF, IBRD and WTO.

Reference Books:

1. Agrawal, A.N. : Indian Economy, Vikas Publishing House, New Delhi.
2. Alak Ghosh : Indian Economy, The World Press, Kolkatta.
3. Bimal Jalan : Indian Economic Crisis, Oxford University Press, Chennai.
4. Dewett, Verma & Sharma : Indian Economics, S.Chand& Co.,
5. Dhingra, I.C. : Indian Economy, Sultan Chand & Co.,
6. Jhingan, M.L. : Economics of Development & Planning, Konark Publishers, New Delhi.
7. Kanka, S.S. : Human Resource Management, S.Chand& Co.,
8. Mongia, J.N. (Editor) : India's Economic Policies, Allied Publishers

9. Prमित Chaudhury : The Indian Economy, Poverty and
Development, Vikas Publishing House,
New Delhi.
- 10 Pramod Verma : Labour Economics and Industrial Relations,
. Tata McGraw Hill
11. RBI Bulletins.
- 12 RudarDatt& Sundaram : Indian Economy, S.Chand& Co.
.
- 13 Sankaran,.S. Dr : Indian Economy, Margham Publications,
. Chennai.
- 14 Shiva Ramu : Globalisation, The Indian Scenario,
. S.Chand& Co.,
- 15 Sivayya,K.V.&V.B.M.Da : Indian Industrial Economy, S.Chand& Co.,
. s
- 16 Uppal : Indian Economic Planning,
. Macmillan India Pvt. Ltd.,
- 17 Velayutham : Foreign Trade, Theory &Practice, S.Chand&
. Co.,

ALLIED - 4
PAPER - 3
MEDIA STUDIES - II

Objectives

To enable the students to understand the forms of communication, Advertising , Newspapers, Radio as a medium and Motion pictures.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To learn about Communication Definitions and scope, Types of Communication like Intra-personal, Inter-personal

To know the details of Advertising, characteristics and functions of mass media

To learn about the types of news and magazines, structure and organization of newspapers and magazines in India

To understand about Radio as a medium of mass communication, All India Radio, organizational structure of Doordarshan, Satellite and cable TV

To explain the Motion picture - historical background, technical aspects, documentary films.

UNIT-I

Communication - Definitions - Scope - forms and purpose - Intra-personal - Interpersonal- mass, organizational, non-verbal, verbal - Process - Sources - Message - Channel - Receiver - Feedback - Noise.

UNIT-II

Advertising - Public relations and Propaganda - Public opinion - Characteristics and functions of Mass Media - Radio - Television - Print - Films

UNIT-III

Newspapers and Magazine - Types of News Papers and Magazines - Structure and organization of Newspapers and Magazines in India- An overview.

UNIT-IV

Radio as a medium of Mass communication - types of ownership - Audience - commercial radio for education - All India Radio - emerging trends -Television as a Mass medium - role and characteristics - Ownership - organizational structure of Doordarshan- Satellite and Cable TV.

UNIT-V

Motion pictures - historical background - structure and organization of Motion pictures industry in India - technical aspects - status, problems and prospects of films as medium of entertainment - Documentary films.

Reference Books:

1. Communication and Culture - A World View, K S Seetharaman, Mc Graw Hill, New Delhi.
2. Communication Studies - An introductory Reader: John Corner, JermyHewthorn, Edward.
3. The process of communication - An introduction to theory and practice - David K S Berlo., Rinchart.
4. Many voices and one world - UNESCO Publications.

ALLIED - 4
PAPER - 4
JOURNALISM - II

Objectives

To enable the students to understand the introduction to Journalism, kinds of News Works of Reporters, Editors and Indian Press Laws.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To know about the Introduction to Journalism, Impact of mass media , Development of Journalism through the ages

To learn about Kinds of News - News values - Reporters, reporting of public meeting - crime and sports

To learn the use of Editing marks, qualifications and functions of an Editor, feature Editorial - Letters to the Editor.

To understand the Role of computers and communication, Techniques - structure and functioning of Newspaper office - Advertisement

To gain the knowledge about Indian press Laws, freedom of press - press council - Prachar Bharathi - investigative Journalism

UNIT - I

Introduction to Journalism - Impact of Mass Media - Fourth Estate - Development of Journalism through the ages from J.A.Hickey to 1947 and Post-Independence period.

UNIT - II

Reporting - Kinds of News - News values - Reporters - News Agencies -Beat reporting of Public meeting - crime and sports.

UNIT - III

Editing -Use of Editing marks - qualifications and functions of an Editor and Sub-Editors - Inverted pyramid form of writing -Page make up - Headline - Lead - feature Editorial - Letters to the Editor.

UNIT - IV

Rotary - Letter press - offset printing - Role of computers and communication techniques - structure and functioning of Newspaper office - Advertisement.

UNIT - V

Indian press Laws - Defamation -Contempt of Court - official Secret Act - Indian constitution and freedom of press -Press council -Prachar Bharathi - investigative Journalism

Reference Books :

1. Ahuja, A.N. - Theory and practice of Journalism, Surjeet publication, Delhi, 1984.
2. Kamath, M.V. - Professional Journalism.
3. Natarajan,S. - A History of the press in India.
4. RangasamyBarthasarathy - Journalism in India.
5. Nadig Krishnamoorthy - Indian Journalism.
6. Carole Flemming and Emma Hemmi'ngway - Introduction to Journalism
7. Gurusamy, M.P. - Journalism (Tamil), Guru -Thenmozhi, Publication, Dindigul, 2009
8. Samy, A.M. - Origin and growth of Tamil press (Tamil) NamaniPathippagam, Chennai, 1987

SKILL BASED SUBJECT
PAPER - 2
HUMAN RIGHTS EDUCATION

Objectives

To enable the students to gain the knowledge about Theories of Human Rights, Agencies of Human Rights, Contemporary issues of Human Rights, Indian Constitution and Human Rights.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

The students learns various definitions of Human Rights, its nature and theories

To learns about the various Agencies of Human Rights & its Machanism

The students learns about the contemporary issues pertaining to Human Rights with women, Children & terrorism

The Students acquires the knowledge about the Indian Constitution & how it gives protection to human rights

The students come to know about the emerging trends in rights of cross gender, prisoners & sex harassment

UNIT-I

Definition - Nature - content - Legitimacy and priority - Theories of Human Rights - Historical development - World War I and II - UNO - UDHR - International Covenants on Economic - Social - Cultural - Political and Civil Rights.

UNIT-II

Agencies of Human Rights - UN High Commission for Human Rights - Amnesty International - Human Rights Watch - International Commission of Juries - Human Rights Court - Mechanisms to uphold and foster Human Rights.

UNIT-III

Contemporary issues of Human Rights - Women, Children, Depressed classes, Bonded Labour, Slavery - Refugees, Capital Punishment - Demand for freedoms - State Vs Human Rights and Terrorism Vs Human Rights.

UNIT-IV

Indian Constitution and Human Rights - Fundamental Rights and Duties - Directive Principles of State Policy - National Commission for Human Rights - State Agencies - Human Rights and courts - Human Rights and Media - OCHR - PUCL and Peoples Watch.

UNIT-V

Emerging trends in Human Rights - Rights of Transgender, detainees, prisoners, street children - Sexual harassment of women at home and work places - Organ sale - Illegal trafficking of women - Police and Human Rights.

Reference Books:

1. Andrew, J.A. & Hines, W.D. International protection of human Rights, London, Mansell publishing Ltd., 1987.
2. Carnston, Maurice: What are Human Rights?, London, The Bodley Ltd., 1973.
3. Desai A.R. ed.: Violations of Democratic Rights in India, Bombay, Popular prakasam, 1986.
4. SivakamiParamasivam: Studies in Human Rights, Salem, 2000.

NON-MAJOR ELECTIVE

PAPER - 2

(To choose 1 out of 2)

FUNDAMENTALS OF NATIONAL SECURITY

Objectives

To enable the students to understand the concept of National Security, Foreign Policy and Defence Policy, Approaches to National Security and Indian Strategic Relationship.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

The Students will learn about National Security, elements of national power Fundamental, factors of National Security

To know the Definition, Determinants, Instruments of Foreign policy & Defence policy

To learn the Approaches to National Security like Coercive and non - coercive approach

To learn the Feature of strategic environment, . India's Military preparedness

To understand India's strategic relationship with Pakistan, China and World powers

UNIT-I

Introduction - Definition, Scope and features of the concept of National Security - Concept of National Power - Elements of National power (tangible and intangible) - Fundamental factors - Values - Goals and policies that determine National Security.

UNIT-II

Foreign policy & Defence policy - Definition - Meaning - Scope of foreign policy and defence policy- Determinants of foreign policy and defence policy - Instruments of foreign policy and defence policy - Diplomacy and defence

UNIT-III

Approaches to National Security - Coercive and non - coercive approach - meaning and scope - Coercive means - threats - threat perception and defence apparatus - armed forces - its organization and functions in India - Non-coercive means - peace mechanics - peace making; peace building.

UNIT-IV

Strategic Environment - India - Feature of strategic environment - its scope in policy making - India's strategic environment - Immediate neighbours - adjacent regions - Indian Ocean and global structure - India's Military preparedness - Defence budget - force structure and organization

UNIT-V

India's strategic relationship (Salient features) - India - Pakistan Politics - Strategic relations - India - China politics - Strategic relations - India and World powers.

Reference Books:

1. Baranwal, S.P. : Measures of Civil Defence in India: New Delhi, Guide - Publications, 1984.
2. Khera, S.S. : India's Defence problems, New Delhi, Orient Longmans, 1968.
3. Waever, Ole : National Security in perspective, New Delhi, Gian, 2003.
4. Rao, P.V.R. : Defence without Drift, Bombay, Popular Prakasam, 1970.

NON-MAJOR ELECTIVE
PAPER - 2
INDIAN CONSTITUTION

Objectives

To enable the students to understand the Historical background and salient features of Indian constitution, Fundamental Rights and Duties, Local Government, Relations between the Union and the States.

Learning Outcomes

On Successful Completion of the Course the Students will be able to

To know the Historical background of Indian Constitution.

To understand the Fundamental Rights and Duties of the citizens.

To learn about Judiciary powers of the Union Government.

To learn about Judiciary powers of the State and Local Government.

To understand the Relations between Union and States, Public Services.

UNIT - I

Historical Background -Constituent Assembly - The Preamble - Basic Principles - Salient features.

UNIT -II

Fundamental Rights - Fundamental Duties - Directive Principles of State Policy.

UNIT - III

Union Government - Executive - Legislature -Judiciary – Independence of Judiciary- Judicial Review - Judicial Activism.

UNIT - IV

Government of the State and Local Government- Executive- Legislature – Judiciary- Panchayat Raj - Municipalities.

UNIT - V

Relations between the Union and the States - Public Sectors - Public Service Commissions - Amendments.

Reference Books:

1. Bidyut Chakrabarty and Rajendra Kumar Pandey, Indian Government and Politics, New Delhi: Sage Publications, 2012.
2. Durga Das Basu, Introduction to the Constitution of India, New Delhi: Prentice Hall, 1996.
3. Gautam, D.N. Fifty Years of Indian Constitution, New Delhi: Manak Publication, 2001.
4. Mehta, S.M. Constitution of India and Amendment Acts, New Delhi: Deep & Deep, 1990.
5. Kapur, A.C. Select Constitutions, New Delhi: S. Chand & Co., 2005.
6. Subba Rao, T.V. Constitutional Development in India, New Delhi: Deep & Deep, 1996.
7. Pylee. M.V. - India's Constitution, New Delhi: S. Chand & Co, 2005.

SEMESTER - V

CORE PAPER - 9

HISTORY OF EUROPE from 1453 to 1789 C.E.

Objectives

The course aims to understanding of the Geographical discoveries, Renaissance and Reformation movements in Europe. The study envisages achievements of Louis XIV, Austrian war of succession and political unrest in Europe.

Learning Outcomes

The paper enables the students to understand

The beginning of the modern age with Geographical discoveries and fall of Constantinople

The Renaissance movements and its impact

Developmental stages of Reformation

Louis XIV Achievements and Dutch war

Austrian War of Succession and unrest in Europe

UNIT - I

Beginning of Modern Age - Geographical Discoveries - Results –Fall of Constantinople in 1453 -Transition from Medieval to Modern age.

UNIT - II

Renaissance in Italy - Literacy Renaissance- Francisco, Petrarch, Giovanni Boccaccio- Artists of Renaissance - Leonardo-da-Vinci, Raphael, Michael Angelo – Venetian School of Painting -Impact of Renaissance.

UNIT - III

The Developmental Stages of Reformation- Martin Luther - Henry VIII of England - Charles V - Phillip II of Spain - Counter Reformation - Thirty Years War.

UNIT - IV

Louis XIV - Achievements - Foreign Policy - The Dutch War - Spanish War of Succession - The Treaty of Utrecht, 1713- Fredrick the Great.

UNIT - V

Austrian War of Succession - Maria Theresa's domestic and foreign policy - Joseph II-reforms - Peter the Great - reforms and foreign policy - Catherine II - reforms and foreign policy - Unrest in Europe - Impact of the American war of Independence - Louis XVI of France.

Reference Books:

1. C.D.M. Ketelby : A History of modern times from 1789, George G. Harrap&Co. Ltd., London, 1964.
2. B.V. Rao : History of Europe Sterling Publishes Pvt. Ltd., New Delhi, 2000.
3. H.A.L. Fisher : From the beginning of 18th Century to 1935 A.D., Vol. - 11 Surjeet Publications, Delhi - 1987.
4. T.S. Ramalingam, History of Europe.

CORE PAPER - 10
HISTORY OF U.S.A. from 1861 to 1932 C.E.

Objectives

This paper aims to study Abraham Lincoln, rise of business industries, labour movement, westward expansion. An estimate of Theodore Roosevelt and the USA and First world war are studied.

Learning Outcomes

The paper makes to understand Abraham Lincoln and civil war

Rise of business industries and labour movement

Growth of imperialism and westward expansion

Theodore Roosevelt and Dollar diplomacy

USA and First world War

UNIT-I

Abraham Lincoln - Civil War - Causes, Course and Results - Reconstruction

UNIT-II

Rise of Big Business - Rail Roads - Growth of Industry - Labour Movement - Grangers - Populist Movement.

UNIT-III

Growth of Imperialism - the Spanish-American War of 1898 - Open Door Policy - The Westward Expansion (1861-1900) - End of Frontier.

UNIT-IV

Theodore Roosevelt - Progressive Reforms - Foreign Policy - W.H. Taft - Dollar Diplomacy - Woodrow Wilson - New Freedom.

UNIT-V

USA and First World War - 14 points - Treaty of Versailles - Warren Hardinge
- Coolidge Prosperity - Hoover - Great Depression.

Reference Books:

1. Hill. C.P. : History of the United States, Edward Arnold, London, 1974.
2. Hofstadter : The American Republic, Vol 1, Upto 1865, Prentice - Hall Miller &Arooran. K Engle WoodCliffs, NewJersey, 1959.
3. NambiArooran. K. : History of United States of America (Tamil), Tamil Nadu Text Book Society, Government of Tamil Nadu, Cehnnai, 1975.
4. Parkes, H.B. : The United States of America - A History Khosla Publishing House, Delhi, 1986.
5. Rajayyan. K. : A History of the United States, Madurai Publishing House, Madurai, 1978.

CORE PAPER - 11

HISTORY OF CHINA AND JAPAN from 1900 to 2000 C.E.

Objectives

The paper aims to understand the political developments in China and Japan in 20th century. The boxer rebellion, rise of Kuomintang party, Mao, of China and rise of militarism and the foreign policy of Japan are dealt with elaborately.

Learning Outcomes

Boxer rebellion and Decline of Manchus

Rise of Kuomintang party & Second Sino-Japanese war, Russo-Japanese war

Estimation of Mao and China in World affairs till 2000 CE

Rise of imperialism- First Sino-Japanese war, Russo-Japanese war, First world war and Japan.

Rise of Militarism in Japan, The Japan and Second World War, Foreign policy of Japan from 1950-2000 CE

UNIT - I

Boxer Rebellion - Manchu reforms - 1911 Revolution - Decline of Manchus
Dr. Sun Yat Sen - Yuan Shi Kai.

UNIT - II

China and the First World War - May 4th Movement - Washington Conference
- Rise of Kuomintang Party- Chiang Kai Sheik - Birth of Civil War in China -
Manchurian Crisis - Second Sino-Japanese war.

UNIT - III

Mao's era - Establishment of Peoples' Republic of China - Cultural Revolution
- Estimate of Mao - Post Mao era - China in the World affairs till 2000 C.E.

UNIT - IV

Rise of Imperialism - First Sino-Japanese War - Anglo-Japanese Alliance - Russo-Japanese War - First World War and Japan - Washington Conference - London Naval Conference.

UNIT - V

Rise of Militarism - Japan and Second World War – Socio-Economic and Political Changes in Japan from 1919 to 1950 - Foreign Policy of Japan from 1950 to 2000 C.E.

Reference Books:

- 1) Ahamed L.L : A Comprehensive History of the Far East. S. Chand and Co.,Ltd, New Delhi, 1981.
- 2) David, M.D.I,the Making of Modern China. Himalaya Publishing House, Bombay, 1993.
- 3) Paul.H.Clyde&Burton.F.Beers,The Far East - A History of West and Impact on Eastern hemisphere 1830 - 1975.Pemtice Hall of India [p] Ltd., New Delhi,1988.
- 4) Ross Terrill,The Future of China after Mao.Clrion Books, Delhi,1987.
- 5) Sukaiming, Modern China - A Topical History, New World press, Beijing, 1986.
- 6) Vinacke.H.M.A History of the Far East in Modern Times. Kalayani Publishers, New Delhi,1989.

CORE PAPER - 12

CONSTITUTIONAL HISTORY OF INDIA from 1773 to 1950 C.E.

Objectives

The paper aims to bring out the history and developments of Indian constitution right from the Indian regulating act of 1773. The charters act of 1793, The Queens proclamation, Montague-Chelmsford reforms of 1919 and Indian Independence act are studied.

Learning Outcomes

Understand the historical background for Regulating act, 1773

Charter acts of 1793, 1833

Queens Victoria proclamation, Minto-Morley reforms of 1909

Montague-chelmsford reform 1919 & Round table conferences

Provincial autonomy Government of India act 1935 and Indian Independence act of 1947 and Indian constitution of 1950

UNIT - I

Historical Background - Regulating Act of 1773 - Pitt's India Act of 1784.

UNIT - II

Charter Act of 1793 - Charter Act of 1813 - Charter Act of 1833 - Charter Act of 1853.

UNIT - III

Queen Victoria's Proclamation - Government of India Act of 1858 - Indian Council's Act of 1861 - Indian Council's Act of 1892 - Minto-Morley Reforms of 1909.

UNIT - IV

Montague-Chelmsford Reforms 1919 - Dyarchy of System - Simon Commission - Round Table Conferences.

UNIT - V

Government of India Act of 1935 - Provincial Autonomy - Indian Independence Act of 1947 - Indian Constitution of 1950.

Reference Books:

1. Pylee. M.V. - India's Constitution, New Delhi: S. Chand & Co, 2005.
2. Pylee, M. V. - Constitutional History of India, New Delhi: S. Chand & Co. 2003.
3. R.C. Agarwal, Constitutional Development and National Movement in India, New Delhi: S. Chand & Co., 2005.
4. A.C. Kapur & K.K. Mishra. - Select Constitutions, New Delhi: S. Chand & Co, 2005.
5. R.C. Agarwal, Indian Political System. New Delhi: S. Chand & Co, 2003.

INTERNAL ELECTIVE - I

PAPER - 1

(To choose 1 out of 3)

HISTORY OF FREEDOM MOVEMENT IN TAMILNADU from 1800 to 1947C.E.

Objectives

A comprehensive study of freedom movement in Tamil Nadu till Independence. The Palayakarars revolt, Vellore revolt, and Growth of western education are highlighted. Tamil Nadu in the Congress sessions, Swadeshi movement, Vedaranya salt Satyagraha and important Tamil Nationalists and their role are studied.

Learning Outcomes

The students will be able to understand

Origin of Freedom movement , Palayakaras revolt and Vellore revolt

Growth of western education, Formation of Indian National Congress and Tamil Nadu in the congress sessions

Swadeshi movement and role of Justice party

Emergence of Gandhiji, Vedaranyam salt satyagraha, Quit India movement

Tamil Nationalists viz. Thillaiyadi Valiyammai, Subramaniya Siva and their role

UNIT - I

Origin of Freedom Movement - The Palaiyakarasin South Indian Revolts, Vellore Revolt - Causes, course and results.

UNIT-II

Growth of Western Education - Socio - Economic - Religious factors - Role of Press - Pre-Congress Political Associations - Formation and Growth of Indian National Congress - Tamil Nadu in the Congress Sessions - Moderates and Extremists.

UNIT - III

Swadeshi Movement - Surat split - Extremist activities - Vanchinathan - Cenbagaraman - Home Rule Movement - Madras Presidency Association - Role of Justice party - Consequences of Jallianwala Bagh Massacre.

UNIT - IV

Emergence of Gandhiji - Non-Cooperation Movement - Civil Disobedience Movement - Swaraj party - Neill Statue Satyagraha - Vedaranyam Salt Satyagraha - Impact of II World War - Quit India Movement - INA trials - Independent India.

UNIT - V

Tamil Nationalists - Thilliyadi Valliyammai - Subramaniya Siva - Bharathiyar - Thiru. Vi. Ka - Dr. P. Varadarajalu Naidu - S. Sathiyamurthy - Rukmani Lakshmi pathi - Rajaji - E.V. Ramasamy - Kamaraj - Jothi Venkatachalam

Reference Books:

1. Baker, C. J - The Politics of South India 1920 - 37, Cambridge University press, 1976.
2. Baker, C. J and Wash Book, D.A - South India - Political Macmillan company Ltd, New Delhi, 1975.
3. Copley, ARH - The Political career of C. Rajagopalachari 1937 - 54, The Macmillan company of India Ltd, Madras, 1978.
4. Ganesan, A - The Press in Tamil Nadu and struggle for Freedom 1917 - 37, Mittal Publications, New Delhi, 1989.
5. Kandaswamy, P - The Political career of K. Kamaraj, Concept publishing company, New Delhi, 2001.

6. NambiArroan, K
 - Tamil Renaissance and Dravidian Nationalism 1905 - 1944, Koodal Publishers, Madurai, 1980.
7. PattabiSitarammaya, B
 - History of India National Congress (1885 - 1935),
The Congress Working Committee are the Occasion of 50th Anniversary of Congress, Madras, 1935.
8. Rajaramman, P
 - The Justice Party - A Historical perspective 1916 - 37. Poompozhi Publishers, Madras - 1998.
9. Rajayyan, K
 - History Tamil Nadu 1565 - 1982, Raj Publishers, Madurai, 1982.
10. Sivagnanam, M.P.
 - ViduthalaipporialTamilzhagam, (Tamil) Vol. I and II. Poongodipathippagam, Chennai, 2005.
11. Sundralingam, R.
 - Politics and Nationalist Awakening in South India 1852 - 1891, Rawat Publications, New Delhi, 1980.
12. Viswanathan, E.Sa,
 - The Political Career of E.V. Ramasami Naicker, Ravi and Vasanth Publications, Madras. 1983.

INTERNAL ELECTIVE - I

PAPER - 2

WOMEN DEVELOPMENT IN TAMILNADU from 1900 to 2000 C.E.

Objectives

It aims to a detailed study of women in the 20th century. It includes Feminist theories, Position of women in Sangam age, Medieval and Modern period, women movements, and women welfare and women empowerment including Panchayat Raj.

Learning Outcomes

Students will be able to understand

Feminist theories and position of women in Tamil Nadu

Women in Sangam age, Medieval and Modern period

Women movements and women welfare in Tamil Nadu

Social reform and women welfare in Tamil Nadu.

Women empowerment and women in Panchayat Raj

UNIT - I

Status and role of women - Feminist Theories - Feminism - Position of women in TamilNadu.

UNIT - II

Traditional Tamil Society - Women in Sangam Age –Mediaeval and Modern periods.

UNIT - III

Movements for Women in 19th and 20th Centuries - International Women's year- Decade for women, 1975-1985.

UNIT - IV

Women Organization - Social reform and welfare in TamilNadu- Govt. policy on women 1947 to 2001.

UNIT - V

Women empowerment –Social, economic and political challenges facing by women - women at work - violence - personal law - women in Panchayat Raj - Women and Self Help Group - Reservation for women in Parliament.

Reference Books:

1. KumKumSangari& Sudesh veid : Recasting women, Essay in Colonial History, Kali for women, 2006.
2. Sushilakaushik: Panjayat Raj in Action, Challenges in women's Role, Delhi, 1996.
3. Nivedita menon : Gender & Politics in India, New Delhi, OUP, 1999.
4. Madhu Vij : Women studies in India , A journey of 25 years, Rawat, 2014.

INTERNAL ELECTIVE - I

PAPER - 3

ARCHAEOLOGY - I

Objectives

The Archaeological studies with its branches namely Epigraphy, Numismatics, Excavation and monuments helps to understand the history of Ancient period

Learning Outcomes

Students will be able to understand

Definition of Archaeology - Its branches of Epigraphy, Numismatics-Monument and Sites.

Exploration & Excavation-Dating methods

Palaeolithic, Mesolithic and Neolithic cultures

Ceramic industry and its types, Graffiti and Inscribed potsherds

Harappa culture, Chalcolithic culture; Early Iron age and Megalithic culture in south India

UNIT - I

Definition of Archaeology - History of Archaeology in India - Nature and Scope - Epigraphy – Numismatics – Monuments and Sites.

UNIT - II

Aims of Exploration - Excavation - Dating Methods in Archaeology

UNIT - III

Stone Age Cultures- A brief Survey of Palaeolithic- Mesolithic and Neolithic cultures in India.

UNIT - IV

Ceramic Industry and its types - Graffiti Marks -Inscribed Potsherd - Its Importance

UNIT - V

Harappan Culture - Chalcolithic Culture of Western and Central India - Early Iron Age period- Megalithic Culture of South India

Reference Books:

1. Gurusurthy. S : Ceramic Traditions in South India, University of Madras, 1981
2. Magalingam T.V. : Early South Indian Palaeography, Madras University, Chennai 1967.
3. Narasimhaiah.B: Neolithic and Megalithic Cultures in TamilNadu, Sundeep Publication, New Delhi, 1980.
4. Ramachandran K.S. : A Bibliography of Indian Megaliths, The State Department of Archaeology, Tamil Nadu, 1971.
5. Dr. Raman. K.V., Principles and Methods of Archaeology, Parthajan Publications, Chennai, 1988.
6. Rao.S.R. : Lothal and the Indus Civilizations, Asia Publishing House, Bombay, 1973.
7. Dr. Venkataraman. R. : Indian Archaeology- A Survey, Ennes Publications, Udumalpet, 1999.

SKILLED BASED SUBJECT
PAPER - 3
COMPETITION EXAMINATIONS

Objectives

- To impart overall idea about Competitive Examinations
- To create awareness about various Central Level Competitive Examinations
- To educate the students about various State Government Services & Examinations
- To make students alert about the opportunities in Teaching positions both Central/State and School / Higher Education.
- To motivate the students through preparation tips & suggestions

UNIT-I

Introduction to Competitive Examinations

Competitive Examinations India an Introduction- Civil Services - Preliminary and Main Examination - Government Employment in other services - Examinations Patterns and stages - Written Test - Oral Test - Negative marks - Reservation policies of State/Central government in selection process: Horizontal Reservations - Vertical Reservations.

UNIT-II

Central Level Competitive Examinations

Central Services - Union Public Services Commission (UPSC) - Pattern and Stages - Staff Selection Commission CGL/CHSL - Stages of Selection - Railway Recruitment Board (RRB) : NTPC-ALP - Stages of selection -Defence Examinations - LIC/GIC Examinations: AAO/Assistants - Stages of Selection - Institute of Banking Personnel Selection Examinations (IBPS) - P.O/clerical - Stages of Selection.

UNIT - III

State Level Competitive Examinations

TNPSC: Tamil Nadu Public Service Examinations - One Time online Registration - Combined Civil Services Examination, Group 1- Combined Civil Service Examinations & Group II - Stages of Selection - Madras High Court Service Examination - Typist/Assistants/Xerox Machine Operator/Reader - District Educational Officers Examinations - Group IV & V.A.O Examinations - Other Technical Examinations.

UNIT-IV

Recruitment of Educational Teaching Services

UGC -JRF/NET Examinations - Central Teachers Eligibility Test (CTET) – UGC/SET - Teachers Recruitment Board: TNTET - PGTRB - TNTET - Qualification and stages of Recruitment.

UNIT-V

Competitive Examination preparation Tips

Reading Newspapers on daily basis, Magazines, Reference Books for Subjects - Subjects of Study - General Science (Physics, Chemistry, Biology) - History, Economics, Geography, Indian Polity - Maths, Reasoning and General Awareness/General English - Perusing Previous Years Question Papers - Homework - Attending Oral Interviews: Mock Interview - Tackling FAQ's during interviews - Review of Interview.

Books for Study:

1. S.K. Das, The Civil Services in India: Oxford India Short Introductions, Sri Padmavathi Publications, Chennai, 2013.
2. Aarif Qadir, How to Crack UPSC Civil Services Examination: An Ultimate Strategy Book to Crack Civil Service, Examination, Amazon Digital Services L.L.C, 2014.

3. Dr. Md. Usmangani Ansari, Mission IAS - Prelim/Main Exam, Trends, How to prepare Strategies, Tips & Detailed Syllabus, Disha Publishers, New Delhi, 2016.

4. D.R. Khullar & JACS Rao, Environment for Civil Services Prelims and Mains and Other Competitive Examinations, Manav Books, Distributors, Agra, U.P, 2015.

5. Manorama Year Book, Malayala Manorama Publications, Kottayam, Kerala.

Books for Reference:

1. Dr. Divya S Iyer, Path Finder: Civil Services Main Examination, DC Books Pvt Ltd., New Delhi.

2. Edgar Thorpe, The Pearson CSAT Manual 2013: Civil Services Aptitude Test for the UPSC Civil Services Preliminary Examination, New Delhi.

3. S.A. Majid, Special Current Affairs for Civil Services Examinations, Kalinjar Publications, New Delhi.

4. Sanjiv Verma, The Indian Economy: for UPSC 7 State Civil Services Preliminary & Main Examinations, Unique Publications, New Delhi.

5. Veerasekaran, TNPSC Group II, Kikzhakku Publishers, Chennai.

SEMESTER VI
CORE PAPER - 13
HISTORY OF EUROPE from 1789 to 1945 C.E.

Objectives

- To teach the Causes, Course and Results of French Revolution.
- To impart the administration of Napoleon as Emperor.
- To educate the Unification of Italy and Germany.
- To discuss the impact of Colonialism and Imperialism, and the First World War.
- To discuss on the rise of Nazism and Fascism and the causes for the Second World War.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the Causes, Course and Results of French Revolution.
- Summarize the administration of Napoleon as Emperor.
- Discuss the Unification of Italy and Germany.
- Illustrate the impact of Colonialism and Imperialism, and the First World War.
- Appraise on the rise of Nazism and Fascism and the causes for the Second World War.

UNIT-I

French Revolution - Causes, Course and Results - Rise of Napoleon Bonaparte
- French Revolution -Consulate - Constitution of 1799 - Napoleon as emperor -
Napoleonic wars - Continental System - Napoleon's domestic reforms.

UNIT-II

Vienna Congress - Holy Alliance - Concert of Europe - Metternich - Louis
XVII - Charles X - Revolution of 1830 - Louis Philip - causes and course of 1848
Revolution - Louis Napoleon as President and as Emperor -Napoleon III - Third
Republic of France.

UNIT-III

Unification of Italy- Role of Cavour, Garibaldi, Mazzini and Victor Immanuel
II- Unification of Germany - Bismarck.

UNIT-IV

Eastern Question - The Greek war of Independence - The Crimean war -
Young Turk Movement - Balkan wars - First World War - League of Nations -
Mustafa Kamaal Pasha - Russian Revolution of 1917.

UNIT-V

Nazism- Hitler- Fascism - Mussolini - Europe between the World Wars -
Second World War -UNO.

Reference Books:

1. BV. Rao : History of Modern Europe (1789 - 1992) Sterling Publishers Private Ltd., New Delhi -16.
2. C.D.M. Ketelby : A History of modern times from 1789, George G. Harrap & Co. Ltd., London 1964.
3. H.A.L. Fisher: From the beginning of 18th Century to 1935 A.D., Vol. - 11 Surjeet Publications, Delhi - 1987.

CORE PAPER - 14
HISTORY OF U.S.A. from 1932 to 2000 C.E.

Objectives

To teach Franklin D. Roosevelt's Policies and the role of USA in the Second World War.

To instruct on the Domestic and Foreign Policy of Harry S. Truman, Cold War and D. Eisenhower.

To discuss the administration of John F. Kennedy's and Martin Luther King.

To educate on the administration of Lyndon B. Johnson, Richard Nixon, Gerald Ford and Jimmy Carter.

To discuss the administration of USA under Ronald Reagan, George Bush (Sr.) and Bill Clinton.

Learning Outcomes

By the successful completion of the course the students will be able to

Explain Franklin D. Roosevelt's Policies and the role of USA in the Second World War.

Illustrate the Domestic and Foreign Policy of Harry S. Truman, Cold War and D. Eisenhower.

Summarize the administration of John F. Kennedy's Internal and External Policies, and Martin Luther King.

Discuss the administration of Lyndon B. Johnson, Richard Nixon, Gerald Ford and Jimmy Carter.

Relate the USA under Ronald Reagan, George Bush (Sr.) and Bill Clinton.

UNIT-I

Franklin D. Roosevelt - New Deal - Good Neighbour Policy - USA and Second World War.

UNIT-II

Domestic and Foreign Policy of Harry S. Truman - Cold War- D. Eisenhower.

UNIT-III

John F. Kennedy - Internal Policy - Foreign Policy - Civil Rights Movement - Martin Luther King.

UNIT-IV

LyndonB. Johnson - Richard Nixon - Gerald Ford - Jimmy Carter.

UNIT-V

USA under Ronald Reagan - George Bush (Sr) - End of Cold War - Bill Clinton.

Text Books and Reference Books:

1. Hill C.P.: History of the United States, Edward Arnold, London, 1974.
2. Hofstadter, Miller & Aaron: The American Republic, Vol.II, Since 1865, Prentice - hall, Engle Wood Cliffs, New Jersey, 1959.
3. Parkes, H.B.: The United States of America - A History, Khosla Publishing House, Delhi, 1986 .
4. Rajayyan. K.: A History of the United States, Madurai Publishing House, Madurai, 1978.
5. United States Information Agency: An outline of American History, 1994.

CORE PAPER-15
INTERNATIONAL RELATIONS since 1945C.E.

Objectives

- To teach the Instruments of Diplomacy.
- To impart the knowledge of the world during the inter war period.
- To educate the impact of the world peace organisations
- To discuss the causes, course and impact of the Cold War.
- To instruct the influence of Terrorism.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the Nature of the Internal Relations.
- Illustrate the rise of Dictatorship, totalitarianism among the world countries.
- Summarize the Military Alliances.
- Discuss the causes and impact of Terrorism.
- Appraise the influence of International Associations.

UNIT-I

Nature of International Relations - National Power - Instruments for the Promotion of National Interests - Diplomacy.

UNIT-II

Inter-War Years - Reparation - Inter Allied debts - World Economic crisis - Collective security - Rise of Dictatorship - Totalitarianism.

UNIT-III

Second World War - Peace Settlements - Military alliances - Emergence of Power Blocs - Cold War - UNO - Detente.

UNIT-IV

Disarmament and Arms control - Disintegration of U.S.S.R - Emerging New World Order - Multipolar Vs Unipolar Concepts - Fight Against Terrorism.

UNIT-V

Present trends in International Associations - Role of International Associations
- Common Wealth Nations, NAM, SAARC, OAU, ASEAN, G-8, G-15, G-77, European Union.

Reference Books:

1. Carr.E.H : International Relations between the two world wars, 1919-1939, New York, 1966.
2. Calvecoressi, P. : World Politics since 1945.
3. Moon, P.T. : Imperialism and World Politics , The Macmillan Company, New York, 1926.
4. Morgenthau, Hans.J: Politics among Nations, The struggle for Power and Peace, New York, 1973.
5. Palmer and Perkins: International Relations, Third Ed, AITBS Publishers & Distributors, Delhi, 2000.
6. Prakash Chander& Prem Arora : International Relations, Cosmos Bookhive (p) Ltd. Gurgaon.
7. Schleicher, C.P : International Relations , New Delhi, 1963.
8. Schuman, F.: International Politics, 6th Ed, McGRaw Hill Book Company, New York, 1958.
9. Sen.A.K : International Relations since 1919, S.Chand& Co., Ltd, New Delhi, 1993.
10. Wright, Q : The study of International Relations, Appleton - Century - Crafts, New York, 1955.

INTERNAL ELECTIVE - II

PAPER - 1

(To choose 1 out of 4)

HISTORY OF SCIENCE AND TECHNOLOGY IN INDIA upto 1900 C.E.

Objectives

- To teach the evolution of Man.
- To impart the scientific development of Industrial systems in Ancient India
- To educate the socio-intellectual contributions of Guptas.
- To discuss the development of Astronomical Observatories.
- To instruct the influence of Metallurgy.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the development of Microliths.
- Illustrate the scientific development of Harappan Town Planning System.
- Summarize the Ancient method of Cultivation.
- Discuss the technological development during 1200 to 1707.
- Appraise the influence of Industrial Revolution in British India.

UNIT-I

Pleistocene - Evolution of man – Palaeolithic Industries – Mesolithic (Microliths) Technology - Rock Art - Invention of fire and wheel - The impetus for Metallurgy - Impact of Bronze and Iron.

UNIT-II

Harappan Town Planning System - Vedic Agricultural and Industrial systems – Sculptures and Bronzes - Painting and its composition - Seals and Sealings - Pottery.

UNIT-III

Ancient method of cultivation - Craft production and technology – Development of Art and Architecture under Mauryas, Kushanas and Guptas - Science, Mathematics and Astronomy under Gupta times.

UNIT-IV

Technology and Non-agricultural production methods from 1200 to 1707 CE - development of Architecture and paintings during 1200- 1707 CE - Sawai Jai Singh and his Astronomical observatories.

UNIT-V

Introduction of Modern Sciences by the Europeans - Asiatic Society of Bengal - Social needs and technological applications - Limitations in pre-industrial manufacturing - Industrial Revolution in British India upto 1900 C.E.

Reference Books:

1. Studies in the History of Science in India, Anthology, D.D. Chattopadhyaya.
2. History of Science and Technology in India, G. Kuppuram and K. Kumudamani.
3. History of Science and Technology in Ancient India, D.D. Chattopadhyaya.
4. Department of Science and Technology - Government of India - Website.
5. Council of Scientific and Industrial Research, Website.

INTERNAL ELECTIVE - II

PAPER - 2

DRAVIDIAN MOVEMENT IN TAMILNADU UPTO 1947 C.E.

Objectives

- To teach the establishment of Western Education in TamilNadu.
- To impart the knowledge of the development of Justice Party.
- To educate the impact of socio reform movement in TamilNadu.
- To discuss the causes for the development of Self Respect Movement .
- To instruct the influence of Dravida Nadu.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the establishment of Adi Dravida Mahajana Sabha.
- Illustrate the works of the South Indian Liberal Foundation.
- Summarize the contributions of EVR Periyar.
- Discuss the causes for the fall of the Justice Party.
- Appraise the growth of the demand for sperate Dravida Nadu.

UNIT- I

Dravidians and Indo-Aryan - Caldwell's Contribution - Western Education and Indian Renaissance - Early Dravidian Leaders - P.V. Subramania Pillai - ChinnaThambi Pillai - Attempt of AyothidasaPandithar - Rettaimalai Srinivasan for consolidation - Founding of Adi Dravida Mahajana Sabha 1894.

UNIT-II

South Indian Liberal Federation 1916 - P.T. ThiyagarayaChetti - Dr. C. NatesaMudali - Dr. T.M. Nair - Founding of Dravidan - Justice and Andhra Prakasika- Justice Party - Demand for Communal Award - Southborough Commission - Meston Award - 1919.

UNIT-III

Election of 1920 - Justice Party Government - Elections of 1923, 1926, 1929, and 1932 - changing affiliations - Services of the Justice Government - Socio educational - economic - demand for separate electorate by Depressed Class leaders - M.C. Raja - Rev. D. John Rathinam - N. Sivaraj- E.V. Ramasamy and acceptance of 16 points by Justice party.

UNIT-IV

Elections of 1937 - Fall of the Justice party - Rajaji as Congress Premier - Hindi imposition - E.V Ramasamy - Self Respect and Rationalist Association - leader of Justice party, 1938 – Anti-Hindi struggle - Demand for Separate DravidaNadu, 1939.

UNIT-V

Second World War and Justice party - demand for Dravida Nadu, 1944 - Justice party renamed as Dravida Kazhagam - Emergence of young leaders in Dravida Kazhagam - C.N. Annadurai – W.P.A.Soundrapandian - Indian Independence and D.K's stand in 1947.

Reference Books:

1. NambiArroan K - Tamil Renaissance and Dravidian Nationalism
2. Sivagananam. M.P - Viduthalai PorilTamilagam (in Tamil) (Two parts)
3. Stalin Gunsekaran .T - Viduthalai VelviyilTamilagam (in tamil) (Two parts)
4. Parathasarathy - Dravida IyakkaVaralaru (in Tamil)
5. Devanandan .P.D. - The Dravida Kazhagam -A revolt against Movement
6. E.S.K . Viswanathan - The Political career of E.V.R
7. Sami Chidambaranan - Tamil Thalaivar (in Tamil)

INTERNAL ELECTIVE - II

PAPER - 3

HISTORY OF THE ARABS from 750 to 1258 C.E.

Objectives

To teach the establishment of Abbasid dynasty, and to estimate the rule of Al-Mansur and Harun Al-Rashid.

To impart the scientific development and cultural contributions under the Abbasids.

To educate the socio-intellectual contributions of the Fatimids of Egypt.

To discuss the causes, course and impact of the Crusades.

To instruct the influence of Moorish Civilization on Europe.

Learning Outcomes

By the successful completion of the course the students will be able to

Explain the establishment of Abbasid dynasty, and to estimate the rule of Al-Mansur and Harun Al-Rashid.

Illustrate the scientific development and cultural contributions under the Abbasids.

Summarize the socio-intellectual contributions of the Fatimids of Egypt.

Discuss the causes, course and impact of the Crusades.

Appraise the influence of Moorish Civilization on Europe.

UNIT-I

Rise of the Abbasids - Abul Abbas As-saffah - Al-Mansur – Harun Al-Rashid - Al-Mamun.

UNIT-II

Social, Economical, Religious and Cultural condition of the people under Abbasids - Development of Language, Literature, Philosophy - Science, Fine Arts and Architecture - Administration - Downfall.

UNIT-III

Fathimids of Egypt -Ubaidullah - Al-Mahadhi- Al-Mansur - Al-Muiz- Al-Azeez - Fall of Fathimids- Socio-Intellectual life, Arts and Learning under Fathimids.

UNIT-IV

The Crusades - Causes –Courses - their impact.

UNIT-V

Moorish Spain -Abdur Rahman III - his contribution -Influence of Moorish Civilization on Europe.

Reference Books:

1. P.K. Hitti: History of Arabs, The Macmillan press Ltd, London-1970.
2. Syed Amir Ali: A short history of Saracens, Kitab Bhavan, New Delhi 2, 1981.
3. S.A.Q, Hussaini Arab Administration, Iddabah - I -Adabiyat, 1976, Delhi.
4. Syed Mahmudum : Islam, its concept and history Kitab Bhavan, 1981, New Delhi.
5. S. Khuda Baksh: The Orient under the Caliphs, Idarah- I -Adabiyat 1983, Delhi.

INTERNAL ELECTIVE - II

PAPER - 4

HISTORY OF RUSSIA FROM EARLY TIMES to 1917 C.E.

Objectives

- To teach the establishment of the rise of Kiev in Moscow.
- To impart the knowledge of Russia in the 17th century.
- To educate the growth of Russia in early times.
- To discuss the causes, course and impact of the First World War.
- To instruct the influence of Russia among the world countries.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the establishment of Kievan Rus.
- Illustrate the condition of Russia during 17th century.
- Summarize the Russia and its influence on Eastern Question.
- Discuss the impact of Liberalism in Russia.
- Appraise the influence of the First World War.

UNIT-I

Early History - Rise of Kiev and Moscow - The Rule of Michael Romanov.

UNIT-II

Russia in the 17th Century - Peter the great and Catherine the great - Russia in the Napoleonic struggle and after.

UNIT-III

Alexander I - Nicholas I - Alexander II - the conquest of Central Asia - Russia and the Eastern Question.

UNIT-IV

Decline of liberalism - Alexander III

UNIT-V

Nicholas II – Russo-Japanese war - Russia and the First World War.

Reference Books:

1. Basil Dmytryshyn : History of Russia, Prentice Hall of India {P} Ltd New Delhi - 1981.
2. Geoffrey Hosking : A History of Soviet Union Fontana Press -1985 /
3. Leonid I Brezhnev : Socialism, peace the freedom and-independence of the peoples. Allied' publishers {P} Ltd Madras-1982.
4. Modak A.G. : Economic Development of the U.S.S.R. Himalaya Publishing House Bombay-1982.
5. Gokhale. B.K. : History of the Modern World. 1900-1960 Himalayan Publishing House Bombay - 1982.
6. Vladimir Poletayev, Valentine & Mironov Leonora Rutes : A Short History of the USSR, Sterling Publishes {P} Ltd., 1976.

INTERNAL ELECTIVE - III

PAPER - 1

(To choose 1 out of 4)

HISTORY OF SCIENCE AND TECHNOLOGY SINCE 1900 C.E.

Objectives

- To teach the promotion of Science and Technology in India.
- To impart the Execution of Indian Government Policies for the development of science.
- To explain the types of Irrigation methods.
- To discuss the importance of space research.
- To instruct the influence of Ecological Hazards.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the role of Government in the development of science.
- Illustrate the scientific development of Agriculture.
- Summarize the contributions of Transport and Communication sectors.
- Discuss the growth and impact of Cottage Industry.
- Appraise the influence of Super Powers in scientific development.

UNIT-I

Introduction -Contribution of Europeans -Asiatic Society of Bengal - Indian Science - Scientific Education-Scientific survey and research Organization for the promotion of Science-Indian Government Policies for promotion of Science - Indian Scientists.

UNIT-II

Agriculture - Agricultural Education and Research - Veterinary Science - Food crops - Commercial crops - Cash crops - Sugarcane - Cotton - Tea - Coffee - Rubber - Oil seeds - Plantation crops - Irrigation - Types of Irrigation - Irrigational schemes.

UNIT-III

Transport and Communication - Roads and Bridges - Harbours - Light houses - water ways - Railways - Telegraph and Telephones - Automative and Aeronautical Industry - Space Research and Satellites – INSAT systems – Medicalscience - Pharmacy and Health science.

UNIT-IV

Industry - Cottage Industries - Handloom Industry - Textile Industries - Iron and steel Industry - Energy - Types of Energy and Generation - Atomic and nuclear research - Software and Information Technology.

UNIT-V

Impact - Political implications - Social and cultural conservancy - Brain drain - Reasons for backwardness in comparison to Super Powers - WTO - Ecological hazards - G7 and G20.

Reference Books:

1. S.P. Gupta, Modern India and Progress in Science and Technology.
2. Dr. R. Venkatraman. History of Science and Technology.
3. S. Varghese Jayarajm, History of Science and Technology.
4. Dr. Kuppuram and Kumudamani : History of Science and Technology 12 volumes.
5. O.P Jeggi : History of Science and Technology.
6. P.S. Joshi and K. Vajreshwar : Science Scientific Method Technology and developments.
7. S.V. Sen, R.C. Majumdar, B.V. Subrayappa : A concise History of Science in India.

INTERNAL ELECTIVE - III

PAPER - 2

DRAVIDIAN MOVEMENT IN TAMILNADU since 1947 C.E.

Objectives

- To teach the students about the development of Regional Parties.
- To gain knowledge about the Anti Hindi Agitation.
- To educate the students on various welfare measures in Tamilnadu
- To impart wide knowledge on the growth of Tamilnadu under different parties.
- To instruct the influence Central and State Governments

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the establishment of Regional Parties.
- Illustrate the Victory of Annadurai as Chief Minister.
- Summarize the birth of different Political parties.
- Discuss the causes for the Sri Lankan Issue.
- Appraise the development of IT in Tamil Nadu.

UNIT- I

Meeting of Rajaji and Periyar in 1949 - Split in Dravida Kazhagam and the emergence of DMK - Young dynamic followers of C.N. Annadurai - New style in press - stage film worlds - struggle of DMK - 1952 Elections - 1954 Bye election and support to Kamaraj - Kallakudi - Thiruttani–Devikulam–Peermedu struggle - 1957 entry and election of 15 MLAs.

UNIT-II

1962 Elections - 50 MLAs- Indo-Chinese war - Indian Defence Rules - Abandoning of Separate Dravida Nadu demands - Anti Hindi and Anti price rise agitations - large scale unrest - 1964 – 65 – Election of 1967 - New Alliance formula of seat adjustment – Victory of DMK and Annadurai as CM.

UNIT-III

The Administration and death of C.N. Annadurai - succession crisis and M. Karunanidhi becomes CM - various welfare measures - development activities - Congress split and DMK's support to Congress (I) - Demand for State Autonomy - 1971 Elections - continuance of Alliance - M.G.Ramachandran and split in DMK – Emergence of ADMK - Emergency and aftermath in TamilNadu.

UNIT-IV

Alliance Politics in TamilNadu - M.G.Ramachandran first ADMK Govt. in 1977 – 80, 1980 - 84 and 1984 - 88. Welfare measures and development activities of ADMK - Sri Lankan issue and political changes in TamilNadu - Demise of M.G.Ramachandran in 1987 and split in ADMK - The DMK administration 1989 - 91.

UNIT-V

Rajiv Gandhi's Assassination and Political changes in 1991 - Ms. J. Jayalalitha as CM - welfare activities - charges and criticism, 1996 - Return of M. Karunanidhi as CM for the fourth time - Changed affiliations and alliance – Developments in TamilNadu – Growth of software - IT development in TamilNadu.

Reference Books:

1. Hard Grave, R: The Dravidian movement, Popular Prakasam, Bombay, 1965.
2. Subramanian, N. : Social and Cultural History of Tamil Nadu, CE. 1336 - CE. 1994, Ennes Publications, Udumalpet, 1999.
3. Thandavan, R. : All India Anna Dravida Munnetra Kazhagam, Tamil Nadu Academy of Political Science, Madras University, 1987.
3. Spratt, P. : DMK in power, Nichiketa publication Ltd, Bombay, 1970.

INTERNAL ELECTIVE - III

PAPER - 3

AN INTRODUCTION TO MUSEOLOGY

Objectives

To teach the students to obtain complete knowledge of different types Museums and its functions.

To impart the knowledge of scientific preservations of Antiquities.

To explore the history of museums and their role in society.

To impart the knowledge of curating and preservation.

To highlight the importance of Museum and its influence in History.

Learning Outcomes

By the successful completion of the course the students will be able to

Explain the history and growth of Museums

Illustrate the kinds of museums in different levels

Summarize the scientific development and Preservation techniques.

Discuss the role of museums in society and administration.

Appraise the knowledge of museum related organisations.

UNIT-I

Museology - Definition - Objectives - History and growth of Museums–
Museum Architecture.

UNIT-II

Kinds of Museum - National - Regional - State - District - Site - Private
Museums.

UNIT-III

Functions of Museum - Storage - Conservation - Preservation Techniques -
Education – Research- Museum visit.

UNIT-IV

Museum - Administration - Security - Museum Library - Legislative measures
-Model of Museum objects.

UNIT-V

Museum related organizations - International - Indian Museums in the promotion of Tourism - Study of Select Museums in India - National Museum New Delhi, Government Museum, Chennai - Salar Jung Museum, Hyderabad –District MuseumVellore.

Reference Books:

1. Dr. V. Jayaraj - Museology - Heritage Management - Seawaves Printers, Chennai - 86, 2005
2. M.L. Nigam - Fundamentals of Museology, Deva Publicaitons, Hyderabad, 1985
3. Grace Morley - The Museum and its functions, Ed. Saifur Rahman dar, Lahore Museum, Lahore, 1981
4. Dr. V. Jayaraj - Handbook on Conservation in Museums Published by the Commissioner of Museums, Chennai, 1995
5. J. Smifa, J. Baxi and Vinod P. Dwivedi - Museum Storage, Modern Museum, V.P. Abbhinav Publications, New Delhi, 1985
6. Banerjee. N.R. - Museum and cultural Heritage in India Agam Kala prakashan, New Delhi, 1990
7. Agarwala. V.S. - Museum studies, PrithiviPrakashan, Varanashi, 1978
8. Grace Morley - Museum today, Lucknow, 1981
9. Agarwal. O.P. - Care and Preservations of Museum Objects, 1980
10. H. Sarkar - Museum and Museology, Sundeep Prakashan, New Delhi, 1981

INTERNAL ELECTIVE - III

PAPER - 4

ARCHAEOLOGY - II

Objectives

- To have a wider knowledge on the role of archaeologists in bringing out the cultural significance.
- To impart the knowledge scientific development in Archaeological excavations.
- To educate and shed more light on various excavations sites.
- To discuss the documentation of the physical remains of the human past.
- To instruct the key goal of placing past humanity in a historical, geographical, and chronological context.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the development of Tamil Script.
- Illustrate the significance of Numismatics during different rulers of south India.
- Summarize the development of Art and Architecture in south India.
- Discuss the conservation and preservation of Monuments.
- Appraise the influence of Iconography.

UNIT - I

Epigraphy - Its importance- TamizhiScript –Palaeography, Languages and Types of Script with Special Reference to South India.

UNIT - II

Numismatics –Sangam – Satavahana - Pallava-Imperial Cholas - Pandyas Vijayanagara Period.

UNIT - III

Art and Architecture under the Pallavas, Cholas, Pandyas, Vijayanagara and Nayaks

UNIT - IV

Monuments- It's Importance - South Indian Monuments – Forts, Palaces and Temples - Conservation and Preservation - Visit to Archaeological Monuments and Sites

UNIT - V

Iconography - Paintings - Caves and Fresco Paintings

Reference Books :

1. Ekambaranathan, A : Principles and Methods of Archaeological Excavation and Ponnuswamy Aranga (in Tamil) (Third Ed.) Kulamangalam Publishers, Chennai 2002.
2. Gurumurthy, S: Ceramic Traditions in South India, University of Madras, 1981.
3. Mahalingam T.V.: Early South Indian Palaeography, Madras University, Chennai, 1967.
4. Narasimhaiah B: Neolithic and Megalithic Cultures in Tamil Nadu, Sundeep Prakashan, New Delhi, 1980.
5. Ramachandran K.S.: A Bibliography of Indian Megaliths, The State Department of Archaeology, Tamil Nadu, 1971.
6. Raman K.V. Principles and Methods of Archaeology, Parthajan Publication, Chennai, 1988.
7. Rao S.R.: Lothal and the Indus Civilizations, Asia Publishing House, Bombay, 1973
8. Venkataraman R.: Indian Archaeology - A Survey, Ennes publications, Udumalpet, 1999.

SKILL BASED SUBJECT

PAPER - 4

GROWTH OF PANCHAYAT RAJ INSTITUTIONS IN TAMILNADU

Objectives

- To teach the evolution of the Local Bodies.
- To impart the transformation of British experiment in local bodies
- To educate the three-tier structure of the Indian administration for rural development.
- To discuss the ways to strengthen the Panchayat Raj institutions
- To instruct the functions and importance of Panchayat Raj.

Learning Outcomes

By the successful completion of the course the students will be able to

- Explain the development of Local Administration through the ages.
- Illustrate the importance of Elections.
- Summarize the Village Administration under different rulers.
- Discuss about the government of India under British crown
- Appraise the impact of Panchayati Raj Act.

UNIT-I

Introduction, Definition of a Local administration - Village Administration in Sangam Age - Mandram - Ambalam and other institutions in Chera, Chola and Pandya times - Administration.

UNIT-II

Village administration under the Pallavas – Imperial Cholas - Uthiramerur inscription - Kudavolai system - Election system in the Village assemblies during Chola and Pandya periods.

UNIT-III

Village administration under the Vijayanagaras - Nayaks – Madurai Sultans – Marathas - Nawabs of Arcot and Palayakars.

UNIT-IV

Village administration under the British - East India Company - Ryotwari system - Govt. of India under the British Crown - Lord Ripon's Resolution of 1882. Formation of Taluk Boards – Panchayat Raj - Amendments till 1947.

UNIT-V

Village Administration after Independence - Panchayat blocks - Three tier system of Panchayat Raj -Village, Block and District - National Extension Service - Community Development Programme - Rajiv Gandhi - Panchayati Raj Act – 73rd Constitutional Amendment

Reference Books:

- | | | | |
|---|---|---|---|
| 1 | Pillay K.K | - | History of Local Self Government in Tamil Nadu |
| 2 | Saraswathi S. | - | Development of Rural Administration in Tamil Nadu |
| 3 | Venkata Rao R. | - | History of local self Government in the Madras Presidency |
| 4 | Palanidurai S. | - | Power to the powerless, A study on panchayat Raj Act. |
| 5 | Palanidurai S. | - | The New Panchayat Raj Act |
| 6 | State Institute for Panchayat administration, Govt. of Tamil Nadu | - | A Review
A Manual for panchayat Administration in Tamil Nadu |

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M. A. Tamil 2022-23 onwards - Affiliated Colleges

The following details should be given each programme (PG degree)

Programme Objectives:

1. இலக்கிய வகைமைகளைத் தெரிந்து கொள்ளுதல்
2. இலக்கணக் கோட்பாடுகளை அறிந்து கொள்ளுதல்
3. பண்பாட்டு வரலாற்றினைப் புரிந்து கொள்ளுதல்
4. மொழியியல் அடிப்படைகள், ஆராய்ச்சி நெறிமுறைகள் தெரிந்து கொள்ளுதல்
5. இதழியல் பற்றிய நடைமுறைகளைப் புரிதல்

Programme Educational Objectives:

1. சங்க இலக்கியம், சங்க இலக்கியம் அறஇலக்கியம், பக்திஇலக்கியம், இக்கால இலக்கியம், போன்றவற்றில் அடிப்படை அறிவைப் பெறுதல்,
2. எழுத்திலக்கணம் சொல்லிலக்கணம் பொருள் இலக்கணம் போன்றவற்றை அறிந்துகொள்ளுதல்
3. தமிழ்ப்பண்பாடு தமிழக வரலாறு முதலானவற்றைத் தெரிதல்
4. மொழியியல் கோட்பாடுகளைப் புரிந்துகொள்ளுதல்
5. ஆய்வுக்கட்டுரைகள் எழுதும் முறைகளை அறிதல்

Programme Specific Outcomes:

1. அகஇலக்கியம், புறஇலக்கியம் போன்றவற்றை இனங்கண்டறிதல்
2. எழுத்திலக்கணக் கூறுகளைப் புரிந்து கொள்ளுதல்
3. சொல்லிணக்கக் கோட்பாடுகளை அறிதல்
4. பொருள் இலக்கணக் கோட்பாடுகளைத் தெளிதல்
5. மொழியியல் பற்றிய அடிப்படைகளைத் தெரிந்துகொள்ளுதல்
6. ஆராய்ச்சி நெறிமுறைகளைக் கற்றுக்கொள்ளுதல்
7. நவீனத் தமிழ் வளர்ச்சிப் போக்குகளைப் புரிந்துகொள்ளுதல்
8. காப்பிய இலக்கணம் காப்பிய வகைகளைத் தெரிந்துகொள்ளுதல்
9. இருபதாம் நூற்றாண்டின் தமிழ் இலக்கிய வளர்ச்சியைத் தெரிந்து கொள்ளுதல்
10. ஆய்வேடுகள் எழுதும் திறன்பெறுதல்

Programme Outcomes

1. இலக்கிய வகைமைகளைத் தெரிந்து கொள்ளுதல்
2. சங்க இலக்கியத்தில் புலமை கொள்ளுதல்
3. பக்தி இலக்கிய சிறப்புகளைத் தெரிந்து கொள்ளுதல்

4. சங்ககாலச் சமுதாயச் சிறப்புகளைவெளிக்கொணர்தல்
5. சமூகத்திற்கு ஏற்ற இலக்கியப் படைப்புகளையும் படைத்தல்
6. தமிழ் ஊடகவியல் வளர்ச்சிக்குத் துணை நிறுதல்
7. இலக்கணப் புலமை பெறுதல்
8. சிறந்த ஆய்வுச் சிந்தனைகளை வெளிக்கொணர்தல்.

M.A. TAMIL EMPLOYMENT AREAS

முதுகலைத் தமிழ் இலக்கியம் படிக்கும் மாணவர்களுக்கு வேலைவாய்ப்புக்கான களங்கள் நிறைந்துள்ளன. மொழி,கலை, பண்பாடு, வரலாறு,கல்வெட்டு,தொல்லியல் போன்ற பாடங்களைப் பயில்வதாலும் பயிற்சி பெறுவதாலும் மாணவர்கள் வேலைவாய்ப்பிற்கான திறன்பெறுகின்றனர். இவ்வாய்ப்புகள் அரசு மற்றும் தனியார்துறைகளில் மிகுந்துள்ளன. பின்வரும் துறைகளில் தமிழ் இலக்கிய மாணவர்களுக்கான வாய்ப்புகள் அதிகமுள்ளன.

1. பள்ளி,கல்லூரி, பல்கலைக்கழகங்களில்,கற்பித்தல் பணி
2. ஆராய்ச்சி நிறுவனங்களில் ஆய்வுப்பணி
3. மெய்ப்புத்திருத்தப்பணி
4. மொழிபெயர்ப்பு பணி
5. தகவல்தொர்பு நிறுவனப்பணி
6. விளம்பர நிறுவனங்களில் பணி
7. அச்சு மற்று காட்சி ஊடகங்களில் பணி
8. அரசு மற்றும் தனியார் துறைகளில் பணி

M.A TAMIL JOB TYPES

- Tamil Tele Caller
- Accounts Manager
- Translator - (from Tamil to other Languages)
- Commodity Dealer
- Tamil Teacher & Home Tutor
- Customer Support Manager
- Online Tutor
- Clerk

THIRUVALLUVAR UNIVERSITY MASTER OF ARTS UNDER CBCS

(With effect from 2022-2023)

The Course of study and the Scheme of Examination

Sl.no	Study Components	Ins .hrs/ Week	Credit	Title of the paper	Maximum marks		
	Course Title				CIA	Uni Exam	Total
Semester I							
CORE	PAPER-1	6	5	இக்காலஇலக்கியம்	25	75	100
Core	Paper-2	6	5	அறஇலக்கியம்	25	75	100
Core	Paper-3	6	5	தொல்காப்பியம்-எழுத்ததிகாரம்	25	75	100
Core	Paper-4	6	5	தமிழ்பண்பாட்டுவரலாறு	25	75	100
Core elective	Paper-1	5	3	1.மொழியியல் அறிமுகம் 2.தொல்லியல்	25	75	100
Open elective	Paper-1	5	3	1.இசுமியல் கவிம் 2.பேச்சுக்கலை	25	75	100
Semester II					CIA	Uni Exam	Total
CORE	PAPER-5	6	5	காப்பியங்கள்	25	75	100
Core	Paper-6	6	5	பக்திஇலக்கியம்	25	75	100
Core	Paper-7	6	5	தொல்காப்பியம் - சொல்லதிகாரம்	25	75	100
Core Elective	Paper-2	6		1.சைவசிக்காங்கம் 2.பெண்ணியப்படைப்புகள்	25	75	100
Compulsory paper		4		Human Rights	25	75	100
Open Elective	Paper-2	6	3	1.ஊடகத்தமிழ் 2.நாடகத்தமிழ்	25	75	100
Field study			2		100	-	100
Semester III					CIA	Uni Exam	Total
Core	Paper-8	6	5	சங்கஇலக்கியம் (அகம்)	25	75	100
Core	Paper-9	6	5	அராய்ச்சி நெறிமுறைகள்	25	75	100
Core	Paper-10	6	5	தொல்காப்பியம் - பொருளதிகாரம்	25	75	100
Core Elective	Paper-3	6	3	1.சிறீநிலக்கியம் 2. தமிழ் இலக்கண வரலாறு	25	75	100
Open elective	Paper-3	6	3	1.பயன்பாட்டுநாட்டுப்பாடுகளில் 2. அறிவியல் தமிழ்	25	75	100
Mooc course			2				100
Semester IV					CIA	Uni Exam	Total
Core	Paper-11	6	5	சங்க இலக்கியம் புறம்	25	75	100
Core	Paper-12	6	5	தொல்காப்பியம் - பொருளதிகாரம்	25	75	100
Core	Project compulsory		7	Project with viva voce			100
Core Elective	Paper-4	5	3	1.இந்தியத்தத்துவங்கள் 2.கணிதமும் தமிழும்	25	75	100
Open Elective	Paper-4	5	3	1.திருவள்ளுவம் 2. இளங்கோவடிகள்	25	75	
		120	92				

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA11 Name of the Paper: இக்கால இலக்கியம் Credit: 4

Total Hours per Week: 6 Lecture Hours:6 Tutorial Hours: 0 Practical Hours:0

Course Objectives

- 1.கவிதையின் வளர்ச்சிப்போக்குகளை அறிந்த கொள்ளுதல்
- 2.புதிய இலக்கியத்தின் தோற்றுவாய் -வகைகளைத் அறிதல்
- 3.சிறுகதை இலக்கியத்தின் போக்குகளை உணர்ந்து கொள்ளுதல்
- 4.நாடகத்தின் இயல்புகளைப் புரிந்து கொள்ளுதல்
- 5.உரைநடையின் வீச்சினைத் தெளிந்து கொள்ளுதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to புதுக்கவிதையின் இலக்கணம் - புதுக்கவிதைப்படைப்பாளர்கள் - புதுக்கவிதை உத்திகள் - பாடுபாடுள் புதுக்கவிதையின் இன்றைய நிலை அறிதல்.....
2. After studied unit-2, the student will be able to புதின இலக்கியத்தின் தோற்றம் வளர்ச்சி - வகைகள் - படைப்பாளர்கள் - புதின உலகில் எஸ் இராமகிருஷ்ணன் பணிகள் - தெரிந்துகொள்ளுதல்.....
3. After studied unit-3, the student will be able to சிறுகதை இலக்கணம் - வகைகள் - சிறுகதையாசிரியர்கள் -சிறுகதை உத்திகள் - கவிப்பித்தன் கதைகள் -அறிந்துகொள்ளுதல்
4. After studied unit-4, the student will be able to நாடகம் -அறிமுகம் - காலஅஅளவு - நாடகஆசிரியர்கள் - காட்சிஅமைப்பு - மு.இராமசாமியின் நாடகங்கள் - படைப்பாளுமை மதலியன அறிந்துகொள்ளுதல்.....
5. After studied unit-5, the student will be able to உரைநடையின் சிறப்பு - வகைகள் - உரைநடையின் இயல்பு - முதலானவற்றை

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...16**

பாரதியார் -பாரதிதாசன் -அறிவுமதி பச்சியப்பன் போன்ற கவிஞர்களின் வரலாறு அறிதல் -படைப்புகள் -சிறப்புகள் -கண்ணம்மா என் குழந்தை கவிதை வெளிப்படுத்தும் கருத்துக்கள் நெஞ்சு பொறுக்கும் நிலை எனும் கவிதை வெளிப்படுத்தும் சமூகநிலை - நட்புக்காலம் எனும் கவிதை வெளிப்படுத்தும் சமூகபொருளாதார நிலை -மழைபுத்த முந்தானை எனும் கவிதை வெளிப்படுத்தும் நயம் பாடுபொருள் ஆகியவை அறிதல்

Unit-2: (50 to 100 contents)**Teaching Hours: ...16**

புதினத்தின் கட்டமைப்பை அறிதல் சஞ்சாரம் நாவலின் நடை உத்தி ஆசிரியர் எஸ் . இராமகிருஷ்ணன், அவர்களின் பிற படைப்பிலிருந்து மாறுபட்ட பார்வை புதினத்தின் கதைக்கரு - கதை மாந்தர்கள் -புலப்பாட்ட உத்திகள்

Unit-3: (50 to 100 contents)**Teaching Hours: ...15**

ஊர்ப்பிடாரி - சிறுகதையின் அமைப்பு - புலப்பாட்டு உத்திகள் - கதைமாந்தர்கள்- சமூகநிலை ஆகியவற்றை புலப்படுத்துதல் .

Unit-4: (50 to 100 contents)**Teaching Hours: ...15**

மு.இராமசாமி -படைப்புகள் வலியுறுப்பு நாடக உத்திகள் கதைமாந்தர்கள் - பின்னணி போன்றவை அறிதல்

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

உரைநடை இலக்கியம் - இன்றியமையாமை -டாக்டர் சி.பா. - நூல்கள் சங்க இலக்கிய சிறப்புகள் -போன்றவற்றை வெளிப்படுத்துதல்

Internal Assessment Methods: (refer the instructions)**Text book:****1 – 10****Reference Book:**

- 1.இரா வல்லிக்கண்ணன் புதுக்கவிதை தோற்றமும் வளர்ச்சியும், எழுத்துப்
- 2.பாலா புதுக்கவிதை ஒருபார்வை
3. மன்னர்மன்னன் கறுப்புக்குயிலின் நெருப்புக்குரல் 4.
- நிர்மலா சுரேஷ் தமிழில் ஹைக்குகவிதைகள்
5. நா வானமாமலை புதுக்கவிதை-முற்போக்கும் பிற்போக்கும்
6. ந.சுப்புரெட்டியார் புதுக்கவிதை போக்கும் நோக்கும்

1 – 10**Course Material: website links, e-Books and e-journals**

.www.projectmadurai.org

https://www.tamilvu.org

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	M	S	M	S	S	SS	S	S	S
CO3	M	S	S	S	M	SS	S	S	S	S
CO4	S	M	S	M	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA12 Name of the Paper: அறலக்கியம் Credit: 5

Total Hours per Week:6 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours: 0

Course Objectives

- 1.திருக்குறள் -சிறப்புகள் அறிதல் - கட்டமைப்பு தெளிதல் - வள்ளுவத்தின் வாழ்வியல் அறிதல் அறக்கருத்துக்களை அறிந்து கொள்ளுதல்
- 2.நாலடி ஆசாரக்கோவையில் அறம் சார்ந்த கருத்தினை அறிதல். நாலடி காட்டும் சமூகச்சூழல் தெளிதல் அறம் இடம் பெற்ற பாங்கு அறிதல்
- 3.அறநெறி நல்வழி அக்கால சமூக நிலை கானல்
- 4.நாலடி சிவப்பிரகாசர் குமரகுருபரர் காட்டிய வாழ்வியல் அறிதல்
- 5.நரிவிருத்தம் முதுரையில் காணலாகும் அறக்கருத்துக்களை அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to நால கண்களைக் கசிந்துருகச் செய்து கொடுப்பதைக்காட்டிலும் இனிமையான சொற்களை பேசுதல் சிறந்தது இன்சொல் பேசுபர்க்கு துன்பமும் துயரமும் வாழ்க்கையில் ஏற்படாது என்பதை அறிதல் புறங்கூறான் என்றல் இனிது அறத்தைப்பற்றி வாயாலும் சொல்லாதவனாய் ஒருவன் தீய செயல்களை செய்து வந்தாலும் அவன் பிறனைப் பழித்துப் புறங்கூறாதவன் ஆவன் என்பதை அறிதல்.....
2. After studied unit-2, the student will be able to நாலடியார் , அறம் வலியுறுத்தும் பாங்கு அறிதல் அறத்தாரே வாழ்வார்மனதால் நேர்மையுடன் இருப்பதுஅறம் அறத்தை மறுப்பவர் வீழ்ச்சி உறுதி என்பன தெளிதல்
3. After studied unit-3, the student will be able to அறத்தின் வழியைப் பழிந்து சாரமாகத் தரும் முறை அறிதல் முனைப்பாடியார் வரலாறு செருக்கு எட்டும் பயன்படாது என்பது அறிதல்.....
4. After studied unit-4, the student will be able to பசியின் தன்மை அறிதல் உணவின் மேன்மை புரிந்து கொள்ளல் - உணவு அதிகம் கிடைப்பதால் பல நாட்களுக்குத் தேவையானதை ஒரு நாளில் ஏற்க இயலாது என்பதைத்தெளிதல் நிலையாமையைஉணர்த்துதல் ஆற்றங்கரை மரமும் அரசபோகமும் நிலையில்லாததது என்பதை அறிதல்.....
5. After studied unit-5, the student will be able to நன்னெறி காட்டும் ஒழுக்க நெறிகள் அறிதல் - துறைமங்கலம் சிவப்பிரகாசர் வாழ்வியலை அறிதல் பிறப்பினால் உயர்வு தாழ்வு வேண்டற்க போன்றவை தெளிதல்.....

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...16

கண்களைக் கசிந்துருகச் செய்து கொடுப்பதைக்காட்டிலும் இனிமையான சொற்களை பேசுதல் சிறந்தது இன்சொல் பேசுபார்க்கு துன்பமும் துயரமும் வாழ்க்கையில் ஏற்படாது என்பதை அறிதல் புறங்கூறான் என்றல் இனிது அறத்தைப்பற்றி வாயாலும் சொல்லாதவனாய் ஒருவன் தீய செயல்களை செய்து வந்தாலும் அவன் பிறனைப் பழித்துப் புறங்கூறாதவன் ஆவன் என்பதை அறிதல்

Unit-2: (50 to 100 contents)

Teaching Hours: ...15

நாலடியார் , அறம் வலியுறுத்தும் பாங்கு அறிதல் அறத்தாரே வாழ்வார்மனதால் நேர்மையுடன் இருப்பதுஅறம் அறத்தை மறுப்பவர் வீழ்ச்சி உறுதி என்பன தெளிதல்

Unit-3: (50 to 100 contents)

Teaching Hours: ...15

அறத்தின் வழியைப் பழிந்து சாரமாகத் தரும் முறை அறிதல் முனைப்பாடியார் வரலாறு செருக்கு எட்டும் பயன்படாது என்பது அறிதல்

Unit-4: (50 to 100 contents)

Teaching Hours: ...16

பசியின் தன்மை அறிதல் உணவின் மேன்மை புரிந்து கொள்ளல் - உணவு அதிகம் கிடைப்பதால் பல நாட்களுக்குத் தேவையானதை ஒரு நாளில் ஏற்க இயலாது என்பதைத்தெளிதல் நிலையாமையைஉணர்த்துதல் ஆற்றங்கரை மரமும் அரசபோகமும் நிலையில்லாததது என்பதை அறிதல்

Unit-5: (50 to 100 contents)

Teaching Hours: ...16

நன்னெறி காட்டும் ஒழுக்க நெறிகள் அறிதல் - துறைமங்கலம் சிவப்பிரகாசர் வாழ்வியலை அறிதல் பிறப்பினால் உயர்வு தாழ்வு வேண்டற்க போன்றவை தெளிதல்.....

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

- | | | |
|-------------------------------|--------------------------|--------------------------|
| 1. திருக்குறள் | கழக வெளியீடு 154 | டி.டி.கே சாசை சென்னை -18 |
| 2. நாலடியார் | கழக வெளியீடு 154 | டி.டி.கே சாசை சென்னை -18 |
| 3. இனியவை நாற்பது | கழக வெளியீடு 154 | டி.டி.கே சாசை சென்னை -18 |
| 4. இன்ன நாற்பத | : | |
| 5. ஆசாரக்கோவை | : | |
| 6. பழமொழிநானூறு அறநெறிச்சாரம் | : | |
| 7. நல்வழி | : | |
| 8. நன்னெறி | : | |
| 9. நீதிநெறிவிளக்கம் | : | |
| 10. நரிவிருத்தம் | : | |
| 11. முதுரை கழக வெளியீடு 154 | டி.டி.கே சாசை சென்னை -18 | |

Course Material: website links, e-Books and e-journals

Tamil virtual University : <https://www.tamilvu.org>

International Research Journal of Tamil**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA13 Name of the Paper: தொல் - எழுத்து Credit:5

Total Hours per Week: 6 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours: 0

Course Objectives

- 1.எழுத்துக்களின் பிறப்பு - இடம் - உறுப்புக்கள் -அறிதல்
- 2.அறிதல் எழுத்துக்களின் சேர்க்கை -புணர்ச்சி – தெளிதல்
- 3.தோன்றல் -திரிதல் - பொருளை வேற்றுமைப்படுத்துதல் -
4. சொற்கள் நிலையாக நின்று புணரும் பாங்கு – அறிதல்
5. மொழியில் உள்ள குறுகிய உகரம் புணரும் பாங்கு அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to உயிர் மெய் -எழுத்து பிறப்பு அறிதல்
2. After studied unit-2, the student will be able to மொழிக்கு இறுதில் வரும் எழுத்துக்கள் மொழிக்கு முதலில் வரும் எழுத்துக்கள் 22 முதல் எழுத்தும் இறுதியில் வரும் 24 எழுத்துக்களோடு புணரும் பாங்கு -அறிதல்.....
3. After studied unit-3, the student will be able to அறிதல் நிலைமொழி ஈற்று – உயிர் எழுத்து மயங்குதல் ..
4. After studied unit-4, the student will be able to நிலைமொழி இறுதியில் புள்ளி மயங்கும் நிலை அறிதல்
5. After studied unit-5, the student will be able to அறிதல் நெடில் உயிர் – ஆய்தம் -வன் மென் இடை தொடர் உகரங்கள் தெளிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1						
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...16**

அறிதல் நூல் என்பது எழுத்தைக்குறித்தல் - எழுத்து -மதல்எழுத்து- எழுத்தின் இனம் -மாத்திரை -சுட்டெழுத்து - வினாஎழுத்து எழுத்து மயக்கம் -எழுத்துக்களின் உருவம் - எழுத்துக்களின் ஒலியளவு - மெய்யெழுத்துக்களின் உடனிலை மயக்கம்

Unit-2: (50 to 100 contents)**Teaching Hours: ...15**

புணர்ச்சியின் பாகுபாடுகள் - உயிர் முன் உயிர் - உயிர் முன் மெய் - மெய் முன் உயிர் , மெய் முன் - மெய், பெயரோடு பெயர், பெயரோடு தொழில், தொழிலோடு பெயர், தொழிலோடு தொழில், புணர்ச்சியில் நிகழ்வன, இயல்பு, திரிபு , மெய்யிரிந்தாதல், இயல்பு , திரிதல், புணர்ச்சியில் தோன்றும் சாரியை - எழுத்துச்சாரியை - உடம்படுமெய் - அறிதல்

Unit-3: (50 to 100 contents)**Teaching Hours: ...16**

அறிதல் பெயர்ச்சொல்லோடு வேற்றுமை உருபு போது இடையில் வரும் சாரியை - உயிர் எத்துக்கள் இன் சாரியை பெற்று வருதல். யுயா என்னும் வினாச்சொல் வற்று சாரியை பெறுதல் மெய்யில் முடியும் சொற்கள் - குற்றியலுகரம் -புறனடை -அறிதல்

Unit-4: (50 to 100 contents)**Teaching Hours: ...15**

ஆற பண்டைய தமிழ்ச்சொற்கள் வல்லின மெய்யில் முடிவதில்லை - நு நீங்கலாக மெல்லின இடையின எழுத்துக்களில் முடியும் சொற்கள் வருமொழிக்கு முதலில் வரும் எழுத்துக்கள் , ஞ ஒற்றில் முடியும் சொல் உரிஞ் - உ -எழுத்து இடையில் சேர்ந்து புணரும் ந-ண -ஒற்று புணர்ச்சி - இடையொற்று - ய,ர ல வ ழ ஒற்று புணரும் பாங்கு அறிதல்

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

அறிதல் ஆறுவகையான குற்றியலுகரப்புணரியல் - ஈரெழுத்தொருமொழி, உயிர்த்தொடர், இடைத்தொடர், ஆய்த்தொடர்மொழி, வன்தொடர்மொழி, மென்தொடர் குற்றியலுகரப்புணரியல், குற்றியலுகர மொழி யா வரும்போது குற்றியலிகரமாக மாறும் பாங்கு அறிதல்

Internal Assessment Methods: (refer the instructions)**Text book:****1 – 10****Reference Book:****1 – 10**

மு. சண்முகம் பிள்ளை (ப.ஆ) தொல்காப்பியம் எழுத்ததிகாரம்

2. ஆ.சிவலிங்கனார் தொல்காப்பியம் எழுத்ததிகாரம் உரை

3. கு.சுந்தரமூர்த்தி தொல்காப்பியம் எழுத்ததிகாரம்

4. செ.வை.சண்முகம் பிள்ளை எழுத்ததிலக்கணக்கோட்பாடு

5. தி.முருகரத்தினம் தமிழ் எழுத்தியல் அன்றும் இன்றும்

6. ச. பாலசுந்தரனார் தொல்காப்பியம் எழுத்ததிகாரம்

7. டாக்டர் மு ஹம்சா தொல்காப்பியரின் எழுத்திலக்கணக் கோட்பாடு

8. ச.வே சுப்பிரமணியம் தொல்காப்பிய உரைவளக் கோவை

9. டாக்டர் மொ அ துரை அரங்கசாமி தொல்காப்பிய நெறி

10. வ.சுப.மாணிக்கம் தொல்காப்பிக்கடல்

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA14 Name of the Paper: தமிழ்ப் பண்பாட்டு வரலாறு Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: Practical Hours:

Course Objectives

- 1.தமிழர்களின் வாழ்வியலை கால அடிப்படையில்ரலாற்றுக்கு முந்தைய காலம் : பழைய கற்காலம்- புதிய கற்காலம் என அறிதல்
2. களப்பிரர் பல்லவர் சோழர் காலங்களில் தமிழர்களின் பண்பாட்டு நிலையை உணர்ந்துகொள்ளுதல்
3. நீதி இலக்கியம்- சமய மரபு – நீதி, அறம் வடமொழித் தாக்கங்கள் போன்றவற்றைத்தெளிதல்
4. நுண்கலைகள்- இசை – ஓவியம்- சிற்பம் - கட்டடம்- பண்பாட்டுக்கூறுகளை அறிந்துகொள்ளுதல்
5. இருபதாம் நூற்றாண்டில் ஊடகங்கள் வழிப்பண்பாட்டைக் காணுதல்-

Course Out Comes (five outcomes for each units should be mentioned)

- 1.After studied unit-2, the student will be able toவரலாற்றுக்கு முந்தைய காலம் : பழைய கற்காலம்- புதிய கற்காலம்- சிந்துவெளி மனித இனவளர்ச்சி – கலைகள் உருவாக்கம்- பண்பாட்டு வரலாறு— சங்ககாலம். போன்றவற்றை அறிதல்
2. After studied unit-2, the student will be able to
தமிழர்நிலை: இருண்டகாலம் என்ற களப்பிரர் காலம்- பல்லவர் காலம் - சோழர் காலம்பாண்டியர் காலம்- நாயக்கர் காலம்- நவாபுகள் காலம்- ஐரோப்பியர்காலம்.
3. After studied unit-3, the student will be able to
நீதி இலக்கியம்- சமய மரபு – நீதி, அறம் வடமொழித் தாக்கங்கள்- பக்தி இலக்கியம்- பண்பாட்டுப் பரவல்- பண்பாட்டுச் சேர்க்கை போன்றவற்றை தெரிந்துகொள்ளுதல்
4. After studied unit-4, the student will be able to
பக்தி வழி உருவான பண்பாட்டுத் தன்மைகள். நுண்கலைகள்- இசை – ஓவியம்- சிற்பம் - கட்டடம்- பண்பாட்டுக்கூறுகளைத் தெளிதல்
5. After studied unit-5, the student will be able to

இருபதாம் நூற்றாண்டில் ஊடகங்கள் வழிப்பண்பாட்டைக் காணுதல்-வாய்மொழி- அச்சு - பார்த்தலும் கேட்டலும்.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...15

வரலாற்றுக்கு முந்தைய காலம் : பழைய கற்காலம்- புதிய கற்காலம்- சிந்துவெளி மனித இனவளர்ச்சி - கலைகள் உருவாக்கம்-பண்பாட்டு வரலாறு- சங்ககாலம்.

Unit-2: (50 to 100 contents)

Teaching Hours: ...16

தமிழர்நிலை: களப்பிரர் காலம்- பல்லவர் காலம் - சோழர் காலம்-பாண்டியர் காலம்- நாயக்கர் காலம்- நவாபுகள் காலம்- ஐரோப்பியர்காலம்.

Unit-3: (50 to 100 contents)

Teaching Hours: ...15

நீதி இலக்கியம்- சமய மரபு - நீதி, அறம் வடமொழித் தாக்கங்கள்-பக்தி இலக்கியம்பண்பாட்டுப் பரவல்- பண்பாட்டுச் சேர்க்கை-

Unit-4: (50 to 100 contents)

Teaching Hours: ...16

பக்தி வழி உருவான பண்பாட்டுத் தன்மைகள். நுண்கலைகள்- இசை - ஓவியம்- சிற்பம் - கட்டிடம்- பண்பாட்டுக்

Unit-5: (50 to 100 contents)

Teaching Hours: ...16

இருபதாம் நூற்றாண்டில் ஊடகங்கள் வழிப்பண்பாட்டைக் காணுதல்-வாய்மொழி- அச்சு - பார்த்தலும் கேட்டலும்.

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1. க.த. திருநாவுக்கரசு : தமிழர் நாகரிக வரலாறு, ள
2. எஸ். இராமகிருஷ்ணன் : இந்தியப் பண்பாடும் தமிழரும்,
- 3.மயிலை சீனி. வேங்கடசாமி : தமிழர் வளர்த்த அழகுக் கலைகள்,

4. கே.கே. பிள்ளை : தமிழக வரலாறும் பண்பாடும்,
 5.எஸ். வையாபுரிப்பிள்ளை : தமிழர் பண்பாடு,
 6.வே.தி. செல்வம் : தமிழக வரலாறும் பண்பாடும்,
 7.தெ.பொ. மீனாட்சிசுந்தரம் : தமிழும் பிறப்பண்பாடும்,
 8. சி.எம். கணபதி : தமிழக வரலாறும் பண்பாடும்,அருள்
 பதிப்பகம், சென்னை,1990.
 9.செ. வைத்தியலிங்கம் : தமிழ்ப் பாண்பாட்டு வரலாறு,
 10.மா. இராசமாணிக்கனார் : சிந்துவெளி நாகரிகம்,

1 – 10

Course Material: website links, e-Books and e-journals

1.<http://www.tamilvirtualuniversity.org>

2.<http://www.noolulagam.com>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	S	S	S
CO2	S	S	S	M	M	M	M	M	S	S
CO3	S	S	S	M	S	M	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	M	M	M	S	M	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DETA15A Name of the Paper: மொழியியல் Credit: 3

Total Hours per Week: 5 Lecture Hours:5 Tutorial Hours: 0 Practical Hours: 0

Course Objectives

- 1.மொழியிலும் மொழியியல் சார்ந்த விளக்கங்களும் மொழி- வரையறை – விளக்கம்- மொழியியல் பற்றிய சொல் பொருள் விளக்கம், மொழியியல் பிரிவுகள், ஆகியன அறிதல்
- 2.ஒலியியலும், ஒலியனியலும் பேச்சுக்கு மூலமாக இருக்கும் உறுப்புகள் பற்றி அறிதல்
- 3.உருபனியல் பற்றிய விளக்கம் மாற்றுருப அதன் அகவடிவம் புறவடிவம் ஆகியன அறிதல்
4. தொடரியல் பற்றி விளக்கம் மாற்றிலக்கணக் கோட்பாடுகள் பற்றி தெளிதல்
- 5.ம பொருண்மையியல் பற்றி அறிதல் சொற்பொருள் இலக்கணப்பொருள் சுட்டுப்பொள் குறிப்புப்பொருள் போன்றன தெளிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to
மொழியிலும் மொழியியல் சார்ந்த விளக்கங்களும் மொழி- வரையறை – விளக்கம்- மொழியியல் பற்றிய சொல்பொருள் விளக்கம், மொழியியல் பிரிவுகள், மொழி- பேச்சு ஆகியவற்றை அறிதல்
2. After studied unit-2, the student will be able to
ஒலியியலும், ஒலியனியலும்ஒலியியல் விளக்கம்- பிரிவுகள்- பேச்சு உறுப்புகள்- பேச்சொலி வகைப்பாடு- இணையொலிப்பு, ஒலியனியல்- வரையறை – விளக்கம்- ஒலி – ஒலியன் - மாற்றொலி, ஒலியன் கோட்பாடுகள்- மேற்கூற்றொலியன். ஆகியவற்றை தெரிந்துகொள்ளுதல்
3. After studied unit-3, the student will be able to
உருபனியல்உருனியல் - வரையறை- விளக்கம் - உருபன் - உருபு- மாற்றுருபு – நைடாவின் உருபனைக் கண்டறியும் கொள்கைகள்- மாற்றிலக்கணக் கோட்பாடு- அகவடிவம், புறவடிவம் முதலியனவற்றை அறிதல்
4. After studied unit-4, the student will be able to தொடரியல்-வரையறை- சொல்வகைகள்- அண்மையுறுப்பு- விளக்கம்-அண்மையுறுப்புவகைகள்-தொடரமைப்பு-மாற்றிலக்கணக் கோட்பாடு- அகவடிவம், புறவடிவம். ஆகியவற்றை அறிதல்
5. After studied unit-5, the student will be able to
பொருள்வகைகள்- சொற்பொருள்மற்றும்இலக்கணப்பொருள், சொற்பொருள்அலகுகள்- சுட்டுப்பொருள்,குறிப்புப்பொருள்-பொருட் பன்மொழி- பலபொருள்குறித்தஒருசொல்,ஒலியமைப்பில்ஒத்தபொருள் மாறுபடும் சொற்கள். முதலியனவற்றைத் தெரிந்துகொள்ளுதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...8**

மொழியிலும் மொழியியல் சார்ந்த விளக்கங்களும்மொழி- வரையறை - விளக்கம்- மொழியியல் பற்றிய சொல் பொருள் விளக்கம், மொழியியல் பிரிவுகள், மொழி- பேச்சு மற்றும் எழுத்து முறைகள் அறிதல்

Unit-2: (50 to 100 contents)**Teaching Hours: ...13**

ஒலியிலும், ஒலியனிலும்ஒலியியல் விளக்கம்- பிரிவுகள்- பேச்சு உறுப்புகள்- பேச்சொலிவகைப்பாடு- இணையொலிப்பு, ஒலியனியல்- வரையறை - விளக்கம்ஒலி - ஒலியன் - மாற்றொலி, ஒலியன் கோட்பாடுகள்- மேற்கூற்றொலியன்

Unit-3: (50 to 100 contents)**Teaching Hours: ...13**

உருபனியல்உருனியல் - வரையறை- விளக்கம் - உருபன் - உருபு- மாற்றுருபு - நைடாவின் உருபனைக் கண்டறியும் கொள்கைகள்- மாற்றிலக்கணக் கோட்பாடு- அகவடிவம், புறவடிவம்.

Unit-4: (50 to 100 contents)**Teaching Hours: ...13**

தொடரியல்-வரையறை- சொல்வகைகள்-அண்மையுறுப்பு- விளக்கம்-அண்மையுறுப்புவகைகள்- தொடரமைப்பு-மாற்றிலக்கணக் கோட்பாடு- அகவடிவம், புறவடிவம்.

Unit-5: (50 to 100 contents)**Teaching Hours: ...13**

பொருள்வகைகள்- சொற்பொருள்மற்றும்இலக்கணப்பொருள், சொற்பொருள்அலகுகள்- சுட்டுப்பொருள்,குறிப்புப்பொருள்-பொருட் பன்மொழி- பலபொருள்குறித்தஒருசொல்,ஒலியமைப்பில்ஒத்த பொருள் மாறுபடும் சொற்கள்.

Internal Assessment Methods: (refer the instructions)**Text book:****Reference Book**

- முத்துசண்முகம் இக்காலமொழியியல்
- சு. இராசாராம் ஒலியியல்
- ச. அகத்தியலிங்கம் மொழியியல்
- கி. கருணாகரன் மொழியியல்

5. கி. அரங்கன் தொடரியல் மாற்றிலக்கண அணுகுமுறை
- 6.முனைவர் பொற்கோ இக்காலத்தமிழ் இலக்கணம்
7. முனைவர் பொற்கோ பொதுமொழியியல் ஓர் அறிமுகம்
8. பேரா இரா ஜெகதீசன் மொழியின் ஒலி

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	M	S	S
CO2	S	S	S	S	S	M	M	S	S	M
CO3	M	M	M	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	M	S	S	S	M	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DETA15B Name of the Paper: தொல்லியல் Credit: 3

Total Hours per Week: 5 Lecture Hours:3 Tutorial Hours: 0 Practical Hours: 0

Course Objectives

- 1.தொல்லியலின்பொருள்,வரைவிலக்கணம்மற்றும்அதன்முக்கியத்துவம் அறிதல்
- 2.அகழாய்வும் அதன் வகைகளும்- காலவரையறை செய்தல்
- 3.வரலாற்றுக்கு முற்பட்ட காலம் பற்றி அறிதல்
4. கல்வெட்டியலின் பொருளும் முக்கியத்துவமும் தெரிந்துகொள்ளுதல்
4. தொடரியல் பற்றி விளக்கம் மாற்றிலக்கணக் கோட்பாடுகள் பற்றி தெளிதல்
- 5.இந்தியாவில் அயல்நாட்டு நாணயங்கள் - தமிழ் நாட்டியல் அயலக நாணயங்கள். ஆகியவற்றை அறிந்துகொள்ளுதல்

Course Out Comes (five outcomes for each units should be mentioned)

6. After studied unit-1, the student will be able to
தொல்லியலின்செயல்நோக்கம்-தொல்லியலுக்கும்பிறஇயலுக்கும்இடையேயானதொடர்பு-
தொல்லியலாரின்பணிகள்-சுற்றாய்வு-
7. After studied unit-2, the student will be able to
அகழாய்வும் அதன் வகைகளும்- காலவரையறை செய்தல்- தமிழ்நாட்டின் அகழாய்விடங்கள்-
காவிரிப்பூம்பட்டினத்தில் அகழாய்வுகள்-உறையூரின் அகழ்வாராய்ச்சி- கேரளத்தில் அகழ்வாய்வுகள்
- புருஸ்புட் தொண்டு ஆகியவற்றை தெளிதல்
8. After studied unit-3, the student will be able to
உருபனியல்உருனியல் - வரையறை- விளக்கம் - உருபன் - உருபு- மாற்றுருபு - நைடாவின்
உருபனைக் கண்டறியும் கொள்கைகள்- மாற்றிலக்கணக் கோட்பாடு- அகவடிவம், புறவடிவம்
முதலியனவற்றை அறிதல்
9. After studied unit-4, the student will be able to தொடரியல்-வரையறை- சொல்வகைகள்-
அண்மையுறுப்பு- விளக்கம்-அண்மையுறுப்புவகைகள்-தொடரமைப்பு-மாற்றிலக்கணக் கோட்பாடு-
அகவடிவம், புறவடிவம். ஆகியவற்றை அறிதல்
10. After studied unit-5, the student will be able to
பொருள்வகைகள்- சொற்பொருள்மற்றும்இலக்கணப்பொருள், சொற்பொருள்அலகுகள்-
சுட்டுப்பொருள்,குறிப்புப்பொருள்-பொருட் பன்மொழி-

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...13

தொல்லியல் அறிமுகம்தொல்லியலின்பொருள்,வரைவிலக்கணம்மற்றும்அதன்முக்கியத்துவம்-
வரலாற்றுக்குச்சான்றாகத்தொல்லியல்-தொல்லியல்வகைகள்-தொல்லியலின்செயல்நோக்கம்-
தொல்லியலுக்கும்பிறஇயலுக்கும்இடையேயானதொடர்பு- தொல்லியலாரின்பணிகள்-சுற்றாய்வு-
அரும்பொருட்களைப் பாதுகாத்தல்.

Unit-2: (50 to 100 contents)

Teaching Hours: ...13

அகழாய்வும் அதன் வகைகளும்- காலவரையறை செய்தல்- தமிழ்நாட்டின் அகழாய்விடங்கள்-
காவிரிப்பூம்பட்டினத்தில் அகழாய்வுகள்-உறையூரின் அகழ்வாராய்ச்சி- கேரளத்தில் அகழ்வாய்வுகள்
- புருஸ்புட் தொண்டு

Unit-3: (50 to 100 contents)

Teaching Hours: ...13

வரலாற்றுக்கு முற்பட்ட காலம்மண்ணில் காலமும்பெரும்பணிப்படர்வு காலமும்- கற்காலம்-
உலோக காலம்- இந்திய மட்கலப் பண்பாடு-இந்திய தொல்லியல்துறை.

Unit-4: (50 to 100 contents)

Teaching Hours: ...13

கல்வெட்டியல் கல்வெட்டியலின் பொருளும் முக்கியத்துவமும்- கல்வெட்டுகளின் வகைகள்-
தொல்லெழுத்தியல்- தமிழ் எழுத்து (அ) தமிழ் பிராமி எழுத்து - வட்டெழுத்து - கிரந்த
எழுத்து - கல்வெட்டுகளின் காலநிர்ணயம்- பாண்டியரின் உக்கிரன் கோட்டை- பாண்டிய
நாட்டிலுள்ள சில வீரக்கற்கள்

Unit-5: (50 to 100 contents)

Teaching Hours: ...13

பாண்டியர் கால நாணயங்கள்- சேரர் நாணயங்கள் - பல்லவர் நாணயங்கள்- சோழர்கால
நாணயங்கள்- விஜயநகர அரசர் காலநாணயங்கள்- இந்தியாவில் அயல்நாட்டு நாணயங்கள் -
தமிழ் நாட்டியல் அயலக நாணயங்கள்.

Internal Assessment Methods: (refer the instructions)

Text book:

Reference Book

1. பேரா. முனைவர்நா. மாரிசாமி தொல்லியல்
2. .பேராசிரியர் டாக்டர்கோ.வி. இராமன் : தொல்லியல் ஆய்வுகள்,
3. கோ. சுந்தர் (தமிழில்) : பவுல்பான் தொல்லியல் (மிகச்சுருக்கமான அறிமுகம்),
- 4.பேரா. டாக்டர்
கோ. விசய வேணுகோபால் : தொல்லியல் ஆய்வுத் தொகுதி,
5. கா. ராஜன் : தொல்லியல் நோக்கில் சங்க காலம்
6. கா. ராஜன் : கல்வெட்டியல்,
7. இரா. பூங்குன்றன் : செங்கம் நடுகற்கள் - ஓர் ஆய்வு,

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	M	S	S
CO2	S	S	S	S	S	M	M	S	S	M
CO3	M	M	M	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	M	S	S	S	M	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DOTA16A Name of the Paper: இதழியல் தமிழ் Credit: 3

Total Hours per Week: 5 Lecture Hours:5 Tutorial Hours: 0 PracticalHours:0

Course Objectives

- 1.மக்கள் தகவலின் அறிமுகம்- தகவல்தொடர்புவிளக்கம் -அடிப்படைக்கொள்கைகள்- பத்திரிகைத்துறையினர்க்குத்தேவையான தகுதிகள்- பத்திரிகைத் துறையின் தொழில் அம்சங்கள் ஆகியவற்றை அறிதல்
- 2.இதழியல் வரலாறு, வகைகள்- இதழியல் சட்டங்கள்,செய்திச் சேகரிப்பும் செம்மையாக்கமும்- வெளிநாட்டு,உள்நாட்டுச்செய்திகளைப் பெறும்முறை ஆகியவற்றை தெரிதல்
- 3.பக்தி அமைத்தலும், நிறுத்தக் குறியிடலும்- மொழி நடைக் குறிப்பேடு- செய்திஎழுதப்படும்முறை- தலைப்புவகைகள்- பத்திரிக்கை கட்டமைப்பு பற்றி அறிதல்
- 4.விளம்பரத்தின் தத்துவமும் செயல்பாடும்- விளம்பர அறங்கள்-இந்திய நாட்டில் விளம்பரங்கள்.
- 5.மக்கள் உறவியல், சொற்பொருள் விளக்கமும், வரையறையும்- விளம்பரமும்பொதுமக்கள்தொடர்பும் -அரசாங்கமும்மக்கள்தொடர்புமுறைகளும் ஆகியவற்றை அறிதல்.

Course Out Comes (five outcomes for each units should be mentioned)

11. After studied unit-1, the student will be able to

மக்கள் தகவலியல் தொடர்பான செய்தி மற்றும் அதன்தன்மை,எல்லை ஆகியவற்றை அறிந்துகொள்ளுதல் . பத்திரிகைத் துறையின் தொழில் அம்சங்கள்- பத்திரிகை ஓர்ஆற்றல்மிக்கதொடர்பு சாதனம் பயன்பாடுகள் தெரிந்துகொள்ளுதல்

12. After studied unit-2, the student will be able to

இதழியலின் தொடக்ககால வரலாறுஅறிதல் -- இதழியல் சட்டங்கள்,செய்திச் சேகரிப்பும் செம்மையாக்கமும்-செய்திஆசிரியர்கள், துணைஆசிரியர்களின் பொதுவான பணிகள் முதலியனவற்றை அறிதல்

13. After studied unit-3, the student will be able to

சிறுகதை இலக்கணம் – வகைகள் – சிறுகதையாசிரியர்கள் -சிறுகதை உத்திகள் – கவிப்பித்தன் கதைகள் -அறிந்துகொள்ளுதல்

4. After studied unit-4, the student will be able to

விளம்பர அறங்கள்-விளம்பரத்தால் ஏற்படும் நன்மை தீமைகள் - பொருளின் விற்பனை உயர்வு தாழ்வு போன்றவை அறிதல்

5. After studied unit-5, the student will be able to மக்கள் வாழ்வியலில் பேசப்படும் உறவியல், சொற்பொருள் விளக்கமும், வரையறையும்விளம்பரத்திற்கும் பொதுமக்களுக்கும் உள்ளதொடர்பும் - அரசாங்கமும்மக்கள்தொடர்புமுறைகளும்-திட்டமிடுதல்-முடிவுசெய்தல்-மக்கள்தொடர்புசாதனங்கள். ஆகியவற்றின் பயன்பாட்டினை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...13

மக்கள் தகவலியல் அறிமுகம்- தன்மையும்- எல்லையும்- தகவல்தொடர்புவிளக்கம் - செயல்முறை - பத்திரிக்கைத்துறையின் அடிப்படைக்கொள்கைகள்- பத்திரிகைத்துறையினர்க்குத்தேவையான தகுதிகள்- பத்திரிகைத் துறையின் தொழில் அம்சங்கள்- பத்திரிகை ஓர்ஆற்றல்மிக்கதொடர்பு சாதனம்-வானொலிவிதிகள் போன்றவற்றை அறிதல்.

Unit-2: (50 to 100 contents)

Teaching Hours: ...13

இதழியல் வரலாறு, தொடக்க காலம்- தமிழ் இதழியல் வரலாறு இதழ்களின் வகைகள்- இதழியல் சட்டங்கள்,செய்திச் சேகரிப்பும் செம்மையாக்கமும்-செய்திஆசிரியர்கள், துணைஆசிரியர்களின் பொதுவான பணிகள்-வெளிநாட்டு,உள்நாட்டுச்செய்திகளைப் பெறும்முறை- அலைந்து திரட்டும்செய்திகள்-செய்திகளை நேர்ப்படுத்துதல்.

Unit-3: (50 to 100 contents)

Teaching Hours: ...13

பக்தி அமைத்தலும், நிறுத்தக் குறியிடலும்- மொழி நடைக் குறிப்பேடு- செய்திஎழுதப்படும்முறை- தலைப்பு வகைகள்-கிளைவரி-தேதிவரி -முகவுரைவகைகள் -உடல்புகுதி- அச்சுபடித்திருத்தம்- குறியீடுகள் - இதழியல் கலைச்சொற்கள்-கட்டுரைகள் - நெகிழ்வுரைகள்- மதிப்புரை- கருத்துப்படங்களும் கேலிச்சித்திரங்களும்- வானொலி,தொலைக்காட்சிக்குஎழுதும் முறைகள் ஆகியவற்றை அறிந்துகொள்ளுதல்

Unit-4: (50 to 100 contents)

Teaching Hours: ...13

விளம்பரத்தின் தத்துவமும் செயல்பாடும்- விளம்பர அறங்கள் விளம்பரத்தினை எடுக்கும் விதம்- அதன் காலஅளவு சமூக மாற்றத்திற்கான விளம்பரங்கள் - அரசியல் நிகழ்வுக்கான விளம்பரங்கள்- எடுக்கும் விதத்தினை அறிந்துகொள்ளுதல்

Unit-5: (50 to 100 contents)

Teaching Hours: ...13

மக்கள் உறவியல், சொற்பொருள் விளக்கமும், வரையறையும்- விளம்பரமும்பொதுமக்கள்தொடர்பும் -அரசாங்கமும்மக்கள்தொடர்பு முறைகளும்-திட்டமிடுதல்- முடிவுசெய்தல்-மக்கள்தொடர்பு சாதனங்கள்.

Internal Assessment Methods: (refer the instructions)

Text book:**Reference Book**

- | | |
|---------------------------|--------------------------------------|
| 1. இரா கோதண்டன் | இதழியல் |
| 2. மா.சு சம்பந்தன் | அச்சுக்கலை |
| 3. டாக்டர் வே தயாளன் | மக்கள் தகவல் தொடர்பியல் |
| 4. முனைவர் இரா விஜயராணி | தொலைக்காட்சி விளம்பரங்கள் |
| 5. கா திரவியம் | தேசியம் வளர்த்த தமிழ் |
| 6. சோமலே | தமிழ் இதழ்கள் |
| 7. டாக்டர் தங்க மணியன் | பத்திரிக்கையியல் |
| 8. இ.சுந்தரமூர்த்தி | இந்திய விடுதலைக்கு மந்திய தமிழ் |
| 9. டாக்டர் கு முத்துராசன் | இதழியல் வளர்ச்சியும் மொழிபெயர்ப்பும் |
| 10. ம.பா குருசாழி | இதழியல் கலை |

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	M	M	M	MS	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	M	M	S
CO4	S	S	S	S	S	M	M	M	M	S
CO5	S	S	S	S	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DOTA16B Name of the Paper: பேச்சுக்கலை Credit: 3

Total Hours per Week: 5 Lecture Hours:3 Tutorial Hours: 0 Practical Hours: 0

Course Objectives

- 1.பேச்சுக்கலை விளக்கம் -பேச்சுக்கலையின் தோற்றம் வளர்ச்சி- மேடைப்பேச்சு மேடைப்பேச்சின் விளக்கம் ஆகியவற்றை அறிதல்
- 2.இந்தியாவில் மேடைப்பேச்சு தோற்றம் தமிழகத்தில் மேடைப்பேச்சின் தோற்றம் வளர்ச்சி பேச்சாளரின் தகுதிகள் பேச்சால் ஏற்படும் மாற்றம் அறிதல்
- 3.பேச்சின் தொடக்கம்- பல்வேறு அறிஞர்களின் கருத்துக்கள் - தொடங்கும் முறை அறிதல்
- 4.சிறந்த பேச்சாளரின் பண்புகள் மேற்கோள்களைப் பொருத்தமுறளடுத்தாளுதல்
- 5.பேச்சை முடித்தல் - பேச்சுக்குறிப்பெடுத்தல்- திறன் வளர்த்தல்-மாணவர்களைப் பேச்சாளராக உருவாக்குதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to
பேச்சுக்கலை பற்றி விளக்கம் -பேச்சுக்கலை தோன்றிய விதம் - மேடைப்பேச்சு மேடைப்பேச்சின் விளக்கம் முதலியவற்றைத் தெரிந்துகொள்ளுதல்
2. After studied unit-2, the student will be able to
இந்தியாவில் மேடைப்பேச்சு தோற்றம் தமிழகத்தில் மேடைப்பேச்சின் மூலம் ஏற்பட்ட மாற்றம் அதன் வளர்ச்சி
ஆகியன அறிதல் பேச்சாளரின் தகுதிகள் பேச்சால் ஏற்படும் மாற்றம் அறிதல்
3. After studied unit-3, the student will be able to
பேச்சின் தொடக்கம்- பல்வேறு அறிஞர்களின் கருத்துக்கள் - தொடங்கும் முறை அறிதல்
குரல் ஒலி ஏற்ற இரக்கங்கள் உணர்ச்சிபேச்சு அறிவைப்புகட்டுதல் போன்றன தெளிதல்
4. After studied unit-4, the student will be able to சிறந்த பேச்சாளருக்கான பண்பினை வளர்த்துக்கொள்ளுதல் மேற்கோள்களைப் பொருத்தமுறளடுத்தாளுதல் தன்மையறிதல்
5. After studied unit-5, the student will be able to பேச்சை முடித்தல் -
பேச்சுக்குறிப்பெடுத்தல்- திறன் வளர்த்தல்-மாணவர்களைச் சிறந்த பேச்சாளராக உருவாக்குதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...13**

பேச்சுக்கலை விளக்கம் - கலைகளுள் சிறந்தகலைபேச்சுக்கலையின் தோற்றம் வளர்ச்சி
- மேடைப்பேச்சு மேடைப்பேச்சின் விளக்கம்

Unit-2: (50 to 100 contents)**1Teaching Hours:13**

இந்தியாவில் மேடைப்பேச்சு தோற்றம் தமிழகத்தில் மேடைப்பேச்சின் தோற்றம் வளர்ச்சி
பேச்சாளரின் தகுதிகள்

Unit-3: (50 to 100 contents)**Teaching Hours: ...13**

பேச்சின் தொடக்கம்- பல்வேறு அறிஞர்களின் கருத்துக்கள் - தொடங்கும் முறை

Unit-4: (50 to 100 contents)**Teaching Hours: ...13**

சிறந்த பேச்சாளரின் பண்புகள் மேற்கோள்களைப் பொருத்தமுறஎடுத்தாள்தல்

Unit-5: (50 to 100 contents)**1Teaching Hours: ...13**

பேச்சை முடித்தல் - பேச்சுக்குறிப்பெடுத்தல்- திறன் வளர்த்தல்-மாணவர்களைப்
பேச்சாளராக உருவாக்குதல்

Internal Assessment Methods: (refer the instructions)**Text book:****Reference Book**

நீங்களும் பேச்சாளராகலாம்

க.அன்பழகன் பூம்புகார்பதிப்பகம்

பேச்சாளராக

அ.கி.பரந்தாமனார் பாரிநிலையம்

பேச்சுக்கலை

டாக்டர் திருமலை,மீனாட்சி புத்தக நிலையம்

நீங்களும் பேச்சாளராகலாம்

குமரி அனந்தன், வானதிபதிப்பகம் சென்னை

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	M	M	S	S	S	S	S	S	M
CO4	M	S	S	S	S	S	S	S	M	S
CO5	S	S	M	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: II Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA21 Name of the Paper: காப்பியங்கள் Credit: 4

Total Hours per Week: 6 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours:0

Course Objectives

1.காப்பியங்கள் - வகைமை அறிதல் - சிலப்பதிகார சிறப்புகள் - புகார்சிறப்பு - முப்பெரும் உண்மைகள் - பண்டைய திருமண முறை - பரதக்கலை - தொன்மையான விழாபௌத்தம் - அறிதல் - பெண்மையின் சிறப்பு பசிப்பிணி -ஆபுத்திரன் செயல் - மனிதநயம் - அறிதல்

2.தொண்டர் பெருமை - அன்புநிலை - உண்மை அறமே சிவம் -இல்லறத்தின் -மனிதநேயம் -அறிதல் இல்லறத்தின் வழி துறவறம் -அறிதல்

3.கம்பராமாயணச்சிறப்பு - தசரதன் சிறப்பு -இயற்கை -அணிநயம் - தெளிதல் இராமன்சிறப்பு

4. நகரவளம் - கிருத்துவம் -அறிதல் இயற்கை வளம் காணல்

5. இஸ்லாம் சமயம் அறிதல் - நபிகள் நாயகம் வாழ்வும் வாக்கும் தெளிதல் - சிறப்புஅறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to முப்பெரும் உண்மை அறிதல் - தொன்மைவிழா - தமிழர் திருமண முறை அறிதல் இசைக்கருவிகள் பற்றிய செய்தி அறிதல் பசியின் தன்மை - உணவின் முக்கியம் -அறம் செய்தலின் சிறப்பு தெளிதல்.....

2. After studied unit-2, the student will be able to முப்பெரும் சைவசமயத்தின் பெருமை - திருநீற்றின் பெருமை உணர்தல் அன்பின் மகிமை -அறிதல் ஒழுக்கம் -தெளிதல்.....

3. After studied unit-3, the student will be able to கம்பன் அணிநயம் அறிதல் -யாப்பு கட்டமைப்பு தெளிதல் - ஒழுக்கநெறி பயிலுதல்

4. After studied unit-4, the student will be able to தேம்பாவணி காப்பியம் அறிதல் கிருத்துவம் மார்க்கம் பற்றிய அறிவு பெறுதல் - காப்பிய நயம் அறிதல்

5. After studied unit-5, the student will be able to இஸ்லாம் மார்க்கம் பற்றிய அறிவு பெறுதல் எவ்வுயிர்மாட்டும் அன்பு செலுத்துதல்

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Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...16**

சிலப்ப - சிறப்புகள்.- காப்பிய தன்மை அறிதல் - புகார் நகர வர்ணனை தெளிதல் - கோவலன் கண்ணகி திருமண நிகழ்வு - மன்னனை வாழ்த்தும் முறை - இந்திரவிழா தன்மை - நகரமக்கள் கொண்டாட்டங்கள் -காப்பிய யாப்பமைதி போன்றவற்றை அறிதல்

Unit-2: (50 to 100 contents)**Teaching Hours: ...15**

மணிமேகலை காப்பியத்தின் சிறப்புகள். -சீத்தலைச்சாத்தனார் வரலாறு - காப்பியகாலம் - ஆபத்திரன் வரலாறு - ஆதிரையின் வாழ்வு -சாதுவன் -நாகர்கள் வரலாறு போன்றவற்றை எல்லாம் அறிதல்

Unit-3: (50 to 100 contents)**Teaching Hours:****...16**

கம்பராமாயணம்- சிறப்புகள் அறிதல் - இராமாயணம் உணர்த்தும் உண்மை நெறிகளை அறிதல் மிதிலை நகரில் நிகழ்கின்ற தன்மைகளை தெரிந்துகொள்ளுதல்.கவிதை வர்ணனைகளை அறிதல்

Unit-4: (50 to 100 contents)**1Teaching Hours: ...16**

ஏக கிருத்துவின் தந்தை பற்றிய வரலாறு அறிதல் வீரமாமுனிவர் வாழ்வை அறிதல் கிருத்துவ சமயத்தின் மார்க்கத்தை அறிதல் சசையப்பரின் வாழ்வை முழுமையாக தெரிந்து கொள்ளுதல்

Unit-5: (50 to 100 contents)**Teaching Hours: ...15**

இஸ்லாம் மார்க்கம் பற்றிய அறிவு பெறுதல் சீறாப்புராணம் காட்டும் வாழ்வில் நெறி அறிதல் உமறுப்பலவர் சீதக்காதி அபுல்காசிம் போன்றவர்களின் வாழ்வினை அறிதல் சீறாவின் அமைப்பு அறிதல் -ஹிஜரத்காண்டத்தின் பெருமை வீடமீட்ட படலத்தில் இடம்பெறும் காட்சிகள் தெளிதல்

Internal Assessment Methods: (refer the instructions)**Text book:****1 – 10****Reference Book:****1 – 10**

9. பெருமை வ.சுப மாணிக்கம் இரட்டைக்காப்பியங்கள்
 10. மு.வ இளங்கோ கண்ணகி மாதவி (மூன்று நூல்கள்😊)
 11. தெ.பொ.மீ குடிமக்கள் காப்பியம்
 12. அ.ச. ஞானசம்பந்தன் கம்பன் புதியபார்வை
 13. கி.வா.ஜகந்நாதன் தமிழ்க்காப்பியங்கள்

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	S
CO2	S	S	M	S	M	S	M	S	S	M
CO3	M	S	S	S	M	S	S	M	S	S
CO4	S	M	M	S	S	S	S	S	S	S
CO5	S	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: II Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA22 Name of the Paper: பக்திஇலக்கியம் Credit: 4

Total Hours per Week: 6 Lecture Hours: 0 Tutorial Hours: Practical Hours:0

Course Objectives

1. சைவ சமய நூல்வரின் தோற்றம் அறிதல் அவர் வாழ்வறிதல்
2. ஆழ்வார்கள் -பன்னிருவரின் வரலாறு அறிதல் அவர்களின் படைப்புகளை தெரிந்துகொள்ளுதல் அன்பின்வழி இறையை காணுதல்
3. திருமுல் அருணகிரிவள்ளலார் என காலந்தோறும் தோன்றும் அருளாளர்களின் வாழ்வியலை உணர்தல்
- 4.பல்சமய நூல்களை அறிதல் கிருத்துவ மத வாழ்வியலை தெரிந்துகொள்ளல் கிருத்துவக்கம்பனை அறிதல்
5. வகுணங்குடி மஸ்தான் சாகிப அவர்களின் வாழ்வியலையும் படைப்பையும் அறிந்துகொள்ளல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to திருஞானசம்பந்தர் வாழ்க்கை வரலாறு அறிதல் தேவாரத்தின் கட்டமைப்பு தெளிதல் திருநாவுக்கரசர் தொண்டும் பணியும் தெரிந்துகொள்ளுதல் தொண்டர் பெருமை அறிதல் திருவையாறு தல பெருமை உணர்தல் வன்தொண்டன் வாழ்வறிதல் - தடுத்தாட்கொண்ட தன்மை தெரிதல் திருமழமாடி பதிகச் சிறப்பு தெளிதல்
2. After studied unit-2, the student will be able to திருவாய்மொழி உணர்த்தும் வாழ்வியல் அறிதல் ஆண்டாளின் புரட்சிப்பாசுரங்களின் தன்மை அறிதல்
3. After studied unit-3, the student will be able to கதிருமந்திரத்தின் உட்பொருள் அறிந்துகொள்ளல் நால்வர்நான்மணிமாலையின் சிறப்பு கந்தரஅலங்காதத்தில் வரும் நயம் தெளிதல்
4. After studied unit-4, the student will be able to இரட்சணிய மனோகரம் இடம் பெறும் பால்ய பிரார்த்தனை அடியார்களின் ஒழுக்கம் திருநாமப் பதிகம் சீவ வாக்கு அகியவற்றிடல் இடம் பெறும் கருத்துக்களை அறிதல்
5. After studied unit-5, the student will be able to இஸ்லாம் மார்க்கம் பற்றிய அறிவு பெறுதல் குணங்குடி மஸ்தான் சாகிபு வெளிப்படுத்தும் ஆனந்த களிப்பு பற்றி அறிதல்

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Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...16

திருஞானசம்பந்தர் தேவாரம் மண்ணில் நல்ல வண்ணம் வாழலாம்
முதல்திருமுறை – திருக்கழுமலம்பதிகம். (1-11பாடல்கள்)

2) திருநாவுக்கரசர் தேவாரம்- மாதர்ப்பிறைக்கண்ணியானை - ஐந்தாம்
திருமுறை- திருவையாறு பதிகம் (1-10பாடல்கள்)

3) சுந்தரர் தேவாரம் - பொன்னார் மேனியனே – ஏழாம் திருமுறை –
திருமழபாடி திருப்பதிகம்(1-10பாடல்கள்)

4) மாணிக்கவாசகர் - திருவாசகம் - அடைக்கலப்பத்து (1-10பாடல்கள்)

Unit-2: (50 to 100 contents)

Teaching Hours: ...16

1) நம்மாழ்வார் - திருவாய்மொழி- முதல்திருமொழி ஒன்பதாம்பத்து
கொண்ட பெண்டிர்'எனத்தொடங்கும் பாசரம் (1-10பாடல்கள்)

2) திருமங்கையாழ்வார் - பெரிய திருமொழி வாடினேன் வாடி பாசரம் (1-10பாடல்கள்)

3) ஆண்டாள் - நாச்சியர் திருமொழி
'கருப்பூரம் நானுமோ' பாசரம் (1-10பாடல்கள்)

4) திருவரங்கத்தமுதனார் - இராமானுச நூற்றந்தாதி(1-10பாடல்கள்)

Unit-3: (50 to 100 contents)**Teaching Hours: ...15**

திருமூலர் திருமந்திரம் முதல் மந்திரம் வான்சிறப்பு முதல் நடுநிலைமை வரை

அருணகிரிநாதர் கந்தரலங்காரம் 1 முதல் 25 பாடல்கள் வரை

சிவப்பிரகாசர் நால்வர்நான்மணிமாலை 1 முதல் 8 பாடல்கள் வரை

வள்ளலார் திருவரட்பா ஆறாம் திருமுறை முறையீடு 1-10 பாடல்கள்

Unit-4: (50 to 100 contents)**Teaching Hours: ...15**

எச்.ஏ. கிருட்டினப்பிள்ளை - இரட்சணிய மனோகரம்

1.பால்ய பிரார்த்தனை (1-20)

அடியார்களின் ஒழுக்கம் (1-10)

திருநாமப் பதிகம்(1-11)

சீவ வாக்கு(1-10)

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

குணங்குடி மஸ்தான் சாகிபு - குணங்குடி மஸ்தான்சாகிபு பாடல்கள்

1. அகத்தீசர் சதகம்(1-10)பாடல்கள்

2.ஆனந்தக் களிப்பு

Internal Assessment Methods: (refer the instructions)**Text book:****1 – 10****Reference Book:****1 – 10**

1.டாக்டர் ப.அருணாசலம்

பக்தி இலக்கியம் ஓர் அறிமுகம்

2. முனைவர் சோ.ந.கந்தசாமி

திருமுறை இலக்கியம்

3. ப.அருணாசலம்

வைணவ சமயம்

4. மயிலை சீனி வேங்கடசாமி

கிருத்துவமும் தமிழும்

5. முனைவர் சி.நயினார்

மஸ்தான் சாகிபும் தாயுமானவரும்

6. முனைவர் சு.அமிர்தலிங்கம்

வள்ளலாரின் ஆளுமை உருவாக்கம்

7. க.வெள்ளைவாரனார்

பன்னிருதிருமுறை

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	S	M	S	S	S	S	S	M	S
CO4	S	S	S	M	M	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA23 Name of the Paper: தொல் - சொல்லதிகாரம் Credit: 4

Total Hours per Week: 6 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours: 0

Course Objectives

- 1.திணை பால் எண் வழக்கு சுட்டு வினா வகை (கிளவியாக்கம்) வேற்றுமை பெயர்கள் வகைப்பாடு வேற்றுமை உருபுகள் -அறிதல்
- 2.உருபினும் பொருளினும் மெய் தடுமாறி நிற்கும் வேற்றுமைகள் வினைச்சொல் ஆகுபெயர் (வேற்றுமை மயங்கியல்) தெளிதல்
- 3.உயர்திணை அ.:றிணை அ.:றிணை விரவுப்பெயர்கள் பெயர்ச்சொல் வகைப்பாடு ஆகியவற்றை தெரிதல் -
4. இடைச்சொல் பற்றிய விளக்கங்கள் இடைச்சொல்லுக்கென்று தனி இயல்பு இடைச்சொல்லுக்கு புறநடை அறிதல்
5. மொழியானது செய்யுள், வழக்கு என்று பாகுபடுத்தப்பட்டுள்ளதை அறிதல் செய்யுள் ஈட்டச்சொல் செய்யுளில் தொடர் அமைதி இலக்கணத்தில் கட்டுப்படாத மொழி அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to உயிர் மெய் -எழுத்து பிறப்பு அறிதல்
2. After studied unit-2, the student will be able to மொழிக்கு இறுதில் வரும் எழுத்துக்கள் மொழிக்கு முதலில் வரும் எழுத்துக்கள் 22 முதல் எழுத்தும் இறுதியில் வரும் 24 எழுத்துக்களோடு பணரும் பாங்கு -அறிதல்.....
3. After studied unit-3, the student will be able to அறிதல் நிலைமொழி ஈற்று – உயிர் எழுத்து மயங்குதல் ..
4. After studied unit-4, the student will be able to நிலைமொழி இறுதியில் புள்ளி மயங்கும் நிலை அறிதல்
5. After studied unit-5, the student will be able to அறிதல் நெடில் உயிர் – ஆய்தம் -வன் மென் இடை தொடர் உகரங்கள் தெளிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours:**

...16 கிளவியாக்கம், வேற்றுமையியல் சொல்வகை உயர்திணை அ.நிணை திணைக்குரிய பால்வகை அ.நிணைக்குரியபால் ஆண்பாற்பெயர் ஈறு பெண்பாற் பெயர் ஈறு ஐம்பால் அறிதல் வினா விடை அறிதல் வேற்றுமை வகைகள் வேற்றுமையும் பொருளும் வேற்றுமைத்தொகைகள் போன்றன அறிதல்

Unit-2: (50 to 100 contents)**Teaching Hours: ...15**

வேற்றுமை மயங்கியல் கருமல்லா சார்புச்சொல் முதலுக்கு ஐ வரிக் சிணைக்கு கண் வரும் பிண்டப்பெயரும் உறுப்பும் பொருள் தடுமாறும் வினைச்சொல் தொடர்கள் விளிமரபு உருபு பொருளும் மயங்குதல் செய்யுளில் ஐ ஆன் கு உருப இறுதி அகரம் பெறுதல் போன்ற அறிதல்

Unit-3: (50 to 100 contents)**Teaching Hours: ...16**

பெயரியல், சொல்லின் பொது இலக்கணம் சொல்வகை உயர்திணை பெயர்கள் விரவுப்பெயர்கள் சொற்களின் பொது இயல்பு சொற்களின் பாகுபாடு திணை அடிப்படையில் பெயர்ச்சொல் போன்ற அறிதல் வினைச்சொல்லின் பொது இலக்கணம் வினைச்சொல் காட்டும் கால வகை போன்றன அறிதல்

Unit-4: (50 to 100 contents)**Teaching Hours: ...15**

இடையியல், இடைச்சொல்லின் பொது இலக்கணம் இடைச்சொல் வகை இடைச்சொல் நிற்கும் இடம் திரிந்து வேறுபட்டு நிற்கும் இடம் தில் உம் ஓ உம் இடைச்சொல்லின் தன்மைகள் அறிதல் உரியியல் உரிச்சொல்லின் பொது இலக்கணம் உரிச்சொல் வகை அறிதல்

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

எச்சவியல்

Internal Assessment Methods: (refer the instructions)**Text book:**

1 – 10

Reference Book:

1 – 10

- மு. சண்முகம் பிள்ளை (ப.ஆ) தொல்காப்பியம் எழுத்ததிகாரம்
2. ஆ.சிவலிங்கனார் தொல்காப்பியம் எழுத்ததிகாரம் உரை
3. கு.சுந்தரமூர்த்தி தொல்காப்பியம் எழுத்ததிகாரம்
4. செ.வை.சண்முகம் பிள்ளை எழுத்ததிலக்கணக்கோட்பாடு
5. தி.முருகரத்தினம் தமிழ் எழுத்தியல் அன்றும் இன்றும்
6. ச. பாலசுந்தரனார் தொல்காப்பியம் எழுத்ததிகாரம்
7. டாக்டர் மு ஹம்சா தொல்காப்பியரின் எழுத்திலக்கணக் கோட்பாடு
8. ச.வே சுப்பிரமணியம் தொல்காப்பிய உரைவளக் கோவை
9. டாக்டர் மொ அ துரை அரங்கசாமி தொல்காப்பிய நெறி
10. வ.சுப.மாணிக்கம் தொல்காப்பிக்கடல்

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code:DETA24A

Name of the Paper: சைவசித்தாந்தம்

Credit:4

Total Hours per Week: 6 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours: 0

Course Objectives

- 1.சைவ சமயத்தின் தொன்மை அறிதல் அகழ்வாய்வில் தமிழர் வழிபாடு காணல்
2. சைவத் தத்துவங்கள் வேதத்தில் சொல்லப்பட்டுள்ள பாங்கு தமிழ் இலக்கியங்களில் பதவு செய்யப்பட்டுள்ள சைவ சமய தத்துவம் அறிதல்
3. சித்தாந்த கருத்துக்களின் நுட்பம் உணர்தல் பன்னிருதிருமுறையில் காணலாகும் சைவநெறி சால்வழி மார்க்கம் முதலியன தெளிதல்
4. சந்தானக்குரவர்களின் வாழ்வியல் அறிதல் பதினான்கு சாத்திரம் சொல்லும் தத்துவக்கருத்துக்களை உணர்தல்
5. சிவஞான போதம் - தரும் தத்துவார்த்த குறிப்புகளை உள்வாங்கல் திருவருட்பயன் பேறு த்துவம் என்பதன் பொருள் அறிந்துகொள்ளுதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to -சிந்து வெளியில் கண்டெடுக்கப்பட்ட சிவலிங்க வடிவங்கள் ஆரியருக்கு முற்பட் காலங்களில் சைவ வழிபாடு சைவ சித்தாந்தத்தின் அடிப்படை நூல்கள் அறிதல் தத்துவ அடிப்படைகளைத் தெரிந்து கொள்ளுதல் சைவசித்தாந்தமும் அதன் சமூக நிலைப்பாடுகளும் அறிதல்
2. After studied unit-2, the student will be able to திருமுறைதொகுப்பு –பன்னிருதிருமுறைகளின் சிறப்பு – திருமுறைபாடிய சான்றோர்கள் - பசு பதி பாசம் மூன்றின் நலை உணர்தல் சித்தாந்தமும் வேதாந்தமும் வீரசைவம் போன்ற அறிதல்
3. After studied unit-3, the student will be able to மெய்கண்ட சாதிரதின் தன்மை அறிதல் சாத்திரம் இயற்றியோரின் வரலாறு அறிதல் உண்மைநெறி விளக்கம் கொடிப்பாட்டு வினாவெண்பா போன்றன அறிதல்
4. After studied unit-4, the student will be able to இறைவனின் பொது இயல்பைக்குறிப்பிடும் பதிமுதுநிலை உயிர்களின் பொதுத்தன்மை உயிரவை நிலை – ஆணவமலத்தின் இயல்பு இருள்மல நிலை இறைவனின் திருவருள் பேறு அருளுமுது நிலை உண்மைப்பொருள் அறியும் அறியுநிலை உயிர்விளக்கம் ஐந்தெழுத்தருள் நிலை போன்றவை அறிதல்
5. After studied unit-5, the student will be able to சிவஞான போதம் நூல் கட்டமைப்பு பற்றி அறிதல் பிராணவியல் சாதனவியல் உண்மை அதிகாரம்முதல் அதிகுரணம் போன்றவை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours:

...16

சைவத்தின் தொன்மை வரலாறு— மொகஞ்சதாரோஹரப்பா

தடயங்கள்—வேதத்தில் சைவம் - உபநிடத்தில் சைவம்-

சங்க இலக்கியத்தல் சைவம் - காப்பியங்டகளில் சைவம்

.Unit-2: (50 to 100 contents)

Teaching Hours: 16

சைவசித்தாந்த கருத்துக்கள் - பன்னிருதிருமுறையில் சைவசித்தாந்த கருத்துகள்அறிமுகம்
உண்மைவிளக்கம்

Unit-3: (50 to 100 contents)

Teaching Hours: ...15

மெய்கண்ட சாத்திரங்கள் சந்தானசாரியார் — பதினான்கு சாத்திரங்கள் அறிமுகம்
உண்மைவிளக்கம்

- Unit-4: (50 to 100 contents)

Teaching Hours: 15...

திருவருட்பயன் பதிமுதுநிலை -உயிரவை நிலை — ஆணவமலத்தின் இயல்பு இருள்மல நிலை
இறைவனின் திருவருள் பேறு அருளுமுது நிலை உண்மைப்பொருள் அறியும் அறியுநிலை
உயிர்விளக்கம் போன்றவை அறிதல்

Unit-5: (50 to 100 contents)

Teaching Hours: ...16

சிவஞானபோதம் -12 நூற்பாக்கள்

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1 – 10

1. டி.பி.சித்தலிங்கம் சைவ சமயத்தோற்றமும் வளர்ச்சியும்
2. ப.அருணாசலம் சைவசமயம் ஓர்அறிமுகம்
3. க.வச்சிரவேலு சித்தாந்தத் தெளிவியல்
4. நா. சேல்லப்பா திருமந்திரமும் சிவஞானபோதமும்
5. வி.பி. காந்திமதிநாத பிள்ளை: சிவஞானபோதச் சொற்பொழிவு நூல்,
6. கழக வெளியீடு, சென்னை,

6. கு. சுந்தரமூர்த்தி (உ.ஆ) : திருவருட்பயன், 7. ஆ.
வேலுப்பிள்ளை : தமிழர் சமய வரலாறு

8. Rajamanickam : A Development of
Saivam in South

9. ந. சுப்புரெட்டியார் : சைவ சமய விளக்கு,

10. வ.ஆ. தேவசேனாதிபதி : சைவ சித்தாந்தத்தின் அடிப்படைகள்,

11. மு. இளையதம்பி : முப்பொருள் உண்மை விளக்கம்,

12. சி. அருணைவடிவேல் முதலியார் : சிவஞானபோதமாபாடியப் பொருள்நிலை
விளக்கம்,

13. க. வெள்ளைவாரனார் : பன்னிருதிருமுறை வரலாறு (பாகம் 1-2),

14. சிவஞானசுவாமிகள் : சிவஞானபோதசிற்றூரை,

15. அருணைவடிவேல் முதலியார் : முப்பொருள் இயல்பு.

16. க்டர்சோ.நா.கந்தசாமி இந்தியத்தத்துவக் களஞ்சியம்

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	MM	M	M	M	MM	S	S	S	S
CO2	M	M	M	M	S	S	S	S	M	M
CO3	M	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code:DETA25B Name of the Paper: பெண்ணியப் படைப்புகள் Credit: 4

Total Hours per Week: 5 Lecture Hours:5 Tutorial Hours: 0 Practical Hours: 0

Course Objectives

1.பெண்ணியம் உருவான விதம் அதன் விளக்கம்-மேலை நாடுகளில் பெண்ணியம்-

பெண்களுக்குகான சுதந்திரம் சமத்துவம் வாக்குரிமை- பெண் விடுதலைஇயக்கம்.

ஆகியன அறிதல்

2.பெண்ணியக் கோட்பாடுகள்- பெண்ணடிமையின் காரணங்கள், பெண்கள் முன்னேற வழிகள்- மிதவாதப் பெண்ணியம்- மாக்கியப்பெண்ணியம்-சோஷலிசப் பெண்ணியம்- தீவிரவாதப் பெண்ணியம்- ஆன்மீகப் பெண்ணியம்- கலாச்சாரப் பெண்ணியம்பற்றி அறிதல்

3.பெண்ணியம் இந்தியாவில் தோற்றம் பெற்ற பாங்கு அதன் வளர்ச்சியும்- காலந்தோறும் பெண்ணுக்கு ஏற்பட்ட மாற்றங்கள் பெண்களும் அரசு சட்டங்களும்- பெண்களும் ஆகியவற்றைத் தெளிததல்

4.தமிழ் இலக்கிய நோக்கில் பாரதி படைப்புகளில் பெண்ணியம்- பெண் சிறுகதை ஆசிரியர்கள்- பெண் நாவலாசிரியர் - பெண் புதுக்கவிஞர்கள் - மகளிர் இதழ்கள் முதலியவற்றை அறிதல்

5. இலக்கியமும் மகளிர் மேம்பாடும்- பெண்ணியப் படைப்புகளில் பின் நவீனத்துவப்பார்வை ஆகியவற்றை அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

பெண்ணியம் என்பதின் உட்பொருள் உணர்தல் அது உருவான விதம் அதன் விளக்கம்- மேலை நாடுகளில் பெண்ணியம்- பெண்களுக்குகான சுதந்திரம் சமத்துவம் வாக்குரிமை- பெண் விடுதலைஇயக்கம். ஆகியன அறிதல் ஆகியவற்றைத் தெரிந்துகொள்ளுதல்

2. After studied unit-2, the student will be able to

பெண்ணியக் கோட்பாடுகள்- பெண் அடிமைக்கான காரணங்களைத் தெரிந்துகொண்டு மிளுதல் , பெண்கள் முன்னேற வழிகள்- மிதவாதப் பெண்ணியம்- மாக்கியப்பெண்ணியம்- சோஷலிசப் பெண்ணியம்- தீவிரவாதப் பெண்ணியம்- ஆன்மீகப் பெண்ணியம்- கலாச்சாரப் பெண்ணியம் எனப்பல்வேறு வகையான உள்ளவற்றைப்பற்றி அறிதல்

3. After studied unit-3, the student will be able to

உருபனியல்உருனியல் - வரையறை- விளக்கம் - உருபன் - உருபு- மாற்றுருபு -
நைடாவின் உருபனைக் கண்டறியும் கொள்கைகள்- மாற்றிலக்கணக் கோட்பாடு-
அகவடிவம், புறவடிவம் முதலியனவற்றை அறிதல்

4. After studied unit-4, the student will be able to தொடரியல்-வரையறை- சொல்வகைகள்-
அண்மையுறுப்பு- விளக்கம்-அண்மையுறுப்புவகைகள்-தொடரமைப்பு-மாற்றிலக்கணக்
கோட்பாடு- அகவடிவம், புறவடிவம். ஆகியவற்றை அறிதல்
5. After studied unit-5, the student will be able to
பொருள்வகைகள்- சொற்பொருள்மற்றும்இலக்கணப்பொருள், சொற்பொருள்அலகுகள்-
கட்டுப்பொருள்,குறிப்புப்பொருள்-பொருட் பன்மொழி-
பலபொருள்குறித்தஒருசொல்,ஒலியமைப்பில்ஒத்தபொருள் மாறுபடும் சொற்கள்.
முதலியனவற்றைத் தெரிந்துகொள்ளுதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...16

பெண்ணியம் விளக்கம்-மேலை நாடுகளில் பெண்ணியம்- பெண்களுக் வாக்குரிமை-
பெண் விடுதலைஇயக்கம்.

Unit-2: (50 to 100 contents)

Teaching Hours: ...15

பெண்ணியக் கோட்பாடுகள்- பெண்ணடிமையின் காரணங்கள்,பெண்கள் முன்னேற வழிகள்-
மிதவாதப் பெண்ணியம்- மாக்கியப்பெண்ணியம்-சோஷலிசப் பெண்ணியம்- தீவிரவாதப்
பெண்ணியம்- ஆன்மீகப் பெண்ணியம்- கலாச்சாரப் பெண்ணியம்- கிறித்துவப் பெண்ணியம்
பெரியார்ப்பெண்ணியம்

Unit-3: (50 to 100 contents)

Teaching Hours: ...15

இந்தியாவில் பெண்ணியம் தோற்றமும் வளர்ச்சியும்- காலந்தோறும் பெண்மை பெண்களும்
சட்டங்களும் பெண்களும் அரசு திட்டங்களும் மகளிர் அமைப்பு

Unit-4: (50 to 100 contents)

Teaching Hours: ...16

தமிழ் இலக்கிய நோக்கில் பெண்கள் மரபு இலக்கியத்தில் பெண்கள் பாரதி படைப்புகளில்
பெண்ணியம் பெண் சிறுகதை ஆசிரியர்கள் பெண்நாவலாசிரியர் பெண் புதுக்கவிஞர்கள் மகளிர்
இதழ்கள்

Unit-5: (50 to 100 contents)

Teaching Hours: ...16

இலக்கியமும் மகளிர் மேம்பாடும் பெண்ணியப் படைப்புகளில் விமர்சனப் பார்வை – பின் நவீனத்துவப் பார்வையில் பெண்ணியம்

Internal Assessment Methods: (refer the instructions)

Text book:

Reference Book

1. முத்துசண்முகம் இக்காலமொழியியல்
2. சு. இராசாராம் ஒலியியல்
3. ச. அகத்தியலிங்கம் மொழியியல்
4. கி. கருணாகரன் மொழியியல்
5. கி. அரங்கன் தொடரியல் மாற்றிலக்கண அணுகுமுறை
6. முனைவர் பொற்கோ இக்காலத்தமிழ் இலக்கணம்
7. முனைவர் பொற்கோ பொதுமொழியியல் ஓர் அறிமுகம்
8. பேரா இரா ஜெகதீசன் மொழியின் ஒலி

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DOTA25A Name of the Paper: ஊடகத்தமிழ் Credit: 3

Total Hours per Week: 6 Lecture Hours:3 Tutorial Hours: 0 PracticalHours: 0

Course Objectives

- 1.ஊடகங்களின் முக்கியத்துவம் அவற்றின் பயன்பாடு வளர்ச்சி இணையம் ஆகியவற்றை அறிதல்
- 2.இதழியல் அறிமுகம் இதழ்களின் சமுதாயப்பணி- கடமைகள் - பொறுப்புகள் இதழின் தோற்றமும் வளர்ச்சியும் வகைகள் போன்றவற்றை அறிந்துகொள்ளுதல்
- 3.செய்திகளின் அவசியம்-செய்தியாளர்களின் தகுதி - விளக்கம் பத்திரிக்கை சட்டங்களின் முக்கியத்துவம்
- 4.அறிவியல் வளர்ச்சியில் வானொலியின் பங்கு-அவற்றின் பணிகள்நன்மை தீமை ஆகியவற்றை அறிதல்
- 5.இணையம் இண்டர்நெட்வரலாறு— அவற்றின் பயன்பாடு மின்னஞ்சல் சூப்பர் ஹைவே ஆகியவற்றை அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

14. After studied unit-1, the student will be able to
சமூகத்தில் ஊடகங்களின் பங்களிப்பு அவற்றால் ஏற்படும் நன்மைகள் ஊடகங்களின் அறிமுகம்- முக்கியத்துவம் - ஊடகங்களின் வளர்ச்சி - நிலைப்பாடு
பண்பாடுதொடர்நிலையின் வகைகள்- பண்டைய தமிழகத்தில் நிலவிய அச்ச வழி
சாதனங்கள் அஞ்சல்-தந்தி தொலைபேசி -கைபேசி - இணையம் ஆகியவற்றை அறிதல்
15. After studied unit-2, the student will be able to
இதழியல் துறை - அதன் சமுதாயப்பணி- கடமைகள் - பொறுப்புகள் - இந்திய இதழ்களின் ஆரம்பகாலத்தின் நிலை - தமிழகத்தில் இதழின் வளர்ச்சிநிலை - தமிழ் பத்திரிக்கைகளின் வகைகள் - புகைப்படங்களும் இதழ்களும் -தற்கால இதழ்களின் எழுச்சியும் வீழ்ச்சியும்முதலியனவற்றை அறிதல்
16. After studied unit-3, the student will be able to
செய்திகளின் முக்கியத்துவம் -செய்தியாளர்களுக்குரிய தகுதி - விளக்கம் - பொறுப்புகள்- பேட்டி காணும் முறைகள்- முகப்பு தலையங்கம்- மக்களாட்சியில் இதழ்களின்பங்கு- இவற்றின்வழி அறிவியல் வளர்ச்சி- பத்திரிக்கை சட்டங்களின் முக்கியத்துவம் அறிதல்
4. After studied unit-4, the student will be able to விளம்பரத்தின் தத்துவமும் செயல்பாடும்- வானொலியின் பயன்பாடு அதன்- வளர்ச்சி - அவற்றின் பணிகள்-அவற்றின் நன்மை தீமை

தொலைக்காட்சியின் தோற்றம் அறிதல் அவற்றின்வழிஅறிவியல் வளர்ச்சி- திரைப்படத்தின் தோற்றம் அதன் நன்மை தீமைஅறிதல்

5. After studied unit-5, the student will be able to இணையம் இண்டர்நெட்வரலாறு- இணைத்தேடுபொறிகள் பயன்பாடுகள் உலகளாவிய வலை மின்னஞ்சல் அரசின் இணையதளம் சூப்பர் ஹைவே ஆகியவற்றின் பயன்பாட்டினை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...16

ஊடகங்களின் அறிமுகம்- முக்கியத்துவம் - ஊடகங்களின் பரிணாமவளர்ச்சி - நிலைப்பாடு பண்பாடுதொடர்நிலையின் வகைகள்- பண்டைய அச்ச வழி சாதனங்கள் அஞ்சல்-தந்தி தொலைபேசி -கைபேசி - இணையம்

Unit-2: (50 to 100 contents)

Teaching Hours: ...15

இதழியல் அறிமுகம் இதழ்களின் சமுதாயப்பணி- கடமைகள் - பொறுப்புகள் - இந்திய இதழ்களின் தொடக்ககாலம்- தமிழ் இதழின் தோற்றமும் வளர்ச்சியும்- தமிழ் பத்திரிக்கைகளின் வகைகள் - புகைப்படங்களும் இதழ்களும் -தற்கால இதழ்களின் எழுச்சியும் வீழ்ச்சியும்

Unit-3: (50 to 100 contents)

Teaching Hours: ...15

செய்திகளின் அவசியம்-செய்தியாளர்களின் தகுதி - விளக்கம் - வாயில்கள் - பொறுப்புகள் - பேட்டி முறைகள்- முகப்பு தலையங்கம்- மக்களாட்சியில் இதழ்களின்பங்கு- இவற்றின் வழி அறிவியல் வளர்ச்சி- பத்திரிக்கை சட்டங்களின் முக்கியத்துவம்ஆகியவற்றை அறிந்துகொள்ளுதல்

Unit-4: (50 to 100 contents)

Teaching Hours: ...16

அறிவியல் வளர்ச்சியில் வானொலியின் பங்கு- வளர்ச்சி - அவற்றின் பணிகள்-அவற்றின் நன்மை தீமை தொலைக்காட்சியின் தோற்றம் வளர்ச்சிஅவற்றின்வழிஅறிவியல் வளர்ச்சி - திரைப்படத்தின் தோற்றம் வரலாறு

Unit-5: (50 to 100 contents)

Teaching Hours: ...16

இணையம் இண்டர்நெட் வரலாறு- இணைத்தேடுபொறிகள் பயன்பாடுகள் உலகளாவிய வலை மின்னஞ்சல் அரசின் இணையதளம் சூப்பர் ஹைவே

Internal Assessment Methods: (refer the instructions)

Text book:

Reference Book

முனைவர் கி.இராசா

மக்கள் தகவல் தொடர்பியல் அறிமுகம்

முனைவர் இரா மருதுநாயகம்

இருபத்தோராம் நூற்றாண்டில் மக்கள்

தொடர்பியல்,

முக்தா சீனிவாசன்

தமிழ்த்திரைப்பட வரலாறு

அறந்தை நாராயணன்

தமிழ் சினிமாவின் கதை

வெ.மு ஷாஜகான்

திரைப்படக்கலை, உயிர்மைப்பதிப்பகம் சென்னை

மா.பா.குருசாமி

இதழியல் கலை

மு.பொன்னவைக்கோ

இணையத்தமிழ்வரலாறு

Course Material: website links, e-Books and e-journals

- 1.<http://www.tamilvirtualuniversity.org/>
- 2.<http://www.katuraitamil.blogspot.com/>
- 3.<http://www.noolulagam.com/>
- 4.<http://www.sirukathaigal.org/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code:DOTA25B

Name of the Paper: நாடகத்தமிழ்

Credit: 3

Total Hours per Week: 6 Lecture Hours:3 Tutorial Hours: 0 PracticalHours: 0

Course Objectives

- 1 நாடகம் -விளக்கம் செய்திகள்-தொல்காப்பியம் -சங்கஇலக்கியநாடகக்கூறுகள்- அறிதல்
- 2.காப்பியங்களில் நாடகக்கூறுகள்- அடியார்க்குநல்லார் குறிப்பிடும் நாடகச்செய்திகள் - யாழ்ப்பறிய செய்திகள்
- 3பல்லவர்கால - பாண்டியர்கால - சோழர்கால நாயக்கர் கால - மராட்டியர் காலம்- மன்னர் காலத்தில் நாடகங்கள் பற்றி தெளிதல்
- 4பள்ள -குறவஞ்சி - நொண்டிநாடகம்- கீர்த்தனை நாடகங்கள் - ஓரங்க நாடகங்கள்- போன்றவற்றை அறிதல்
- 5.நாடக ஆசிரியர்கள் - நாடகக்குழுக்களை நடத்தியவர்கள் அதன் அமைப்பு அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

17. After studied unit-1, the student will be able to
தொல்காப்பியத்தின்வழி அறியலாகும்நாடகச்செய்திகள்-சங்கஇலக்கியநாடகக்கூறுகள் முதலியன அறிதல்
18. After studied unit-2, the student will be able to
சிலம்பதிகாரத்தில் நாடகக்கூறுகள்- வேத்தியல் பொதுவியல் ஒருமுகளினி இருமுகளினி போன்றவை அறிதல்
முதலியனவற்றை அறிதல்
19. After studied unit-3, the student will be able to
காலமாற்றத்திற்கு ஏற்ப நாடகங்கள் மாற்றம் பெற்றதை அறிதல்
4. After studied unit-4, the student will be able to சிற்றிலக்கிய காலத்தில் எழுந்த நாடகங்களின் தன்மைகளைத்தெரிந்துகொள்ளுதல்
5. After studied unit-5, the student will be able to நாடக ஆசிரியர்கள் -பம்மல் சம்பநதனார் சங்கரதாஸ்சாமிகள்முதல் இக்கால நாடக ஆசிரியர்கள் வரை நாடகக்குழுக்களை நடத்தியவர்கள் - குழுக்கள் -வானொலி நாடகங்கள் - தொலைக்காட்சி நாடக வகைகள்- தற்கால நாடகங்கள் ஆகியவற்றின் பயன்பாட்டினை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...16**

தொல்காப்பியத்தின்வழி அறியலாகும்நாடகச்செய்திகள்-சங்கஇலக்கியநாடகக்கூறுகள்- சங்க இலக்கிய கூத்துகள் - சங்ககால இசையுணர்வு- சங்ககால இசைக்கருவிகள் -

Unit-2: (50 to 100 contents)**Teaching Hours: ...16**

சிலம்பதிகாரத்தில் நாடகக்கூறுகள்- அரங்கேற்றுகாதை கதைச்சுருக்கம்- அடியார்க்குநல்லார் குறிப்பிடும் நாடகச்செய்திகள் - யாழ்ப்பறிய செய்திகள்

Unit-3: (50 to 100 contents)**Teaching Hours: ...15**

பல்லவர்கால நாடகங்கள்- பாண்டியர்கால நாடகங்கள்- சோழர்கால நாடகங்கள்- நாயக்கர் கால நாடகங்கள் - மராட்டியர் காலம்- மன்னர் காலத்தில் நாடகங்கள் பெற்ற சிறப்பு ஐரோப்பியர்கால நாடகங்கள்ஆகியவற்றை அறிந்துகொள்ளுதல்

Unit-4: (50 to 100 contents)**Teaching Hours: ...15**

பள்ள -குறவஞ்சி - நொண்டிநாடகம்- கீர்த்தனை நாடகங்கள் - ஓரங்க நாடகங்கள்- மொழிபெயர்ப்பு நாடகங்கள்- பாகவதமேளா -தெருக்கூத்து - மேடைநாடகம்- நாடகஇலக்கியம் ஆகியவற்றின் தொடக்க நிலைச் செய்திகள் - மேடை நாடகஇலக்கியங்கள்- செய்யுள் நாடக இலக்கியங்கள்- இலக்கியநாடகஏடுகள் போன்றவற்றை அறிதல்

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

நாடக ஆசிரியர்கள் - நாடகக்குழுக்களை நடத்தியவர்கள் - குழுக்கள் -வானொலி நாடகங்கள் - தொலைக்காட்சி நாடக வகைகள்-தற்கால நாடகங்கள்

Internal Assessment Methods: (refer the instructions)

Text book:**Reference Book**

- | | |
|----------------------------------|---------------------------------------|
| 1. ஆபிரகாம் பண்டிதர் | இசைத்தமிழ் |
| 2. ஆளவந்தார் ஆர் | தமிழர் தோற்கருவிகள் |
| 3. இரவீந்திரன் க | தி க.சண்முகம் நாடகங்கள் |
| 4. இராசமாணிக்கனார் | தமிழகக்கலைகள் |
| 5. இராமசாமி மு | தமிழ்நாடகம் நேற்று இன்று நாளை |
| 6. இராசமாசி, முருகேசன் கு | இருபதாம் நூற்றாண்டுத் தமிழ் நாடகங்கள் |
| 7. முத்துசண்முகம், பெரியகருப்பன் | நாடகக்கலையின் வரலாறு |
| 8. விபுலானந்த அடிகள் | யாழ்நூல் |
| 9. மது ச விபுலானந்தம் | தமிழ் இலக்கிய வரலாற்றுக்களஞ்சியம் |

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	M	S	M	S	S
CO3	S	M	S	S	M	S	M	S	M	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: III Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA31 Name of the Paper: சங்க இலக்கியம் அகம் Credit:5

Total Hours per Week: 6 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours:0

Course Objectives

- 1.சங்க இலக்கியங்களை அறிந்து கொள்ளுதல்
2. சங்க காலத்தமிழர்களின் அக வாழ்வியை அறிந்துகொள்ளுதல்
3. சங்க காலத்தமிழர்களின் புற வாழ்வியலை தெரிந்துகொள்ளுதல்
4. தமிழர்களின் வரலாற்றுப் பண்பாட்டையும் நம்பிக்கைகளையும் தெளிதல்
5. சங்ககால பெண்டிர் வாழ்வியலை உணர்தல்

Course Out Comes (five outcomes for each units should be mentioned)

4. After studied unit-1, the student will be able to ' முல்லைப்பாட்டில் இடம் பெறும் கார்கால வருணனை ஆயர்களின் வாழ்வியல் தலைவன் வினை முடித்து மிளும் காட்சி அக்கால சமூக வழிபாடு போன்ற அஅறிதல்
5. After studied unit-2, the student will be able to கலித்தொகையின் பொதுச்சிறப்பு அறிதல் முல்லைக்கலியின் ஏற்றம் ஏறுதழுவுதல் தன்மை பாலைக்கலியில் காணலாகும் அன்பு ஆகியவற்றை அறிதல் குறிஞ்சி நிலத்தின் எழிலான வருணனை தலைவன் பிரிந்து சென்ற விடத்து தலைவி ஆற்றியிருக்கும் பாங்கு முல்லைக்கலியின் சிறப்பு முதலியன அறிதல்
6. After studied unit-5, the student will be able to நந்தெகையின் கட்டமைப்பு சிறப்புகள் கருப்பொருளின் பின்னணியில் மாந்தர்தம் அகத்துணர்வுகள் தமிழரின் பண்புகள் ஆகியன அறிதல் நற்றிணை காட்டும் வாழ்க்கை காதலர் நிலை அன்பின் ஆழம் மாந்தர்தம் அறவாழ்வு அறிதல்
7. After studied unit-3, the student will be able to கஜங்குநுறாறு நூலின் வரலாறு பதிப்பு முறைகள் நூலின் அமைப்பு ஐந்திணையின் சிறப்பு தோழிக்கு உரைத்த பதது கிழவிக்கு உரைத்த பததது இவற்றில் இடம்பெறும் சிறப்பு அறிதல்
8. After studied unit-4, the student will be able to குறிஞ்சிப்பாட்டு தோன்றக்காரணம் பாடல் அமைதி அக்கால மகளிர் இயல்பு களவு வாழ்வின் தன்மை காதலர் உள்ளம் அகத்தொடு நிற்கும் பாங்கு போன்றன அறிதல்.....

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**1Teaching Hours: ...16**

கூறு 1 :முல்லைப்பாட்டு முழுவதும்

Unit-2: (50 to 100 contents)**1Teaching Hours: ...15**

1. கலித்தொகை

1. பாலைக்கலி— 1-5 பாடல் 2.

2. குறிஞ்சிக்கலி— 37,38,39,40,41பாடல்

3. மருதக்கலி— 70,71,72,73,74பாடல்

4. முல்லைக்கலி— 101,102,103,104,105

2. அகநானூறு - 81 பாடல் முதல் 90 பாடல் வரை

Unit-3: (50 to 100 contents)**Teaching Hours: ...15**

1. குறுந்தொகை 90 பாடல் முதல் 100பாடல் வரை

2. நற்றிணை 91 பாடல் முதல் 110 பாடல் வரை

Unit-4: (50 to 100 contents)**1Teaching Hours: ...16**

ஐங்குறுநூறு தோழிக்கு உரைத்த பத்து 31 பாடல் முதல் 40 வரை

கிழத்தி கூற்று பத்து 61 பாடல் முதல் 70 வரை

நெய்தற்பத்து 181 பாடல்முதல் 190 வரை

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

குறிஞ்சிப்பாட்டு முழுவதும்

Internal Assessment Methods: (refer the instructions)**Text book:****1 – 10****Reference Book:****1 – 10**

பார்வை நூல்கள்:

1.எஸ்.வையாபுரிப்பிள்ளை : சங்க இலக்கியம்

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Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	M	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	M	M	S
CO4	S	S	S	S	S	M	M	S	S	S
CO5	M	S	S	M	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: III Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA32 Name of the Paper: ஆராய்ச்சிநெறிமுறைகள் Credit:5

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: 0 Practical Hours:0

Course Objectives

1. ஆய்வுக் கண்ணோட்டத்தை வளர்த்துக்கொள்ளுதல்
2. தமிழ் இலக்கியப் படைப்புகளையும் அவற்றின் காலத்தையும் நுட்பமாக அறிதல்
3. திறனாய்வு முறைகளை அறிந்து ஆய்வு செய்தல் வகைசெய்தல் கோட்பாடுகளைக்கற்றல்
4. ஒரு படைப்பை அல்லது வரலாற்றையும் தமிழ் பொருண்மை குறித்து அறிதல்
5. தமிழாய்வு பரப்பை அறிதல் ஆய்வுப் போக்கின் வளர்ச்சி அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to ஆராய்ச்சி என்ற சொல்லின் பொருள்- ஆய்வாளரின் தகுதி ஆய்வுவகைகள் - கருதுபொருள் அறிதல்
2. After studied unit-2, the student will be able to ஆய்வுப்பொருளை தேர்தல் ஆய்வுப்பொருளின் வரலாறு ஆய்வுப்பயன் ஆய்வின் மூலம் கண்டு உணர்ந்து சொல்ல வேண்டிய கருத்து அறிதல்
3. After studied unit-3, the student will be able to ஆய்வுலக அடிப்படைக் கோட்பாடுகள்: செய்திகள்(Facts) – கருத்துகள்- விதி (Law) – கொள்கை(Theory) – வகைப்பாடு(Classification)– கோட்பாடுகள்- அறிவியல் ஆய்வும்- கலையியல் ஆய்வும்.கம்பன் அணிநயம் அறிதல் -யாப்பு கட்டமைப்பு தெளிதல் - ஒழுக்கநெறி பயிலுதல் ஆகியன தெரிதல்
4. After studied unit-4, the student will be able to சொந்தமாக படைப்பு குறித்து கட்டுரை எழுதுதல் மொழிபயிற்சி
5. After studied unit-5, the student will be able to இஓரு படைப்பைப் ண்பாட்டை வாழ்வியல் கூறுகளை ஒப்பிட்டு அறிய கற்றல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...17**

ஆராய்ச்சி: நெறிமுறைகள் விளக்கம்- ஆராய்ச்சிப் பொருள்-ஆய்வாளர்க்குரிய தகுதிகள்- ஆராய்ச்சி வகைகள்- அணுகுமுறைகள்கருதுகோள்ஆய்வுச் சிக்கல்கள்.

Unit-2: (50 to 100 contents)**Teaching Hours: ...17**

ஆய்வின் அடிப்படை நெறிமுறைகள்: ஆய்வுப் பொருளைத்தெளிவாகச்சுட்டல் - ஆய்வுப் பொருள் பற்றி இதுவரை செய்யப்பட்ட ஆய்வுகள்-ஆராயப்பட வேண்டியன - ஆராயப்பட வேண்டுவனவற்றுள் இப்போதுஎடுத்துக்கொள்ளப்பட வேண்டியன.

Unit-3: (50 to 100 contents)**Teaching Hours: ...14**

ஆய்வுலக அடிப்படைக் கோட்பாடுகள்: செய்திகள்(Facts) – கருத்துகள்- விதி (Law) – கொள்கை(Theory) – வகைப்பாடு(Classification)– கோட்பாடுகள்- அறிவியல் ஆய்வும்- கலையியல் ஆய்வும்.

Unit-4: (50 to 100 contents)**Teaching Hours: ...14**

தமிழாய்வுப் பரப்பு- இலக்கிய ஆய்வு- ஒப்பிலக்கிய ஆய்வு-இலக்கியவரலாற்றுஆய்வு- இலக்கண ஆய்வுமொழி வரலாற்றுஆய்வு- அகராதி ஆய்வு- தமிழியலும் மொழியியலும்- தமிழியலும் பண்பாட்டியலும்- தமிழியலும் நுண்கலைகளும்- தமிழியலும் உளவியலும்- தமிழியலும் தொல்பொருள் அகராதி.

Unit-5: (50 to 100 contents)**Teaching Hours: ...14**

தமிழாய்வுப் பரப்பு- இலக்கிய ஆய்வு- ஒப்பிலக்கிய ஆய்வு-இலக்கியவரலாற்றுஆய்வு- இலக்கண ஆய்வுமொழி வரலாற்றுஆய்வு- அகராதி ஆய்வு- தமிழியலும் மொழியியலும்- தமிழியலும் பண்பாட்டியலும்- தமிழியலும் நுண்கலைகளும்- தமிழியலும் உளவியலும்- தமிழியலும் தொல்பொருள் அகராதி.

Internal Assessment Methods: (refer the instructions)**Text book:****1 – 10****Reference Book:****1 – 10**

1. டாக்டர் ச.வே சுப்பிரமணியன் ஆராய்ச்சி நெறிமுறைகள்
2. டாக்டர் ஈ.சா.விசுவநாதன் ஆய்வு நெறிமுறைகள்
3. டாக்டர் முத்துசண்முகம் ஆய்வுக்கட்டுரைகள் எழுதும் முறை
4. டாக்டர் பொற்கோ ஆராய்ச்சி நெறிமுறைகள்
5. டாக்டர் என் கணேசன் ஆய்வியல் கோட்பாடுகளும் செய்முறைகளும்
6. டாக்டர் வே.சிதம்பரநாதன் ஆய்வியல் முறைகள்
7. முனைவர் கு.வே.பாலசுப்பிரமணியன்

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	S	S	S	M	M	M	M	S	S
CO4	S	S	S	S	S	M	M	S	S	S
CO5	M	M		S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA33 Name of the Paper: தொல் - பொருளதிகாரம் Credit: 5

Total Hours per Week: 6 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours: 0

Course Objectives

1. தமிழின் தொன்மை சிறப்பை அறிந்து கொள்ளலாம் அகத்திணை பற்றி அறிதல் அன்பின் ஐந்திணை பற்றி அறிதல் திணைப்பாகுபாடு கருப்பொருள் உரிப்பொருள் மகளிர் அயற்றி கண்டோர் மொழி தலைவன் கூற்று போன்றவை அறிதல்
2. தொல்காப்பியர் பற்றியும் புறத்திணையின் பொதுத்தன்மை அறிதல் சங்ககால போர்முறை பற்றி அறிதல் போர் பற்றி இசய்தி அறிதல் வெட்சி கரந்தை முதலான துறைப்பற்றிய செய்தி அறிதல்பொருள் அஅதிகாரம் பற்றியும் அறியலாம்
3. தமிழின் காதல் வாழ்வை அறிதல் திருமணமுறைகள் காமக்கூட்டம் பற்றி அறிதல் காதலர் ஒப்புமை காதலரின் கூற்றுகள் தலைவி வருணனைகள் இயற்கை புணர்ச்சி போன்ற செய்திகள் அறிதல்
4. தமிழர்களின் அக வாழ்வு ஒழுக்கத்தைப்பற்றி அறிதல் தலைவனும் தலைவியும் தமர் தர இல்லறமேற்று வாழ்தல் தலைவன் தலைவி தோழி காமக்கிழத்தி செவிலி அறிவர் கூத்தர் இளையர் பார்ப்பர் கூற்று போன்றன அறிதல்
5. பொருள் பற்றி செய்திகள் அறிதல் அகத்தணை மாந்தர்களின் மனநிலை அறிதல் தலைவன்தலைவி பிரிவுக்காலத்தில் ஏற்படும் உள்ளத்தின் தன்மை அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to உரிப்பொருள் கருப்பொருள் முதற்பொருள் திணை திணைமயக்கம் தலைவன் பிரிவு முறைகள் தோழி பேசுமிடங்கள் கண்டோர் கூற்று நிகழுமிடங்கள் தலைவியைக்கொண்டு செல்லுமிடத்து தலைவன் கூற்று கைக்கிளை பெருந்திணை பற்றிய செய்திகள் அறிதல்
2. After studied unit-2, the student will be able to காதலும் வீரமும் ஒன்றுக்கொன்று தொடர்பு பெற்றிருந்தது புறத்திணை பற்றி முழுமையாக அறிதல் சங்க சமூகம் பெரும்பாலும் வீரத்தை அடிப்படையாகக் கொண்டது
- புறத்திணையின் ஏழு திணைகள் பற்றி அறிதல் அகத்திணைகளும் புறத்திணைகளும் கொண்ட தொடர்பு அறிதல் திணையும் துறைகளும் பற்றிய தன்மை அறிதல்
3. After studied unit-3, the student will be able to சிறந்துழி ஐயம் நாட்டம் குறிப்பு மெய்தொட்டு பயிறல் பாங்கர் நிமித்தம் நாற்றம் தோற்றம் தன்னுறு வேட்கை காமக்கூட்டம் இரவுக்குறி அல்லகுறி போன்ற செய்திகள் அறிதல்
4. After studied unit-4, the student will be able to கற்பு வாழ்வில் பெண்பாலருக்க உடையி ஒழுக்க முறைகள் பொறையுடைமை விருந்தோம்பல் வாயில்கள் கடமை அறிவர் தலைவனை

யும் தலைவியையும் இடித்துரைக்கும் பாங்கு பரத்தமை பற்றிய செய்திகள் கல்வி தூது போர் பிற பிரிவின் கால அளவு லைமொழி இறுதியில் புள்ளி மயங்கும் நிலை அறிதல்

5. After studied unit-5, the student will be able to பொருளின் தன்மை உணர்தல் வாழ்வில் ஏற்படும் நோய் இன்பம் பற்றி தெரிதல் எளித்தல் ஏத்தல் போன்ற ஏழுகால நிலைகளில் தோழி கூற்றின் தன்மை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

...16 அகத்திணையியல் முழுவதும்

Teaching Hours:

Unit-2: (50 to 100 contents)

புறத்திணையியல் முழுவதும்

Teaching Hours: ...15

Unit-3: (50 to 100 contents)

களவியல் முழுவதும்

Teaching Hours: ...16

Unit-4: (50 to 100 contents)

கற்பியல் முழுவதும்

Teaching Hours: ...15

Unit-5: (50 to 100 contents)

பொருளியல் முழுவதும்

Teaching Hours: ...16

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1 – 10

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1082

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	MM	M	M	M	MM	S	S	S	S
CO2	M	M	M	M	S	S	S	S	M	M
CO3	M	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code:DETA34A Name of the Paper: சிற்றிலக்கியம் Credit: 3

Total Hours per Week: 6 Lecture Hours:5 Tutorial Hours: 1 PracticalHours: 0

Course Objectives

- 2 கலம்பகத்தின் கட்டமைப்பு அகமரபு தெள்ளாற்றெரிந்த நந்தியின் வரலாறு அறிதல்
- 2.பிள்ளைத்தமிழ் இலக்கணம் பத்து பருவங்கள் அறிதல் பிள்ளைத்தமிழுக்கான பாவகை தெளிதல்- சேக்கிழார் பற்றி வரலாற்று தரவுகள் அறிதல்
- 3.பரணியின் இலக்கணம்கலிங்கத்துப்பரணி - கடை திறப்பு (21-74) காடு பாடியது 4பள்ளு -குறவஞ்சி - நொண்டிநாடகம்- கீர்த்தனை நாடகங்கள் - ஓரங்க நாடகங்கள்- போன்றவற்றை அறிதல்
- 5.நாடக ஆசிரியர்கள் - நாடகக்குழுக்களை நடத்தியவர்கள் அதன் அமைப்பு அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

20. After studied unit-1, the student will be able to
தொல்காப்பியத்தின்வழி அறியலாகும்நாடகச்செய்திகள்-சங்கஇலக்கியநாடகக்கூறுகள் முதலியன அறிதல்
21. After studied unit-2, the student will be able to
சிலம்பதிகாரத்தில் நாடகக்கூறுகள்- வேத்தியல் பொதுவியல் ஒருமுகளழிநி இருமுகளழிநி போன்றவை அறிதல்
முதலியனவற்றை அறிதல்
22. After studied unit-3, the student will be able to
காலமாற்றத்திற்கு ஏற்ப நாடகங்கள் மாற்றம் பெற்றதை அறிதல்
4. After studied unit-4, the student will be able to சிற்றிலக்கிய காலத்தில் எழுந்த நாடகங்களின் தன்மைகளைத்தெரிந்துகொள்ளுதல்
5. After studied unit-5, the student will be able to நாடக ஆசிரியர்கள் -பம்மல் சம்பநதனார் சங்கரதாஸ்சாமிகளமுதல் இக்கால நாடக ஆசிரியர்கள் வரை நாடகக்குழுக்களை நடத்தியவர்கள் - குழுக்கள் -வானொலி நாடகங்கள் - தொலைக்காட்சி நாடக வகைகள்- தற்கால நாடகங்கள் ஆகியவற்றின் பயன்பாட்டினை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...**

தொல்காப்பியத்தின்வழி அறியலாகும் நாடகச் செய்திகள்-சங்கஇலக்கியநாடகக்கூறுகள்- சங்க இலக்கிய கூத்துகள் - சங்ககால இசையுணர்வு- சங்ககால இசைக்கருவிகள் -

Unit-2: (50 to 100 contents)**Teaching Hours: 16**

சிலம்பதிகாரத்தில் நாடகக்கூறுகள்- அரங்கேற்றுகாதை கதைச்சுருக்கம்- அடியார்க்கு நல்லார் குறிப்பிடும் நாடகச்செய்திகள் - யாழ்ப்பறிய செய்திகள்

Unit-3: (50 to 100 contents)**Teaching Hours: ...15**

பல்லவர்கால நாடகங்கள்- பாண்டியர்கால நாடகங்கள்- சோழர்கால நாடகங்கள்- நாயக்கர் கால நாடகங்கள் - மராட்டியர் காலம்- மன்னர் காலத்தில் நாடகங்கள் பெற்ற சிறப்பு ஐரோப்பியர்கால நாடகங்கள்ஆகியவற்றை அறிந்துகொள்ளுதல்

Unit-4: (50 to 100 contents)**Teaching Hours: 15**

பள்ளு -குறவஞ்சி - நொண்டிநாடகம்- கீர்த்தனை நாடகங்கள் - ஓரங்க நாடகங்கள்- மொழிபெயர்ப்பு நாடகங்கள்- பாகவதமேளா -தெருக்கூத்து - மேடைநாடகம்- நாடகஇலக்கியம் ஆகியவற்றின் தொடக்க நிலைச் செய்திகள் - மேடை நாடகஇலக்கியங்கள்- செய்யுள் நாடக இலக்கியங்கள்- இலக்கியநாடகஞடுகள் போன்றவற்றை அறிதல்

Unit-5: (50 to 100 contents)**Teaching Hours: 16**

நாடக ஆசிரியர்கள் - நாடகக்குழுக்களை நடத்தியவர்கள் - குழுக்கள் -வானொலி நாடகங்கள் - தொலைக்காட்சி நாடக வகைகள்-தற்கால நாடகங்கள்

Internal Assessment Methods: (refer the instructions)**Text book:**

Reference Book

- | | |
|-----------------------------------|---------------------------------------|
| 10. ஆபிரகாம் பண்டிதர் | இசைத்தமிழ் |
| 11. ஆளவந்தார் ஆர் | தமிழர் தோற்கருவிகள் |
| 12. இரவீந்திரன் க | தி க.சண்முகம் நாடகங்கள் |
| 13. இராசமாணிக்கனார் | தமிழகக்கலைகள் |
| 14. இராமசாமி மு | தமிழ்நாடகம் நேற்று இன்று நாளை |
| 15. இராசமாசி, முருகேசன் கு | இருபதாம் நூற்றாண்டுத் தமிழ் நாடகங்கள் |
| 16. முத்துசண்முகம், பெரியகருப்பன் | நாடகக்கலையின் வரலாறு |
| 17. விபுலானந்த அடிகள் | யாழ்நூல் |
| 18. மது ச விபுலானந்தம் | தமிழ் இலக்கிய வரலாற்றுக்களஞ்சியம் |

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	S	M
CO2	S	S	S	S	S	S	M	S	S	S
CO3	S	M	M	S	S	S	M	S	M	S
CO4	S	S	S	M	M	S	S	S	S	M
CO5	S	S	S	S	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DETA34B Name of the Paper: தமிழ் இலக்கண வரலாறு Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: 0 Practical Hours: 0

Course Objectives

- 1.தமிழ் மொழியில் உள்ள இலக்கணநூல்களை அறிதல்
2. ஐந்திலக்கண நூலின் தன்மைகளை தெரிந்துகொள்ளுதல்
3. யாப்பியலின் வளர்ச்சியும் தமிழ் இலக்கிய கட்டமைப்பும் பற்றி தெளிதல்
4. யப்பாட்டின் பொது இலக்கணம் அறிதல் மனிதனின் உடலில் தோன்றும் எண்வகை மெய்ப்பாட்டை அறிதல்
2. உவமையின் வகைகள் அறிதல் அணிகளுக்கு எல்லாம் ஊற்றாக இருப்பதை உணர்தல் தொல்காப்பியர் கால உவமைகளை அறிதல்
3. மரபுப்பெயர் இளமைப்பெயர் ஓரறிவு முதல் ஆறறிவு உயிரினங்களின் தன்மை அறிதல்
- 4.தொல்காப்பிய அகமரபிற்கும் பிற்காலத்தில் வந்த அக இலக்கணநூல்களுக்கும் உள்ள ஒற்றுமை வேற்றுமை அறிதல்
5. பாட்டியல் வளர்ச்சி பற்றி தெளிதல் நிகண்டுகள் அகராதிகள் தமிழின் தொன்மை வளம் எடுத்தியம்புவதை அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to அகத்தியர் பற்றியும் முந்துநூல் தன்மை தொல்காப்பிய கோட்பாடுகள் தொல்காப்பியர் கால மொழியின் நலை வேற்றுமைகள் பாவகைகளின் இலக்ககட்டமைப்பு அக புற வாழ்வியல் பற்றி அறிதல்
2. After studied unit-2, the student will be able to நன்னூல் காட்டும் எழுத்து சொல் இவற்றுடன் நேமிநாதம் வீரசோழியம் ஆகியவற்றுடன் ஒப்பிட்டு அறிதல்
3. After studied unit-3, the student will be able to நம்பியகப்பொருள் காட்டும் களவு வாழ்வு கற்பு வாழ்வு ஆண்மகனுக்கு உயி பிரிவுகள் அறத்தொடுநிறுந் வெறிவிலக்கு போன்றன அறிதல் இலக்கணம் காட்டும் சமூகப்பண்பாட்டை அறிந்துகொள்ளுதல்
4. After studied unit-4, the student will be able to பிரபந்த இலக்கியங்களின் தொகுப்பான பாட்டியல் பற்றி அறிதல் எழுத்து சொல் நூல் எனப் பகுத்து அணுகும் தன்மை அறிதல் பாட்டியல் நூல்களின் காலவரிசை அறிதல் பாட்டியல் நூல்களின் ஆசிரியர் பற்றிய வரலாறும் வாழ்வும் அறிதல்

5. After studied unit-5, the student will be able to தமிழில் அகராதிகளின் தோற்றம் வளர்ச்சி கலைச்சொல்லாக்க அகராதி சொல் சேகரிப்பு சொல்லாக்க வகைகள்வீரமாமுனிவர் வெளியிட அகராதி முதலியன அந்தல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...16

இலக்கண வரலாறு— முந்து நூல்- அகத்தியம் -தொல்காப்பியம்

Unit-2: (50 to 100 contents)

Teaching Hours: ...15

பிறகாலஎழுத்து,சொல்லிலக்கணவளர்ச்சி—நன்னூல்-நேமிநாதம்-

வீரசோழியம்- இலக்கணவிளக்கம்- தொன்னூல் விளக்கம்

Unit-3: (50 to 100 contents)

Teaching Hours: ...16

இலக்கண வரலாறு— முந்து நூல்- அகத்தியம் -தொல்காப்பியம்

இறையனார்அகப்பொருள்-நம்பியகப்பொருள்-மாறன்அகப்பொருள்

-புறப்பொருள் வெண்பாமாலை, வீரசோழியம் இலக்கணவிளக்கம்- கொன்னால் விளக்கம்- மகக்கவீரியம்- சுவாமிநாகம்- யாப்பாருங்கலம்.

Unit-4: (50 to 100 contents)

Teaching Hours: ...15

பாட்டியல் நூல்களின் வளர்ச்சி

Unit-5: (50 to 100 contents)

Teaching Hours: ...16

நிகண்டுகள் அகராதிகள்

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

புலவர் இரா. இளங்குமரன் : இலக்கண வரலாறு,
 பேரா. சோம. இளவரசு : இலக்கண வரலாறு,
 மெய்யப்பன் பதிப்பகம்,சென்னை – 608 001.
 கழகப் பதிப்பு, சென்னை,1985.
 தஞ்சாவூர்,முதற்பதிப்பு,1997.
 அகராதியியல் துறை,தமிழ்ப் பல்கலைக்கழகம்,
 தஞ்சாவூர்,2006.
 தமிழ்ப் புத்தகாலயம், சென்னை, முதற்பதிப்பு,
 1959.

நெறிமுறைகள்,

முதற்பதிப்பு,2009.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	MM	M	M	M	MM	S	S	S	S
CO2	M	M	M	M	S	S	S	S	M	M
CO3	M	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DOTA35A Name of the Paper: பயன்பாட்டு நாட்டுப்புறவியல் Credit:3

Total Hours per Week: 6 Lecture Hours: Tutorial Hours: Practical Hours: 0

Course Objectives

1. நாட்டுப்புறவியலின் மக்களின் வழக்காறுகளை அறிதல்
2. நாட்டுப்பு மக்களின் மொழியின் தொன்மை அறிதல்
3. நவீன ஊடகங்களின் மூலம் நாட்டுப்புறவியல் வளரும் தன்மை அறிதல்
4. சமூக நலன்கருதி தகவல் பரிமாற்றத்தில் நாட்டுப்புறவியலின் பங்கினை அறிதல்
5. பொருளின் விற்பனைதளத்தில் நாட்டுப்புறவியல் பயன்படுத்தும் தன்மை தெளிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to -நாட்டுப்புறவியலின் வகைமைகள் பயன்பாடுகள் நாட்டுப்புறவியல் காட்டும் பண்பாடுகள் அறிதல் ஊடகங்களின் வழியாக நாட்டுப்புறவியல் வளரும் தன்மை தெளிதல் அச்ச ஊடகத்தின் மூலமும் தொலைத்தொடர்பு கருவிகளின் மூலமும் நாட்டுப்புறவியல் வளரும் பாங்கு அறிதல்
2. After studied unit-2, the student will be able to கதைகள் மூலம் தொன்மையா நாட்டுப்புறவியலின் கூறுகளை வெளிப்படுத்தும் தன்மை இசைக்கருவிகளைப்பயன்படுத்தி கலைவளர்க்கும் தன்மை கலைகள் மூலம் வளரும் விதம் அறிதல்
3. After studied unit-3, the student will be able to தகவல் பரிமாற்றத்திற்கு நாட்டுப்புறவியல் பயன்படும் தன்மை அறிதல் அரசின் திட்டங்களைக் க்களுக்குக் கொண்டு செல்லும் கலையாக நாட்டுப்புறவியல் விளங்கும் பாங்கு அறிதல்
4. After studied unit-4, the student will be able to நவீன நாடகங்களின் மூலம் நாட்டுப்புறவியல் வளரும் தன்மை அறிதல்
5. After studied unit-5, the student will be able to இணையத்தின் மூலம் உலகளாவிய அளவில் நாட்டுப்புறவியல் வளரும் விதம் அறிதல் ஒலிஒளிப்படங்களின் மூலம் நாட்டுப்புறவியல் பங்காற்றும் தன்மை தெளிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...**

1 ஊடகங்களில் நாட்டுப்புறவியல்

பிரிவு – 1 இதழ்கள்

பிரிவு – 2 வானொலி

பிரிவு – 3 தொலைக்காட்சி

பிரிவு – 4 திரைப்படம்

.Unit-2: (50 to 100 contents)**Teaching Hours:**

2விளம்பரங்களில் நாட்டுப்புறவியல்

பிரிவு – 1 கதைகள்

பிரிவு – 2 பாடல்கள்

பிரிவு – 3 கலைகள்

பிரிவு – 4

இசைக்கருவிகள்

Unit-3: (50 to 100 contents)**Teaching Hours: ...**

தகவல் பரிமாற்றத்தில் நாட்டுப்புறவியல்

பிரிவு – 1 அரசின் திட்டங்கள்

பிரிவு – 2 விழிப்புணர்வு நிகழ்ச்சிகள்

பிரிவு – 3 உள்ளூர் விழாக்கள்

பிரிவு – 4 ஒளிநாடா, குறுந்தகடுகள்

Unit-4: (50 to 100 contents)**Teaching Hours: ...**

நவீன நாடகங்களில் நாட்டுப்புறவியல்

பிரிவு – 1 கதைகள்

பிரிவு – 2 பாடல்கள்

பிரிவு – 3 கலைகள்

பிரிவு – 4 இசைக்கருவிகள்

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

இணையத்தில் நாட்டுப்புறவியல்

பிரிவு – 1 கட்டுரைகள்

பிரிவு – 2 படங்கள்

பிரிவு – 3 ஒலி, ஒளிப்படங்கள்

பிரிவு – 4 நிகழ்வுகள்

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1 – 10

1. ஆறு இராமநாதன் நாட்டுப்புறக் கலைகள் நிகழ்த்து கலைகள்
2. சேவியர் அந்தோணி ஈர்ப்பு விசை பயன்பாட்டு நாட்டுப்புறவியலும் ஆய்வும்
3. சே.ஏ. குணசேகரன் நாட்டுப்புற நிகழ்த்துகலைகள் ஒரு பார்வை

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	MM	M	M	M	MM	S	S	S	S
CO2	M	M	M	M	S	S	S	S	M	M
CO3	M	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DOTA35B Name of the Paper: அறிவியல் தமிழ் Credit:3

Total Hours per Week: 6 Lecture Hours: Tutorial Hours: Practical Hours: 0

Course Objectives

1. ஆறிவியல் சார்ந்த சிந்தனைகள் தமிழில் வெளிவந்த அறிவியல் நூல்கள் அறிதல்
2. தமிழ் இலக்கியங்களில் அறிவியல் கருத்துக்களைப்பிரிந்துகொள்ளுதல்
3. சித்தர்கள் காட்டிய அறிவில் கருத்துக்களை இன்றைய அறிவியலோடு ஒப்பிட்டு அறிதல்
4. தமிழ் இலக்கியங்களில் பதிவாகியுள்ள வானவியல் கருத்துக்களை அறிதல்
5. தமிழில் அறிவியல் கலைச்சொல்லாக்கம் உருவாக்குதலை அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to -தமிழில்வெளிவந்த அறிவியல்ஆய்வுகள்,நூல்கள்,கட்டுரைகள்,இதழ்கள்ஆகியவற்றின் பங்கு அறிவியலின் இன்றியமையாமை முதலியன அறிதல்
2. After studied unit-2, the student will be able to
இலக்கண இலக்கியங்களில் பதிவாகியுள்ள அறிவியல் தகவல்கள் தமிழும்மருத்துவமும்-தமிழும்வேளாண்மையும்
- தமிழும் பொறியியலும்- தமிழும் உயிரியலும்- தமிழும் கணினியும் முதலியன அறிதல்
3. After studied unit-3, the student will be able to சித்தர்கள் காட்டிய அறிவியல் கருத்துக்கள் மருத்துவ குறிப்புகள் இரவாத தன்மைகள் உடல் இயக்க கூறுகள் மதலியன தெளிதல்
4. After studied unit-4, the student will be able to தமிழ் இலக்கண இலக்கிய நூல்களில் பதிவு செய்யப்பட்டுள்ள வானவியல் குறிப்புகள் வானவெளியில் ஏற்படும் மாற்றங்கள் முதலியன தெளிதல்
5. After studied unit-5, the student will be able to இன்றைய அறிவியல் துறைக்குத்தேவையான கலைச்சொல்லாக்கத்தினை உருவாக்குதல் கணினி துறைக்கான சொல்லாக்கம் உருவாக்குதல் முதலியன அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes

5	Yes	Yes	Yes	Yes	Yes	Yes
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Unit-1: (50 to 100 contents)

Teaching Hours: 16

அறிவியலும் அறிவியல் சார்ந்த விளக்கங்களும்:அறிவியல்சொல்லும்பொருளும்-
அறிவியல்சிந்தினைமற்றும்அறிவியல்வரலாறு- அறிவியல்அறிஞர்கள்-தமிழில்வெளிவந்த
அறிவியல்ஆய்வுகள்,நூல்கள்,கட்டுரைகள்,இதழ்கள்ஆகியவற்றின் பங்கு பணி முதலியன
அறிதல்

Unit-2: (50 to 100 contents)

Teaching Hours: 16

- இலக்கண இலக்கியங்களில் பதிவாகியுள்ள அறிவியல் சார்ந்த கருத்துக்களை தெளிதல்
தமிழும் பொறியியலும்- தமிழும் உயிரியலும்- தமிழும் கணினியும்

Unit-3: 50 to 100 contents)

Teaching Hours: ...15

சித்தர்களின்அறிவியல்பதிவுகள்-

சித்தர்களின்மருத்துவஅறிவு-

சித்தர்களின்உயிரியல்,உடலியல்அறிவு- சித்தர்களின் பன் முக அறிவியல்
பார்வைகளை அறிதல் அறிதல் ஈர்வைகள்

Unit-4: (50 to 100 contents)

Teaching Hours: ...15

தமிழிலக்கிய இலக்கணங்களில் பதிவாகியுள்ள கோள்கள்,நட்சத்திரங்கள்
ஆகியனபற்றியபதிவுகள்- வானியல்பதிவுகளின் வழியாகப் பண்டைத் தமிழர்களின்
புலமையை எடுத்துரைத்தல்-

Unit-5: (50 to 100 contents)

Teaching Hours: ...16

அறிவியல்துறைகளில் கலைச்சொல்லாக்கத்தின்பங்கும்பணியும்- அறிவியல்,
கணிதவியல், வானியல், கணினியியல் முதலான பல்துறைகளின் கலைச்
சொல்லாக்கங்கள்-கலைச் சொற்களைஒலி பெயர்ப்பும்,மொழிபெயர்ப்பும் செய்தல்- புதுச்
சொல்லாக்கம் அறிதல்

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1 – 10

1. கு.வி. கிருஷ்ணமூர்த்தி : அறிவியலின் வரலாறு
பேராசிரியர்- தலைவர்
தாவர அறிவியல் துறை,பாரதிதாசன்
பல்கலைக்கழகம்
திருச்சிராப்பள்ளி – 620 024
- 2.கா.செ. செல்லமுத்து : கணிப்பொறியும் பேசிக் மொழியும்
தமிழ்ப்பல்கலைக்கழகம்,தஞ்சாவூர்
- 3.சத்தியபாமா காமேஸ்வரன் : கணக்கதிகாரம்,

- (பதிப்பாசிரியர்) சரசுவதி மகால் வெளியீடு,தஞ்சாவூர்,
முதற்பதிப்பு - 1998
4. அ. சிவபெருமான் : இலக்கியங்களில் வானியல்
பதிப்புத்துறை,அண்ணாமலைப்
பல்கலைக்கழகம்,அண்ணாமலை நகர்- 608 002
முதற்பதிப்பு - 1997, விலை ரூ.30
5. ந. கடிகாசலம் : தமிழும் பிற துறைகளும்
(பதிப்பாசிரியர்) உலகத்தமிழ் ஆராய்ச்சி நிறுவனம்,
தரமணி, சென்னை - 113, ஆகஸ்டு- 1994
- 6.இராதா செல்லப்பன் : கலைச் சொல்லாக்கம்
நவல் கட் பரிரிண்டர்ஸ்சென்னை - 14.
7. அ. சிவபெருமான் : தமிழரின் வானியல் திறன் திருவருள்
நிலைய வெளியீட்டகம் முகையூர்
- அஞ்சல்
விழுப்புரம் மாவட்டம்- 606 306
முதற்பதிப்பு - 1993, விலை ரூ.25
8. இராம. சுந்தரம் : தமிழக அறிவியல் வரலாறு
தமிழ்ப்பல்கலைக்கழகம்
மறுதோன்றிஅச்சகம்,தஞ்சாவூர்- 5
ஆகஸ்டு-2006
- 9.அ. சிவபெருமான் : தமிழும் அறிவியலும்
இணைப்பேராசிரியர்,தமிழியல்
துறை,அண்ணாமலைப்
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2006, விலை ரூ.50
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:பிஷ்கிநீன் பதிப்பகம்,தமிழ்நாடு
வேளாண் பல்கலைக்கழகம். கோவை
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- 11.இராம. சுந்தரம் : பொருள் புதிது வளம் புதிது
வசந்தம் வெளியீடு,71,செல்லையா நகர்,
பிள்ளையார்பட்டி அஞ்சல்,
தஞ்சாவூர், ஆகஸ்டு- 1999
- 12.அனுபவ சித்த மருத்துவர்கள் சங்கம்: அனுபவ சித்த மருத்துவம்
ஐந்தாம் ஆண்டு மாநாட்டு மலர்,நம்பகம்
61/58
பனந்தோப்புத்தெரு,மயிலாடுதுறை,
முதற்பதிப்பு - 200

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	MM	M	M	M	MM	S	S	S	S
CO2	M	M	M	M	S	S	S	S	M	M
CO3	M	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: VI Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code:DTA41 Name of the Paper: ' சங்க இலக்கியம் புறம் Credit:5

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: Practical Hours: 0

Course Objectives

1. சங்க இலக்கியப் புறப்பாடல்களின் பாடுபொருள் அறிதல்
2. புறப்பொருள் மற்றும் புறத்திணைகளை அறிந்துகொள்ளுதல்
3. புறப்பாடல்களில் வெளிப்படும் சமூக வரலாறு பண்பாட்டு காரணிகளை உணர்ந்து கொள்ளுதல்
4. சங்க கால போர்முறைகள் வாழ்க்கை முறைகளைப் புரிந்து கொள்ளுதல்
5. சங்ககால புலவர்களின் கவித்திறன் நுண்ணறிவு வெளிப்பாட்டு உத்தி போன்றவற்றை அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to -சங்ககால புலவர் வரிசையில் பரணர் பெருஞ்சித்தனார் போன்றோரின் வரலாறு அவர்கள் கால சமூக அரசியல் மன்னன் சொல்லாட்சித்திறன் வெளிப்பாட்டு உத்தி பாடல்களின் சிறப்பை அறிந்துகொள்ளுதல்
2. After studied unit-2, the student will be able to ச சங்ககால பெண்பாற் புலவர்கள் பாடல்களின் கருப்பொருள் பெண்பாற் புலவர்களின் வெளிப்பாட்டு உத்தி , உளவியல் அணுகுமுறை முதலியன அறிதல்
3. After studied unit-3, the student will be able to புறப்பொருளின் சிறப்பு பதிற்றுப்பத்தின் அமைப்பு - வெளிப்படும் கருத்துகள் - போர்முறை -வெற்றிக்கொண்டாட்டம் முதலியன அறிதல்
4. After studied unit-4, the student will be able to ஆற்றுப்படை இலக்கணம் ஆற்றுப்படை வகைகள் ஆற்றுப்படையில் வெளிப்படும் விருந்தோம்பல் பரிசளிப்பு முறை மனிதநேயம் நல்லிக்கோடன் சிறப்பு முதலியவற்றைப்பற்றி அறிவுபெறுதல்
5. After studied unit-5, the student will be able to பரிபாடல் பாவகை – நூல் அமைப்பு வையை ஆற்றின் சிறப்பு முருகக்கடவுளின் தன்மை அருளிச்செயல்கள் - திருமால் வழிபாட்டு முறைகள் முதலியன அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours:****...15**

புறநானூறு பரணர் பாடல்கள் 4,63,141,142,144,145,,336,341,343,348

பெருங்கித்தனார் பாடல்கள் 158,159,160,161,162,163,207,208,237,238

.Unit-2: (50 to 100 contents)**Teaching Hours: 16**

புறநானூறுபெண்பாற்புலவர்கள்

ஒளவையார் - 91,92,93,94,95,96,97,98,99,100

மாறோக்கத்து நப்பசலையார்- 37,39,126,174,226,280,383

நக்கண்ணையார்- 83,84,85

Unit-3: (50 to 100 contents)**Teaching Hours: ...16**

புதிற்றுபத்து 3ஆம் பத்து முழுவதும்

Unit-4: (50 to 100 contents)**Teaching Hours: ...15**

சிறுபாணாற்றுப்படை முழுவதும்

Unit-5: (50 to 100 contents)**Teaching Hours: ...16**

புரிபாடல் வையை -நல்லந்துவனார் 6ஆம் பாடல்

சேவ்வேள் 5ஆம்பாடல் பாயிரும் பனிக்கடல்

திருமால் 2ஆம் பாடல் தொன்முறை எனத்துவங்கும் பாடல்

Internal Assessment Methods: (refer the instructions)**Text book:****1 – 10****Reference Book:**

1 – 10

1. சு.வைத்தியநாதன் தமிழர்சால்பு
2. மா.இராசமாணிக்கனார் பத்துப்பாட்டு ஆய்வு
3. மா.இராசமாணிக்கனார் தமிழ் இலக்கியவரலாறு
4. சைவசித்தாந்த கழகம் சங்க இலக்கியச் சொற்வு
5. அ.சினிவாஸ் குறிஞ்சி
6. தே.பொ.மீ பத்துப்பாட்டு ஆய்வு
7. டாக்டர் ஆ இராமகிருஷ்ணன் அகத்திணை மாந்தர் ஓர் ஆய்வு
8. சாமிசிதம்பரனார் பத்துப்பாட்டும் பண்டைத்தமிழரும்
9. ப அரங்கசாமி பத்துப்பாட்டில் பைந்தமிழ் வளம்

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	MM	M	M	M	MM	S	S	S	S
CO2	M	M	M	M	S	S	S	S	M	M
CO3	M	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: V I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DTA42 Name of the Paper: தொல் - பொருளதிகாரம் II Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: Practical Hours: 0

Course Objectives

- 1.மெய்ப்பாட்டின் பொது இலக்கணம் அறிதல் மனிதனின் உடலில் தோன்றும் எண்வகை மெய்ப்பாட்டை அறிதல்
2. உவமையின் வகைகள் அறிதல் அணிகளுக்கு எல்லாம் ஊற்றாக இருப்பதை உணர்தல் தொல்காப்பியர் கால உவமைகளை அறிதல்
3. மரபுப்பெயர் இளமைப்பெயர் ஓரறிவு முதல் ஆற்றிவு உயிரினங்களின் தன்மை அறிதல்
- 4.மீழின் தொன்மை சிறப்பை அறிந்து கொள்ளலாம் அகத்தியரைப்பற்றி செய்தி அறிந்துகொள்ளலாம்
2. தொல்காப்பியர் பற்றியும் பொருள் அஅதிகாரம் பற்றியும் அறியலாம்
- 3.திணை பால் எண் வழக்கு சுட்டு வினா வகை (கிளவியாக்கம்) வேற்றுமை பெயர்கள் வகைப்பாடு வேற்றுமை உருபுகள் -அறிதல்
- 2.உருபினும் பொருளினும் மெய் தடுமாறி நிற்கும் வேற்றுமைகள் வினைச்சொல் ஆகுபெயர் (வேற்றுமை மயங்கியல்) தெளிதல்
- 3.உயர்திணை அ.:றிணை அ.:றிணை விரவுப்பெயர்கள் பெயர்ச்சொல் வகைப்பாடு ஆகியவற்றை தெரிதல் -
4. இடைச்சொல் பற்றிய விளக்கங்கள் இடைச்சொல்லுக்கென்று தனி இயல்பு இடைச்சொல்லுக்கு புறநடை அறிதல்
5. மொழியானது செய்யுள், வழக்கு என்று பாகுபடுத்தப்பட்டுள்ளதை அறிதல் செய்யுள் ஈட்டச்சொல் செய்யுளில் தொடர் அமைதி இலக்கணத்தில் கட்டுப்படாத மொழி அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to உயிர் மெய் -எழுத்து பிறப்பு அறிதல்
2. After studied unit-2, the student will be able to மொழிக்கு இறுதில் வரும் எழுத்துக்கள் மொழிக்கு முதலில் வரும் எழுத்துக்கள் 22 முதல் எழுத்தும் இறுதியில் வரும் 24 எழுத்துக்களோடு பணரும் பாங்கு -அறிதல்.....
3. After studied unit-3, the student will be able to நிதமிழகத்தில் நிலவி வரும் மரபுப்பெயர்களை அறிதல் விலங்கினத்திற்கு உள்ள இளமைப்பெயர் புலன் உணர்வு கொண்டு ஓரறிவு முதல் ஆற்றிவு வரை அறிதல் ஆண்பாற்பெயர் பெண்பாற் பெயர் சிறப்பு வழக்கு மரபு அறிதல்

4. After studied unit-4, the student will be able to இலக்கியம் படைப்பதற்குரிய இலக்கணம் அறிதல் யாப்பியலின் தன்மை நோக்குதல் மாத்திரை எழுத்து அசைவகை அடி யாப்பு மரபு தூக்கு தொடை நோக்கு பா அளவு திணை முதலானவை அறிதல்

5. After studied unit-5, the student will be able to ஓசை முதலியவற்றால் கேட்பாரை மீட்டும் தன்னை நோக்கச் செய்யும் செய்யுள் உறுப்பு பற்றி அறிதல் பாவின் தன்மை அறிதல் திணை பற்றி அறிந்துகொள்ளுதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

...16மெய்ப்பாட்டியல் முழுவதும்

Teaching Hours:

Unit-2: (50 to 100 contents)

உவமையியல்

Teaching Hours: ...15

Unit-3: (50 to 100 contents)

மரபியல் முழுவதும்

Teaching Hours: ...16

Unit-4: (50 to 100 contents)

செய்யுளியல் சூத்திரம் 1 முதல் 118 வரை

Teaching Hours: ...15

Unit-5: (50 to 100 contents)

செய்யுளியல் சூத்திரம் 119 முதல் 235 வரை

Teaching Hours: ...16

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1 – 10

1. மு. சண்முகம் பிள்ளை (ப.ஆ) தொல்காப்பியம் பொருளதிகாரம்
2. ச.வே.சுப்பிரமணியம் தொல்காப்பியம் பொருளதிகாரம்
3. கு.சுந்திரமூர்த்தி தொல்காப்பியம் பொருளதிகாரம்

4. ஆ.சிவலிங்கனார் தொல்காப்பியம் உரைவளம்

5. வ.சுப.மாணிக்கம் தொல்காப்பியத்திறன்

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	MM	M	M	M	MM	S	S	S	S
CO2	M	M	M	M	S	S	S	S	M	M
CO3	M	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code:DETA43B Name of the Paper: கணினித்தமிழ் Credit: 3S

Total Hours per Week:5 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours: 0

Course Objectives

- 1.கணினியின் வரலாறு - அதன் வளர்ச்சி அறிதல் - சமுதாயப்பயன்பாடு இன்றைய வளர்ச்சி அறிதல்
2. கணினிக்கு ஏற்ற மொழி நிரல் உருவாக்குதலை அறிதல் (computer languages & programming) ராமென்பொருள் உருவாக்குதல் இணையம் பயன்படுத்தும் தன்மை அறிதல்
3. கணினி மொழியியல் உருவாக்குதலும் பயன்பாடும் இயந்திர மொழிபெயர்ப்புஅறிதல்
4. கணினி வழி மொழியியல் ஆய்வு அறிதல் ஒளிவழி எழுத்துப்படிப்பான் தன்மை அறிதல்
5. தமிழ் இலக்கண பிழைதிருத்தி பயன்பாடு உணர்தல் கற்றல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to கணினின் வரலாறு , தோற்றம் வளர்ச்சி . கணினியின் வகைகள் ,கணினிவழிக்கல்வி அதன்பயன்கள் வன்பொருள் சாதனங்கள் மென்பொருள் சாதனங்கள் போன்றவை அறிதல்
2. After studied unit-2, the student will be able toகணினிக்கான நிரல் குறிமுறை (CODE) உருவாக்குதல் எழுத்துவடிவில் உள்ள உரையையோ பேச்சையோ ஒருமொழியில் இருந்து மற்றொரு மொழிக்கு மொழிபெயர்ப்பது அறிவது மொழி பெயர்ப்பின் கலையாக தற்கால கணிப்பீட்டு மொழியில் அறிதல் கணினி அகராதியல் உருவாக்கம்அறிதல்
3. After studied unit-3, the student will be able to மொழிநோக்கில் மொழி ஆய்வு அறிதல்
4. After studied unit-4, the student will be able to இளங்கோவடிகள் காட்டும் சமூகம் - சாதியம் -சமயம் பெண்ணியம் முதலானவை அறிந்துகொள்ளுதல்
5. After studied unit-5, the student will be able to நபத்தி வடிவமைப்பு எழுத்துரு தமிழ்ச்சொல்லாளர் சொல்லாளர்களின் மொழிக்கருவிகள் போன்றவை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**Teaching Hours: ...13**

கணினி – பொது அறிமுகம்- கணினி வரலாறு– வன்பொருளும்மென்பொருளும் (Hardware and Software) – கணினியின் அமைப்புச் செயல்பாடு– கணினியின் இன்றைய வளர்ச்சி.

Unit-2: (50 to 100 contents)**Teaching Hours: ...13**

கணினி மொழிகளும் நிரல் உருவாக்கமும்(Computer Languages & Programming), இயந்திரமொழி– சுட்டு மொழி – உணர்நிலை மொழி– மென்பொருள் நிரல் உருவாக்கம் (Software Programme) – செயற்பாட்டு மென்பொருள்(System Software) – பயன்பாட்டு மென்பொருள்(Application Software) – பல்லுடகம் (Multimedia) - இணையம்(Internet) – மின்னஞ்சல் (E-mail) – கணினியின் ஏனைய பயன்பாடுகள்.

Unit-3: (50 to 100 contents)**Teaching Hours: ...13**

கணினி மொழியியல்(Computational Linguistics) இயற்கை மொழிகள் ஆய்வு(Natural Language Processing– NLP) - இயந்திர மொழிபெயர்ப்பு (Machine Translation) – கணினி அகராதியியல் (Computer Lexicography) – தரபு மொழியில்(Copos Linguistiics) – சொல்பிரிப்பான் (Paser)

Unit-4: (50 to 100 contents)**Teaching Hours: ...13**

ஒளி வழி எழுத்துப் படிப்பான்(Ootucak Character

Recognizer) – கணினி நோக்கில் மொழி ஆய்வு– மொழிநோக்கில் கணினி ஆய்வு– செயற்கை அறிவுத் திறன் - கணினி இலக்கிய ஆய்வு

Unit-5: (50 to 100 contents)**Teaching Hours: ...13**

தமிழ்ச் சொல்லாளர்- சொல்லாளரில் இடம் பெறும் மொழிக் கருவிகள்

- சொற்பிழைதிருத்தி– சந்திப்பிழைதிருத்தி- இலக்கணப்பிழை

திருத்தி– பல்வேறு அகராதிகள்- சொல்லடைவு– அகரவரிசைப்படுமுத்தல்- ஏனைய மொழிக்கருவிகள்- பக்க வடிவமைப்பு- இடைவெளி அமைத்தல்- பத்தி வடிவமைப்பு– எழுத்துரு– படம், அட்டவணை இணைத்தல்- கோடு போன்றவை வரைதல்- அடைப்புப் பெட்டி உருவாக்குதல்- அடிக்குறி எண்ணிடல் - பொட்டிடல் - அச்சிடுதல்.

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1 – 10

- 1.கே. புவனேஸ்வரி : இன்.பர்மேஷன் டெக்னாலஜி – ஓர் அறிமுகம்,
கலைஞன் பதிப்பகம், சென்னை – 17, பதிப்பு,2005.
- 2.கே. புவனேஸ்வரி : விஷ்வல் பேசிக்,
கலைஞன் பதிப்பகம், சென்னை– 17, பதிப்பு,2005.
- 3.கே. புவனேஸ்வரி : இண்டர்நெட்,
கலைஞன் பதிப்பகம், சென்னை – 17, பதிப்பு,2005.
- 4.கே. புவனேஸ்வரி : இ - காமர்ஸ்,
கலைஞன் பதிப்பகம், சென்னை– 17, பதிப்பு,2005.
- 5.கே. புவனேஸ்வரி : எம்.எஸ்.வேர்ட் - 2000,
கலைஞன் பதிப்பகம். சென்னை– 17, பதிப்பு,2005.
6. கே. புவனேஸ்வரி : எம்.எஸ்.பவர்பாயிண்ட்,எம்.எஸ்.அக்ஸஸ்- 2000,
கலைஞன் பதிப்பகம், சென்னை 17,பதிப்பு,2006.
7. கே. புவனேஸ்வரி : எம்.எஸ்.எக்ஸல்- 2000,
கலைஞன் பதிப்பகம், சென்னை– 17, பதிப்பு,2006.

- 9.மு. சிவலிங்கம் : டாஸ் கையெடு,
கலைஞன் பதிப்பகம், சென்னை- 17, பதிப்பு,2006.
- 10.பாக்கியநாதன் : எளிய தமிழில்ORACLE,
கலைஞன் பதிப்பகம், சென்னை- 17, பதிப்பு,2006.
11. ஸ்ரீ தேவி : எளிய தமிழில்C++
கலைஞன் பதிப்பகம், சென்னை- 17, பதிப்பு,2006.
- 12.பாக்கியநாதன் : எளிய தமிழில்VC++
கலைஞன் பதிப்பகம், சென்னை- 17, பதிப்பு,2006.
- 13.பாக்கியநாதன் : எளிய தமிழில்JAVA,
கலைஞன் பதிப்பகம். சென்னை- 17, பதிப்பு,2006.
- 14.செபாஸ்டியன்ராஜ் : எளிய தமிழில்HTML,
கலைஞன் பதிப்பகம், சென்னை- 17, பதிப்பு,2006.
- 15.பாக்கியநாதன் : எளிய தமிழில் இன்டர்நெட் அகராதி,
கலைஞன் பதிப்பகம், சென்னை- 17, பதிப்பு,2006.
- 16.பாக்கியநாதன் : எளிய தமிழில்UNIX,
கலைஞன் பதிப்பகம். சென்னை- 17, பதிப்பு,2006.
- 17.சுஜாதா : கணிப்பொறியின் கதை,
பாரதி பதிப்பகம், சென்னை - 17,
நான்காம் பதிப்பு,1994.
- 18.கே. சுந்தரராஜன் : இன்டர்நெட்,
கண்ணதாசன் பதிப்பகம், சென்னை- 17,
மூன்றாம் பதிப்பு,1994.
- 19.எஸ். துணிக்கை அரசு: விண்டோஸ் 95 & 98,
நர்மதா பதிப்பகம், சென்னை - 17.
முதற்பதிப்பு,2000.

20.இராம்குமார் : கணிப்பொறி ஓர் அறிமுகம்,
கழக வெளியீடு,மறுபதிப்பு,1990.

21.க. அபிராமி : மல்டிமீடியா கற்றுக் கொள்ளுங்கள்,தமிழ்ப்
புத்தகாலயம், சென்னை – 17,
முதற்பதிப்பு,1998.

22.தணிகை அரசு : இன்டர்நெட் 2000,
நர்மதா பதிப்பகம், சென்னை –
17,முதற்பதிப்பு,1999.

Course Material: website links, e-Books and e-journals

Tamil virtual University : <https://www.tamilvu.org>

International Research Journal of Tamil

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: DOTA44A Name of the Paper: திருவள்ளுவம் Credit: 3

Total Hours per Week: 5 Lecture Hours:6 Tutorial Hours: 0 Practical Hours: 0

Course Objectives

1. திருக்குறள் உள்ளடக்கமும் அமைப்பும்-திருவள்ளுவம் காட்டும் சமூகப் பொருளாதாரச் சமயச் சிந்தனைகள் அறிதல்.
2. திருக்குறளின் உரைகள் பற்றிய செய்திகள் மொழிபெயர்ப்புகள் தெளிதல் திருக்குறள் வெளிவந்த மூலம் மற்றும் உரைப்பதிப்புகள் ஆய்வுகள் பற்றி அறிந்து கொள்ளுதல்
3. திருவள்ளுவத்தை இலக்கணம் மற்றும் மொழியில் பார்வையில் அணுகுதல் பார்வை – தொடரியல் அமைப்பு அறிதல்
4. யாப்பியல் நோக்கில் திருக்குறள் அமைந்துள்ள பாங்கறிதல்
5. திருவள்ளுவத்தில் அழகியல் அணிநலன் அறிதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to
திருக்குறளின் உள்ளடக்கத்தின் தன்மை அதன் அதிகார பகுப்பு அமைந்துள்ள விதம் ஒன்றன்பின் ஒன்றாக வைத்த முறை – பெண்ணியச் சிந்தனைகள் சமூகப்பொருளாதார சிந்தனைகள் அறிதல்
2. After studied unit-2, the student will be able to
உலக அளவில் திருக்குறளின் மொழிபெயர்ப்புகள் திருக்குறள் பெற்ற பெருமை அதன்பொருட்டு ஏற்படுத்தப்பட்ட பரிசுகள் ஆய்வுக்கட்டுரைகள் அறிதல்
3. After studied unit-3, the student will be able to
திருக்குறளின் இலக்கண கட்டமைப்பு மொழியியல் நோக்கில் வள்ளுவம் அமைந்துள்ளபாங்கு திருக்குறளில் பயின்று வரும் ஒலியன் உருபன் பற்றி அறிந்துகொள்ளுதல்
4. After studied unit-4, the student will be able to
யாப்பியல் நோக்கில் திருக்குறள் அமைந்துள்ளதன்மை அறிதல்
5. After studied unit-5, the student will be able to
அழகியல் நோக்கில் திருவள்ளுவம் பயின்றுள்ள பாங்கு சொல்லணிகள் பொருளணிகள் வள்ளுவத்தில் வந்துள்ள தன்மை அறிதல்

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)**1Teaching Hours: ...13**

திருக்குறள் உள்ளடக்கமும் அமைப்பும்- பால்,
இயல்,அதிகாரப்பகுப்பு,வைப்புமுறை,பெரும்பான்மை சிறுபான்மைக் கருத்துகள்-
பெண்ணியச்சிந்தனைகள் -அரசியல்,சமூகப் பொருளாதாரச் சமயச் சிந்தனைகள்.

Unit-2: (50 to 100 contents)**Teaching Hours: ...13**

திருக்குறள் உரைகள்-மொழிபெயர்ப்புகள், பதிப்புகள்- அமைப்புகள்,
பரிசுகள்,ஆளுமைகள்-திறனாய்வுகள்,ஆய்வுகள்,நூல்கள்,கட்டுரைகள்

Unit-3: (50 to 100 contents)**1Teaching Hours: ...13**

திருக்குறளில் இலக்கண மொழியியல் பார்வை: எழுத்து, சொல், தொடர்,வாக்கியம்-
கூற்று:ஒலியன்,உருபன்,தொடரன்,பொருளன், கருத்தாடல் -புணர்ச்சிஇலக்கணம் -
உருபொலியன்கள்.,திருக்குறள் அகராதிகள், சொல்லடைவுகள், பொருளடைவுகள்

Unit-4: (50 to 100 contents)**Teaching Hours: ...13**

யாப்பியல் நோக்கு : எழுத்து, அசை, சீர்,தளை,யாப்பு, அடி

Unit-5: (50 to 100 contents)**Teaching Hours: ...13**

அழகியல்- அணியியல் நோக்கு — அணி வகைகள். சொல்லணிகள்-

பொருளணிகள்- இசைக்கூறுகள்- ஒலிநயம் - தொடை வகைகள்

Internal Assessment Methods: (refer the instructions)**Text book:****Reference Book**

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சென்னைப் பல்கலைக்கழகம், சென்னை,
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முதற்பதிப்பு.,
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Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	M	M	S	S	S	S	S
CO3	S	S	S	S	S	M	M	S	S	S
CO4	S	M	S	S	M	S	S	S	S	M
CO5	S	S	S	S	S	M	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

ANNEXURE - I

Course Structure

THIRUVALUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core / Practical / Elective / Open Elective / Project / Other

Paper code: Name of the Paper: இளங்கோவடிகள் Credit: 4

Total Hours per Week:5 Lecture Hours: 5 Tutorial Hours: 1 Practical Hours: 0

Course Objectives

1. சிலப்பதிகாரத்தின் காப்பியச்சூழலை அறிதல்
2. காப்பிய இலக்கணம் காப்பிய வகைகளைத் தெரிந்து கொள்ளுதல்
3. சிலப்பதிகாரம் பிற இலக்கியங்களுடன் ஒப்பிட்டு அறிந்து கொள்ளுதல்
4. இளங்கோவடிகளின் படைப்பாளுமையை அறியும் திறன் பெறுதல்
5. தமிழ் இலக்கிய வரலாற்றிலும் தமிழக வரலாற்றிலும் சிலம்பு பெறும் இடம் மற்றும் சிலம்பு குறித்து வெளிவந்த ஆய்வுகளைத் தெரிந்து கொள்ளுதல்

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to சிலப்பதிகாலச் சூழல் -சமயநிலை இளங்கோவடிகள் வரலாறு -காலம் குறித்து வரலாற்று இலக்கியச் சான்றுகள் - சிலம்பின் கதை தற்கால இலக்கியச் சூழலில் பெறும் இடம் முதலானவை தெரிந்து கொள்ளுதல்
2. After studied unit-2, the student will be able to ஐம்பெருங்காப்பியம் -சிறுகாப்பியம் காப்பிய இலக்கணம் - சிலம்பு வலியுறுத்தும் ஒற்றுமை பிறமொழிக்காப்பியங்களுடன் ஒப்பீடு முதலானவை அறிந்துகொள்ளுதல்
3. After studied unit-3, the student will be able to சங்க இலக்கியங்களில் சிலம்பின் கதை நாட்டுப்புற இலக்கியங்களில் சிலம்பு- சிலம்பில் நாட்டுப்புறக் கூறுகள் கதைமாந்தர்கள் கிளைக்கதைகள் முதலானவை தெரிந்துகொள்ளுதல்
4. After studied unit-4, the student will be able to இளங்கோவடிகள் காட்டும் சமூகம் - சாதியம் -சமயம் பெண்ணியம் முதலானவை அறிந்துகொள்ளுதல்
5. After studied unit-5, the student will be able to நன்னெறி காட்டும் ஒழுக்க நெறிகள் அறிதல் - துறைமங்கலம் சிவப்பிரகாசர் வாழ்வியலை அறிதல் பிறப்பினால் உயர்வு தாழ்வு வேண்டற்கு போன்றவை தெளிதல்.....

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes

2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: ...13

இளங்கோவடிகளையார் என்பது குறித்த வரலாறு-அரசர்வணிகர்சமயம்சைவம்- அவர்காலத்துக் காப்பியச்சூழல் 16ஆம்நூற்றாண்டுஅகச்சான்று-புறச்சான்று-காப்பியகாலச்சூழல்-சமகாலஇலக்கியம் அறிதல்

Unit-2: (50 to 100 contents)

Teaching Hours: ...13

காப்பியஇலக்கணம்-காப்பியவகைகள்- சிலம்புபெறும்இடம்-குடிமக்கள் காப்பியம் - தேசியக்காப்பியம் - ஒற்றுமைக்காப்பியம்- முத்தமிழ்க்காப்பியம்- வரலாற்றுக்காப்பியம்- பிறமொழிக்காப்பியங்களுடன் ஒப்பீடு.

Unit-3: (50 to 100 contents)

Teaching Hours: ...13

சிலப்பதிகாரக்கதை- சங்கஇலக்கியம் கோவலன் கதை-கோவலன் கண்ணகி நாடகம் - சிலம்பில்நாட்டுப்பறக்கூறுகள்- நாட்டுப்புறக்களங்கள் - நாட்டுப்புறமாந்தர்கள்- பிறநாடுகளில் கண்ணகி கதை

Unit-4: (50 to 100 contents)

Teaching Hours: ...13

இளங்கோவடிகளின் பல்வேறு பரிணாமங்கள்- அரசியல் அறிஞர் - பொருளியல் வல்லுநர் - சமூகச்சிந்தனைகள்- சாதிசமய பாகுபாடுகடந்தவர் - பெண்மைபோற்றுபவர்- கவிஞர் -கலைஞர் - அறவோர் -துறவோர்

Unit-5: (50 to 100 contents)

Teaching Hours: ...13

சிலப்பதிகாரத்தின் அமைப்பு- காண்டம் - காதை வைப்பு முறை-தொடக்கம்- முடிவு - மூன்றுகாண்டத்தின் சிறப்பில்பு - தமிழ் இலக்கியவரலாற்றிலும் தமிழக வரலாற்றிலும் சிலப்பதிகாரம். இளங்கோவடிகள் குறித்தஆய்வுகள்போன்றவை தெளிதல்.....

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1 – 10

முனைவர் இராம குருநாதன் சிலப்பதிகாரம் ஆய்வுக்கோவை பழனியப்பா பிரதர்ஸ்

சென்னை 14

ரகுநாதன் இளங்கோவடிகள் யார்? மீனாட்சி புத்தக நிலையம் மதுரை
மது.ச.விமலானந்தம் சிலப்பதிகாரத்திறனாய்வு,மணிவாசகர் பதிப்பகம், சிதம்பரம். ச.வே.
சுப்பிரமணியன் இளங்கோவின் உத்திகள், உலகத்தமிழாராய்ச்சி நிறுவனம்
சென்னை.

கு.முத்துராசன் காப்பியக் கருத்தோட்டங்கள்

மார்க்கபந்து சர்மா சிலம்பின் தனித்தன்மை,மணிவாசகர் நூலகம்,சிதம்பரம். ஜீவபந்து
,ஸ்ரீபால் இளங்கோவடிகள் சமயம்,ஜைன இளைஞர்மன்றம்,
சென்னை.

ம.பொ.சிவஞானம் சிலப்பதிகாரஆய்வுரை, பூங்கொடி பதிப்பகம்

Course Material: website links, e-Books and e-journals

Tamil virtual University : <https://www.tamilvu.org>

International Research Journal of Tamil

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	M	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY

BACHELOR OF ARTS

DEGREE COURSE

B.A. TAMIL

CBCS PATTERN

(With effect from 2022 – 2023)

PROGRAMME OBJECTIVES:

1. தமிழ் இலக்கியம் படிப்பதால் தாய்மொழி உணர்வு மேம்படும்.
2. தமிழ் பண்பாட்டை மாணவர்களிடம் வளர்க்கவும் மேம்படுத்தவும் முடியும்.
3. தமிழ் இலக்கியம் படிப்பவர்கள் ஆசிரியர், பத்திரிக்கையாளர் முதலான பணிகளுக்கு அதிக வாய்ப்பு கிடைக்கும்.
4. அரசின் போட்டித் தேர்வுகளில் தமிழ் படித்த மாணவர்கள் அதிகம் வெற்றிபெற வாய்ப்பு உருவாகும்.
5. பல வகையான தமிழ் இலக்கியங்களை படிப்பதன் மூலம் நல்ல ஒழுக்கங்களை பின்பற்ற முடியும்.

PROGRAMME EDUCATIONAL OBJECTIVES:

1. தமிழ் இலக்கியம், இலக்கணம் தொடர்பான அறிவை வளர்த்துக் கொள்ளமுடியும்.
2. பிழையில்லாமல் பேசவும், எழுதவும் படைப்பாக்கத்திறனை வளர்த்துக் கொள்ளவும் முடியும்.
3. மேற்படிப்புக்கான முதுகலை, கல்வியியல், முனைவர் போன்ற பட்டங்களைப் பெற்று பல்வேறு பணியில் சேர வாய்ப்புகள் உருவாகும்.
4. மாணவர்களின் திறனை மேம்படுத்தவும், சமூக நலனில் அக்கறைக்கொள்ளவும் தேச வளர்ச்சியில் பங்குக் கொள்ளவும் வாய்ப்புகள் உண்டாகும்.
5. உயர்படிப்பிற்கும், பதவிக்கும் தமிழ் படித்தவர்களுக்கு முன்னுரிமை வழங்குவதால் தமிழ் இலக்கியத்தை மாணவர்கள் விரும்பி கற்றுக்கொள்வார்.

PROGRAMME SPECIFIC OUTCOMES:

1. பழந்தமிழர் பண்பாட்டை இளையத் தலைமுறைக்கு எடுத்துரைக்க முடியும்.
2. கல்வெட்டுகள் பற்றிய அறிவைப் பெறுவதால் அந்தத் துறையில் மேற்கொண்டு பயணிக்க முடியும்.
3. தொல்லியல் தொடர்பான ஆழ்ந்த அறிவை பெற்று, அத்துறையில் பணியாற்ற முடியும்.

4. கவிதை, கதை, கட்டுரை போன்ற படைப்பாக்க இலக்கியங்களை விரும்பி கற்பதன் மூலம் படைப்பாளர்களாக மாற்றுவதற்கு வாய்ப்புகள் உருவாகும்.
5. பேச்சுகளை, எழுத்துக்களை, கவிதைகளை போன்றவற்றில் ஆர்வம் அதிகமாகும்.
6. தமிழ் இலக்கிய, இலக்கண நூல்களை விரும்பிக் கற்பதனால் தமிழாந்த அறிஞர்களாக உருவாக முடியும்.
7. தமிழ் புலமை அதிகரிப்பதனால் பல தமிழ் அறிஞர்களிடம் மொழி குறித்த விவாதங்கள் செய்ய முடியும்.
8. சமூக ஊடகங்களான செய்தித்தாள், தொலைக்காட்சி போன்ற துறைகளில் தங்களை ஈடுபடுத்திக் கொள்ள முடியும்.
9. தமிழ் இலக்கியங்கள், இலக்கணங்கள் தொடர்பான கோட்டுபாட்டு அடிப்படையில் ஆய்வுகள் செய்ய முடியும்.
10. தமிழின் மேன்மையை தமிழ் கூறும் நல் உலகிற்கு எடுத்துரைக்கலாம்.

PROGRAMME OUTCOMES:

1. தமிழில் அடிப்படை இலக்கணத்தைக் கற்றுக் கொள்ள முடியும்.
2. பத்திரிக்கை துறையில் வல்லுனராக பணியாற்ற முடியும்.
3. திரைத்துறைகளில் பங்கேற்று புகழ்பெற முடியும்.
4. தமிழ் அறிவை கற்பதனால் நல்ல கவிஞராக வலம் வரலாம்.
5. சிறுகதை, நாவல் போன்ற இலக்கியத் துறைகளால் எழுத்தாளராக வரலாம்.
6. கல்வித்துறையில் ஆசிரியர், பேராசிரியர் போன்ற பணிகளில் திறம்பட செயல்பட முடியும்.
7. அரசுத்துறைகளில் தமிழ் கற்றதனால் பணிகளில் சேர வாய்ப்புகள் அதிகம் கிடைக்கும்.
8. மொழியியல் அறிஞராக பல ஆய்வுகளை மேற்கொள்ள முடியும்.

THIRUVALLUVAR UNIVERSITY

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(With effect from 2020 – 2021)

The Course of Study and the Scheme of Examination

S. No.	Part	Study Components		Ins. Hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni.Exam	Total
SEMESTER I									
1	I	Language	Paper-1	6	4	தமிழ்/பிறமொழிகள்	25	75	100
2	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3	III	Core Theory	Paper-1	5	3	இக்கால இலக்கியம் (கவிதை, உரைநடை, நாடகம், புதினம், சிறுகதை)	25	75	100
4	III	Core Theory	Paper-2	4	3	இலக்கணம் - 1 நன்னூல் (எழுத்ததிகாரம்)	25	75	100
5	III	ALLIED – 1	Paper-1	7	4	தமிழக வரலாறும் பண்பாடும்	25	75	100
6	III	PE	Paper-1	6	3	Professional English I	25	75	100
7	IV	Environment Studies		2	2	சுற்றுச் சூழல் பிரிவுகள்	25	75	100
TOTAL				36	23		175	450	600
SEMESTER II									
8	I	Language	Paper-2	6	4	தமிழ்/பிறமொழிகள்	25	75	100
9	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
10	III	Core Theory	Paper-3	5	3	இக்கால இலக்கியம் (கவிதை, உரைநடை, நாடகம், புதினம், சிறுகதை)	25	75	100
11	III	Core Theory	Paper-4	4	3	இலக்கணம் - 2 நன்னூல் (சொல்லதிகாரம்)	25	75	100
12	III	ALLIED – 1	Paper-2	7	6	தமிழக வரலாறும் பண்பாடும்	25	75	100
13	III	PE	Paper-1	6	3	Professional English II	25	75	100
14	IV	Value Education		2	2	மதிப்புக் கல்வி	25	75	100
15	IV	Soft Skill		2	1	Soft Skill	25	75	100
TOTAL				30	26		200	525	700

S. No.	Part	Study Components		Ins. Hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER III							CIA	Uni. Exam	Total
16	I	Language	Paper-3	6	4	தமிழ்/பிறமொழிகள்	25	75	100
17	II	English	Paper-3	6	4	ஆங்கிலம்	25	75	100
18	III	Core Theory	Paper-5	3	3	இலக்கியம் 3 சமயப்பாடல்களும் சிற்றிலக்கியங்களும்	25	75	100
19	III	Core Theory	Paper-6	3	3	இலக்கணம் - 3யாப்பருங்கலக்காரிகை	25	75	100
20	III	ALLIED – 2	Paper-3	7	4	தமிழ் இலக்கிய வரலாறு - 1	25	75	100
21	IV	Skill based Subject	Paper-1	3	2	பயன்பாட்டுத் தமிழ்	25	75	100
22	IV	Non-major elective	Paper-1	2	2	தமிழ்மொழி – அடிப்படை இலக்கணம்	25	75	100
TOTAL				30	22		175	525	700
SEMESTER IV							CIA	Uni. Exam	Total
23	I	Language	Paper-4	6	4	தமிழ்/பிறமொழிகள்	25	75	100
24	II	English	Paper-4	6	4	ஆங்கிலம்	25	75	100
25	III	Core Theory	Paper-7	3	3	இலக்கியம் 4 காப்பியங்கள்	25	75	100
26	III	Core Theory	Paper-8	3	3	இலக்கணம் - 4தண்டியலங்காரம் (பொருளணியியல் மட்டும்)	25	75	100
27	III	ALLIED – 2	Paper-4	7	4	தமிழ் இலக்கிய வரலாறு - 2	25	75	100
28	IV	Skill based Subject	Paper-2	3	2	படைப்பிலக்கியமும் மொழிபெயர்ப்பும்	25	75	100
29	IV	Non-major elective	Paper-2	2	2	இணையம்	25	75	100
TOTAL				30	22		175	525	700
SEMESTER V							CIA	Uni. Exam	Total
30	III	Core Theory	Paper-9	5	4	சங்க இலக்கியம் (அகம்)	25	75	100
31	III	Core Theory	Paper-10	6	4	இலக்கணம் 5 (அகம்)	25	75	100
32	III	Core Theory	Paper-11	6	4	தமிழ்மொழி வரலாறு	25	75	100
33	III	Core Theory	Paper-12	6	4	இலக்கியத் திறனாய்வு	25	75	100
34	III	Elective	Paper-1	4	3	(கீழ்க்கண்ட மூன்றில் ஏதேனும் ஒன்றைத் தெரிவுசெய்துகொள்ளலாம்) அ. தகவல் தொழில்நுட்பம் ஆ. நாட்டுப்புறவியல் இ. விளம்பரக்கலை	25	75	100
35	IV	Skill based Subject	Paper-3	3	2	தொல்லியல்	25	75	100
TOTAL				30	21		150	450	600

S. No.	Part	Study Components		Ins. Hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title							
SEMESTER VI							CIA	Uni. Exam	Total
36	III	Core Theory	Paper-13	5	4	சங்க இலக்கியம் (புறம்)	25	75	100
37	III	Core Theory	Paper-14	6	4	இலக்கணம் 6 (புறம்)	25	75	100
38	III	Core Theory	Paper-15	6	4	திராவிட மொழிகளின் ஒப்பிலக்கணம்	25	75	100
39	III	Compulsory Project	Paper-16	5	5	Group / Individual Project	25	75	100
40	III	Elective	Paper-2	5	3	(கீழ்க்கண்ட மூன்றில் ஏதேனும் ஒன்றைத் தெரிவுசெய்துகொள்ளலாம்) அ. இதழியல் ஆ. புத்தக பதிப்பியல் இ. தமிழ் உரைநடை வரலாறு	25	75	100
41	III	Elective	Paper-3	5	3	(கீழ்க்கண்ட மூன்றில் ஏதேனும் ஒன்றைத் தெரிவுசெய்துகொள்ளலாம்) அ. தமிழர் அழகுக் கலைகள் ஆ. பெண்ணியம் இ. சுற்றுலாவியல்	25	75	100
42	IV	Skill based Subject	Paper-4	3	2	தகவல் தொடர்பியல்	25	75	100
43	V	Extension Activities		-	1	விரிவாக்கச் செயல்பாடுகள்	100	-	100
TOTAL				30	26		250	450	700

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	4	8	100	200
	Allied (Even Semester)	2	6	12	100	200
	Electives	3	3	9	100	300
	Core	15	(3-7)	57	100	1500
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
	Professional English	2	3	6	100	200
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	3	12	100	400
Part V	Extension	1	1	1	100	100
	Total	43		140		4300

திருவள்ளூர் பல்கலைக்கழகம்
இளங்கலைப் பட்டப்படிப்பு
தமிழ்

2022-2023 ஆம் கல்வியாண்டு முதல் நடைமுறைப்படுத்தப்படும்

பாடத்திட்டம் (CBCS)
B.A. Tamil Syllabus (CBCS)

முதல் ஆண்டு
முதல்பருவம்

தாள் 1
இலக்கியம் I

நோக்கம்:

1. தமிழ் இலக்கியத்தின் இக்கால சமுதாயத்தை படைப்புகளின் வழி கற்பித்தல்.
2. படைப்பாற்றாலை ஊக்குவித்தல்.
3. இக்கால இலக்கியங்களில் படைப்பாக்க உத்திகளை விலக்குதல்.
4. புத்திலக்கிய நோக்கையும், போக்கையும் விளக்குதல்.
5. கதை, கவிதை போன்ற இலக்கிய வகைகளை திரைத்துறைக்கு எடுத்துச் செல்லுதல்.

இக்கால இலக்கியம் I
(கவிதை, உரைநடை, நாடகம், புதினம், சிறுகதை)

அலகு -1

Teaching Hours : 18

கவிதை

1) பாரதியார் கவிதைகள்

- | | | |
|--------------|---|--------------|
| 1. பாரததேசம் | - | 13 பாடல்கள், |
| 2. தமிழ் | - | 4 பாடல்கள் |

2) பாரதிதாசன் கவிதைகள் - தமிழியக்கம்,
(பாவை பப்ளிக்கேஷன்ஸ், சென்னை)

அலகு -2

Teaching Hours : 18

உரைநடை

முனைவர்.மு.கருப்புசாமி

-

தமிழ்த்தேர் (உரைநடை தொகுப்பு)
பாவைப்பதிப்பகம், மதுரை.

அலகு -3

Teaching Hours : 18

நாடகம்

கண்ணதாசன்

-

மாங்கனி (கவிதைநாடகம்)

அலகு -4

Teaching Hours : 18

புதினம்

இமயம்

-

ஆறுமுகம்

அலகு -5

Teaching Hours : 18

சிறுகதை

மண்மணக்கும் கதைகள்

-

தொகுப்பாசிரியர்
முனைவர் பா. சிங்காரவேலன்
காரா பப்ளிசர்ஸ், திருச்சி.

பயன் :

1. தமிழ் மொழியின் ஈடுபாட்டுணர்வை மிகுதிபடுத்திக் கொள்வர்
2. படைப்பு திறனை ஏற்படுத்தியும் வளர்த்தும் கொள்வர்.
3. வாசிப்புத் திறனை வளர்த்துக் கொள்வர்.
4. சமுதாயத்தில் பல்வேறு செயல்பாடுகளை கற்றுக்கொள்வர்.
5. ஊடகத்துறையில் ஈடுபடுத்திக்கொள்ளும் திறனைப் பெறுவர்.

தாள் 2
இலக்கணம் I
நன்னூல் - எழுத்ததிகாரம்

பாடநூல் : நன்னூல் - எழுத்ததிகாரம்
காண்டிகை உரை - ஆறுமுக நாவலர்
(முல்லை நிலையம்,
சென்னை - 1,
பதிப்பு, 2008.)

- அலகு 1 : பாயிரம்
- அலகு 2 : எழுத்தியல்
- அலகு 3 : பதவியல்
- அலகு 4 : உயிரீற்றுப் புணரியல்
- அலகு 5 : மெய்யீற்றுப் புணரியல், உருபு புணரியல்

சார்புப்பாடம் - 1

தாள் 1

தமிழக வரலாறும் பண்பாடும் - 1

பாடநூல் : தமிழக வரலாறும் மக்கள் பண்பாடும்,
டாக்டர் கே.கே. பிள்ளை,
உலகத் தமிழாராய்ச்சி நிறுவனம்,
தரமணி, சென்னை - 600 113.

- அலகு 1 : 1) தமிழக வரலாற்றுக்கான அடிப்படை ஆதாரங்கள்
2) தமிழகத்தின் இயற்கை அமைப்புகள்
3) வரலாற்றுக் காலத்துக்கு முந்திய தமிழகம்
4) சிந்துவெளி அகழ்வாராய்ச்சி
- அலகு 2 : 5) பண்டைத் தமிழரின் அயல்நாட்டுத் தொடர்புகள்
6) தமிழ் வளர்த்த சங்கம்
- அலகு 3 : 7) சங்க இலக்கியம்
8) பண்டைத் தமிழரின் வாழ்க்கை
- அலகு 4 : 9) களப்பிரர்கள்
- அலகு 5 : 10) பல்லவர்கள்
11) தமிழகத்தில் நான்காம் நூற்றாண்டு முதல் ஒன்பதாம் நூற்றாண்டு வரை சமூக நிலை

பார்வைநூல்கள் :

1. வே.தி. செல்லம், தமிழக வரலாறும் பண்பாடும்,
மணிவாசகர் பதிப்பகம்,
சென்னை - 600 108.
2. டாக்டர் ந.க.மங்களமுருகேசன் தமிழக வரலாறும், பண்பாடும்
சாரா பப்ளிஷர்ஸ், திருச்சி.

இரண்டாம் பருவம்

தாள் 3

இலக்கியம் 2

இக்கால இலக்கியம் 2

(கவிதை, உரைநடை, நாடகம், புதினம், சிறுகதை)

- அலகு 1 : **கவிதை**
வைரமுத்து - இன்னொரு தேசிய கீதம்
- அலகு 2 : **உரைநடை**
சுந்தரராமசாமி - காற்றில் கலந்த பேரோசை
- அலகு 3 : **நாடகம்**
ஜெயந்தன் - நினைக்கப்படும்
- அலகு 4 : **புதினம்**
பிரபஞ்சன் - மகாநதி
- அலகு 5 : **சிறுகதை**
சிறுகதைத் தொகுப்பு - ரிஷி பப்ளிகேஷன்ஸ் கோயம்புத்தூர்.

தாள் 4
இலக்கணம் 2

நன்னூல் - சொல்லதிகாரம்

பாடநூல் : நன்னூல் - சொல்லதிகாரம்
காண்டிகை உரை - ஆறுமுக நாவலர்
(முல்லை நிலையம்,
சென்னை-1,
பதிப்பு-2008)

- அலகு 1 : பெயரியல்
- அலகு 2 : வினையியல்
- அலகு 3 : பொதுவியல்
- அலகு 4 : இடையியல்
- அலகு 5 : உரியியல்

சார்புப்பாடம் - 1

தாள் 2

தமிழக வரலாறும் பண்பாடும் - 2

பாடநூல் : தமிழக வரலாறும் மக்கள் பண்பாடும்,
டாக்டர் கே.கே. பிள்ளை,
உலகத் தமிழாராய்ச்சி நிறுவனம்,
தரமணி, சென்னை - 600 113.

- அலகு 1 : 1) சோழப் பேரரசின் தோற்றம்
2) சோழப் பேரரசின் வளர்ச்சியும் வீழ்ச்சியும்
3) சோழர் காலத்தில் தமிழரின் சமுதாயம்
- அலகு 2 : 4) பாண்டியரின் தோற்றமும் வீழ்ச்சியும்
- அலகு 3 : 5) மதுரை நாயக்கர்கள்
6) தமிழகத்தில் 13 முதல் 18 ஆம் நூற்றாண்டு வரை சமூக நிலை
- அலகு 4 : 7) ஐரோப்பியரின் வரவு
8) பத்தொன்பதாம் நூற்றாண்டின் அரசியலும் தமிழகத்தின் சமூக நிலையும்
- அலகு 5 : 9) இருபதாம் நூற்றாண்டில் தமிழகம்

**இரண்டாம் ஆண்டு
மூன்றாம் பருவம்
சிறப்புப்பாடம்**

**தாள் 5
இலக்கியம் 3**

சமயப்பாடல்களும் சிற்றிலக்கியங்களும்

- அலகு 1 : திருஞானசம்பந்தர் - கோளறு திருப்பதிகம் (10)
சுந்தரர் - திருவதிகை - நொடித்தான் மலைப்பதிகம்
தானனை முன்படைத்தான் (1-10)
- அலகு 2 : திருப்பாணாழ்வார் - கொண்டல் வண்ணனை (1-10)
ஆண்டாள் - திருப்பாவை (1-10)
- அலகு 3 : பிள்ளைத்தமிழ் - மீனாட்சியம்மைப் பிள்ளைத்தமிழ் -
தாலப் பருவம்
கலம்பகம் - திருக்காவலூர்க் கலம்பகம் (1-10)
- அலகு 4 : குமரகுருபரர் - சிதம்பர மும்மணிக்கோவை (1-5)
சிவப்பிரகாசர் - சோணசைலமாலை (1-10)
- அலகு 5 : வேதநாயக சாஸ்திரியார் - ஞான நொண்டி நாடகம்
பெத்லேகம் குறவஞ்சி
குணங்குடியார் பாடல்கள் - தியானநிலை (1-10)

தாள் 6
இலக்கணம் 3
யாப்பருங்கலக்காரிகை

- அலகு 1 : உறுப்பியல் - எழுத்து, அசை, சீர்
- அலகு 2 : உறுப்பியல் - தளை, அடி, தொடை
- அலகு 3 : செய்யுளியல் - வெண்பா, ஆசிரியப்பா
- அலகு 4 : செய்யுளியல் - கலிப்பா, வஞ்சிப்பா, மருட்பா
- அலகு 5 : ஒழிபியல்

சார்புப்பாடம் - 2

தாள் 3

தமிழ் இலக்கிய வரலாறு - 1

பாடநூல் : தமிழ் இலக்கிய வரலாறு,
ச. ஈஸ்வரன்
நிர்மலா பதிப்பகம், சென்னை.

- அலகு 1 : சங்க காலம் & சங்க இலக்கியங்கள் (1 – 42)
- அலகு 2 : பதினெண்கீழ்க்கணக்கு நூல்கள் முதல் காப்பியங்கள் வரை (43 – 54)
- அலகு 3 : இரட்டைக் காப்பியங்கள் முதல் பக்தி இலக்கியங்கள் வரை (65 – 97)
- அலகு 4 : இடைக்கால இலக்கிய இலக்கணங்கள் முதல் சிற்றிலக்கியங்கள் வரை (98 – 155)
- அலகு 5 : சைவத் திருமடங்களின் தமிழ்த்தொண்டு முதல் வைணவர்களின் தமிழ்த்தொண்டு (159 – 163)

பார்வை நூல்கள் :

1. முனைவர் அ. ஜெயம், : தமிழ் இலக்கிய வரலாறு
சந்திரலேகா வைத்தியநாதன் ஜனகா பதிப்பகம்,
63, தம்பையா சாலை, மேற்கு மாம்பலம்,
சென்னை – 600 003.
2. எம்.ஆர். அடைக்கலசாமி : தமிழ் இலக்கிய வரலாறு,
பால்நிலா பதிப்பகம்,
லயோலா நகர், சென்னை – 600 024.
3. முனைவர். கி. ராசா : தமிழ் இலக்கிய வரலாறு
நியூ செஞ்சுரி புக் ஹவுஸ்
சென்னை – 98

திறன் அடிப்படையிலான விருப்பப்பாடம் - 1

தாள் 1

பயன்பாட்டுத் தமிழ்

பாடநூல் : கா. பட்டாபிராமன் - மொழிப் பயன்பாடு,
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்.,
41-பி, சிட்கோ இன்டஸ்ட்ரியல் எஸ்டேட்,
அம்பத்தூர்.

- அலகு 1 : ஆசிரியர் கடிதம்
- அலகு 2 : அலுவலகம் கடிதம்
- அலகு 3 : விளம்பரத் தமிழ், பதிப்பாசிரியர்
- அலகு 4 : மெய்ப்புத் திருத்தலும் நூலாக்கப் பணியும்
- அலகு 5 : வானொலி, தொலைக்காட்சி நிகழ்ச்சிகளில் பங்குபெறல்,
ஆவணங்கள் வரைதல்.

துறை சாரா விருப்பப்பாடம் - 1

தாள் 1

தமிழ்மொழி – அடிப்படை இலக்கணம்

பாடநூல் : தவறின்றித் தமிழ் எழுத,
மருதூர் அரங்கராசன்,
ஐந்திணைப் பதிப்பகம்,
279, பாரதி சாலை, திருவல்லிக்கேணி, சென்னை-5,
போன் : 044 – 28549410

- அலகு 1 : எப்படி எழுதினால் என்ன (பக். 16 முதல் 39 வரை)
- அலகு 2 : அளவான இலக்கணம் (பக். 40 முதல் 60 வரை)
- அலகு 3 : தொடர் இலக்கணம் (பக். 60 முதல் 95 வரை)
- அலகு 4 : வலிமிகும் இடங்கள் (பக். 97 முதல் 127 வரை)
- அலகு 5 : வலிமிகா இடங்கள் (பக். 128 முதல் 174 வரை)

நான்காம் பருவம்

சிறப்புப்பாடம்

தாள் 7

இலக்கியம் 4காப்பியங்கள்

- அலகு 1 : சிலப்பதிகாரம் - புகார்க்காண்டம் - மனையறம்படுத்த காதை, வழக்குரை காதை
- அலகு 2 : மணிமேகலை - பாத்திரம் பெற்ற காதை உதயணகுமார காவியம் (1-40 பாடல்கள்)
- அலகு 3 : பெரியபுராணம் - இளையான்குடி மாறநாயனார் புராணம் முழுவதும்
- அலகு 4 : கம்பராமாயணம் - கும்பகர்ணன் வதைப்படலம்
- அலகு 5 : தேம்பாவணி -பாலமாட்சிப் படலம் முழுவதும் சீறாப்புராணம் - மானுக்குப் பிணை நின்ற படலம்

தாள் 8

இலக்கணம் 4

தண்டியலங்காரம்

பாடநூல் : தண்டியலங்காரம் (பொருளணியியல் மட்டும்)

- அலகு 1 : தன்மையணி மற்றும் உவமை அணி (1&2 அணிகள்)
- அலகு 2 : உருவக அணி முதல் முன்ன விலக்கணி முடிய (3-6 அணிகள்)
- அலகு 3 : வேற்றுப்பொருள் வைப்பணி முதல் தற்குறிப்பேற்ற அணி முடிய (7-12 அணிகள்)
- அலகு 4 : ஏது அணி முதல் அவநுதி அணி முடிய (13-23 அணிகள்)
- அலகு 5 : சிலேடையணி முதல் பாவிக அணி முடிய (24-35 அணிகள்)

சார்புப்பாடம் - 2

தாள் 4

தமிழ் இலக்கிய வரலாறு - 2

- பாடநூல் : தமிழிலக்கிய வரலாறு,
ச. ஈஸ்வரன்
நிர்மலா பதிப்பகம்,
சென்னை.
- அலகு 1 : சித்தர் இலக்கியம் முதல் தமிழகத்தில் வேற்றரசர் ஆட்சி
(164 முதல் 192 வரை)
- அலகு 2 : இஸ்லாமியரின் தமிழ்த்தொண்டு முதல் மறுமலர்ச்சிக்கால இலக்கியம்
(193 முதல் 207 வரை)
- அலகு 3 : ஐரோப்பியர்களின் தமிழ்ப்பணி முதல் கிறிஸ்தவர்களின் தமிழ்ப்பணி
(208 முதல் 214 வரை)
- அலகு 4 : இக்கால இலக்கியம் முதல் புலம்பெயர் இலக்கியம்
(215 முதல் 311 வரை)
- அலகு 5 : இணையத்தமிழ் முதல் தமிழும் சாகித்திய அகாடமி விருதுகளும்
(301 முதல் 320 வரை)

திறன் அடிப்படையிலான விருப்பப்பாடம் - 2

தாள் 2

படைப்பிலக்கியமும் மொழிபெயர்ப்பும்

அலகு 1	:	மரபுக்கவிதை	-	வெண்பா அல்லது ஆசிரியப்பா
அலகு 2	:	புதுக்கவிதை	-	20 அடிகள்
அலகு 3	:	சிறுகதை	-	குறிப்பிட்ட பொருளில் மூன்று பக்கங்களில் அமைதல்
அலகு 4	:	ஓரங்க நாடகம்	-	கொடுக்கப்படும் தலைப்பை ஒட்டி நான்கு அல்லது ஐந்து பக்கங்களில் அமைதல்.
அலகு 5	:	மொழிபெயர்ப்பு	-	100 சொற்கள் அடங்கிய ஆங்கிலப் பகுதியைத் தமிழில் மொழிபெயர்த்தல்.

(பொதுவாக மரபுக்கவிதை, புதுக்கவிதை, சிறுகதை, ஓரங்கநாடகம் இவற்றின் இலக்கணம் - அமைப்பு - பாடுபொருள் போன்றவற்றைக் கற்பித்து அதன் பிறகு படைப்புகளுக்கான பயிற்சி அளித்தல் வேண்டும். மொழிபெயர்ப்பின் நுட்பங்கள் மொழிபெயர்ப்பின் வகைகளைக் கற்பித்தல் வேண்டும்)

துறை சாரா விருப்பப்பாடம் - 2

தாள் 2

இணையம்

பாடநூல் :

இணையமும் இனிய தமிழும்,
முனைவர் க. துரையாசன்,
இணைப்பேராசிரியர் தமிழ்த்துறை,
அரசினர் கலைக்கல்லூரி (தன்னாட்சி), கும்பகோணம்-1.

இசை பதிப்பகம்,
24,சுபரிநகர், டாக்டர் குருமூர்த்தி சாலை,
கும்பகோணம் - 1,
அலைபேசி : 9442426552, தொலைபேசி : 0435 - 2402501.

- அலகு 1 : இணையம் - அறிமுகமும் வரலாறும் - செய்திகளைத் தேடிப் பெறுதல் -
இணையம் - சொற்பொருள் - தொலைபேசிக் கம்பி வழித் தகவலறியும் சேவை
- வலைப்பின்னல் - முதல் இணையதளம் - தமிழில் முதல் இணையதளம் -
இணையமுகவரி - இணையத்தின் பயன்கள் - இணைய மாநாடுகள்.
- அலகு 2 : இணையவழித் தமிழ் கற்றலும் கற்பித்தலும் - மரபுசார் கற்பித்தல் முறைகள் -
ஆசிரியரை மையமாகக் கொண்ட கல்விமுறை - மாணவரை மையமாகக்
கொண்ட கல்வி முறை - இணையவழிக் கற்றலும் கற்பித்தலும் - பயன்கள் -
இணையவழி தமிழ் கற்றல் - கற்பித்தல் - தமிழ் இணையப் பல்கலைக்கழகம்
- கல்வித்திட்டம் - மழலைக்கல்வி - சான்றிதழ்க்கல்வி - மேல்நிலை -
மேற்சான்றிதழ்கள் கல்வி - பட்டயக் கல்வித்திட்டங்கள் - பட்டப்படிப்பு -
இணையவழித் தேர்வு - பாட வடிவமைப்பு - கணினித்தமிழ்ப் பணிகள் -
தொடர்பு மையங்கள்.
- அலகு 3 : மின்னஞ்சலும் மின்நூலகமும் - மின்னஞ்சல் - மின்னஞ்சல் முகவரி -கடவுச்சொல்
- மின்னஞ்சல் உருவாக்கம் - கவனத்தில் கொள்ள வேண்டியவை -
கலந்துரையாடல் - மின்நூலகம் - தமிழ் இணையப் பல்கலைக்கழக
மின்நூலகம் - இலக்கண நூல்கள் - இலக்கிய நூல்கள் - சமய
இலக்கியங்கள் சிற்றிலக்கியங்கள் - பிற இலக்கியங்கள் - இருபதாம்
நூற்றாண்டு இலக்கியங்கள் (உரைநடை) - கவிதை - மதுரைத்திட்டம் -
இந்திய மொழிகளின் நடுவண் நிறுவனம் போன்றவை.
- அலகு 4 : ஒருங்கு குறியீட்டுமுறை-குறியாக்கமுறை -பிட்டுமுறை - தமிழில் ஒருங்கு குறியீட்டு
முயற்சிகள் - தமிழ்நெட் 97 - தமிழ்நெட் 99 - எழுத்துருக்கள் - தமிழ்
எழுத்துருக்கள் - இணைய இதழ்கள் - திண்ணை - தமிழ்த்திணை போன்றவை
- இணைய இதழ்களின் நிறை குறைகள் - வலைப்பூ வலைப்பூவும்
இணையதளமும் - உருவாக்கம் - தமிழில் வலைப்பூக்கள் தமிழ்ப்பூக்கள் -
மானிடன் - திரட்டிகள் - போன்றவை.

அலகு 5 : தமிழ்ப் பல்கலைக்கழகங்கள் - கல்விசார் இணைய தளங்கள் - கற்பிப்பவை - நூலகங்கள் - தகவல்களை வழங்குபவை - விக்கிபீடியா - தமிழ்விக்கிபீடியா - மனிதவள மேம்பாட்டுத்துறை - தமிழ்நாடு மாநில உயர்கல்வி மன்றம் - தமிழ்நாடு அறிவியல் மற்றும் தொழில்நுட்ப மன்றம் - உயர்கல்வித்துறை - தமிழ் வளர்ச்சித்துறை - வேலைவாய்ப்பு இணைய தளங்கள் - தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம் - மத்திய அரசுப் பணியாளர் தேர்வாணையம் - இந்திய ஆட்சிப்பணி - ஆசிரியர் தேர்வு வாரியம் - இணைய வேலை வாய்ப்பு மையங்கள் வேலை வாய்ப்பகத் தகவல்கள்.

பார்வை நூல்கள் :

1. முனைவர் மு. இளங்கோவன் : இணையம் கற்போம்,
வயல்வெளிப் பதிப்பகம்,
இடைக்கட்டு உள்கோட்டை (அஞ்சல்),
கங்கைகொண்ட சோழபுரம் (வழி),
அரியலூர் மாவட்டம் - 612 901.
2. மு. பழனியப்பன் : கணினியும் இணையமும்,
மீனாட்சி நூலக வெளியீடு,
புதுக்கோட்டை - 622 003.
3. மு. பழனியப்பன் : இணைய உலகம்,
எஸ்.ரவிச்சந்திரன் பாமா பதிப்பகம்,
சென்னை - 24.
4. பவானி : இன்றைய வாழ்க்கையின் இணையம்,
ஜெய்சங்கர் பப்ளிகேஷன்ஸ்,
38, நடேச அய்யர் தெரு,
தி.நகர், சென்னை - 17.

சிறப்புப்பாடம் - தாள் 9

அலகு 1	:	நற்றிணை	-	1 - 15 வரை
அலகு 2	:	குறுந்தொகை	-	1 - 25 வரை
அலகு 3	:	கலித்தொகை	-	பாலைக்கலி - முதல் 5 பாடல்கள் மருதக்கலி - முதல் 5 பாடல்கள்
அலகு 4	:	அகநானூறு	-	களிற்றியானை நிரை 1 - 10 வரை
அலகு 5	:	பத்துப்பாட்டு	-	நெடுநல்வாடை

தாள் 10

இலக்கணம் - 5

பாடநூல் : நம்பியகப்பொருள்

- அலகு 1 : அகத்திணையியல்
- அலகு 2 : களவியல் - பாங்கியற்கூட்டம் முடிய
- அலகு 3 : களவியல் - பகற்குறி முதல் வரைவிடை வைத்துப்
பொருள்வயிற் பிரிவு முடிய
- அலகு 4 : வரைவியல்
- அலகு 5 : கற்பியல், ஒழிபியல்

தாள் 11

தமிழ்மொழி வரலாறு

பாடநூல் : தமிழ்மொழி வரலாறு,
டாக்டர் சு. சக்திவேல்,
மணிவாசகர் பதிப்பகம்,
8/7, சிங்காரத்தெரு, பாரிமுனை,
சென்னை – 600 108.

அலகு 1 : தோற்றுவாய்
பழங்காலத் தமிழ்

அலகு 2 : இடைக்காலத் தமிழ்

அலகு 3 : தற்காலத் தமிழ்
கல்வெட்டுத் தமிழ்

அலகு 4 : தமிழில் பிறமொழிக் கலப்பு
தமிழ்க் கிளைமொழிகள்
தமிழ்ச் சொற்பொருள் மாற்றம்

அலகு 5 : தமிழ்த் தொடரியல்
தமிழ் வரிவடிவம்

தாள் 12

இலக்கியத் திறனாய்வு

பாடநூல் : இலக்கியத் திறனாய்வியல்,
தா.ஏ. ஞானமூர்த்தி,
ஐந்திணைப் பதிப்பகம்,
279, பாரதி சாலை மாடியில்,
திருவல்லிக்கேணி, சென்னை - 600 005.

- அலகு 1 : இலக்கிய ஆய்வு முதல் இலக்கியக்கலை வரை
அலகு 2 : இலக்கிய உணர்ச்சி முதல் மானிட உண்மை வரை
அலகு 3 : வடிவம் முதல் பாட்டு வரை
அலகு 4 : காப்பியம் முதல் நனவோடை புதினம் வரை
அலகு 5 : சிறுகதை முதல் இலக்கிய இயக்கங்கள் வரை

பார்வை நூல்கள் :

1. டாக்டர் சு. பாலச்சந்திரன் : இலக்கியத் திறனாய்வு,
நியூ செஞ்சுரி புக் ஹவுஸ் பி. லிட்.,
41-பி, சிட்கோ இன்டஸ்ட்ரியல்ஸ் லிமிடெட்,
அம்பத்தூர், சென்னை.
2. டாக்டர் மு. வரதராசன் : இலக்கியத்திறன்,
பாரிநிலையம்,
184, பிராட்வே, சென்னை.
3. அ.ச. ஞானசம்பந்தம் : இலக்கியக்கலை,
கழக வெளியீடு, சென்னை - 600 108.
4. முனைவர் கே. பழனிவேலு : கோட்பாட்டியல் திறனாய்வுகள்,
அகரம், மனை எண்-1,
நிர்மலா நகர், தஞ்சாவூர் - 613 007.

விருப்பப்பாடம் - 1

தாள் 1

அ. தகவல் தொடர்பியல்
ஆ. நாட்டுப்புறவியல்

இ. விளம்பரக்கலை

குறிப்பு : மேற்கண்ட மூன்று விருப்பப் பாடங்களில் ஏதேனும் ஒன்றைத் தெரிவு செய்து கொள்ளலாம்.

தகவல் தொடர்பியல்

பாடநூல் : முனைவர் கி. இராசா – மக்கள் தகவல் தொடர்பியல் அறிமுகம், பாவை பப்ளிகேஷன்ஸ், 142, ஜானிஜான்கான் சாலை, இராயப்பேட்டை, சென்னை – 600 014.

- அலகு 1 : கொள்கைகளும் கோட்பாடுகளும்
- அலகு 2 : தகவல் தொடர்புச் சாதனங்கள்
- அலகு 3 : வானொலி
- அலகு 4 : தொலைக்காட்சி, திரைப்படம்
- அலகு 5 : விளம்பரம்

ஷ

பார்வை நூல்கள் :

1. வே. தயாளன், வ. ஜெயா மக்கள் தகவல் தொடர்பியல், ஜெயா பதிப்பகம், கோயம்புத்தூர் - 1998.
2. முனைவர் மு. கோமதி, தகவல் தொடர்பு ஊடகங்களில் இலக்கியச் செல்வாக்கு மோகன் முகில் பதிப்பகம், 10, தண்டபாணி நகர், கோண்டூர், கடலூர்-2.
3. வெ. கிருஷ்ணமூர்த்தி, தகவல் தொடர்பியல், மணிவாசகர் பதிப்பகம், சென்னை, 1991.
4. வெ. நல்லதம்பி, தொலைக்காட்சியும் பிறதகவல் துறைகளும், வள்ளுவன் வெளியீட்டகம், திருவான்மியூர், சென்னை - 41, 1990.

ஆ. நாட்டுப்புறவியல்

- அலகு 1 : நாட்டுப்புறவியல் வரலாறு - விளக்கம் - நாட்டுப்புறவியல் - சமூகவியல் - மானுடவியல் - உளவியல் நோக்கு - நாட்டுப்புற இலக்கியமும் ஏட்டிலக்கியமும் - பழமொழிகள் - விடுகதைகள் - புராணக்கதைகள்.

- அலகு 2 : நாட்டுப்புறவியல் வளர்ச்சி வரலாறு - தொல்காப்பியம் குறிப்பிடும் பண்ணத்தி, பிசி, புலன் சங்க இலக்கியங்களின் வள்ளைப்பாட்டு முதலியன. சிலப்பதிகாரத்தின் வரிப்பாடல்கள் - குரவைப்பாட்டு - திருவாசகத்தின் திருப்பொற்சுண்ணம் முதலானவை - சிற்றிலக்கிய வகைகளின் வளர்ச்சி - தாயுமானவர் - இராமலிங்கர் - பாரதியார் - பாரதிதாசன் ஆகியோர் பாடல்களில் நாட்டுப்புறப் பாடல்களின் வடிவங்கள்.
- அலகு 3 : ஏட்டிலக்கியத்திற்கும் வாய்மொழி இலக்கியத்திற்கும் இடையே உள்ள ஒற்றுமை
வேற்றுமைகள் - பழக்க வழக்கங்கள் - நாகரிகமும் பண்பாடும் - சமய உணர்ச்சி - வாழ்க்கைநெறி போன்றவை - நாட்டுப்புறக் கலைகள் - கூத்து - ஆட்டம் - நடனம் - கும்மி - கோலாட்டம்.
- அலகு 4 : நாட்டுப்புறப் பாடல்கள் - வகைகள் - குழந்தைப் பாடல்கள் - தொழில் பாடல்கள்
- விளையாட்டுப் பாடல்கள் - கொண்டாட்டப் பாடல்கள் - உணர்ச்சிப் பாடல்கள் - இழவு - சடங்குப் பாடல் முதலானவை.
- அலகு 5 : நாட்டுப்புறப் பாடல்கள் பாடும் நேரமும் இடமும் - வடிவங்கள் - மெட்டுகள் - இசையொலிகள் - பாநலம் - வருணனை - உவமை - கற்பனை - நீதிகள் முதலியன - நாட்டுப்புறக் கதைகள் - வகைகள் - கதைப்பாடல்கள் முதலியன.

பாடநூல் :

- சு. சக்திவேல் : நாட்டுப்புற இயல் ஆய்வு, மணிவாசகர் பதிப்பகம், 12-ஆ, மேலசன்னதி வீதி, சிதம்பரம்-1.

பார்வை நூல்கள்

1. சு. சண்முக சுந்தரம் : நாட்டுப்புற இயல், மணிவாசகர் பதிப்பகம், 8/7, சிங்கர் தெரு, பாரிமுனை, சென்னை-108.
2. ஆறு. அழகப்பன் : நாட்டுப்புறப் பாடல்கள் - திறனாய்வு, கழக வெளியீடு, 79, பிரகாசம் சாலை, சென்னை-1.
3. ஆறு. இராமநாதன் : நாட்டுப்புறவியல் ஆய்வுகள், மணிவாசகர் பதிப்பகம், சிதம்பரம் - 608 001.

இ. விளம்பரக்கலை

- பாடநூல் : விளம்பரக்கலை, ச. ஈஸ்வரன், இரா. சபாபதி.

அலகு 1 : விளம்பரம் - விளக்கங்கள் - விளம்பரத்தின் இயல்புகள் - அறிவிப்பும்
விளம்பரமும்
- விளம்பரத்தின் தன்மைகள் - விளம்பர எல்லை - விளம்பர நோக்கங்கள் -
விளம்பர வரலாறு - குறிக்கோள்கள்.

அலகு 2 : விளம்பர வகைகள், விளம்பரத்தின் பயன்கள்
1) விளம்பரங்களின் வகைகள்
2) விளம்பர தளங்களைத் தேர்ந்தெடுக்கும் பொழுது கவனிக்கப்பட வேண்டியவை
3) விளம்பரத்தினால் உற்பத்தியாளர்கள் அடையும் நன்மைகள்
4) விளம்பரத்தினால் நுகர்வோர் அடையும் நன்மைகள்
5) விளம்பரத்தினால் அரசும் பிற நிறுவனங்களும் அடையும் நன்மைகள்
6) விளம்பரத்தினால் சமூகம் அடையும் நன்மைகள்

அலகு 3 : விளம்பர நெறிகள்
1) விளம்பர ஒழுக்க நெறிகள்
2) தடை செய்யப்பட்ட விளம்பரங்கள்
3) விளம்பரத்திற்கான சில விதிமுறைகள்
4) விளம்பர வரைவின் அடிப்படைத் தத்துவங்கள்

அலகு 4 : விளம்பரப் பணிகள், விளம்பரத்தின் தாக்கம்
1) விளம்பரத்தின் பணிகள்
2) விளம்பர நிறுவனங்கள்
3) விளம்பர அறங்கள்
4) விளம்பரத்தின் தாக்கம்
5) அகநிலை

அலகு 5 : விளம்பர மேம்பாடு
1) விளம்பரங்களின் மொழிநிலை
2) விளம்பர உத்திகள்
3) விளம்பரம் தொடர்பான சட்டங்கள்

தாள் 3

திறன் அடிப்படையிலான விருப்பப்பாடம் - 3

தொல்லியல்

பாடநூல் : தொல்லியல்
டாக்டர் ஜே. தியாகராஜன்

பாவை பதிப்பகம், மதுரை.

- அலகு 1 : தொல்லியலின் பொருள் விளக்கம் - தொல்லியலும் பிற பாடங்களும் - தொல்லியல் பிரிவுகள் - தொல்லியலாரின் பணிகள் - தொல்லியலின் பயன்கள்.
- அலகு 2 : தொல்லியலின் வரலாறு - தொல்லியல் கோட்பாடுகள் - இந்தியாவில் தொல்லியல் - இந்தியாவின் தொன்மைக்காலம் - மேற்பரப்புக் கள ஆய்வு - ஆய்வு நோக்கங்கள் -இடத்தேர்வு - வழிமுறைகள்- மேற்பரப்புக் கள ஆய்வுக்குறிப்புகளைப் பதிவு செய்தல் - மேற்பரப்புக் குள ஆய்வும் அறிவியலும்.
- அலகு 3 : அழகாய்வுப் பணியாளர்கள் - அகழாய்வுக்கான கருவிகளும் துணைக் கருவிகளும்- அகழாய்வு நெறிமுறைகள் - அகழாய்வு முறைகள்- ஆய்வுப் பொருட்கள் பதிவு முறைகள் - காலக்கணிப்பு முறைகள்.
- அலகு 4 : அகழாய்வும் அதன் தொடர்புடைய பிற அறிவியல்களும் - தொல் பொருட்கள் பாதுகாப்பு வழிமுறைகள் தொல்லியல் துறை அருங்காட்சியகங்கள் - தொல்லியல் ஆய்வினைத் தொகுத்து எழுதுதல் - ஆய்வு முடிவினை வெளியிடுதல்.
- அலகு 5 : தொல் எழுத்துக்கள் - இந்தியப் பிராமி கல்வெட்டுகளின் தோற்றம் - தமிழ் பிராமி எழுது பொருட்கள் - கல்வெட்டாய்வாளர்கள் - கல்வெட்டுகள்
- நாணயங்கள்
- கல்வெட்டின் வகைகள் - நாணயங்களின் தோற்றம் - இந்திய - தமிழக கோயிற் கட்டடக் கலை.

ஆறாம் பருவம்

சிறப்புப்பாடம் - தாள் 13

இலக்கியம் - 6

சங்க இலக்கியம் (புறம்)

- அலகு 1 : பதிற்றுப்பத்து - மூன்றாம் பத்து
- அலகு 2 : புறநானூறு - பாடல் எண். 51 முதல் 65 வரை
(மொத்தம் 15 பாடல்கள்)
- அலகு 3 : பரிபாடல் - 2 பாடல்கள்
1. மாயோயே மாயோயே எனத் தொடங்கும் பாடல்
மூன்றாம் பாடல் - திருமால்
2. பாயிரும் பனிக்கடல் பார்த்துகள் படப்புக்கு எனத்
தொடங்கும் ஐந்தாம் பாடல் (செவ்வேள் 81 அடிகள்)
- அலகு 4 : பத்துப்பாட்டு - சிறுபாணாற்றுப்படை
- அலகு 5 : திருக்குறள் - 10 அதிகாரங்கள்
அறத்துப்பால் 11 முதல் 15 வரை
பொருட்பால் 51 முதல் 55 வரை

தாள் 14

இலக்கணம் - 6

பாடநூல் : புறப்பொருள் வெண்பாமாலை – பாடாண் படலம் முடிய

- அலகு 1 : வெட்சிப்படலம், கரந்தைப்படலம்
அலகு 2 : வஞ்சிப்படலம், காஞ்சிப்படலம்
அலகு 3 : நொச்சிப்படலம், உழிஞைப்படலம்
அலகு 4 : தும்பைப்படலம், வாகைப்படலம்
அலகு 5 : பாடாண்படலம்

தாள் 15

திராவிட மொழிகளின் ஒப்பிலக்கணம்

பாடநூல் : திராவிட மொழிகளின் ஒப்பிலக்கணம்,
திராவிட மொழிகள் - 1 & 2
டாக்டர் ச. அகத்தியலிங்கம்,
மணிவாசகர் பதிப்பகம்,
31, சிங்கர்தெரு, பாரிமுனை, சென்னை - 600 108.

- அலகு 1 : திராவிட மொழிகள் (5-ஆம் பகுதி நீங்கலாக) முதல் திராவிட மொழிக் கல்வெட்டுகள் வரை
- அலகு 2 : திராவிடமொழி இலக்கணங்கள்
தமிழ்மொழி இலக்கணங்கள் முதல் முத்துவீரியம் வரை
- அலகு 3 : திராவிடமொழிகள் - 2ஆம் பகுதி
1) மொழியும் மாற்றங்களும் முதல் ஒப்பியல் வரை
- அலகு 4 : திராவிடமொழியியல் வரலாறு முதல் ழ வரை
- அலகு 5 : பெயர்ச்சொல் முதல் திராவிடமொழிகளில் எண்ணுப்பெயர்கள் வரை

விருப்பப்பாடம் - 2

தாள் 2

அ. இதழியல்

ஆ. புத்தகப் பதிப்பியல்

இ. தமிழ் உரைநடை வரலாறு

குறிப்பு : மேற்கண்ட மூன்று விருப்பப் பாடங்களில் ஏதேனும் ஒன்றைத் தெரிவு செய்து கொள்ளலாம்.

அ. இதழியல்

- அலகு 1 : இதழியல் : விளக்கம் - இதழ்களின் பணிகளும் பொறுப்புகளும் - இதழ்கள் வகைகளும் இயல்புகளும் - மக்களாட்சியில் இதழியல் - இதழ்களின் சுதந்திரம் - இதழ்களின் நடத்தையறக் கோட்பாடுகள் - இதழியல் தொழில் வாய்ப்புகள்
- அலகு 2 : இதழியல் வளர்ச்சி வரலாறு - தமிழகத்தில் இதழியல் வளர்ச்சி - பத்திரிகைச் சட்டங்கள் - பத்திரிகை மன்றம் - இதழ்கள் தொடங்குவதற்குரிய வழிமுறை செய்தித்தாள் நிர்வாக அமைப்பு.
- அலகு 3 : செய்தியாளர் - செய்தி - செய்தியின் உள்ளடக்கங்கள் - செய்தி திரட்டுதல் - செய்தி நிறுவனங்கள் - பேட்டி - குற்றச் செய்திகள் - பல்வேறு வகையான செய்திகள் - செய்திகளும் சிறப்புத் தனி இயல்புகளும் - படங்களும் இதழ்களும்.
- அலகு 4 : செய்திகளைச் செப்பனிடுதல் - நுட்பங்கள் - ஆசிரியர் - செய்தி ஆசிரியர் - துணை ஆசிரியர்கள் - செய்தியின் கட்டமைப்பு - பக்க வடிவமைப்பு - அச்சுப்படி திருத்துதல் - பக்க வடிவமைப்பு - அச்சுப்படி திருத்துதல் - அச்சுப்பிழை திருத்தக் குறியீடுகள் - இதழியல் கலைச் சொற்கள்.
- அலகு 5 : இதழியல் மொழிநடை - தலையங்கம் - சிறப்புத் தனிக் கூறுகள் - திறனாய்வு - இதழ்களில் எழுதுவது எப்படி? - இதழ்களில் விளம்பரம் - தற்காலத் தமிழ் இதழ்களின் எழுச்சியும் வீழ்ச்சியும் - நல்ல இதழ்கள் : எவை, எப்படி?.

பார்வை நூல்கள் :

1. டாக்டர் கு. முத்துராசன் : இதழியல் வளர்ச்சியும் மொழிபெயர்ப்பும், ஐந்திணைப் பதிப்பகம், அஞ்சல் பெட்டி எண்.2989, 279, பாரதி சாலை மாடியில், (பைகிராப்ட்ஸ் சாலை), திருவல்லிக்கேணி, சென்னை - 600 005.

2. இரா. கோதண்டபாணி : இதழியல்,
கற்பக நூலகம், 21 அ. ஆசாரி தெரு,
தல்லாகுளம், மதுரை – 625 002.
3. முனைவர் வி.தமிழ்ச்செல்வன் : இதழியல்
4. டாக்டர் தங்கமணியன் : பத்திரிகையியல்,
மாணிக்கம் பதிப்பகம், மானச கங்கோத்தரி,
மைசூர் - 570 006.

ஆ. புத்தகப் பதிப்பியல்

பாடநூல் :

புத்தகக் கலை - முனைவர் அ. விநாயகமூர்த்தி,
பாலமுருகன் பதிப்பகம்,
63, புதுத்தெரு, செங்குட்டை, காட்பாடி - 632 007,
வேலூர் மாவட்டம், போன் : 0416 - 2295247

- அலகு 1 : புத்தகம் - வகைகள் - பதிப்பு - வகைகள் - தழுவலும் மொழிபெயர்ப்பும் - மலிவுப்பதிப்பு - அகராதிகள் - கலைச்சொல் அகராதி - கொள்ளைப் பதிப்பு.
- அலகு 2 : ஏட்டுச் சுவடிப் பதிப்பு - புத்தகம் பெயர்க்காரணம் - சில சிறப்பு நூலகங்கள் - எழுது கருவிகள் - ஏட்டுப் பிரதிகளின் வகைகள் - மூலத்தை முடிவு செய்தல் - பாடத்திருத்தம்.
- அலகு 3 : பதிப்பாசிரியர் - பதிப்புக்குழு - பதிப்பாசிரியரின் பொறுப்புகள் - தகுதிகள் - சுருக்கக் குறியீட்டு விளக்கம் - நிறுத்தக்குறிகள் - சந்தி பிரித்தல் - அகர நிரல் - மொழி நடை படங்கள் - பதிப்பும் சட்டமும்.
- அலகு 4 : அச்சகம் - அச்சத் தொழில் வரலாறு - ஈ புகஸ் இன்டர்நெட் பத்திரிகை - அச்சகங்களின் வகைகள் - அச்ச எழுத்துகளின் வடிவம் - அச்சக் கோத்தல் - அச்சடித்தல் - அச்சிடும் முறைகள் - காகிதம் - காகிதச் சோதனை - அச்ச மைகள் - பட அச்ச - கணினி அச்ச.
- அலகு 5 : புத்தக உறுப்புகள் - பதிப்புரிமைப் பக்கம் முதலாயின - புத்தக வடிவம் - பக்க
எண்கள் - மெய்ப்புப்படி திருத்துதல் - திருத்தக் குறியீடுகள் - பைண்டிங் வகைகள் - வெளியிடுபவர் - புத்தகத் தயாரிப்பு நிர்வாகம் - எழுத்துரிமைத் தொகை - ஒப்பந்தம் - பதிப்புரிமை - விற்பனையாளர் வாணிக நிபந்தனைகள் - பன்னாட்டுத் தரப்புத்தக எண் (ISBN) பொது நூலக இயக்ககம் - விற்பனை வழிகள் கண்காட்சிகள் - பொருட்காட்சிகள்.

பார்வை நூல்கள் :

1. மா.சு. சம்பந்தன், : அச்சுக்கலை, தமிழர் பதிப்பகம், சென்னை, 1960.
2. அ. ஆலிஸ், : மக்கள் தகவல் தொடர்பியல் கலைச்சொல் அகராதி, மதுமதி பப்ளிகேஷன்ஸ், திருச்சி, 1955.
3. மா.பா. குருசாமி : இதழியல் கலை, குருதேமொழி பதிப்பகம்,
4. எஸ். ராஜம் (பதி) : சந்தி குறியீட்டு விளக்கம், மாரே அண்டு கம்பெனி, சென்னை, 1958.
5. ஜே. பெர்னான்டஸ், : கம்ப்யூட்டர் புரோக்ராமிங் & அப்ளிகேஷன்ஸ், என். வெங்கடசாமி முன் பப்ளிஷர்ஸ், மதுரை, 1998.

இ. தமிழ் உரைநடை வரலாறு

பாடநூல் :

தமிழ் உரைநடை வரலாறு
வி. செல்வநாயகம்,
குமரன் புத்தக இல்லம்,
குமரன் காலனி, சென்னை- 26,
மறுபதிப்பு, 2000.

அலகு 1

:

சங்க காலம்

1. தமிழ்ச் செய்யுளின் ஆரம்பநிலை
2. உரைநடை ஆரம்பம்
3. சிலப்பதிகாரத்திலுள்ள உரைநடை
4. இசைநாடகத் தமிழும் உரையும்
5. தொல்காப்பியம் குறிக்கும் உரைநடை வகை

அலகு 2

:

களவியலுரைக் காலம்

1. களவியலுரைக் கால நூல்கள்
2. களவியலுரையிலுள்ள இருவகை நடை
3. பாரத வெண்பாவிலுள்ள உரைநடை
4. சாசனத் தமிழ் உரைநடை
5. மணிப்பிரவாள நடையின் தோற்றம்

அலகு 3

:

உரையாசிரியர்களின் காலம்

1. உரை வளர்ச்சிக்குரிய காரணம்
2. உரை வகுத்த ஆசிரியர்கள்
3. உரையாசிரியர்கள் கையாண்ட நடைவகை
4. சாசனத்தமிழ் உரைநடை
5. மணிப்பிரவாள நடை

அலகு 4

:

ஐரோப்பியர் காலம்

1. உரைநடையில் உண்டான மாற்றம்
2. ஐரோப்பியர் வகுத்த உரைநடை
3. பழைய மரபு தழுவிய உரைநடை
4. ஆறுமுக நாவலரும் இக்கால உரைநடையும்
5. 19-ஆம் நூற்றாண்டிலிருந்த பிற உரைநடை வகைகள்

அலகு 5

:

இருபதாம் நூற்றாண்டு

1. தனித்தமிழ் நடை
2. மறுமலர்ச்சி நடை
3. உரையும் நடையும், உரைநடையும்

ஆறாம் பருவம்

விருப்பப்பாடம் - 1

தாள் 1

அ. தமிழர் அழகுக் கலைகள்
ஆ. பெண்ணியம்
இ. சுற்றுலாவியல்

குறிப்பு : மேற்கண்ட மூன்று விருப்பப் பாடங்களில் ஏதேனும் ஒன்றைத் தெரிவு செய்து கொள்ளலாம்.

அ. தமிழர் அழகுக் கலைகள்

பாடநூல் : தமிழர் வளர்த்த அழகுக் கலைகள்,
மயிலை சீனி. வேங்கடசாமி,
NCBH
41, பி, சிட்கோ இண்டர்ஸ்ரீஸ்,
அம்பத்தூர், கிண்டி, சென்னை - 58.

அலகு 1 : அழகுக்கலை - கட்டடக்கலை - குகைக் கோயில்கள் - கற்றளிகள் - மரக் கட்டடங்கள் - செங்கற்கட்டடங்கள் - பாறைக் கோயில்கள் போன்றவை (பக். 1 முதல் 46 வரை)

அலகு 2 : சிற்பக்கலை - சிற்பம் அமைக்கும் பொருள்கள் - இரண்டு வகைச் சிற்பங்கள் - கல்லும் உலோகமும் - யவன நாட்டுச் சிற்பமும் நமது நாட்டுச் சிற்பமும் - ஓவியக்கலை (பக். 47 முதல் 86 வரை)

அலகு 3 : கூத்துக்கலை - காவியக்கலை - பதினோர் ஆடல் - பரத நாட்டியம் - காவியப் புலவனும் ஓவியக்கலைஞனும் சிந்தாமனர் - சூளாமணி - தேவாரம் - இராமாயணம் முதலியன (பக். 87 முதல் 161 வரை)

அலகு 4 : நாடகக்கலை - நாடக நூல்கள் - நாடக இலக்கணம் - ஒன்பதுசுவை - நடிப்பு -
நாடகக் கலையின் மறுமலர்ச்சி போன்றவை (பக்.162 முதல் 194 வரை)

அலகு 5 : கலைகளைப் போற்றும் - கடற்கரைகோயில் - பல்லவர் சோழர் கோயில்கள் - மேல்நாட்டாரின் கலை ஆர்வம் - வேலூர் மண்டபம் - சிற்பங்கள் (பக்.195 முதல் 237 வரை)

பார்வை நூல்கள் :

1. முனைவர் பாக்யமேரி
காலந்தோறும் தமிழர் கலைகள்,
அறிவுப் பதிப்பகம்,
142, ஜானிஜான்கான் ரோடு,
சென்னை - 14.
2. திரு.வி. கலியாணசுந்தரனார்
தமிழர் கலை,
பாரிநிலையம்,
59, பிராட்வே, சென்னை - 1.
3. க.சி. கமலையா
தமிழகக் கலை வரலாறு,
மணிவாசகர் பதிப்பகம்,
55, லிங்கி தெரு, சென்னை.

ஆ. பெண்ணியம்

பாடநூல் :

பெண்ணியம்,
முனைவர் இராம. பிரேமா,
உலகத் தமிழாராய்ச்சி நிறுவனம்,
டி.டி.டி.ஐ. (அஞ்சல்), தரமணி, சென்னை - 600 113.

- அலகு 1 : பெண்ணியம் - சொற்பொருள் விளக்கம் - பெண்ணியத்தின் தோற்றமும் வளர்ச்சியும் - 1970-75 ஆம் ஆண்டுகளில் பெண்ணிய வளர்ச்சி முதலானவை (பக். 1 முதல் 33 வரை)
- அலகு 2 : எண்பதுகளில் பெண்ணியம் - பெண்ணியத்தின் எதிர்காலம் - பெண்ணிய வகைகள் முதலானவை. (பக். 33 முதல் 55 வரை)
- அலகு 3 : குடும்ப அமைப்பு - பால்தன்மை - பெண்ணின் வரலாறு - தீவிரவாதப் பெண்ணிய வாதிகளின் செயற்பாடுகள் - பெண்ணியக் கோட்பாட்டாளர்கள் - பெண்ணிய நூல்கள் (பக். 56 முதல் 75 வரை)
- அலகு 4 : மகளிரியல் கல்வி - பெண்ணிய இயக்கத் திறனாய்வு - மொழியும் உளவியல் பகுப்பாய்வும் - மார்க்சியப் பெண்ணியம் (பக். 6 முதல் 96 வரை)
- அலகு 5 : இந்தியப் பெண்ணிய வரலாறு - இந்தியப் பெண்களின் கூட்டமைப்பு - இந்திய தேசிய பெண்கள் குழு - அகில இந்திய பெண்கள் மாநாடு முதலானவை (பக். 96 முதல் 117 வரை)

பார்வை நூல்கள் :

1. டாக்டர் முத்துச் சிதம்பரம் பெண்ணியம் தோற்றமும் வளர்ச்சியும், தமிழ்ப்புத்தகாலயம், சிவப்பிரகாசம் தெரு, தி. நகர், சென்னை.
2. பேராசிரியர் நா. ஜெயபாலன் பெண்ணியம் ஓர் ஆய்வு, மோகன் பதிப்பகம், 4, பாரதி சாலை, திருவல்லிக்கேணி, சென்னை - 5.

இ. சுற்றுலாவியல்

பாடநூல் :

சுற்றுலாவியல்
டாக்டர் ஜே. தியாகராஜன்
டாக்டர் மா. காந்திதாசன்
பாவைப்பதிப்பகம்,
மதுரை.

- அலகு 1 : சுற்றுலாவியல் அறிமுகம் - அமைப்பாளர்கள் (Organizers), வழிகாட்டிகள் (Guides), பணிகள் (Tourists) பற்றிய செய்திகள்.
- அலகு 2 : பண்டைக் காலச் சுற்றுலாப் பயணிகள் (யுவான் சுவாங் பாஹியான் மார்க்கோ போலோ) மூவரின் பயண அனுபவக் குறிப்புகள்.
- அலகு 3 : சுற்றுலாப் பயன்கள் (அறிவு வளர்ச்சி - பொருளாதார வளர்ச்சி, வேலை வாய்ப்பு)
- அலகு 4 : தமிழகத்தின் புகழ்மிக்க தலங்கள் மாமல்லபுரம் - சிற்பக் கலை - தஞ்சைப் பெரிய கோயில் - கட்டடக் கலை, சித்தன்னவாசல் - ஓவியக்கலை.
- அலகு 5 : தமிழகத்தில் சுற்றுலா வளர்ச்சிக்கான வாய்ப்புகள் (தமிழகச் சுற்றுலாத் துறையின் செயற்பாடும் வளர்ச்சிப் பயன்களும்)

பார்வை நூல்கள் :

1. மா. இராசசேகர், சுற்றுலாவியல்,
கொங்குப் பதிப்பகம்,
பாண்டியன் நகர்,
சின்னாண்டான் கோயில், கரூர்.
2. முனைவர் ச. ஈஸ்வரன், சுற்றுலாவியல்,
பாவை பப்ளிகேஷன்ஸ்,
142, ஜானி ஜான்கான் சாலை,
இராயப்பேட்டை, சென்னை - 14,
போன் : 28482441.
3. வெ. கிருட்டிணமூர்த்தி சுற்றுலா வளர்ச்சி
மணிவாசகர் பதிப்பகம்,
பாரிமுனை,
சென்னை -18.

தாள் 4

திறன் அடிப்படையிலான விருப்பப்பாடம் - 4

தகவல் தொடர்பியல்

பாடநூல் : முனைவர் கி. இராசா – மக்கள் தகவல் தொடர்பியல் அறிமுகம், பாவை பப்ளிகேஷன்ஸ், 142, ஜானிஜான்கான் சாலை, இராயப்பேட்டை, சென்னை – 600 014.

- அலகு 1 : கொள்கைகளும் கோட்பாடுகளும்
- அலகு 2 : தகவல் தொடர்புச் சாதனங்கள்
- அலகு 3 : வானொலி
- அலகு 4 : தொலைக்காட்சி, திரைப்படம்
- அலகு 5 : விளம்பரம்

பார்வை நூல்கள் :

1. வே. தயாளன், வ. ஜெயா மக்கள் தகவல் தொடர்பியல், ஜெயா பதிப்பகம், கோயம்புத்தூர் - 1998.
2. முனைவர் மு. கோமதி, தகவல் தொடர்பு ஊடகங்களில் இலக்கியச் செல்வாக்கு மோகன் முகில் பதிப்பகம், 10, தண்டபாணி நகர், கோண்டூர், கடலூர்-2.
3. வெ. கிருஷ்ணமூர்த்தி, தகவல் தொடர்பியல், மணிவாசகர் பதிப்பகம், சென்னை, 1991.
4. வெ. நல்லதம்பி, தொலைக்காட்சியும் பிறதகவல் துறைகளும், வள்ளுவன் வெளியீட்டகம், திருவான்மியூர், சென்னை - 41, 1990.

விரிவாக்க செயல்பாடுகள்

ஆய்வேடு

ஆய்வேடு பணிக்க மேற்கொள்ள வேண்டிய நெறிமுறைகள்:

- ❖ ஆய்வு பற்றிய விளக்கம் அறிதல்
- ❖ ஆய்வுத் தலைப்பு தேர்வு செய்தல்
- ❖ முதன்மைத் துணை ஆதாரங்களைத் திரட்டுதல்.
- ❖ ஆய்வு நெறிமுறைகளை அறிந்து ஆய்வேடு எழுதுதல்.
- ❖ மேற்கோள்களைத் தேர்ந்தெடுத்தல்,
- ❖ ஆய்வுப் பயனை வெளிப்படுத்துதல்,
- ❖ களஆய்வினை மேற்கொள்ளுதல்
- ❖ துணை நூற்பட்டியல் தயாரித்தல்.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

PROGRAMME OBJECTIVES

1. To educate students on the fundamental concepts, principles, and functions of management.
2. To provide knowledge and skills in various areas of management such as human resources, finance, operations, and marketing in order to provide a comprehensive understanding of a business system.
3. Students will be given knowledge of qualitative and quantitative techniques for critical thinking and problem solving.
4. To provide students with practical industrial experience in order to hone their managerial competencies and business acumen while gaining a comprehensive understanding of business and industry.
5. To instill a global perspective on industrial and organisational establishments and their functions in order to make sound decisions in an international business setting.

PROGRAMME EDUCATIONAL OBJECTIVES

1. **Conceptual Understanding & Its Application**
Students will demonstrate sufficient understanding of concepts and will be able to articulate real-world business situations. Students will exhibit the critical thinking skills that are necessary to integrate different functional areas of management in evaluating alternate business situations.
2. **Integration of Different Functional Areas Of Management**
Students will be adept at using appropriate quantitative tools to analyse real-world business situations and will have the necessary oral and written communication skills to effectively interact with their stakeholders.
3. **Sharpen Your Skills In Innovation And Entrepreneurship.**
Students will acquire competencies in innovative thinking to pursue entrepreneurship and/or intrapreneurship.
4. **Business Ethics And Leadership Abilities**
Through active engagement with curricular and co-curricular activities, students will acquire team-working skills as well as leadership qualities cognizant of a holistic business environment. Students will be sensitive to ethical issues arising from society and the business interface.
5. **Lifelong Learning and Research**
Students will develop an aptitude for research and continuous learning.

PROGRAM OUTCOMES

PO1. Understanding management techniques and emerging technologies in business

PO2: Providing global perspectives and ethical principles in order to commit to professional ethics, accountability, and management practice norms.

PO3: Enhancement of critical and analytical thinking skills.

PO4: Improvement of interpersonal skills

PO5. Creating social sensitivity and understanding CSR, ethical and sustainable business practices demonstrates sensitivity to social, ethical and sustainability issues.

PO6. Development of Entrepreneurship Acumen.

PO7. Apply research and business intelligence.

PO8. Provide qualitative and quantitative problem-solving and decision-making techniques.

PO9. Ability to work individually and with a team in a multidisciplinary setting to be a leader in a diverse team.

PO10. Engage in independent and lifelong learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES

1. Acquiring conceptual clarity of various functional areas
2. Ability to analyze various functional issues affecting the organization.
3. Demonstrating the ability to evolve strategies for organizational benefits
4. Demonstrate proficiency in the fundamental business principles and practices that enable successful firms to operate in domestic and global environments.
5. Demonstrate critical thinking and analysis skills that solve business problems in a real-world context.
6. Demonstrate effective communication through the delivery of written and oral presentations.
7. Determine the ethical issues that influence business decisions from an economic, political, legal, and social standpoint.
8. Understand the ecosystem of start-ups in the country.
9. Ability to build the department as a center of excellence for imparting high quality management education at the undergraduate level.
10. Fostering thinking minds that are sensitive to societal needs and issues thus making them good human beings and responsible members of the society.

SEMESTER I
THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: I

Paper type: CORE THEORY

Paper code: CBA11

Principles of Management Credit: 3

Total Hours per Week: 5

Lecture Hours: 5

Tutorial Hour: 1

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Course Objectives

1. To familiarize the students with basic concept of management.
- 2.To acquire skills to become a good manager.
- 3.To plan effectively and to take right decisions.
- 4.To understand the theories of management.
5. To understand the functions of management.

Course Outcomes

CO 1. After the study of unit-1, the student will be able to understand the concept of management.

CO 2. After the study of unit-2, the student will be able to plan and make decisions.

CO 3. After the study of unit-3, the student will be able to differentiate organization structure and know the functioning in business unit.

CO 4. After the study of unit-4, the student will be able to motivate employees, delegate work, and differentiate between power and authority.

CO 5. After the study of unit-5, the student will be able to coordinate and control activities in an organization.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1**Teaching Hours: 15**

Management - Definition - Importance - Nature and Scope of Management - Objectives of management - Process - Levels of Management - Role and function of a Manager – Administration vs Management - Management as an Art or Science - Management as a Profession - Contributions of Henry Fayol and F W Taylor to Management.

Unit-2**Teaching Hours: 15**

Planning – Definition- Nature - Importance - Steps in Planning – Limitations of Planning features of good plan- obstacles to effective planning- types- Objectives - Policies - Procedures - and Methods - Decision making – definition - Process of decision making - Types of managerial decision- key to success in decision making.

Unit-3**Teaching Hours: 15**

Organizing – Meaning of organization- elements of organization – Process of organizing Importance - Types of Organization structure - Span of Control –meaning- theory of Graicunas- factors determine span of management- Principles of Organization Departmentation Committee - formal organization- Informal Organization.

Unit-4**Teaching Hours: 15**

Authority - Delegation - Decentralization - Difference between authority and power - Uses of authority - Staffing - Sources of recruitment - Selection process - Training - Directing - Nature and purpose of Directing – Motivation (Maslow’ s Need Hierarchy Theory , Hertzberg Theory, X and Y Theory) – Social responsibilities of business.

Unit-5**Teaching Hours: 15**

Co-ordination – nature and characteristics - Need of co-ordination - Types - Techniques - Distinction between Co-ordination and Co-operation – Controlling – meaning- nature and purpose of control- need and importance of Controls - Control Process- problems in control process.

Text books

1. P.C. Tripathi & P.N. Reddy , Principles of Management , Tata McGraw-Hill, New Delhi.
2. Dr. C.D.Balaji, Principles of Management, Margham Publications, Chennai
3. Dr.J. Jayasankar , Principles of Management , Margham Publications, Chennai
4. Dr. C.B.Gupta Business Management, Sultan Chand & Sons, New Delhi
5. Dr.M.Sakthivel Murugan, Management Principles and Practices, New Age International Pvt Ltd.
6. Vijay Kumar Kaul, Principles and Practices of Management, S. Chand Publishing, New Delhi.
7. R.S.N.Pillai, S. Kala, Principles and Practice of Management, S. Chand, New Delhi
8. D.Wigol,Business Management, S.Chand,New Delhi.
9. Dinkar Pagare-Principles of Management, Sultan Chand and Sons,New Delhi.

10. Harold Koontz, Heinz Weihrich- Essentials of Management Tata Mc Graw Hill, Publishing Co.Ltd,New Delhi.

Reference Books

1. Hanagan , Management Concepts & Practices , MacMillan India Ltd.New Delhi.
2. Prasad L.M. , Principles and Practice of Management, Sultan Chand & Sons, New Delhi.
3. Peter F. Drucker , Practice of Management,Harper Collins Publishers,India.
4. Harold Koontz, Aryasri & Heniz Weirich , Principles of Management - Tata McGrawHill , New Delhi.
5. R.N. Gupta , Principles of Management , S.Chand &Co. New Delhi.
6. R.K.Sharma and Shashi K Gupta , Principles of Management, Kalyani Publishers,New Delhi.
7. James A.F.Stoner , Edward and Daniel, Management , Pearson Education,Noida,U.P.
8. J.P. Mahajan, Akshay Mishra, Principles and Practices of Management, ANE Books Pvt Ltd.

Course Material: website links

- www.sasurieengg.com
- www.toolshero.com
- www.mindtools.com
- <https://education.stateuniversity.com>
- <https://iedunote.com>
- <https://managementhelp.org>
- <https://casestudyinc.com>

Journal Reference

- Management Matters: LIBA's Journal of Management published by Loyola Institute of Business Administration (LIBA), Chennai
- IIMB Management Review published by Indian Institute of Management, Bangalore

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	S	S	M
CO2	M	S	M	S	S	S	M	S	S	S
CO3	S	S	M	M	S	S	M	M	M	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: I

Paper type: CORE THEORY

Paper code: CBA 12Business Mathematics and Statistics I

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To familiarize students with the basic concepts in Business Mathematics and Statistics
2. To make students understand various Measure of central tendency.
3. To know principles of construction of Dispersion
4. To be able to choose rational options in practical decision making
5. To have rules for Differentiation

Course Outcomes

1. After the study of unit-1, the student will be able to apply basic terms of statistical data solving practical problems in the field of business.
2. After the study of unit-2, the student will be able to explain basic methods of Measure of central tendency.
3. After the study of unit-3, the student will be able to solve problems in the areas of simple and compound interest account, use of compound interest.
4. After the study of unit-4, the student will be able to discuss the effects of various types and methods of interest account.
5. After the study of unit-5, the student will be able to Connect acquired knowledge and skills with practical problems.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-1**Teaching Hours: 15**

Statistics – Definition – scope and Limitation – Presentation of data- Simple Bar Diagram, Multiple Bar Diagram ,Component Bar Diagram ,Percentage Bar Diagram ,Pictogram Diagrammatic and graphical Representation of Data- Frequency Polygon, Frequency Curve, Cumulative Frequency Curve.

Unit-2**Teaching Hours: 15**

Measure of central tendency – Arithmetic Mean ,Weighted Arithmetic Mean –Frequency Distribution ,Properties of AM Combination Mean ,Geometric Mean ,Harmonic Mean - Median and Mode ,Quartile and Deciles .

Unit-3**Teaching Hours: 15**

Measure of Dispersion – Range, Merit and Demerit - Mean Deviation – Quartile Deviation - Standard Deviation – Relative Measure- Coefficient Variation

Unit-4**Teaching Hours: 15**

Mathematics for Finance – Simple and compound Interest, Effective rate of interest – Annuities, Leasehold estate, Free Hold Estate, Amortization, Immediate Annuity, Present value of an immediate annuity - Discounts and mathematics present values.

.Unit-5**Teaching Hours: 15**

Basic calculus – Rules for Differentiation, Introduction, Function, Properties of limits – Continuity -Derivative of trigonometric function, Product Rule, Quotient Rule, Function. Proportion of Theory and Problem: 20:80

Text books

1. Dr. P.R. Vittal, Business Mathematics and Statistics ,Margham Publications,Chennai,2013
2. S P Rajagopalan, R Sattanathan - Business Mathematics,Vijay Nicole Imprints (p) Ltd,2013
3. Prof. A. V. Rayarikar , P. G. Dixit,Business Mathematics and Statistics, Nirali Prakshan Publishers,2019
4. J.K. Sharma Business Statistics,Pearson Publication.
5. PA.Naviitham , Business Mathematics and Statistics, Jai Publishers, Trichy, April 2013
6. D.Joseph Anbarasu, Business Statistics,Vijay Nicole Imprints Private Limited, Chennai,2015.
7. B L Agarwal Basic Statistics, New Age International Private Limited,New Delhi,4th Edition ,2006.
8. T. Veerarajan, Fundamentals of Mathematical Statistics,Yes Dee Publishing Pvt Ltd,Chennai,2017.
9. R.S.N Pillai, Bagavathi, Statistics Theory and Practice, S. Chand Company Limited- New Delhi,7th Edition 2008.

10. P. A.Naviitham , Business Statistics & Operations Research, Jai Publishers, Trichy.

Reference Books

1. Agarwal B.M., Business Mathematics & Statistics ,Ane Books Pvt Ltd, 2009
2. Andre Francis Business Mathematics and Statistics, Six Edition
3. A Francis; Ben Mousley,Business Mathematics and Statistics, Andover, United Kingdom Cengage Learning, 2014
4. Prof. A. V. Rayarikar , P. G. Dixit Business Mathematics And Statistics Kindle Edition
5. M.Hajameeral, M.Ravinthammal University Statistical Methods and their applications I, Science Press New Delhi 2013
6. S.P.Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi, 36th edition 2008
7. S.P.Gupta, Statistical Methods, Sultan Chand & Sons,New Delhi, 45th edition 2017
8. S.C. Gupta, V.K.Kapoor Fundamentals of Mathematical Statistics , Sultan Chand & Sons, New Delhi,12th Edition 2020
9. D.C. Sancheti , V.K.Kapoor, Business Mathematics,Sultan Chand & Sons, New Delhi,11th Edition 1993
10. Dr. P.R. Vittal, Business Statistics & Operations Research , Margham Publications,Chennai ,2013

Course Material: website links

- file:///C:/Users/Welcome%20Friend/Downloads/14b14198b6e26157b7eba06b390ab763-original.pdf
- <https://easyengineering.net/operations-research-p-ramamurthy/>

Journal Reference

- IMA Journal of Management Mathematics published by Oxford Academic

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	M	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	S	S	M	M	S	M	S	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: I

Paper type: ALLIED- I

Paper code: CABA13A

A. Business Organization

Credit: 3

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hours: 1

Course Objectives

1. The course aims to provide the basic concept with regard to business enterprises
2. To obtain knowledge of business and its functional areas.
3. To understand in detail the types of Business.
4. To study the factors that influences the location
5. To obtain in depth understanding of the Stock Exchanges its functions, and to gain knowledge about Trade Associations and Chamber of Commerce

Course Outcome

1. After the study of Unit-1, the student understands the basic fundamentals of the business organization.
2. After the study of Unit-2, the student attains the knowledge of various forms and types of the business organization.
3. After the study of Unit-3, the student understands the main working aspects of organizations.
4. After the study of Unit-4, the student acquires in depth understanding of the Stock Exchanges and its functions.
5. After the study of Unit-5, the student gain knowledge about Trade Associations and Chamber of commerce

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-I**Teaching Hours: 18**

Business - Meaning - Types of Business and Profession - Organization - Meaning and Importance of Business Organization.

Unit-II**Teaching Hours: 18**

Forms of Business Organization - Sole Trader, Partnership - Joint Hindu Family System - Joint Stock Companies - Co-operative Societies - Public Utilities and Public Enterprises.

Unit-III**Teaching Hours: 18**

Location of Industry - Factors influencing location and size - Industrial Estates and District Industries Centre.

Unit-IV**Teaching Hours: 18**

Stock Exchange - Functions - Working - Services - Regulations of Stock Exchange in India, Business combinations - Causes - Types - Effects.

Unit-V**Teaching Hours: 18**

Trade Associations and Chamber of Commerce – Objectives - Functions – Differences between Trade Association and Chamber of Commerce.

Text books

1. Sundar K, Business Organization, Vijay Nicole Imprints Pvt. Ltd. Chennai.
2. G. Prasad, C.D. Balaji, Business Organization, Margham Publications, Chennai
3. Tapas Ranjan Saha, Business Organisation and Management , Vijay Nicole Imprints Pvt Ltd, Chennai
4. Gupta C B –Modern Business Organisation, National Publishing House,
5. Vasudevan and Radhaswami , Business Organization, S. Chand & Company, New Delhi.
6. Kathiresan, Dr.Radha Business Organization, Prasanna Publishers and Distributors,
1. 7.P.C. Tulsian, Business Organisation and Management, Pearson Education, New Delhi
2. 8.Subhanjali Chopra, Vandana Munjal, Rishika Nayyar, Business Organisation and Management, J.S.R. Publishing House.
9. Dr. Padmakar Asthana, Dr. I.M. Sahai, Busies Organisation and management, Sahitya Bhawan Publications , Agra.
10. P.N.Reddy, Principles of Business Organisation and Management, S. Chand, Delhi.

Reference books

1. Bhusan Y. K , Business Organization, Sultan Chand & Sons, New Delhi.
2. Prakash Jagadish , Business Organization and Management.KITAB Mahal
3. Reddy P. N. and Gulshan.S.S , Principles of Business Organization and Management, Eurasia Publishing House (P) Ltd.

4. Chhabra T N , Business Organisation and Management, SUN India Publications New Delhi.
5. M C. Shukla , Business Organization & Management, S, Chand & Co Ltd, Delhi.

Course Material: website links

- business.udemy.com
- www.coursera.org › browse › business
- [www.kopykitab.com.business](https://www.kopykitab.com/business) .org
- www.businessmanagementdaily.com › business-management-daily-ed.

Journal Reference

- Vikalpa published by Indian Institute of Management, Ahmedabad
- Decision published by Indian Institute of Management Calcutta

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	M	M	S	S	S	S	M	S	S
CO4	M	S	S	S	M	M	M	M	S	M
CO5	S	S	S	S	M	S	M	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: I

Paper type: ALLIED- I

Paper code: CABA13B

B. Principles of Insurance Credit: 3

Total Hours per Week: 5

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives:

1. To understand the basic functions and legal principles of Insurance.
2. To attain the knowledge of various types of Insurance.
3. To apply the knowledge on the insurance-related legal principles.
4. To attain in-depth knowledge in Life Insurance.
5. To understand Marine and Fire Insurance.

Course Outcome

1. After the study of Unit1, the student understands the basic functions and legal principles of insurance.
2. After the study of Unit2, the student attains the knowledge of various types of Insurance.
3. After the study of Unit3, the student will be able to apply their knowledge on the insurance-related legal principles.
4. After the study of Unit4, the student gains in -depth knowledge acquisition in Life Insurance.
5. After the study of Unit5, the student acquires in depth understanding of Marine and Fire Insurance.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-I**Teaching Hours: 15**

Definition of insurance - classification of Contracts of Insurance - Marine and Non-Marine - General principles of law as applied to non-marine insurance.

Unit-II**Teaching Hours: 15**

Life Assurance - objectives of Life Assurance - principles of Life Assurance - different plans of Life Assurance and annuities - policy condition and privilege - assignment and nomination - lapses and revivals - surrender values and loans - claims - double insurance.

Unit-III**Teaching Hours: 15**

Marine Insurance - principles of marine insurance - functions of marine insurance - proximate clause - subrogation and contribution

Unit-IV**Teaching Hours: 15**

Types of marine policy - clauses in general use - warranties - kinds of marine losses - reinsurance and double insurance.

Unit-V**Teaching Hours: 15**

Fire insurance - principles of law as applied to fire insurance - the subject matter of fire insurance - fire waste - hazard types of fire policy - cover notes - surveys and inspection average- re-insurance - renewals.

Text Books

1. Periasamy P – Fundamentals of Insurance –Vijay Nicole Imprints (P) Ltd.Chennai.
2. Dr. A. Murthy, Elements of Insurance – Margham Publications,Chennai
3. Dr. A. Murthy-Principles and Practice of Insurance, Margham Publications Chennai
4. Gupta P K – Insurance and Risk Management – Himalaya Publishing House, Mumbai
5. Mishra M N – Principles and Practice of Insurance – S Chand & Co,New Delhi.
6. Panda G S –Principles and Practice of Insurance –Kalyani Publishers, New Delhi.
7. Sethi Bhatia, Elements of Banking Insurance, PHI Publishers, New Delhi.
8. M.C.B.S Garg Bodla K.Pal, Mahesh Chand Garg, Insurance Management, Principles and Practices, Deep & Deep Publications,
9. Neelam C. Gulati, Principles of Insurance management , Excel Books India.
10. Arunajatesan, Risk Management Insurance, Mac Millan.

Reference Books

1. Dr. B. Vardharajan - Insurance Vol 1 and 2. - Tamil Text Book.
2. R.S. Sharma - Insurance Principle & Practice - Vara Bombay, 2006.
3. A Murthy - Elements of Insurance Risk management & Insurance - Harrington, 2006 - Tata McGraw Hill
1. 4.Eswari Karthikeyan.M. Fundamental Principles of Insurance , Sahitya Bhawan Publications

2. 5.Neeti Gupta, Abha Chopra, Principles of Insurance , Kalyani Publishers.
6. Nathan Wiley, Principles and Practices of Life Insurance Kessinger Publications.
7. Ned B. Ricks, Principles of principled Life Insurance Selling , Universal Publishers.

E- Materials

- www.kaplanfinancial.com › insurance
- www.insurancecareertraining.com
- www.nationalonlineinsuranceschool.com

Journal Reference

- Journal of Insurance and Risk Management published by BIMTECH Birla Institute of Management Technology, Greater Noida

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	M	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	S	S	M	M	S	M	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: I

Paper type: ALLIED –I

Paper code: CABA13

C.Business Ethics

Credit: 3

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

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Course Objectives

1. To provide basic knowledge of business ethics, values and its relevance in modern context.
2. To attain knowledge in various types of Ethics.
3. To learn the ethical practices to be followed in Human Resource and marketing activities.
4. To be socially responsible towards the stakeholders of business.
5. To develop the social skills required for the successful practice of management within the framework of societal values.

Course Outcomes

1. After the study of Unit1, the student understands the importance of Ethics and Values in Business.
2. After the study of Unit2, the student acquires the knowledge of various types of Ethics.
3. After the study of Unit3, the student learns the ethical practices to be followed in Human Resource and marketing activities.
4. After the study of Unit4, the students learn to be socially responsible towards the stakeholders of Business.
5. After the study of Unit5, the students develop the social skills required for the successful practice of management within the framework of societal values.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT-I**Teaching Hours: 18**

Role and importance of Business Ethics and Values in Business - Definition of Business Ethics
Impact on Business Policy and Business Strategy - Role of CEO - Impact on the Business Culture.

UNIT-II**Teaching Hours: 18**

Types of Ethical issues - Bribes - Coercion - Deception - Theft - Unfair Discrimination.

UNIT-III**Teaching Hours:18**

Ethics internal - Hiring - Employees - Promotions - Discipline - Wages - Job Description - Exploitation of employees.

UNIT-IV**Teaching Hours: 18**

Ethics External - Consumers - Fair Prices - False Claim Advertisements.Environment Protection - Natural - Physical - Society - Relationship of Values and Ethics - Indian Ethos - Impact on the performance.

UNIT-V**Teaching Hours: 18**

Social Responsibilities of Business towards Shareholders, Employees, Customers, Dealers, Vendors , Government - Social Audit.

Text Books

1. 1.Dr.S. Shankaran , Business Ethics& Values, Margham Publications, Chennai.
2. 2.Memoria& Subba Rao, Business Panning and Policy, Himalaya Publishing House, Mumbai.
3. Bodi R and Bodi N. V , Business Ethics
4. 4.A.C. Fernando, K.P. Muraleedharan, E.K. Satheesh, Business Ethics- An Indian Perspective, Pearson.
5. A.C. Fernando, Business Ethics- An Indian Perspective, Kindle Edition.
6. Ronald D. Francis, Mukthi Mishra, Business Ethics- An Indian Perspective, Payal Books.
7. 7.P.S. Balaji, Business ethics, An Indian Perspective, Dreamtech Press.
8. Anand Das Gupta, Business Ethics, Text and cases, Springer, Oxford University Press.
9. Andrew crane , Business Ethics, Springer
10. Saurabh Agrawal, Business Ethics, SB PD Publishing House.

Reference Books

1. David J. Fritzsche, Business Ethics: A Global & Management Perspective , Tata McGraw-Hill
2. Ramaswamy Namakumari - Strategic Planning - Corporate Strategy , Laxmi Publications Pvt.Ltd.
3. Velasquez - Business Ethics, Prentice - Hall of India,
4. Peter Madsen & Jay M. Shafritz , Essential of Business Ethics
5. Ken Smith and Phil Johnson , Business Ethics and Business Behavior.
6. Pratley - Essence of Business Ethics , Prentice - Hall of India.

E- Materials

- josephsononbusinessethics.com
- www.globethics.net
- www.ethicssage.com

Journal Reference

- Journal of Human Values published by SAGE Publications
- International Journal of Business Ethics in Developing Economies Mapping with Programme Outcomes published by Publishing India.

Mapping with Program Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	M	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	M	S	M	S	S	S
CO5	S	S	S	M	M	S	M	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

SEMESTER II

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115 BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: II

Paper type: CORE THEORY

Paper code: CBA 21 Business Environment

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To know the factors that affect the business environment
2. To help understand how Political Environment have an influence on Business organization.
3. To understand the various factors influencing Business Organisation.
4. To know how Economic Environment influence Business Organisation
5. To know how Financial Environment play a significant role in Business

Course Outcomes

1. After the study of unit-1, the student will be able to know the factors that affect the business environment
2. After the study of unit-2, the student will be able to understand how Political Environment influence Business Organisation.
3. After the study of unit-3, the student will be able to understand how Social Environment impact society
4. After the study of unit-4, the student will be able to know how Economic Environment impact Business
5. After the study of unit-5, the student will be able to know how Financial Environment, and Financial institutions help Business Organizations

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT-I**Teaching Hours: 15**

The concept of Business Environment - Its nature and significance - Brief overview of political - Cultural - Legal - Economic and social environments and their impact on business and strategic decisions.

UNIT-II**Teaching Hours: 15**

Political Environment - Government and Business relationship in India - Provisions of Indian constitution pertaining to business

UNIT-III**Teaching Hours: 15**

Social Environment - Cultural heritage - Social attitudes - impact of foreign culture - castes and communities - Joint family systems - Linguistic and Religious groups - Types of Social Organization

UNIT-IV**Teaching Hours: 15**

Economic Environment - Economic Systems and their impact of Business - Macro Economic Parameters like GDP - Growth Rate - Population - Urbanization - Fiscal deficit - Plan investment - Per capita Income and their impact on business decisions

UNIT-V**Teaching Hours: 15**

Financial Environment - Financial System - Commercial banks - RBI - IDBI - Non-Banking Financial Companies NBFC's

Text books

1. Dr. S. Sankaran - Business Environment, Margham Publications, Chennai.
2. K. Aswathappa, Essentials of Business Environment, Himalaya Publishing House, Mumbai.
3. Joshi - Business Environment- Kalyani Publishers, Chennai.
4. Namitha Gopal –Business Environment –Vijay Nicole Imprints, Chennai.
5. Dr. V. C. Sinha, Business Environment, SBPD Publications.
6. Rosy Joshi, Sangam Kapoo Priya Mahajan –Business Environment, Kalyani Publishers.
7. The Business Environment, , McGraw Hill Higher Education
8. Ivan Worthing, The Business Environment : A Global Perspective , Pearson .
9. Brinkman-Navarro-Harper, Business Environment (English, Paperback,
10. Francis Cherunilam, Business Environment

Reference Books

1. Francis Cherunilam: Business Environment – Text and Cases, Himalaya Publishing House, Mumbai..
2. A.C. Fernando, Business Environment, Pearson Indian Education Services Pvt. Ltd Noida.

3. Ian Worthington and Chris Britton: The Business Environment, Prentice Hall, New Delhi.
4. Shaikh Saleem, Business Environment, Pearson Indian Education Services Pvt. Ltd, Noida.
5. Rudder Dutt and Sundharam, K.P.M.: Indian Economy, S. Chand & Company Limited, New Delhi.
6. Misra, S.K. and Puri, V.K.: Economic Environment of Business, Himalaya Publishing House, Mumbai.
7. Misra, S.K. and Puri, V.K.: Indian Economy, Himalaya Publishing House, New Delhi.
8. Adiseshiah, S. Malcolm (1986). Role of Foreign Trade in Indian Economy. New Delhi: Lancer International.
9. Agarwal, J. C. and N. K. Chowdhary (1991). Indian Economy: Crisis and Reforms. Delhi: Shipra.
10. Agarwal, P. N. (1978). *India's Export Strategy*. New Delhi: Vikas Publishing House.

Course Material: website links

- <https://study.com/academy/lesson/what-is-business-environment-definition-factors-quiz.html>
- <https://www.investopedia.com/terms/p/pest-analysis.asp>
- https://www.mindtools.com/pages/article/newTMC_09.htm
- https://link.springer.com/chapter/10.1007/978-3-319-32754-9_3
- https://en.wikipedia.org/wiki/Gross_domestic_product

Journal Reference

- International Journal of Business Environment published by Inderscience publishers.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	M	S
CO2	M	S	M	M	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: II

Paper type: CORE THEORY

Paper code: CBA 22 Business Mathematics & Statistics-II

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hours: 1

Course Objectives

1. To enable the students to understand the the basic concepts in Business Mathematics and Statistic
2. To make students understandvarious tools and techniques using Matrix.
3. To know the principles of Correlation and Regression
4. To be able to choose rational options in Time Series.
5. To develop skills in analysis of Index Number and weighted Index Numbers.

Course Outcomes

1. After the study of unit-1, the student will be able to Identify statistical tools needed to solve various business problems.
2. After the study of unit-2, the student will be able to Solve Simultaneous Equation using matrix Method.
3. After the study of unit-3, the student will be able to able to apply Correlation & regression.
4. After studying unit-4, the student will be able to develop Time Series
5. After studying unit-5, Students can Use Index Number , Weighted and UN weighted Index Numbers in practical application .

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-I**Teaching Hours: 15**

Matrix Theory, Equal Matrices ,Diagonal Matrix ,Scalar Matrix, UnitMatrix ,Null Matrix, Row Matrix, Column Matrix, Matrix Operation – Operation on Determinants – Inverse of a Square Matrix (not more than 3)

Unit-II**Teaching Hours: 15**

Solving Simultaneous Equation using matrix Method, Simulation Linear Equations, General properties of matrices, Method of Reduction

Unit-III**Teaching Hours: 15**

Correlation .Karl Pearson's Correlation ,Positive Correlation ,Negative Correlation ,No Correlation ,Simple Correlation – Scatter Diagram – Numerical Value of the Correlation Coefficient - Concurrent Deviation method – Rank Correlation – Properties of Correlation Coefficient ,Limitation -Uses of Correlation in Business Regression – Regression Lines – Regression coefficients – Uses of Regression in Business Problems.

Unit-IV**Teaching Hours: 15**

Time Series – Component of time Series, Secular trend, Seasonal Variation, Cyclical Variation, Irregular Variation – Measurement of Trend, Graphic Method – Semi Average method – Moving Average method –Method of Least Squares – Measurement of Seasonal Variations – Simple Average Method – Ratio to Moving Average Method

Unit-V**Teaching Hours: 15**

Index Number – Weighted and UN weighted Index Numbers – Cost of Living Index Number – Average of Relative Price Indices-Quality Index Number- Test on index Numbers- Time reversal test, Factors reversal test- Circular test. Proportion of Theory and Problem: 20:80

Text books

1. Dr. P.R. Vittal Business Mathematics and Statistic, Margham Publications,Chennai ,2013
2. S P Rajagopalan, R Sattanathan - Business Mathematics,Vijay Nicole Imprints (P) Ltd,2013
3. Prof. A. V. Rayarikar , P. G. Dixit Business Mathematics And Statistics Nirali Prakshan Publishers,2019
4. Agarwal B.M. Business Mathematics & Statistics.
5. D.C. Sancheti , V.K.Kapoor, Business Mathematics, Sultan Chand & Sons, New Delhi,2007
6. C.B.Gupta, Vijay Gupta An introduction to statistical methods , Vikas Publishing House Pvt.Ltd, 23rd edition 2004,2015, New Delhi
7. G.C.Beri ,Business Statistics, Mc Graw Hill Education Private Limited, Chennai 3rd edition, 2016
8. Mukesh kumar ,Anand Chauhan ,Business Mathematics Scientific International Pvt.Ltd , New Delhi-2017.

9. S.P.Rajagopalan , R.Sattanathan, Business Statistics and Operations Research 3rd Edition, Vijay Nicole Imprints Pvt Ltd ,2014.
10. S.K.Kapoor, Elements of Practical Statistics, Oxford and IBH Publishing Corporation Pvt.Ltd, New Delhi 2008

Reference Books

1. Agarwal B.M. Business Mathematics & Statistics Ane Books Pvt Ltd, 2009
2. S P Rajagopalan, R Sattanathan - Business Mathematics, Tata McGraw- Hill Publishing company Ltd, New Delhi, 2009
3. A Francis; Ben Mousley Business Mathematics and Statistics, United Kingdom Cengage Learning, 2014
4. Prof. A. V. Rayarikar , P. G. Dixit Business Mathematics And Statistics, Nirali Prakshan Publishers, 2019
5. B M Aggarwal, Business Mathematics and Statistics, Ane Books Pvt Ltd, 2010
6. Dr.A. Thilagaraj & Dr.N.Soundarraj, Business Mathematics, Learntech Press ,Trichy, 2010
7. Dr. P.R. Vittal Business Statistics , Margham Publications, 2009, Chennai
8. J.P.Singh , Business Mathematics , Ane Books Pvt.Ltd New Delhi 2016.
9. S.P.Gupta- Statistical Methods, Sultan Chand & Sons-New Delhi- 36th Edition 2008
10. S.P.Gupta- Statistical Methods, Sultan Chand & Sons-New Delhi- 45th Edition 2017

E- Materials

- https://www.researchgate.net/publication/316507362_Business_Mathematics_Statistics
- <https://www.toppr.com/guides/business-mathematics-and-statistics/>
- https://www.dphu.org/uploads/attachements/books/books_3502_0.pdf

Journal Reference

- Journal of Mathematical Sciences published by Springer

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	S	S	S
CO2	S	S	S	S	M	S	M	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: II

Paper type: ALLIED I

Paper code: CABA23AA.Customer Relationship Management Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

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Course Objectives

1. To understand the significance of Customer Relationship Management (CRM)
2. To enable students, learn the importance of Customer Relations
3. To understand the various components of CRM
4. To understand processes that involve in customer relationship management (CRM)
5. To know the use of technology in CRM

Course Outcomes

1. After the study of unit-1, the student will have a clear understanding of be able to know CRM
2. After the study of unit-2, student will be able to learn various stages and importance of CRM.
3. After the study of unit-3, student will know the components of CRM and how to measure effectiveness.
4. After the study of unit-4, students will be able to check out the framework of CRM
5. After the study of unit-5, student will be able to use of technology in CRM

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT-I**Teaching hours: 18**

CRM – Introduction – Definition – characteristics- objectives- Need for CRM – Complementary Layers of CRM – Customer Satisfaction – factors influencing customer satisfaction- determinants- benefits- customer value- building customer satisfaction - Customer Loyalty –features- importance- loyal customer ladder- Product Marketing – importance – marketing mix- Direct Marketing- meaning- nature difference between direct and conventional marketing- functions- advantages and limitations.

UNIT-II**Teaching hours: 18**

Customer Learning Relationship – meaning- areas of learning relationship- categories of relationship- basis for building learning relationships – Promise- trust- commitmentsatisfaction- strategies and guidelines or building learning relationships- Key Stages of CRM – Forces Driving CRM –key principles of CRM- Benefits of CRM – limitations of CRM Growth of CRM Market in India – CRM in different sectors in India.

UNIT-III**Teaching hours: 18**

CRM Program and strategy– Components of CRM -Groundwork for Effective use of CRM – types of CRM program- planning CRM program - role of CRM program- managing CRM program- measuring effectiveness of CRM program- Information Requirement for an Effective use of CRM .

UNIT-IV**Teaching hours: 18**

CRM Process Framework – Formation process- Governance Process – Performance Evaluation Process- evolution process- customers in CRM- Relationship marketing and CRM process – tool- difference between relationship marketing and CRM- objectives of relationship marketing- customer relationship hierarchy- six market framework of relationship marketing- dimensions- strategies- essentials of Relationship Marketing.

UNIT-V**Teaching hours: 18**

Use of Technology in CRM – 11 C's of relationship criteria for creating value for customers- use of technology- CRM Technology Tools – E-CRM – Requirement Analysis for CRM technology- Implementation of CRM technology– emerging trends in CRM technology- pitfalls of IT focus in CRM-Call centre- classification- call centre process- use of technology in call centre- operational challenges- CRM Package/ software – functional areas- Key CRM software packages- selection of CRM packages- benefits of software- CRM implementation- phases- business transformation process- issues in CRM implementation Reasons for Failure of CRM- guidelines for successful CRM implementation.

Text books

1. Dr. Freda Gnanaselvam & A.V. Aruna Kumar, Customer Relationship Management, Takur Publications
2. G.Shainesh, Jagdish N Sheth – Customer Relationship Management – Laxmi Publication Pvt. Ltd.
3. K.Balasubramaniyan - Customer Relationship Management, , GIGO Publication, 2005.

4. Dr. P. Sheela Rani – Customer Relationship Management – Margham Publications, Chennai
5. Ed Peelen ,Rob Beltman Customer Relationship Management 2nd Edition
6. Lars Helgeson CRM for Dummies Paperback – July 5, 2017.
7. Roger J. Baran ,Robert J. Galka, Customer Relationship Management: The Foundation of Contemporary Marketing Strategy 2nd Edition, Kindle Edition
8. Francis & Stan Maklan Buttle, Customer Relationship Management : Concepts and Technologies, 4th edition paperback
9. Parvatiyar Atul ,G Shainesh, Customer Relationship Management: Emerging Concepts, Tools and Applications Hardcover – 1 July 2017
10. G. Shainesh ,Jagdish N. Sheth Customer relationship management Paperback – 1 January 2020 by
11. V. Kumar, Customer Relationship Management- Concept, Strategy, and Tools, Werner Reinartz

Reference Books

1. Dr. Ravi Kalakota E-business – Roadmap for success, , Pearson Education Asia, 2000.
2. Rebecca Saunders - Business – The Dell way, India Book Distributors, 2000.
3. Amrit tiwana - The Essentials Guide to Knowledge Management – E-business and CRM application, Pearson education, 2001.
4. Adrian Payne, Handbook of CRM: Achieving Excellence in Customer Management , Butterworth-Heinemann is an imprint of Elsevier, Linacre House, Jordan Hill, Oxford
5. Kristin Anderson and Carol Kerr, Customer Relationship Management, McGraw-Hill,
6. Paul Greenberg, CRM at the Speed of Light, Fourth Edition: Social CRM 2.0 Strategies, Tools, and Techniques for Engaging Your Customers Hardcover , Publisher: McGraw-Hill Education; 4th Edition
7. Barton J. Goldenberg, The Definitive Guide to Social CRM: Maximizing Customer Relationships with Social Media to Gain Market Insights, Customers, and Profits (FT Press Operations Management) 1st Edition by, Publisher: Pearson FT Press; 1st Edition
8. Salesforce.com For Dummies (For Dummies (Computer/Tech)) 6th Edition by Liz Kao and Jon Paz, Publisher: For Dummies; 6 edition (April 25, 2016), Language: English, ISBN-10: 9788126563012, ISBN-13: 978-1119239314

9. John Goodman, Customer Experience 3.0: High-Profit Strategies in the Age of Techno Service Hardcover – August 12, 2014 by, Publisher: AMACOM; First edition
10. Brian K. Gardner, ROI from CRM: It's about sales process, not just technology Paperback – May 4, 2016, Publisher: Gale Media, Inc.

Course Material: website links

- <https://study.com/academy/lesson/what-is-business-environment-definition-factors-quiz.html>
- <https://www.investopedia.com/terms/p/pest-analysis.asp>
- https://www.mindtools.com/pages/article/newTMC_09.htm
- https://link.springer.com/chapter/10.1007/978-3-319-32754-9_3
- https://en.wikipedia.org/wiki/Gross_domestic_product

Journal Reference

- International Journal on Customer Relations published by Publishing India Group

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	S	M	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	M	S	S	M	S	M	S	S	M	S
CO4	S	S	S	S	M	S	S	S	S	M
CO5	S	M	M	S	S	S	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: II

Paper type: Allied- I

Paper code: CABA23B B. Principles of Banking System Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

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Course Objectives

1. To know how banking system functions within the financial system
2. To know the concept of Social Responsibility of Banks
3. To understand the role of Reserve Bank of India
4. To know the functions of modern Commercial Banks
5. To know all about financial services

Course Outcome

1. After the study of unit-1, student will have a complete knowledge on the origin of Banks
2. After the study of unit-2, student will be able to know the Concept of Social Responsibility of Banks
3. After the study of unit-3, student will be able to understand the roles of various banks
4. After the study of unit-4, student will be able to understand the Functions of Modern Commercial Banks
5. After the study of unit-5, student will understand the various financial services in the Indian economy

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT-I**Teaching hours: 18**

Introduction - Origin of Banks - Definition of Bank - Types of Bank - Banking Systems – UnitBank - Merits of UnitBank - Demerits of UnitBanks - Branch Bank - Its merits and demerits - Financial System - Components of financial system

UNIT-II**Teaching hours: 18**

Concept of Social Responsibility of Banks - Role of banks in Primary, Secondary and Territory sector - Mixed Banking - Retail Banking - Wholesale Banking - Universal Banking.

UNIT-III**Teaching hours: 18**

Reserve bank of India (central bank) - Commercial Banks - Cooperative Banks - flow of cooperative funds - Urban Cooperative Bank - Land Development Banks - Development Bank - NABARD (National Bank for Agriculture and Rural Development) - Regional Rural Bank - EXIM bank

UNIT-IV**Teaching hours: 18**

Functions of Modern Commercial Banks - Savings account - Current account - Difference between savings account and current account - Fixed Deposit - Recurring Deposit - Granting of Loan - Clean Loan - Second loan - Overdraft -Cash Credit.

UNIT-V**Teaching hours: 18**

Factoring - Lease Finance - Export Finance - Credit Card - Credit Rating - E-business - Ecommerce - E-banking - Automatic Teller Machines.

Text Books

1. Santhanam -Banking and Financial System, Margham Publications, Chennai.
2. S.N.Maheshwari -Banking Law Theory and Practice , Kalyani Publishers, Chennai.
3. Sundharam & Varshney- Banking Theory Law and Practice – Sultan Chand & Sons, New Delhi
4. Gurusamy -Banking Theory Law and Practices — Vijay Nicole Imprints (P) Ltd, Chennai.
5. K.P. Kandesami, S. Natarajan, R. Parameswaran, Banking Law and Practice, S. Chand, Delhi.
6. Moorad Choudary, The Principles of Banking, Wiley
7. G.S. Popli, Anuradha Jain, Principles & systems of banking, PHI Learning Pvt Ltd.
8. Ashok Kumar Das, Principles of Banking for today's bankers
9. Dr. V.C. Sinha, Indian Banking System, sold by SBPD Publishing House.
10. Ruchika Gahlot, Principles of Indian Banking, Lakshmi Publications.

Reference Books

1. Kandasami K P, Natarajan - Banking Law and Practice , S.Chand & Co New Delhi.
2. Varshney and Malhotra – Principles of Banking – Sultan Chand & Sons

3. Bimal N. Patel, Banking Law and Negotiable Instruments Act, Eastern book company
4. Bimal N. Patel, Dolly Jabbal, Prachi V. Motiyani, Banking Law, Eastern book company
5. Dr. O.P. Gupta, Banking law and Practice in India, Sahitya Bhawan Publications
6. Kandasami K.P., Banking Law and Practice, S Chand & Company

E-Materials

- <https://www.bookden.in/products/macmillan-book-ebook-principles-practices-ofbanking>
- <https://www.freebookcentre.net/business-books-download/Banking-principles-andpractice.html>
- <https://gurukpo.com/Content/BBA/fundamental-of-Banking.pdf>

Journal Reference

- Indian Journal of Finance and Banking published by Centre for Research on Islamic Banking & Finance and Business

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: II

Paper type: ALLIED I

Paper code: CABA23CC. Fundamentals of Computer Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To know the importance of computers, types and uses.
2. To understand the Computer Architecture and various components of a computer system
3. To learn computers input-output devices and display devices
4. To know what is computer program ,Computer Languages and the Software.
5. To know the basics of connecting electronic devices, internet and computer virus

Course Outcome

1. After the study of unit-1, student will have knowledge about computer
2. After the study of unit-2, student will understand computer architecture
3. After the study of unit-3, student will know the functioning of parts
4. After the study of unit-4, student will be able to develop program
5. After the study of unit-5, student will be able to use computers effectively.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT-I**Teaching Hours: 8**

Introduction - Characteristics of computers – Five Generations of computers – Classification - Computer System - Uses of Computers.

UNIT-II**Teaching Hours: 8**

Computer Architecture - CPU - Memory - Communication between various units of a computer system - Storage Devices - Magnetic Tape - Magnetic Disk - Optical Disk - CD-ROM.

UNIT-III**Teaching Hours: 8**

Input Devices - Types - keyboard - Mouse - Output Devices - Classification of Output - Printers - Plotters - Monitors.

UNIT-IV**Teaching Hours: 8**

Computer program - Developing a Program - Algorithm - Flowchart Program Testing and Debugging - Program Documentation - Types of Documentation - Characteristics of a good program - Computer Languages - Software.

UNIT-V**Teaching Hours: 8**

Internet basics - Basic internet terms - Getting connected to internet - Internet applications - Electronic Mail - How e-mail works - Searching the Web - Internet and Viruses.

Text books

1. Kritka Gupta, Sunil Chauhan, Akash Saxena – Fundamentals of Computer – Laxmi Publication Pvt. Ltd
2. Raja Raman – Fundamentals of Computer – Prentice Hall of India
3. Alex Leon and Mathews Leon – Computer Application in Business – Vijay Nicole Imprints Ltd.,
4. P K Sinha – Fundamentals of Computer-BPH Publication
5. Arora, Ashok and Bansal Shefali – Computer Fundamentals – Excel Books
6. Brian W. Kernighan & Dennis M. Ritchie, The C Programming Language, Second Edition, Prentice Hall, 1988, <http://cm.bell-labs.com/cm/cs/cbook/>,
7. “Computer Fundamentals and Programming in C” by Reema Thareja
8. The Hidden Language of Computer Hardware and Software. By Charles Petzold.
9. A Handbook of Agile Software Craftsmanship. by Robert C.
10. Fundamentals of Computers Paperback – 17 December 2014 by Rajaraman V(Author), Adabala N(Author)

Reference Books

1. Introduction to Computer Science, IITL Education Solutions Limited, Pearson Education.
2. P K Sinha Computer Fundamentals

3. Computer for Competitive Exams (Fundamental of Computer with MCQs):
Fundamental of Computer with Multiple Choice Questions (Popular Master Guide)” by
RPH Editorial Board
4. Reema Thareja, Fundamentals of Computers
5. E Balagurusamy, Fundamentals of Computers
6. Sahni Horowitz, Fundamentals of Computer Algorithms
7. Harvey M. Deitel & Paul J. Deitel, C How to Program, Fourth Edition, Prentice Hall,
2004,
8. Stefano Ceri, Dino Mandrioli & Licia Sbattella, The Art and Craft of Computing,
Addison-Wesley, 1998,
9. Delores M. Etter, Engineering Problem Solving with C, Third Edition, Prentice Hall,
2005,
10. Goel, Anita, Computer Fundamentals, Pearson
11. Ram, B Computer Fundamentals: Architecture & Organization. 4th Edition New Age
Publication

Course Material: website links

- https://www.academia.edu/14277811/Computer_Fundamental_for_BBA_B.Com_and_BCA
- <https://theintactone.com/2019/08/31/ccsubba-506-computer-fundamentals/>
- <https://www.tutorialsmate.com/2020/04/computer-fundamentals-tutorial.html>
- <https://www.youtube.com/watch?v=tIfRDPeKybU>
- <https://in.okfn.org/files/2013/07/-Computer-Fundamental.pdf>

Journal Reference

- Indian Journal of Computer Science, New Delhi

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

SEMESTER III

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III

Paper type: Core Theory

Paper code: CBA31 Production and Materials Management Credit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hours: 1

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Course Objectives

1. To enable the students to understand the various process of production in Organisation
2. To enable the students to be aware of techniques of Production Management
3. To familiarize students with quality control techniques used to effectively carry out Production.
4. To sensitize students on the materials management functions - planning, purchasing, store handling and vendor rating
5. To understand the inventory control techniques.

Course Outcome

1. After the study of unit-1, student will be able to understand the concept of operations and relationship between operations and other business functions.
2. After the study of unit-2, student will be able to analyses and evaluate various production and scheduling techniques, and to identify appropriate location for factories.
3. After the study of unit-3, student will be able to implement work and method study procedures.
4. After the study of unit-4, student will be able to plan and implement suitable materials planning principles and practices in operations.
5. After the study of unit-5, student will be able to plan and implement store keeping and material handling and rating vendors.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I

Teaching hours: 15

Production System - Introduction - Production - Productivity - Production Management - Objectives of Production Management - Functions and scope of production management - Relationship of production with other functional areas.

UNIT– II

Teaching hours: 15

Production Planning and Control - Routing and Scheduling - Dispatching - Maintenance management - Types of maintenance - Breakdown - Preventive - Routine - Maintenance Scheduling. Plant Location - Introduction - Need for selecting a suitable location - Plant Location problem - Advantage of Urban, suburban and rural locations - Systems view of location - Factors influencing plant location. Plant layout - Plant layout problem - Objectives - Principles of plant layout - Factors influencing plant layout - Types of layout.

UNIT– III

Teaching hours: 15

Work and Method Study - Importance of work study - Work study procedures - Time study - Human considerations in work study - Introduction to method study - Objectives of method study - Steps involved in method study Work measurement - Objectives of work measurement - Techniques of work measurement - Computation of standard time - Allowance - Comparison of various techniques.

UNIT– IV

Teaching hours: 15

Materials - Meaning - Types - Materials Management - Definition and Functions - Importance of materials Management - Inventory control - Function of inventory - Importance - Tools of Inventory Control - ABC - VED - FSN analysis - Purchase Management - Purchasing - Procedure - Dynamic purchasing - Principles - Store planning.

UNIT– V

Teaching hours: 15

Store Keeping and Materials Handling - Objectives - Function of store keeping - Store responsibilities - Location of store house - Centralized store room - Equipment - Security measures - Protection and prevention of stores - Fire and other Hazards - Bin card - Stock Cards. Vendor rating - Vendor development - Purchase Department - Responsibility - Buyer - Seller relationship - Value analysis.

Text Books

1. Saravanavel P and Sumathi S, Production and Materials Management, Margham Publications, Chennai.
2. Paneerselvam - Production and Operations Management - Prentice - Hall of India, New Delhi,
3. Aswathappa, K - Production and Operations Management - Himalaya Publishing House, Mumbai
4. Chunnawalla and Patel - Production and Materials Management, Himalaya Publishing House, Mumbai
5. Gopalakrishnan - Materials Management - Prentice - Hall of India.

Reference books

1. Harding HA - Production Management.
2. Buffa - Production Management.
3. Broom - Production Management.
4. Saxena JP -Production and Operations Management
5. SN Chari - Production and Operation Management.
6. Adam and Ebert - Production and Operations Management - Prentice - Hall of India.
7. Muhdnan - Production and Operation Management MacMillan
8. Dutta - Integrated Materials Management
9. England and Leenders - Purchasing and Materials Management
10. Varma - Materials Management

E-Materials

- <http://www.nitc.ac.in/app/webroot/img/upload/Production%20Management%20Module%201%20Course%20notes.pdf>
- https://gurukpo.com/Content/BBA/production_and_Material_Management.pdf
- http://www.vssut.ac.in/lecture_notes/lecture1429900757.pdf
- <http://www.ddegjust.ac.in/2017/Uploads/11/POM-325.pdf>
- <https://www.doccity.com/en/purchase-and-materials-management/4694923/>

Journal Reference

- Materials Management Review published by Indian Institute of Materials Management, New Delhi.
- The IUP Journal of Operations Management published by IUP Publications, Hyderabad.
- Journal of Manufacturing and Materials Processing published by MDPI, Switzerland.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	M
CO2	M	S	S	S	M	S	S	S	S	S
CO3	S	M	M	S	S	M	S	M	S	S
CO4	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	M	S	S	M	M	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III

Paper type: Core Theory

Paper code: CBA32

Financial Accounting

Credit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To familiar the students with basic accounting principles
2. To understand and prepare trial balance
3. To prepare balance sheet
4. To learn single and double entry method
5. To learn various types of shares and debentures.

Course Outcomes

1. After the study of Unit-1, the student is able to know the basic concepts of accounting, principles, convention, rules of accounting and various books of accounting.
2. After the study of Unit-2, the student is able to know the trial balance method, depreciation and their needs and various method of charging depreciation.
3. After the study of Unit-3, the student is able to know the preparation of financial accounting, procedure for preparation of trading and profit and loss accounts and balance sheet.
4. After the study of Unit-4, the student is able to know the need for preparation of single entry system and their uses.
5. After the study of Unit-5, the student is able to know the meaning of shares and its type.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I**Teaching hours:15**

Financial Accounting- Meaning and Definition - Accounting Concepts - Accounting Conventions - Objectives of Accounting - Rules of Accounting -Principles of Double Entry System - Book Keeping- Journal - Ledger - Subsidiary Books - Purchases Book, Sales Book, Returns Book and Cash Books.

UNIT- II**Teaching hours:15**

Trial Balance - Meaning and Definition - Method of Trail Balance-Depreciation - Need for Depreciation - Causes of Depreciation - Objectives of Depreciation - Straight Line And Diminishing Balance Methods Of Charging Depreciation Only.

UNIT- III**Teaching hours:15**

Final Accounts - Introduction - Preparation Trading Accounting - Profit and Loss Account and Balance Sheet.

UNIT- IV**Teaching hours:15**

Single Entry System - Definition - Salient Features - Limitations - Difference Between Double Entry and Single Entry Systems - Ascertainment of Profit - Net Worth Method Only.

UNIT- V**Teaching hours:15**

Company Accounts - Meaning of shares - Types of Shares-Issue, Forfeiture and Reissue of Shares - Debentures - Issue of Debentures Only.

(Weightage of Marks: Problems - 80%, Theory - 20%)

Text Books

1. T.S. Reddy & A. Murthy - Financial Accounting , Margham Publishers,Chennai.
2. Jain.S.P- Introduction to Financial Accounting, Kalyani Publishers
3. Maheswari.S.N - Financial and Management Accounting, Sultan Chand, New Delhi.
4. Bhattacharya- Financial Accounting for Business Managers. PHI Learning
5. Prof.Jawarlal,Dr.Seema Srivastava-Financial Accounting,Sultan Chand,New Delhi.
6. Umamaheswari, Dr.Vasanthi,Financial Accounting,Charulatha Publications,Chennai.
7. Dr.F.Elayaraja,Dr.S.Prabu, Financial Accounting,Charulatha Publications,Chennai.
- 8.N.Ramachandran,Ramkumar Financial Accounting for ManagementMC GRAW Hills New Delhi.
- 9.Dr.Nisikant Jha,Introduction to Financial Accounting Himalaya Publishing House,
- 10.S.Manikandan Financial Accounting Scitech Publications, Chennai.

Reference Books

1. Gupta R.L and Radhaswamy - Advanced Accounting.
2. Shukla. M.C & Grewal .T.S- Advanced Accounting.
3. Tulsian - Financial Accounting - Tata McGraw-Hill Pub.
4. N. Vinayakam & B. Charrumathi - Financial Accounting
5. Dr. S. Ganeson & S.R. Kalavathi - Financial Accounting.

6. Charles T. Horngren, Gary L. Sundem, John A. Ellist, Donna R. Philbrick, Introduction to Financial Accounting Pearson Publication.
7. R.L. Gupta, V.K. Gupta Financial Accounting Sultan Chand and Sons New Delhi
A. Murthy Financial Management Margam Publications Chennai.
8. Dr.S.N. Maheswari, Elements of Financial Management, Sultan Chand and Sons New Delhi

E-Materials

- tudocu.com/en-gb/document/lancaster-university/principles-of-financial-accounting/lecture-notes/acf212-principles-of-financial-accounting-lecture-notes/1495870/view
- <https://ocw.mit.edu/courses/sloan-school-of-management/15-511-financial-accounting-summer-2004/lecture-notes/>
- <https://www.topfreebooks.org/principles-of-financial-accounting/>

Journal Reference

- The IUP Journal of Accounting Research and Audit Practices published by IUP, Hyderabad.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III

Paper type: Core Theory

Paper code: CBA33 Human Resource ManagementCredit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To understand the concepts and basic functions of Human Resource Management.
2. To learn the process of employee recruitment and selection.
3. To acquire knowledge in the training needs and methods.
4. To understand the need and methods of performance appraisal.
5. To analyse the key issues related to Compensation, Mentoring, Career Planning, Promotion, Transfers and Termination.

Course Outcome

1. After the study of Unit1, the student understands the concepts and basic functions of Human Resource Management.
2. After the study of Unit2, the student learns the process of employee recruitment and selection.
3. After the study of Unit3, the student acquires knowledge in identifying the training needs and methods.
4. After the study of Unit4, the student understands the need and methods of performance appraisal.
5. After the study of Unit5, the student can analyse the key issues related to Compensation, Mentoring, Career Planning, Promotion, Transfers and Termination.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I

Teaching hours: 15

Definition of HRM - Objectives of HRM - Nature and scope of HRM - Principles of HRM - Difference between Personnel Management and HRM - Duties and Responsibilities of HR Managers - Qualities of HR managers - role of HR managers - importance of HRM - challenges of HRM - Evolution and Growth of HRM - Environment of HRM - Strategic HRM.

UNIT– II

Teaching hours: 15

Human Resource Planning - Features of HR planning - objectives - factors influencing HR planning - Recruitment - Principle of recruitment - objectives - steps involved in recruitment process - Sources of recruitment - Selection - definition - importance - process of Selection - Use of various tests - Interview techniques in selection - objectives - types - limitations - guidelines - Recruitment vs selection - Induction.

UNIT– III

Teaching hours: 15

Employee Training and Development - Definition - Objectives - need and importance - Identification of Training needs - essentials of good training program - characteristics Process of training - Training Methods - on the job training methods - off the job training methods- Executive development - advantages of training to employees - Techniques - effectiveness of training and development programs.

UNIT– IV

Teaching hours: 15

Performance Appraisal - Definition - Features - Objectives - Advantages - limitations - characteristics of an effective performance appraisal systems - Need for Performance Appraisal - Process - Methods - Traditional and modern methods of performance appraisal - merit rating - concepts and methods - BARS - Compensation.

UNIT– V

Teaching hours: 15

Transfer objectives - types - merits - demerits - characteristics of an effective transfer policy - Promotion and termination of services - Purpose of promotion - factors influencing promotion - types of promotion - Open and closed system of promotion - advantages, importance of promotion - demotion - Career development - Mentoring - HRM Audit - Nature - Benefits - Scope - Approaches

TEXT BOOKS

1. Dr. J. Jayasankar - Human Resource Management - Margham Publications, Chennai.
2. Dr. C.D. Balaji - Human Resource Management - Margham Publications, Chennai.
3. Aswathappa K - Human Resource and Personnel Management, Himalaya Publishing House.Mumbai.
4. Gupta C B - Human Resource Management - Sultan Chand & Sons.
5. Sundar & Srinivasan J - Essentials of Human Resource Management - Vijay Nicole Imprints
6. Murugesan G - Human Resource Management - Lakshmi Publications Pvt. Ltd
7. Gary Dessler, Biju Varkkey – Human Resource Management – Pearson Education, Delhi

- 8.K.Aswathappa, Human Resource Management – Text and Cases – Mc Graw Hill Co, New Delhi
9. Durai Human Resource Management-Pearson Education, New Delhi
- 10.VSP Rao Human Resource Management,Excel Books New Delhi.

Reference books

1. Memoria CB - Personnel Management
2. Subba Rao P - Human Resource Management and Industrial Relations
3. Prasad - Getting the right people - MacMillan I Ltd
4. Pattanayak - Human Resources Management - Prentice - Hall of India
5. Decenzo/Robbins - Personnel/Human Resource Management - Prentice - Hall of India
6. Saiyadain Mirza - Human Resource Management
7. Venkataratanam - Personnel Management & Human Resources
8. Saxena - Marketing Management - Tata McGraw Hill Pub
9. A. M. Sheikh - Human Resource Development & Management.
10. Dwivedi RS - Human Relations and Organization Behavior

E- Materials

- www.masters-in-human-resources.org
- www.oxfordhomestudy.com > ... > HR

Journal Reference

- Journal of Strategic Human Resource Management published by Publishing India
- Indian Journal of Industrial Relations published by Sri Ram Centre of IR & HR

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	M	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	M	S
CO4	S	S	S	S	M	S	S	M	M	S
CO5	M	S	M	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III

Paper type: Core Theory

Paper code: CBA34

Managerial Economics Credit: 4

Total Hours per Week: 4

Lecture Hours: 3

Tutorial Hour: 1

Course Objectives

1. To acquaint the students with principles of economics in managerial decision making.
2. To understand the basic concepts of managerial economics and its applications.
3. To understand the basic concepts of demand, supply, and equilibrium and their determinants.
4. To know the meaning and price output decisions of perfectly competitive firm both short and long run.
5. To understand the concepts of monopolistic and oligopolistic competition.

Course Outcome

1. After the study of Unit1, the student understands the concepts and relationship between Micro and Macro Economics
2. After the study of Unit2, the student can analyses the market supply and demand on market dynamics.
3. After the study of Unit3, the student acquires knowledge on production and cost analysis.
4. After the study of Unit4, the student will understand pricing methods.
5. After the study of Unit5, the student will have knowledge about market structure.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching hours: 12**

Nature and Scope of Managerial Economics - Definition of Economics - Important concept of Economics - Basic Economic problem - Relationship between Micro and Macro-economic - Managerial Economics - Nature and Scope - Objectives of the Firm.

UNIT– II**Teaching hours: 12**

Theory of Consumer behavior - Managerial Utility Analysis indifference curve and analysis Meaning of Demand - Law of Demand - Types of Demand - Determinants of demand - Elasticity of Demand - Demand Forecasting.

UNIT– III**Teaching hours: 12**

Production and Cost Analysis - Law of returns to scale and Economies of scale - Cost analysis - different cost concepts - Cost - output relationship - Short run and long run - Revenue curves of firms - Supply Analysis.

UNIT- IV**Teaching hours: 12**

Pricing Methods and Strategies - Objectives - Factors - General Considerations of Pricing - Methods of pricing - Role of Government - Dual pricing - price Discrimination.

UNIT– V**Teaching hours: 12**

Market forms - Market structure - Basis of Market classification - Output determination - Perfect Competition - Monopoly - Monopolistic Competition - Duopoly - Oligopoly.

Text Books

1. Dr. S. Sankaran - Managerial Economics - Margham Publications
2. Varshney RL and Maheshwari KL - Managerial Economics. Sultan Chand & sons
3. Aryamala T - Managerial Economics - Vijay Nicole Imprints Private Limited
4. Mankar: Business Economics, Macmilan Ltd.
5. Yogesh Maheshwari - Managerial Economics - Prentice-Hall of India
6. Jinghan M.L - Micro Economics, Vrinda Publications (P) Ltd. (Theory)
7. Prof.D.Mustafa Managerial Economics,AITBS Publishers, New Delhi.
8. M.L. Jhingan,J.K.Stephen, Managerial Economics , Vrinda Publications (P) Ltd, New Delhi.
9. D.D.Chaturvedi, S.L Gupta, Managerial Economics International Book House, (P) Ltd, New Delhi.
10. V.L Mote,Samuel Paul, G.S.Gupta ,Managerial Economics MC Graw Hill Publications New Delhi

Reference Books

1. Dean - Managerial Economics - Prentice-Hall of India.
2. Peterson - Managerial Economics - Prentice-Hall of India.
3. Mote Paul Gupta - Managerial Economics - MGH.
4. Mehta P.L. - Managerial Economics.
5. Dr. Shivani Kapoor, Prof. O Shukla - Managerial Economics - Laxmi Publication Pvt. Ltd

E-Materials

- https://www.tutorialspoint.com/managerial_economics/managerial_economics_overview.htm
- http://economicsconcepts.com/managerial_economics.htm
- <http://www.yourarticlelibrary.com/managerial-economics/managerial-economics-meaning-scope-techniques-other-details/24730>
- <https://www.edx.org/course/introduction-to-managerial-economics-2>
- <https://www.mheducation.co.uk/ebook-managerial-economics-9780077164270-emea>
- <https://epdf.pub/managerial-economics84ed28a3e234f607d8b67fd30c1104f456672.html>

Journal Reference

- The Indian Journal of Economics and Business published by Ashwin Anokha Publications & Distributions

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	M	S	S	S	M	M	M	S
CO4	M	S	M	S	M	M	S	M	M	M
CO5	S	S	S	S	M	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III

Paper type: ALLIED-2

Paper code: CABA35A

A. Office Management

Credit: 3

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives:

1. To understand the concepts and basic functions of Office.
2. To know the responsibilities and skills required of an office manager.
3. To develop the knowledge of Location, Layout and the Environment of an Office.
4. To learn about various types of office furniture and its uses.
5. To attain the skill of records management.

Course Outcome

1. After the study of Unit1, the student understands the concepts and basic functions of an office and responsibilities and skills required by the office manager.
2. After the study of Unit2, the student attains the knowledge of Location, Layout and the environment of an Office.
3. After the study of Unit3, the student gains knowledge of various types of office furniture and its uses.
4. After the study of Unit4 the student can handle mail services.
5. After the study of Unit5, the student learns the skill of records management.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching hours: 18**

Office - Meaning and scope - Office Functions - Qualifications of Office Manager - Office Management - Definition - Elements of Office Management - Functions of Office Management.

UNIT– II**Teaching hours: 18**

Location of an Office - Office Accommodation - Office Layout - Office Environment.

UNIT– III**Teaching hours: 18**

Office Furniture - Factors considered in selecting office furniture - Types of office furniture - Office Appliances and Equipment - Importance - Merits and Demerits - Typewriter - Duplicators - Photo Copier - Franking Machine - Communication Equipment : Dictaphone - Intercom - Telephone - Telex - Fax - PABX - PBX - Uses of Computers in Office .

UNIT– IV**Teaching hours: 18**

Mail service - Handling Inward Mail Service - Handling Outward Mail Service - Communications - Internal and external communication - Mechanical Devices for Oral Communication - Mechanical Devices for written Communication - Office Forms - Principles of Forms Design - Form Control - Continuous Stationery.

UNIT– V**Teaching hours: 18**

Records Management - Objectives - Filing - Definition - Essentials of a good filing system - Centralized and Decentralized Filing System - Methods of Filing - Classification of Files - Indexing - Definition - Types.

Text Books

1. N.S, Raghunathan - Office Management - Margham Publications, Chennai
2. C.B.Gupta - Office Organisation and Management, Sultan Chand & Sons.
3. V.Balachandran and V.Chandrasekaran - Office Management - Vijay Nicole Imprints Private Limited, Chennai.
4. P.K.Ghosh - Office Management - Sultan Chand & Sons.
5. Pillai R.S.N, Bhagwathi. V - Office Management, S. Chand Publications
6. Kathiresan, Dr. Radha, Office Management, Prasanna Publishers, Chennai.
7. Dr.T.S. Devanarayanan, N.S.Raghunathan, Office Management Margham Publications, Chennai.
8. Dr. R.C. Bhatia, Principles of Office Management, Lotus Press.
9. Alamelu Mangayarkarasi, Introduction to Office Management, Notion Press.
10. Dr. R.C. Bhatia, Modern Office Management and Commercial Correspondent, Sterling Publishers Pvt.Ltd.

Reference Books

1. Denyer JC - Office Management, Macdonald & Evans.
2. Littlefield CL and Peterson RL - Modern Office Management, A Drien Maisonneuve.

3. Leffingowell & Robinson – Text Book of Office Management, Mc Graw Hill.
4. Chopra R.K - Office Management, Himalaya Publishing House.
5. Arora S.P – Office Organisation and Management- Vikas Publishing House.
6. Dr.T.S. Devanarayan, N.S.Raghunathan - Office Management
7. R.C. Agarwal, Dr. Piyush Shalya, Office Management SBPD.
8. Thatheya.M- Office Management, Charulatha Publications.
9. I.M. Sahai, Office Management & Secretarial Practice, Sanitya Bhawan Publishers, Agra.
- 1.

E- Materials

- <https://www.kopykitab.com/Office-Management-by-Bagavathi-And-R-S-N-Pillai>
- https://www.researchgate.net/publication/323731787_Office_Management
- [alison.com › tag › office-administration](https://alison.com/tag/office-administration)
- [study.com › office_manager_courses](https://study.com/office_manager_courses)
- [snacknation.com › blog › office-manager-training](https://snacknation.com/blog/office-manager-training)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III
code: CABA35B

Paper type: ALLIED-2
B. Services MarketingCredit: 3

Paper

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To have thorough understanding of services marketing,
2. To acquire the knowledge of services strategies
3. To understand the service rendered to customers.
4. To identify and fill the service gaps.
5. To understand the challenges in managing and delivering the quality services.

Course Outcome

1. After studied Unit1, the student will have thorough understanding of marketing services,
2. After studied Unit2, the student acquires knowledge of services strategies including service product and delivery
3. After studied Unit3, the student gains Customer Service oriented mindset.
4. After studied Unit4, the student learns to Identify and fill the service gaps.
5. After studied Unit5, the student acquires in depth understanding of the challenges in managing and delivering the quality services.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching hours:18****MARKETING SERVICES**

Introduction Growth of the service sector. The concept of services. Characteristics of services - classification of services - designing of the service - blueprinting, using technology in developing human resources, building service aspirations.

UNIT– II**Teaching hours:18****MARKETING MIX IN SERVICE MARKETING**

The seven Ps: Product decision, pricing strategies and tactics placing or distribution methods for services, promotion of services and. Additional dimension in services marketing - people, physical evidence and process.

UNIT– III**Teaching hours: 18****EFFECTIVE MANAGEMENT OF SERVICE MARKETING**

Managing demand and supply through capacity planning and segmentation - internal marketing of services - external versus internal orientation of service strategy.

UNIT– IV**Teaching hours: 18****DELIVERING QUALITY SERVICES**

The customer expectations versus perceived service gap. Factors and techniques to resolve this gap. Gaps in services - quality standards, factors and solutions - the service performance gap - key factors and strategies for closing the gap. External communication to the customers - the promise versus delivery gap - developing appropriate and effective communication about service quality.

UNIT– V**Teaching hours: 18****MARKETING OF SERVICES**

Marketing of services - Financial - Bank Marketing - Mutual Funds Marketing - Health - Hospital services - Hospitality - hotel services marketing - tourism marketing - airlines services marketing - travel services marketing - railway services marketing - Educational Services - training services marketing - agricultural extension services marketing.

Text Books

1. Dr. L. Natarajan, Services Marketing -.Margham Publications, Chennai
2. Balaji. B -Services Marketing & Management. S.Chand, New Delhi
3. Valerie Zeithaml - Services Marketing - Tata McGraw-Hill Pub.
4. Wirtz Jochan, Services Marketing, People, Tech, Strategy, Pearson.
5. Lovelock, Chatterjee.S.M, Pearson Education, India.
6. Zeithaml, Services Marketing, SE Indian Education.
7. Rao, Services Marketing, Pearson.
8. Dr. Tarvi Gupta, Dr. Smita Mishra, Dr. Mamta Rani - Services Marketing, Nithya Publications.
9. Vinnie Jauhari Kirti Dutta, Services Marketing, Oxford University Press.
10. Mathur, Services Marketing, New Age International Pvt.Ltd Publishers.

Reference Books

1. Ravi Sankar Service Marketing. The Indian experience -, Manas Publications, New Delhi.
2. Zeithaml Parasuraman and Berry Delivering Quality Services -. The free press Macmillan.
3. S. Balachandran Excellence in services -, Business Publishing House, Bombay
4. Philip Kotler Marketing of Non-Profit Organization Prentice Hall of India (P) Ltd. India New Delhi.
5. K.Douglas Hoffman and John E.G. Bateson, ,Services Marketing, Concepts, Strategies & Cases, Thomson South Western
6. Roland T.Rust, Anthony J.Zahorik, Timothy L. Keiningham Service Marketing, Addison Wesley
7. Dr.R. Kalyan, Services Marketing, Charulatha Publications.
8. Adrian Palmar, Principles of Services Marketing Book chor.com
9. Deepti Wadera, Jaspeet Kaur, Marketing of Services, Global Vision Publishing House.

E- Materials

alison.com › Marketing Courses

- www.edx.org › learn › marketing
- www.oxfordhomestudy.com › marketing-courses

Journal Reference

- Indian Journal of Marketing published by Associated Management Consultants Private Limited, New Delhi.
- Journal of Services Marketing published by Emerald Publishing.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	S	M	S	M
CO2	S	S	M	S	M	S	S	M	S	M
CO3	S	S	M	S	S	S	S	M	M	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	M	M	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III
code: CABA35C

Paper type: ALLIED-2
C.Tourism ManagementCredit: 3

Paper

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

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Course Objectives

1. To understand the growth and development of tourism.
2. To attain knowledge in both National and International Tourism.
3. To understand the Economic and Cultural environment of tourism.
4. To know the pricing strategy of tourism industry.
5. To learn the Administrative system and Ministry of tourism.

Course Outcome

1. After the study of Unit1, the student understands the history, growth and development of tourism.
2. After the study of Unit2, the student gains knowledge in both national and international Tourism.
3. After the study of Unit3, the student acquires in depth understanding of economic and cultural environment of tourism.
4. After the study of Unit4, the student understands the pricing strategy of tourism industry
5. After the study of Unit5, the student understands the role/ service of government administrative system and Ministry of Tourism

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching hours: 18**

Definition of tourism and the need for tourism - meaning and nature of tourism - The birth, growth and development of tourism - basic components of tourism- elements of tourism - factors influencing growth of tourism - tourism in India and abroad.

UNIT– II**Teaching hours: 18**

Tourism - planning - need for planning - coordination in planning - assessment of tourist demand and supply - government's role in planning - environmental planning - tourism under five year plans. Tourism marketing - concepts and importance - marketing functions in tourism - tourist marketing mix - tourist "Product"- tourist market - segmentation - its bases.

UNIT– III**Teaching hours: 18**

Tourism and culture - tourism and people: tourism and economic development - economic benefits - regional development - tourism and growth of related industry, tourism and employment - cultural resources - cultural tourism in India - Tourism and international understanding.

UNIT– IV**Teaching hours: 18**

Tourism pricing - methods of pricing - tourism promotion - advertising costs - steps in planning an advertising campaign - tourist publicity - sales support - Public relations - Tourist publicity.

UNIT– V**Teaching hours:18**

Tourism and government administrative systems - ministry of tourism - department of tourism - Indian tourism development corporation - world tourism organization - travel agents in India.

Text Books

1. Anand M.M - Tourism and Hotel Industry in India, Prentice - Hall of India
2. Pran Nath Seth, Successful Tourism Management, Sterling Publishers Private Ltd
3. Clib SN - Perspectives of Indian Tourism in India
4. R.K. Malhotra, Tourism Marketing, Anmol Publications Pvt Ltd New Delhi.
5. R.K. Sinha Leisure Tourism, Dominant Publishers & Distributors, Delhi.
6. Dr. S. M. Jha , Tourism Marketing, Himalaya Publishing House, Mumbai.
7. Parveen Sethi Handbook of Leisure & Tourism, Anmol Publications Pvt Ltd, New Delhi.

Reference Books and Journal

1. Bukart A J -The Management of Tourism - William Heinemann Ltd, London
2. Butler R W - The Social Implications of Tourism Development ,
3. A.K.Bhatia Principles and Practices , Tourism Development , Sterling Publishers Private Ltd.

E- Materials

- www.shiksha.com › hospitality-travel › travel-tourism - chp alison.com › Business › Tourism and Hospitality Courses
- www.edx.org › learn › tourism-management

Journal Reference

- Indian Journal of Tourism and Hospitality Management Technology published by Kerala Institute of Tourism and Travel Studies (KITTS), Kerala
- AVAHAN: A Journal on Hospitality and Tourism published by Amrapali Institute

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III

Paper type: Skill based

subjectPaper code: CSBA36

Business Communication

Credit: 2

Total Hours per Week: 3

Lecture Hours: 2

Tutorial Hour: 1

Couse Objectives

1. To understand the concepts and basic functions of Communication.
2. To identify the various levels of organizational communication and its process.
3. To train the students draft effective business correspondence.
4. To draft effective business correspondence with clarity.
5. To have knowledge of the various traditional and modern equipment used for communication.

Course Outcome

1. After the study ofUnit1, the student understands the concepts and basic functions of Communication.
2. After the study of Unit2, the student will be able distinguish among various levels of organizational communication and its process.
3. After the study of Unit3, the student will be trained in effective business writing.
4. After the study of Unit4, the student will draft effective business correspondence and reports.
5. After the study of Unit5, the student understands the various traditional and modern equipment used for communication.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I

Teaching hours: 9

Meaning and importance of Business Communication - Methods of Communication - Types of Communication - Communication Process - Objectives of Communication - Principles of Effective Communication.

UNIT- II

Teaching hours: 9

Business letters - Structure of a letter - Qualities of a good business letter - Business enquiries - Offer and Quotations - Orders - Execution of orders - Cancellation of orders - Letters of Complaints - Collection letters.

UNIT– III

Teaching hours:9

Circular Letters - Bank correspondence - Insurance correspondence - Letters to the Editor - Application for Situations.

UNIT– IV

Teaching hours:9

Correspondence of a Company Secretary - Preparation of Agenda and Minutes - Annual Reports.

UNIT– V

Teaching hours:9

Communication media - Telephone, Telex, Fax, Internet, E-Mail, Video Conferencing and Cell Phones.

Text Books

1. N.S. Raghunathan & B. Santhanam, Business Communication, Margham Publications
2. Sundar K- Business Communication, Vijay Nicole Imprints (P) Ltd.,
3. Rajendra Pal and Korlehalli - Essentials of Business Communication
4. Pillai and Bagawathi - Commercial correspondence and office management.
5. N.S. Pandurangan, B. Santhanam - Business Communication.
6. Lesikar, Flatley, Rentz, Lentz, Pande – Business Communication, Mc GrawHill ,New Delhi.
7. C.B.Gupta - Business Communication, Sultan Chand and Sons, New Delhi.
8. Jain Mukherji – Effective Business Communication, Mc GrawHill ,New Delhi.
9. Dr.N.Premavathi – Business Communication Correspondence, Sri Vishnu Publications, Chennai.
10. Chaturvedi- Business Communication. Pearson Education, New Delhi.

Reference Books

1. Ramesh M. S. Pattan Shetty - Effective Business English and Correspondence
2. Guffey - Essentials of Business Communication
3. Gart Side L. - Modern Business Correspondence.
4. Mazumder - Commercial Correspondence.
5. Lesikar & Pettit - Business Communication.
6. Sharma Mohan - Business Correspondence and Report writing.

7. Devaraj and Antonysamay K S - Executive Communication

E-Materials

- https://is.muni.cz/el/1456/jaro2016/MPV_COMA/um/E-book_II_Business-Communication.pdf
- <http://www.ddegjust.ac.in/studymaterial/mba/cp-105.pdf>
- <https://aqilkhans.files.wordpress.com/2011/10/business-communication.pdf>
- https://gurukpo.com/Content/BBA/Business_Communication.pdf
- <https://examupdates.in/mba-business-communication/>

Journal Reference

- International Journal of Marketing and Business Communication published by Publishing India Group, New Delhi

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: III

Paper type: Non-major elective

Paper code: CNBA37

Management Concepts

Credit: 2

Total Hours per Week: 2

Lecture Hours: 1

Tutorial Hour: 1

Course Objectives

1. To understand the concepts of management related to Business.
2. To learn the roles, skills and functions of management.
3. To learn the application of the knowledge in solving organizational problems.
4. To develop optimal managerial skills in planning and decision making.
5. To acquire knowledge in Communication, Leadership, Controlling, Motivation and Delegation

Course Outcome

1. After the study of Unit1, the student understand the concepts of management learns the roles, skills and functions of management related to Business.
2. After the study of Unit2, the student develop optimal managerial skills in planning and in taking decisions
3. After the study of Unit3, the students develop knowledge to organize program.
4. After the study of Unit4, the student acquires in depth knowledge in Communication, Leadership, Controlling, Motivation and Delegation
5. After the study of Unit5, the student can control and coordinate.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching hours: 6**

Management - meaning and Definition - Importance - nature - scope of management process - Role and Functions of a Manager - levels of management - Taylor's contribution - Fayol's contribution - Elton Mayo's contribution - Systems approach - Contingency approach-

UNIT- II**Teaching hours: 6**

Planning - meaning and definition of planning - Nature of planning- Purpose of planning - Steps in planning process - Types of plans - Merits and Demerits of Planning - Objectives - nature of objectives - importance of objectives - functions of objectives - MBO - meaning and definition - nature of MBO - process of MBO - Advantages and disadvantages of MBO.

UNIT– III**Teaching hours: 6**

Organising - meaning and definition of organizing - nature and Purpose of organizing - organizational structure - types of Organisation structure - Line and Staff Organisation - Committee Organisation - Departmentation - Span of Control - meaning and definition of span of control - Delegation of Authority - difference between authority and power - types of authority - uses of authority - Centralization and Decentralization of Authority - elements of responsibility - differences between authority and responsibility.

UNIT- IV**Teaching hours: 6**

Directing - nature of directing - purpose of directing - Leadership - nature of leadership - importance of leadership - functions of leadership - qualities of effective leaders - styles of leadership - Motivation - nature of motivation - importance of motivation - theories of motivation - Communication - Process of Communication - principles of effective communication - Barriers of Communication.

UNIT- V**Teaching hours: 6**

Controlling - meaning and definition of controlling - nature of controlling - objectives of controlling - importance of controlling - Control process - technique of controlling - Co-ordination - Need of coordination - Principles of coordination - technique of coordination - requisites for excellent coordination - Approaches to achieve effective Co-ordination

Text Books

1. Sundar - Principles of Management - Vijay Nicole Private Limited
2. Dr.C.D. Balaji -Principles of Management -Margham Publications
3. J.R. Beulah Bharathi, & C. Arunachalam, Principles of Management, Thakur Publications Pvt Ltd
4. L.M.Prasad – Principles of Management, Sultan Chand and Sons, New Delhi.
5. R.N.Gupta –Principles of Management , S.Chand Publisher, New Delhi.
6. J.Jayashankar – Principles of Management, Margham Publications, Chennai.
7. Koontz, Weihrich, Aryasri- Principles of Management, Mc Graw Hill Education, New Delhi.
8. Tripathi, Reddy - Principles of Management, Mc Graw Hill, New Delhi.
9. Dinkar Phagare - Principles of Management, Sultan Chand and Sons, New Delhi.
10. Kumkum Mukherjee – Principles of Management, Mc Graw Hill, New Delhi.

Reference Books

1. L.M. Prasad - Principles and Practice of Management - Margham Publication.
2. R.N. Gupta - Principles of Management - S.Chand& Co.
3. Tripathi, Principles of Management, Mc Graw Hill.
4. Neeru Vasishth, Principles of Management, Bookchor.com
5. J.K. Mitra, Principles of Management, Oxford University Press.
6. Dipak Bhattacharya, Principles of Management Text & Cases.
7. Thomas, John, Management: Principles and Guidelines, Bookchor.com.

E-Materials

- www.managementstudyguide.com
- www.managementconcepts.com
- managementhelp.org
- www.edx.org › learn › management
- https://gurukpo.com/Content/MBA/Principles_and_Practices_of_Management.pdf
- https://www.tutorialspoint.com/management_principles/management_principles_tutorial.pdf

Journal Reference

- Vikalpa published by Indian Institute of Management, Ahmedabad
- Decision published by Indian Institute of Management Calcutta
- Management Matters: LIBA's Journal of Management published by Loyola Institute of Business Administration (LIBA), Chennai

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low

SEMESTER IV

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115 BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Core Theory

Paper

code: CBA41 Organizational Behaviour

Credit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To understand the significance of Organizational Behavior.
2. To learn the dynamics of groups in the organization.
3. To understand the importance of leadership and motivation in organizations
4. To know how organizational culture, organizational climate and conflicts influence the functioning of an organization
5. To know the importance of management of change in organizations.

Course Outcome

1. After the study of Unit- 1, student will be able to know the importance of organizational behavior.
2. After the study of Unit- 2, student will be able to know the dynamics of groups in organizations.
3. After the study of Unit- 3, student will be able to understand the leadership concept.
4. After the study of Unit- 4, student will be able to understand the significance of organizational culture in functioning an organization.
5. After the study of Unit- 5, student will be able to learn concept of change and its significance in organizations

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT– I**Teaching Hours: 15**

Organizational behavior - meaning - Nature - importance - Role - historical development of organizational behavior - organization as a social system - socio-technical system - open system - factors influencing organizational behavior - environmental factors - constraints over organization and managerial performance.

UNIT– II**Teaching Hours: 15**

Meaning of group and group dynamics - reasons for the formation of groups - characteristics of groups - theories of group dynamics - types of groups in organization - group cohesiveness - factors influencing group cohesiveness - group decision making process - small group behavior.

UNIT– III**Teaching Hours: 15**

Leadership concept - characteristics - leadership theories - leadership styles - managerial grid - leadership continuum - leadership effectiveness. Motivation - concept and importance - motivators - financial and Non-financial - theories of motivation. Morale - Meaning - Characteristics - Determinants of Morale.

UNIT– IV**Teaching Hours: 15**

Organizational culture - Definition - Determinants of Organizational culture - Characteristics - Types - Functions. Organisational Climate - Definition - Determinants of Organisational Climate - Distinction between Organisational Culture and Organisational Climate. Organisational Effectiveness - Definition - factors influencing Organisational Effectiveness - Approaches to Organisational Effectiveness. Organisational Conflict - Definition - Features - Sources of Conflict - Different stages of conflict - Measures to stimulate conflicts.

UNIT– V**Teaching Hours: 15**

Management of change: meaning - importance - resistance to change - causes - dealing with resistance to change - concepts of social change and organizational causes - factors contributing to organizational change - organizational development - meaning and process.

Text books

1. Dr. C.D. Balaji - Organisational Behaviour - Margham Publications, Chennai.
2. J. Jayasankar - Organizational Behavior, Margham Publications, Chennai.
3. Aswathappa. K. - Organizational Behavior - HPH, Bombay.
4. K.Sundar and J.Srinivasan - Elements of Organisational Behaviour - Vijay Nicole Imprints Private Limited, Chennai.
5. S.S. Khanka - Organizational Behavior. S.Chand, New Delhi.
6. Dr.P.K.Ghosh, Partho Ghosh - Organisation Behaviour - Laxmi publications Pvt. Ltd.
7. Richard L Hughes, Robert , Gordon – Leadership Enhancing the Lessons of Experience, Tata Mc Graw Hill, New Delhi.
8. Stephen Robbins and Timothy Judge, Essentials of Organizational Behavior.

9. Amy C. Edmondson -The Fearless Organization: Creating Psychological Safety in the Workplace for Learning, Innovation, and Growth
10. Lee G. Bolman and Terrence E. Deal-Reframing Organizations: Artistry, Choice, and Leadership

Reference Books

1. Sekaran, Uma - Organizational Behavior-text & cases - Tata McGraw Hill Pub Ltd., New Delhi, 1989.
2. Robbins, P.Stephen - Organizational Behavior-Concepts, Controversies & Applications - Prentice Hall of India Ltd., New Delhi, 1988.
3. Luthans Fred - Organizational Behavior - McGraw Hill Publishers Co. Ltd., New Delhi.
4. Rao, VSP and Narayana, P.S. - Organization Theory & Behavior - Konark Publishers Pvt. Ltd., Delhi, 1987.
5. Prasad, L.M - Organizational Theory & Behavior - Sultan Chand & Sons, New Delhi.
6. Stephen P Robbins and Timothy A Judge, Neharihe Vohra - Organizational Behavior, Pearson Prentice Hall New Delhi.
7. Organizational Behavior: Human Behavior at Work by John Newstrom
8. Managing Organizational Behavior: What Great Managers Know and Do by Timothy Baldwin, Bill Bommer, and Robert Rubin

Course Material: website links, e-Books and e-journals

- <https://lecturenotes.in/subject/55/organizational-behaviour-ob>
- <https://examupdates.in/mba-organizational-behaviour-notes/>
- http://www.tmv.edu.in/pdf/Distance_education/BCA%20Books/BCA%20VI%20SEM/BCA-629%20OB.pdf
- https://www.tutorialspoint.com/organizational_behavior/organizational_behavior_tutorial.pdf
- https://www.researchgate.net/publication/307855834_Organisational_Behaviour_Text_Cases

Journal Reference

- Journal of Organization and Human Behaviour published by Publishing India Group

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	S	S
CO2	S	S	S	M	M	M	M	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Core Theory

Paper code: CBA42 Taxation

Credit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To acquaint the students with basic principles of underlying provisions of direct and indirect laws
2. To develop a broad understanding of tax laws and accepted tax practices.
3. To enable students to appreciate the wider economic, social, administrative compliance and political context within which taxes are imposed.
4. To instil an awareness on students that taxes can and often do to constitute significant cost to business and households and therefore can have a major impact in economic and other decision making.
5. To provide specialised and updated knowledge in the area of GST in a systematic manner enhancing analytical and problem solving skills for decision making.

Course Outcomes

1. After the study of Unit-1 student will be able to understand the concept of indirect tax and to know current taxation structure prevailing in India.
2. After the study of Unit-2 student will be able to understand the concepts of central sales taxes in India and to know the categories of collection taxes and offence and penalties for not paying sales taxes.
3. After the study of Unit-3 student will be able to understand the concepts of custom duties
4. After the study of Unit-4 student will be able to understand the Authorities of customs and excise officers
5. After the study of Unit-5 student will be able to understand the concept of goods and service tax

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- I**Teaching hours: 15**

Introduction about Indirect Tax - Constitutional Validity of Indirect Tax Laws- Indirect Tax Structure in India - Canons of Taxation - Difference Between Direct and Indirect Taxation - Merits and Demerits.

UNIT- II**Teaching hours: 15**

The Central Excise Act, 1944 - Definitions of various terms relating to the Central Excise Act. - Categories of Central Excise Duties - Levy and Collection of Excise Duty - Offences and Penalties - Adjudication of Confiscation and Penalties - Administrative Set up of Excise Department

UNIT- III**Teaching hours: 15**

Customs Duties - Definitions - Goods - Imported goods - Export goods - Levy of Customs duty - Exemptions from customs Duty - Prohibitions on importation and exportation of goods - Baggage Rules.

UNIT- IV**Teaching hours: 15**

Authorities of Customs - Appointment of officers of customs - Appointment of Customs Ports, Airports - Refund of Customs Duty and Excise Authorities Powers - Imposition of Fines and Penalties.

UNIT- V**Teaching hours: 15**

Goods and Services Tax (GST) - introduction - GST Need for GST in India - Salient Features - Objectives - Advantages and disadvantages - SGST and CGST - VAT and GST: A Comparison

Text Books

1. Dinkar Pagare, Business Taxation, Sultan Chand & Sons, New Delhi.
2. Balachandran V, Indirect Taxation, Sultan Chand & Sons, New Delhi
3. Govindan M.S, Indirect Taxes Made Easy, Sitaraman & Co, Chennai.
4. Datey V.S, Indirect Taxes, Taxman Publications, New Delhi.
5. Jayakumar.A, Indirect taxes, Learntech Press, Trichy.
6. T.S.Reddy, Y.HariPrasad, Business Taxation, Margham Publications, Chennai.
7. Dr. H.C. Mehrotra, Prof. V.P.Agarwal, Good and Service Tax, Sahitya Bhawan Publications.
8. Dr.Hariharan, Income Tax, Vijay Nicole Publications, Chennai.
9. Johnson, Linda.M Essentials of Federal Income Taxation for individuals and Business, Cch Inc.
10. Arun Kumar Chandak, Vinay Malani, Puri 's Taxes in India, Agarwal Law House, New Delhi.

References Books

1. Basic Concepts and Features of Good and Service Tax In India' Girish Garg, International Journal of scientific research and management (IJSRM) ||Volume||2||Issue||2||Pages||542- 549||2014||

2. A Primer on Goods and Services Tax in India, published by Centre for Budget and Governance Accountability, 2011
3. Goods And Service Tax - An Introductory Study, CA. Sudhir Halakhandi, April 2007 The Chartered Accountant p. 1595-1601
4. Indirect Tax: Materials and modules drawn by Institute of Chartered Accountants of India
5. K Vaitheeswaran, Students Handbook on Indirect Taxes, Snow White Publications Pvt. Ltd.
6. For Indirect taxes by Institute of Company Secretaries of India.
7. P. Verra Reddy, Central Excise Manual (Law and Procedure), Asia Law House
8. Mukhopadhyay, Essays on Indirect Taxation, Manupatra Information Solutions Pvt Ltd. V S Datey, Student's Guide to Service Tax and VAT, Taxman Allied Services Pvt. Ltd. Books in India.
9. V. Nagaragan, Indirect Taxes, Asia Law House
10. G.Sekar, Professional Guide to Tax Audit, Agarwal Law House, Delhi.

E-Materials

- www.cbec.gov.in
- www.icaai.org
- www.taxlawsonline.com
- www.taxguru.com
- www.tax4india.com/vat/vat.html
- www.india.gov.in/citizen/salestax.php
- www.indiataxes.com
- www.indialawnews.com

Journal Reference

- Vision: Journal of Indian Taxation published by Journal Press India

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	S	S
CO2	S	S	S	M	M	M	M	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Core Theory

Paper code: CBA43 Management Accounting

Credit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To familiarize the students with basic management accounting concept and gain knowledge in marginal costing.
2. To apply the financial perspective of accounting for cost. Identify problems associated with relying on financial accounting information for internal decision making.
3. To organize cost information according to the decision-making needs of the organization.
4. To know the meaning of marginal costing techniques for decision making process.
5. To know the distinction between cash flow and fund flow statement, finally to know the method for preparing the cash flow statement.

Course Outcome

1. After the study of Unit- 1, students will acquire the basic knowledge required for application of tools for decision making.
2. After the study of Unit- 2, students can describe the fundamental concepts of ratio analysis and uses of ratios.
3. After the study of Unit- 3, students will be able to know the budgets and budgetary control and prepare the budgets.
4. After the study of Unit- 4, student is able to know the concept of fund flow management and its objectives. To know the various method to find out the profit and to select the projects.
5. After the study of Unit- 5, the student is able to know the meaning of cash flow statement and its significance.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT– I**Teaching hours: 15**

Management Accounting - Definition - Objectives and functions - Advantages and limitations - Distinction between Financial Accounting and Management Accounting - Meaning of Financial statements - Tools of Financial Statement Analysis - Comparative Financial Statements - Common Size Financial Statements - Trend Percentages.

UNIT– II**Teaching hours: 15**

Ratio Analysis: Meaning - Definition - Significance - Limitations - Classification - Liquidity Ratios (Short Term Solvency Ratios) and Long term Solvency Ratios.

UNIT– III**Teaching hours: 15**

Budget and Budgetary Control - Objectives - uses - limitations - preparation of production, sales, purchase, cash and flexible budget.

UNIT- IV**Teaching hours: 15**

Fund Flow Analysis: Meaning - Definition - Uses of Fund Flow Statement - Limitations of Fund Flow Statement - Preparation of Fund Flow Statement - marginal costing - definition - advantages and disadvantages - marginal cost statement - contribution - cost - volume profit analysis - P/V ratio - BEP - margin of safety.

UNIT- V**Teaching hours: 15**

Cash flow Analysis: Meaning - Definition - Uses of Cash Flow Statement - Limitations of Cash Flow statement - Distinction between Fund Flow Statement and Cash Flow Statement - Preparation of Cash Flow Statement.

(Weightage of Marks: Problems - 80%, Theory - 20%)

Text Books

1. T.S. Reddy & Hari Prasad Reddy - Management Accounting - Margham Publications, Chennai.
2. Murthy A and Gurusamy S - Management Accounting :Theory and Practice - Vijay Nicole Imprints Private Limited, Chennai.
3. Manmohan & Goyal - Management Accounting - Saithya Bhavan, Agra.
4. R.S. Pillai & Bhagavathi - Management Accounting - S. Chand & Co. Ltd, New Delhi.
5. S.N. Maheswari - Management Accounting - Sultan Chand & Sons, New Delhi.

Reference Books

1. S.P. Gupta - Management Accounting - Sultan Chand & Sons, New Delhi.
2. S.P. Jain and Narang - Cost Accounting - Kalyani Publishers, New Delhi.

E-Materials

- http://ebooks.lpude.in/commerce/mcom/term_1/DCOM302_DCOM403_MANAGEMENT_ACCOUNTING.pdf
- http://www.pondiuni.edu.in/storage/dde/downloads/finiii_ma.pdf
- <http://www.gbv.de/dms/zbw/613659759.pdf>
- http://164.100.133.129:81/econtent/Uploads/Management_&_Financial_Accounting.pdf

Journal Reference

- Mudra: Journal of Finance and Accounting published by Diva Enterprises Ltd, New Delhi

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	S	S
CO2	S	S	S	M	M	M	M	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Core Theory

Paper code: CBA44 Operation Research Credit: 4

Total Hours per Week: 4

Lecture Hours: 3

Tutorial Hour: 1

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Course Objectives

1. To familiarize students with the basic concepts in Operation Research
2. To make students understands various tools and techniques like LPP Transportation.
3. To know principles of construction of mathematical models situations and Mathematical analysis methods of operation research
4. To be able to choose rational options in practical decision making problems using standard mathematical models of operations research
5. To have skills in analysis of operations research objectives mathematical methods.

Course Outcomes

1. After studied unit-1, the student will be able to Identify and develop operation research models from the verbal description of the real system
2. After studied unit-2, the student will be able to knowledge and understanding the characteristics
3. After studied unit-3, the student will be able to Understand the mathematical tools that are needed to solve optimization problems
4. After studied unit-4, the student will be able Use mathematical tools to solve the proposed model
5. After studied unit-5, the student will be able develop the report that describes the and the solving and techniques, analysis the result an propose recommendations.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-I**Teaching Hours: 12**

Operation Research - origin - Definition - Various model and Modeling - Application and Scope - Merits and demerits. Linear Programming Characteristics - Formulation Graphical Method. Solution to Graphical method Alternative method of solving LPP - (Simple Problems).

Unit-II**Teaching Hours: 12**

Assignment Problems - Definition, Type of assignment problems, formulation and solutions Assignment Problems. Transportation model Introduction, Definition, Types of transportation problem, methods to solve transportation problem - Degeneracy - Methods of finding initial Basic Feasible Solution - Simple Problems.

Unit-III**Teaching Hours: 12**

Game Theory - Introduction, terminologies of game theory, game with mixed and pure strategies, Values of Game - Optimum Strategy - with Saddle Point, without saddle point - dominance property (rule), graphical method of solving game.

Unit-IV**Teaching Hours: 12**

Sequencing - Introduction, sequencing problems, processing n jobs to two machines, processing n jobs to three machines, processing two jobs through m machine, processing n jobs through m machine. Replacement models - Introduction, individual replacement policy, group replacement policy, miscellaneous replacement problems (basic problems).

Unit-V**Teaching Hours: 12**

Networking - Introduction, critical path method (CPM), Problem Evaluation and Review Technique (PERT), Construction of network diagram - Slack critical path, basic difference PERT and CPM (basic problems)

Proportion of Theory and Problem: 30:70**Text books**

1. Dr. P.R. Vittal Operations research - Margham Publications, Chennai.
2. Gurusamy S - Elements of operation Research - Vijay Nochole Imprints (P) Ltd.
3. Prem kumar Gupta & D.S.Hira, Operations research - S. Chand & Company, New Delhi.
4. R. Paneerselvam, Operations research - PHI Learning Pvt. Ltd.
5. J.K. Sharma, Operations research - Laxmi Publications Pvt.Ltd.
6. Dr. P.R. Vittal & V.Malini - Operations research - Margham Publications-Chennai-2017
7. Er Prem Kumar Gupta & Dr.D.S.Hira, Problems in Operation Research, S.Chand & Company Limited, New Delhi -2020
8. Prof.V.Sundaresan, Prof.K.S.Ganapathy Subramanian & K.Ganesan Resource Management Techniques, AR Publication,Chennai 2007
9. N.Ramanathan , Operations Research ,Vijay Nicole Imprints Pvt. Ltd, Chennai ,2008
10. Frederick S.Hillier, Gerald J.Leeberman, Bodhibrata Nag, Preefam Basu,Introduction to Operation Research, MC Graw hill Education Pvt. Ltd, 9th Edition ,2013

Reference Books

1. Hamdy A.Taha, Operations Research, Prentice Hall of India, New Delhi, 2007.
2. KantiSwarup, P.K.Gupta, Manmohan, Operations Research, Sultan Chand & Sons, New Delhi, 2008.
3. Sasieni, Arthur Yaspan, Lawrence Friedman, Operations Research Methods and Problems, Wiley International Edition, 1959.
4. S.D. Sharma, Operations Research, Kedarnath Ram Nath & Co Publishers, 15th Edition 2007.
5. Gurusamy S - Operations Research - Vijay Nichole Imprints (P) Ltd.
6. Prof. A. Chandasekaran , B.Kalpana, A Text book of Operations Research , Dhanam Publications , 1st Edition, 2016
7. J.K.Sharma, Operations Research Theory And Applications , Macmillan Publisher India Limited, New Delhi, 2009, 4th Edition
8. Dr.S.P.Gupta, Dr.P.K.Gupta & Dr.Manmohan, Business Statistics and Operations Research, Sultan Chand and Sons , New Delhi, 2007
9. S.P.Rajagopalan & R.Sattanatha, Business Statistics and Operations Research 3rd Edition, Vijay Nicole Imprints Pvt Ltd -2014.
10. Dr. P.R. Vittal Business Statistics & Operations Research , Margham Publications, Chennai , 2013

E- Materials

- <file:///C:/Users/Welcome%20Friend/Downloads/14b14198b6e26157b7eba06b390ab763-original.pdf>
- <https://examupdates.in/operation-research-notes/>
- <https://easyengineering.net/operations-research-p-ramamurthy/>
- <https://examupdates.in/operation-research-notes/>

Journal Reference

- International Journal of Industrial and Operations Research published by Vibgyor Publishers

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	S	S	S
CO2	M	S	S	S	M	S	M	M	M	S
CO3	S	M	S	M	S	M	S	S	M	S
CO4	M	S	S	S	M	M	M	M	M	M
CO5	S	M	S	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Allied-2

Paper code:

CABA45A A. Retail Management Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To illustrate the functions of retailers and to explain the significance of retails as an industry.
2. To know the steps involved in choosing a location for retail stores.
3. To understand the concept of retail marketing mix.
4. To know the concept of retail pricing and factors affecting it.
5. To analyze the key concepts of retails supply chain management

Course Outcomes

1. After the study of Unit1, the student will understand the concepts and functions of retailer.
2. After the study of Unit2, the student will gain knowledge about retail property development in India.
3. After the study of Unit3, the student will apply the technology tool that aid merchandise planning.
4. After the study of Unit4, the student will be able to determine retails pricing strategies.
5. After the study of Unit5, the student will be able to identify the opportunities offered in retail as a career.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1**Teaching Hours: 18**

Definition and scope of retailing - significance - prospects of retailing in India - types of Retailers - characteristics - functions - types of ownership - Franchising

Unit-2**Teaching Hours: 18**

Location - importance - levels - Determining factors - site selection - factors affecting the demand - store layout - objectives - space planning

Unit-3**Teaching Hours: 18**

Buying system - objectives - inventory management - budget plan- branding strategies - sourcing decision - connecting with vendors - negotiating - maintaining relationship with vendors.

Unit-4**Teaching Hours: 18**

Pricing strategies - objectives - methods - pricing - approaches for setting prices - external factors influencing pricing

Unit-5**Teaching Hours: 18**

Retail automation and supply chain management - integrated supply chain - retail technology - vending - online retailing

Text books

1. Gibson G. Vedamani - Retail Management 4th Edition Jaico Publication
2. Swapna Pradhan - Retailing Management 4th Edition Tata Mc Graw Hill Education Pvt Ltd
3. Boom Halpeth, Veena Prasad - Retail Management Himalaya Publishing House -
4. Kuldeep Singh-Retail Management in New Dimension, Global Academic Publishers and distributors.
5. Chandrasekar.S, Manjunath.S-Vikas Retail Management- Publishing House Pvt Ltd and Jain Group of Institutions (JGI)
6. Pradhan, 5th edition, Retailing Management- Mc Graw Hill, New Delhi.
7. Barry Berman, Retail Management a Strategic Approach Pearson Education , 13th Edition.
8. Gibson- Retail management , Pearson Education, 5th Edition.
9. Dr. Anand Thakur, Retail management, Lovely Professional University.
10. SIA Retail Marketing – SIA Publishers and Distributor Pvt Ltd.

Reference Books

1. Barry Berman, Joel E Evans, Ritu Shrivastava, Retail Management-A Strategic Approach Thirteenth Edition-By Pearson, 2017.
2. Michael Levy, Barton Weitz and Dhruv Grewal, Retailing Management- Hardback ISBN13: 978-0078028991 9th Edition

3. U.C. Mathur ,Retail Management: Text and Cases , ISBN: 9789389307436, International Publishing House Pvt Ltd.
4. Joel Evans & Barry R. Berman, Retail Management, Global Edition Pearson Education.
5. Patrick M. Dunne , Retailing- - ISBN13: 978-1133953807- 8th Edition
6. Barry Berman , Retail Management- - ISBN13: 978-0132720823 -12th Edition
7. Michael Levy and Barton A. Weitz, Retailing Management--ISBN13: 978-0073381046- 7th Edition
8. Prof.(Col). Sameer Misra, Retail Inventory Management-- ISBN: 9789355152930 Edition: 1
9. Jha Madhukant Retail Management- - Gen Next Publications -ISBN: 9789380222141, 9380222149 Edition: 01, 2009
10. James Topps, Glenn Taylor –Kogan, Managing the Retail Supply Chain: Merchandising Strategies that Increase Sales and Improve Profitability –Page; 1st edition (3 January 2018)ISBN-13 : 978-0749480622.

Course Material: website links

- <https://www.wileyindia.com/retail-management-text-and-cases.html>
- https://books.google.co.in/books/about/RETAILING_MANAGEMENT_TEXT_CASE_S.html?id=nxwE_n1z0NQC&redir_esc=y
- <https://www.sapnaonline.com/books/retail-management-text-cases-sk-baral-8174734449-9788174734440>
- http://www.crectirupati.com/sites/default/files/lecture_notes/Retail%20Management.pdf
- http://newhorizonindia.edu/nhc_kasturinagar/wp-content/uploads/2018/01/VI-SEM-BBA-Retail-Mgt.-notes.pdf

Journal Reference

- ELK Journal of Marketing & Retail Management published by ELK Education Consultants Pvt. Ltd., Ghaziabad
- Supply Chain Pulse published by ITM Business School Navi Mumbai

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	M	S	M	M	S	S	M	S
CO3	S	M	S	S	M	M	M	M	M	S
CO4	S	S	S	S	M	S	S	S	M	M
CO5	S	M	S	S	S	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Allied-2

Paper code:

CABA45B B. Project Management

Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To familiarize the students with the steps involved in managing a project
2. To help the students to identify feasible projects, the methods of financing such projects and controlling its cost.
3. To recognize issues in a realistic project scenario.
4. To discuss the implementation of project planning and organization.
5. To demonstrate the use of appropriate source of funds in project evaluation and review in Projects

Course Outcomes

1. After the study of unit-1, the student will be able to apply the fundamentals of project management in their job.
2. After the study of unit-2, the student will be able to analyse the projects on various aspects.
3. After the study of unit-3, the student will be able to plan and design the approach to project management.
4. After the study of unit-4, the student will be able to know about the information on financial sources and project financial institutions.
5. After the study of unit-5, the student will be aware of becoming a better project manager.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I**Teaching Hours: 18**

Project - Meaning - Definition - Project Management - Meaning - Definition - Characteristics - Process - Benefit - Project Life Cycle - Classification - Scope and Significance - System Approach - Project Manager - Skills, Role and Responsibilities

UNIT– II**Teaching Hours: 18**

Project Analysis - Market and Demand Analysis - Feasibility Analysis - Technical Analysis - Financial Analysis - Break-Even Analysis - Profitability Analysis - Risk Analysis - Social Analysis - Benefit Analysis

UNIT– III**Teaching Hours: 18**

Project Planning and Organisation - Development of Project Organisation - Forms of Project Organisation - Planning the project Organisation - Structure - Modular Approach to Project Management - Effective and Ineffective Project Management.

UNIT– IV**Teaching Hours: 18**

Project Finance - Sources - Institutional Finance to Entrepreneurs - Financial Institutions - working Capital Management - Incentives and Subsidies.

UNIT– V**Teaching Hours: 18**

Project Evaluation - Techniques for Project Evaluation and Review - Project Control - Performance Control - Cost Control - Control during stages of Project.

Text Books

1. P.Saranavel - Project Management - Margham Publications, Chennai
2. Vasant Desai - Project Management - Himalaya Publishing House, Mumbai.
3. V.C. Sontakki - Project Management - Himalaya Publishing House, Mumbai
4. Choudhary, Project Management - - Tata McGraw Hill Publications.
5. Pradeep Pai, Project Management — Pearson Education.
6. Beena Agarwal, Shyam .K. Agarwal. Project Management
7. K. Nagarajan, Project Management, New Age international Pvt Ltd.
8. Pradeep Pai, Project Management, Pearson Education.
9. Kalpesk Ashar, Project Management, Essential, Vibrant publishers
10. Meredith , Project Management , Wiley Publishers.

Reference Books

1. Clifford F Gray - Project Management: The Managerial Process (Special Indian Edit.), Oregon State University.
2. Harvey Maylor -Project Management
3. Project Management - Harold Kerzner - Wiley; 1st edition
4. Brilliant Project Management – Stephen Barker, Rob Cole, Pearson Education Limited.

E- Materials

- <https://www.studocu.com/in/document/guru-gobind-singh-indraprastha-university/bachelors-of-business-administration/lecture-notes/project-management-notes/3321296/view>
- <http://rccmindore.com/wp-content/uploads/2015/06/Project-Management-1.pdf>
- Http://ebooks.lpude.in/management/bba/term_5/DMGT302_Fundamentals_of_Project_Management.pdf
- <https://www.bachelorsportal.com/studies/220929/business-administration-project-management.html>

Journal Reference

- International Journal of Project Management published by Science Direct

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	S	M	M	M
CO2	S	M	S	M	S	M	S	S	M	M
CO3	M	M	S	S	S	M	S	M	S	S
CO4	S	M	M	S	S	M	S	S	S	S
CO5	S	M	M	S	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Allied-2

Paper code:

CABA45C C. Hotel Management Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To provide students with a detailed knowledge on the origin, history and operations of the hospitality industry.
2. To make students to understand the various departments that are operating in the hotels
3. To make students familiar about various job positions, duties and responsibilities of staffs
4. To familiarize students about various equipment's, machineries software applications that are existing in the hotel industries
5. To provide insight into hotel products, guest needs, pricing, marketing, promotion, overall Control.
6. To make students to understand about licensing laws, governments regulations, food and Beverage dispensing rules and procedures

Course Outcomes

1. After the completion of the Unit1, students will be able to understand the historical background of hospitality industry.
2. After completion of the Unit2, students will be able to understand the Major and the minor departments in the hotels
3. At the end of the Unit3 students shall be able to understand the different types of guests and their needs
4. At the end of the Unit4 the students will be able to get acquainted with the underlining principles and concepts of marketing and their relevance in hospitality industry
5. After the completion of the Unit5 students shall be able to understand the licensing laws and regulations of the hospitality industries

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-I**Teaching Hours: 18**

Hotel industry - introduction and evolution - classification of hotels - types of accommodation - intermediary accommodation, grouping of accommodation – Development of Hotel Industry in India - industry define - early history of hotel industry - Hotel Industry vs. Tourism Industry.

UNIT– II**Teaching Hours: 18**

Characteristics of hotels - Major and minor departments in the hotels and its activities. Duties and responsibilities of various department staffs - Major and minor equipment's and tools in various departments, its usage and operations

UNIT– III**Teaching Hours: 18**

Types of hotel guests and their needs - Selection of hotel-Room rates - Hotel brochures and tariffs - Property Management systems - Reservation Management system – Revenue Management system - Guest account Management system - General Management system – Back office and system

UNIT– IV**Teaching Hours: 18**

Marketing functions at its relevance to Hotel Industry - Model of consumer market – Personal characteristics affecting consumer behaviour - Buyers decision process - Defining Customer Value and Satisfaction - Relationship Marketing - Retaining Customers - sales - purchasing - storage system - industry levels - ordering levels - costing - recipe costing - menu pricing - hotel security.

UNIT– V**Teaching Hours: 18**

License - permission from authorities - Labor Department - City corporations - police – State Exercise - Department of Tourism - ESI - food and beverage service - problems and prospects of Hotel Industry.

Text Books

1. Sudhir Andrews, Hotel Front Office Training Manual.
2. Sudhir Andrews, Hotel Food and Beverage Service Training Manual
3. Sudhir Andrews, Hotel House Keeping Training Manual
4. J M S Negi – S.Chand, Professional Hotel Management, New Delhi.
5. Jatashankar R.Tewari, Hotel Front Office- Operation and Management - Oxford University Press India 2016, Mumbai
6. Branson & Lennox, Hotel Housekeeping Management.
7. Jagmohan Negi, Gaurav Manohar- Hospitality Management Current Trends and Practices- University Science Press Laxmi Publications, New Delhi.
8. R.K. Malhotra- Encyclopedia of Hotel Management and Tourism Services- Tourism Marketing, Anmol Publications Pvt.Ltd, New Delhi.
9. Karma, Krishnan.K, Robert, Cmill, S.Kaushal- Hospitality Operation Management, Wheeler Publishing, New Delhi.

10. Kumar, H.L. Personnel Management in Hotel, Catering Industry, Metropolitan, New Delhi

Reference Books and Journal

1. James A. Bardi, Hotel Front Office Management- Wiley
2. Thangam -E-Philip- Modern Cookery Vol 1, 2, Catering Management-Vijay Dhawan
3. Dennis.R.Lillicrap & John A Cousins Food and Beverage Service
4. Sudhir Andrews, Front Office Management Operations, Mc Graw Hill Education.
5. Philip Kotler et.al - Marketing for Hospitality and Tourism, Prentice Hall, 2003, New Delhi.
6. Derek Taylor - Hospitality Sales; Promotion Strategies for Success, Reed Educational Professional Publishing Ltd., 2001
7. Cooper et. al - Tourism; Principles and Practice, Prentice Hall, 1998, New Delhi.
8. Bill Marvin - Guest Based Marketing - How to increase restaurant sales without breaking your budget, John Wiley; Sons, 1997
9. Lea R. Dopson et al.(2008). Food And Beverage Cost Control. John Wiley & Sons, Inc., Hoboken, New Jersey

E- Materials

- https://www.academia.edu/1408229/Hotel_management_and_operations
- https://www.boeken.com/file/ebooksample/9789001878917_h1.pdf
- <https://www.university.youth4work.com/study-material/hotel-management-lecture>

Journal Reference

- Indian Journal of Hospitality Management

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	M	S	S	M	S
CO2	M	M	M	M	S	M	M	S	M	M
CO3	S	M	S	S	S	M	S	S	M	S
CO4	M	M	M	M	S	M	M	S	M	M
CO5	S	M	S	S	S	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Skill based subject

Paper code: CSBA4Entrepreneurship Development Credit: 2

Total Hours per Week: 3

Lecture Hours: 2

Tutorial Hour: 1

Course Objectives

1. To understand the meaning of the term Entrepreneurship
2. To know the history of the concept and identify the changing trends in the business.
3. To know the problems of entrepreneur with the focus on women/rural/ and small scale entrepreneur.
4. To understand the role placed by government in promotion and develop of entrepreneur and prepare project report.
5. To motivate students to become entrepreneurs.

Course Out Comes

1. After the study of unit-1, the student will be able to understand the enterprise, entrepreneur and entrepreneurship.
2. After the study of unit-2, the student will be able to get the complete picture of government programs available for entrepreneurs.
3. After the study of unit-3, the student will be able to understand and prepare business plan make presentation.
4. After the study of unit-4, the student will be able to write project report for starting an entrepreneur.
5. After the study of unit-5, the student will be able to assess the qualities of an entrepreneur and learn to be a successful entrepreneur.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-1:**Teaching Hours: 9**

Introduction - Understanding the meaning of Entrepreneurial ship - Characteristics of an Entrepreneur - Classification of the Entrepreneurs - Entrepreneurial Scene in India - Factors influencing Entrepreneurship – Functions of an Entrepreneur

Unit-2:**Teaching Hours: 9**

Entrepreneurial growth - Role played by government and Non-Government agencies in promoting Entrepreneurship - Entrepreneurship Development Programmes - SISI, TIIC, SIDBI, DIC, NSIC, IDBI, IFCI Problems of Entrepreneurs: Women entrepreneurs - Rural Entrepreneurs - Small scale entrepreneurs and Export Entrepreneurs.

Unit-3:**Teaching Hours: 9**

How to enter into Market? - Business idea generation Techniques - Identification of Business Opportunities - Marketing Feasibility - Financial Feasibility – Technical Feasibility - Legal Feasibility.

Unit-4:**Teaching Hours: 9**

Project Appraisal - Methods - Techniques - Preparation of Business Plan - Content of a Business Plan - Project Report.

Unit-5:**Teaching Hours: 9**

Procedure for starting an enterprise – factors involved in selecting new Unit- Franchising and Acquisition – Qualities of successful Entrepreneurs –Case Study.

Text books

1. Jayashree Suresh, Entrepreneur Development, Margham Publications, Chennai
2. Khanka - Entrepreneurial Development - S.Chand, New Delhi.
3. Raj Shankar –Essentials of Entrepreneurship – Vijay Nicole Imprints Pvt. Ltd, Chennai
4. P.Saravanel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai - 1997.
5. Monica Loss, F.L.Bascunan Entrepreneurship Development Global Academic Publishers and Distributors.
6. Dr.D.Kesavan, N.Vivek Entrepreneurial Development Notion Press.
7. Janani, Sujeetha, Asokhan, Priyadharshini, “A Text book on Entrepreneurship Development and Management in Extension, Write and Print Publications.
8. Robert Hisrich, Michael Peter, Deen Shepherd- Entrepreneurship MC Graw Hill, New Delhi.
9. A.K. Lal, Entrepreneurship Development and Management, Snap deal
10. M.C.Garg. Entrepreneurial Development Free Books Centre.Net.

Reference Books

1. Saini - Entrepreneurship: Theory & Practice, Deep and Deep Publications.
2. Gupta CB - Entrepreneurial Development. Sultan Chand & Sons, New Delhi
3. Vasant Desai - Dynamics of Entrepreneurial Development and Management.
4. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi, 2001.

5. Mathew Manimala, Entrepreneurship Theory at the Crossroads, Paradigms & Praxis, Biztrantra ,2nd Edition ,2005.
6. Arya Kumar. Entrepreneurship. Pearson, New Delhi
7. Rajeev Roy ,Entrepreneurship, Oxford University Press, 2nd Edition, 2011.
8. Prasanna Chandra, Projects – Planning, Analysis, Selection, Implementation and Reviews, Tata McGraw-Hill, 8th Edition, 2017.
9. Dr. Vasant Desai,Dr. Kulveen Kaur, Entrepreneurship Development and Management Himalaya Publishing House,Mumbai.
10. Dr. Vasant Desai, Small Scale Industries and Entrepreneurship, HPH,Mumbai.

Course Material: website links, e-Books and e-journals

- <https://www.freebookcentre.net/business-books-download/Entrepreneurial-Development.html5>
- https://books.google.co.in/books/about/Entrepreneurial_Development.html?id=rYLd2d6HJisC6.
- <https://www.krishipanth.com/entrepreneurship-development-pdf-book/>

Journal Reference

- The Journal of Entrepreneurship published by Sage Publications
- Journal of Small Business & Entrepreneurship published by Taylor and Francis
- Indian Journal of Entrepreneurship published by Associated Management Consultants Private Limited

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	S	S	M	S	S
CO2	M	S	M	M	M	M	S	M	M	M
CO3	S	M	M	S	S	S	S	M	S	S
CO4	M	S	S	M	M	M	S	M	M	M
CO5	M	M	M	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: IV

Paper type: Non major elective

Paper code: CNBA47

Training and Development Credit: 2

Total Hours per Week: 2

Lecture Hours: 1

Tutorial Hour: 1

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Course Objectives

1. To know an in-depth understanding of the role of training.
2. To know the methods of training.
3. To understand the concepts of career development .
4. To know the important concepts used in management development and process and MD programme.
5. To know the institutions offering training programme in India.

Course out Comes (five outcomes for each units should be mentioned)

1. After the study of unit-1, the student will know the basic concepts of training, identify training needs and functions of training department.
2. After the study of unit-2, the student will know the various on-the-job and off the job techniques of training.
3. After the study of unit-3, the student will have a clear picture about career planning and development.
4. After the study of unit-4, the student understands the different techniques of management development programme.
5. After the study of unit-5, the student will know the information about the different management training institutes in India.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-1**Teaching Hours: 6**

Concepts of Training and development - Identifying Training Needs - Structure and Functions of Training Department - Evaluation of Training Programme - Role, Responsibilities and Challenges to Training Managers

Unit-2**Teaching Hours: 6**

Techniques of on the job training - Coaching - Apprenticeship - Job Rotation - Job Instruction Training - Training by Supervisors - Techniques of off the job Training, Lecturers, Conferences, Group Discussion.

Unit-3**Teaching Hours: 6**

Concept of Career - Career Stages - Career Planning - Need - Importance - Steps in Career Planning - Career Development - Characteristics - Need - Methods of Career Planning and Development.

Unit-4**Teaching Hours: 6**

Management Development - Meaning - Definition - Need and importance of Management Development - Characteristics - Levels - Management Development Process and Components of MD Programme.

Unit-5**Teaching Hours: 6**

Need for Training in India - Government Policy on Training - Training Institutes in India - Management Development Institute.

Text books

1. Thirumaran D, V.Santhosh - Training and Development, Thakur Publishers Chennai.
2. Employee Training and Development (SIE) | 7th Edition
3. Blanchard, P. Nick & Thacker, W.James., Effective Training,. Prentice-Hall India, 3rd Edition, 2004.
4. Goldstein, I and Ford J.K, Training in Organizations,. Cengage Learning. 2007, Fourth edition.
5. Lynton, R.P. and Pareek, U, Training for Development.
6. Noe, A, Raymond. & Kodwani, A, Employee Training and Development, The McGrawHill Companies,.
7. Rishipal Training and Development Methods- S.Chand and Sons Publishers-New Delhi.
8. Janakiram- Training and Development-Biztantra Publishers-New Delhi.
9. Pandu G. Naik, Training & Development Text and Cases, Excel Books
10. Elaine Biech, Training & Development for Dummies.

Reference Books

1. Lalitha Balakrishnan & Gowri Ramachandran - Training & Development - Vijay Nicole Imprints Pvt. Ltd.

2. Rao PL: HRD through In-House Training, New Delhi, Vikas Publishing House (P) Ltd.,
3. Reid M.A.: Training Interventions: managing Employee Development London, IPM, 3rd ed., 1992.
4. Aggarwala, D.V., Manpower Planning, Selection, Training and Development, New Delhi, Deep & Deep Publications (P) Ltd., 1999.

Course Material: website links, e-Books and e-journals

- <https://www.mbaskool.com/business-concepts/human-resources-hr-terms/8685-training-and-development.html>
- <https://businessjargons.com/training-and-development.html>
- <https://corporatefinanceinstitute.com/resources/careers/soft-skills/employee-training-and-development/>
- http://ebooks.lpude.in/management/mba/term_4/DMGT518_TRAINING_AND_DEVELOPMENT_SYSTEM.pdf
- <http://www.pondiuni.edu.in/sites/default/files/training-development-260214.pdf>
- <https://www2.le.ac.uk/projects/oer/oers/psychology/oers/Training%20and%20Development%20Introduction%20and%20Overview/Training%20and%20Development%20Introduction%20and%20Over>

Journal Reference

- ASTI Journal of Training and Development published by Association of State Training Institutions in India ,HCM Rajasthan State Institute of Public Administration, Jaipur

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

SEMESTER V

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115 BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Core Theory

Paper code: CBA51 Marketing Management

Credit: 4

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To enable the students to understand the fundamentals of marketing and formulate marketing plan including marketing objectives, marketing mix, and marketing environment.
2. To impart the students information about consumer behavior to inform marketing strategy and tactics.
3. To determine the strategy for developing product life cycle and product portfolio structure that are consistent with evolving market needs.
4. To develop pricing strategy that will be taken into account perceived value, competitive pressures and corporate objectives.
5. To develop strategy for the efficient distribution of product and services.
6. To prepare and deliver sales presentation and to develop messaging for marketing communication.

Course outcome

1. After the study of unit-1, the student will be able to identify the primary marketing activities of an Organisation.
2. After the study of unit-2, the student will be able to use marketing information and research to develop marketing strategies for targeting customers.
3. After the study of unit-3, the student will be able to create and analyse product positioning, brand building process, with appropriate product portfolio structure which contributes to the success of products or services.
4. After the study of unit-4, the student will be able to understand the price elasticity and how it can be used to set price for a product. The student will be able to evaluate how to use distribution channels to market the products / services effectively.
5. After the study of unit-5, the student will be able to use the appropriate promotional tools for the promotion of products/ services.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching hours: 18**

Definition - Fundamentals of Marketing - Role of Marketing - Relationships of Marketing with other functional areas - Concept of marketing mix - Marketing Management of Product or Services - Marketing approaches - Selling - Various Environmental factors affecting the marketing functions

UNIT– II**Teaching hours: 18**

Buyer Behavior - Buying motives - Buyer Behavior Model - Factors influencing buyer behavior. Market segmentation - Need and basis of Segmentation - Marketing strategy - Targeting - Positioning.

UNIT– III**Teaching hours: 18**

Sales Forecasting - Various methods of Sales Forecasting - The Product - Characteristics - Classifications - Consumer goods - Industrial goods - New product development - process - Product Life Cycle - Product line and product mix decisions - Branding - Packaging.

UNIT– IV**Teaching hours: 18**

Pricing - Factors influencing pricing decisions - Pricing objectives - Pricing policies and procedures - Pricing strategies - Channel of distribution - importance - Various kinds of marketing channels - Factors considered in selecting Channel of Distribution.

UNIT- V**Teaching hours: 18**

Promotion Mix - Advertising - role of advertising - advertising objectives - advertising media-characteristics - media selection and evaluation - effectiveness of advertising - Personal Selling - types - task of sales person - principles of personal selling - elements of selling process - Sales Promotion - planning for sales promotion - sales promotion tools - Public Relations - characteristics and tools of PR - Direct marketing - key features of direct marketing - direct marketing media - limitations - online marketing - objectives - viral marketing - website evaluation - limitation of online media.

Text Books

1. J. Jayasankar - Marketing - Margham Publications, Chennai.
2. Essentials of Marketing - Sundar K, Vijay Nicole Imprints Pvt. Ltd.
3. Rajan Nair - Marketing - Sultan & Chand, New Delhi.
4. Ramaswamy and Namakumari - Marketing Management, Laxmi Publications Pvt. Ltd
5. Adrian Palmer - Introduction to Marketing theory and practice- Oxford University Press- Indian edition, New Delhi.
6. Philip Kotler- Marketing Management, Pearson Publications, New Delhi.
7. Kruti Shah, Alan D'Souza-Advertising and Promotion IMC perspective, Tata MC Graw Hill Education Pvt.Ltd, New Delhi.
8. Dr.C.B.Gupta, Dr.N.Rajan Nair- Marketing Management Sultan Chand and Sons, New Delhi
9. R.S.N.Pillai, Bagavathi- Modern Marketing-S.Chand and Sons, New Delhi.
10. Jain, Neha Singhal- Principles of Marketing-Cengage Delhi Publications.

Reference Books and Journal

1. Varshney RL and Gupta SL - Marketing Management,
2. Dholokia - Marketing Management Cases & Concepts, MacMillan I Ltd.
3. Bender - Secrets of Power Marketing.
4. Philip Kotler and Armstrong - Marketing Management,
5. Saxena - Marketing Management - Tata McGraw Hill Publications.
6. Ajit Kumar Bansal, Ajay Sharma, Marketing Management.
7. L.Natarajan, Marketing , Margham Publications, Chennai.
8. Rudani, Basics of Marketing Management, S. Chand & Co, New Delhi.
9. Dr. Shaila Bootwala, Principles of Marketing, Nirali Prakashan.
10. Venugopal Pingali, Marketing Management, Sage Publications India Pvt Ltd.

E- Materials

- http://dl.ueb.edu.vn/bitstream/1247/2250/1/Marketing_Management_-_Millenium_Edition.pdf
- <https://www.8freebooks.net/download-marketing-management-philip-kotler-pdf/>
- <http://jnujprdistance.com/assets/lms/LMS%20JNU/BBA/Marketing%20Management/Marketing%20Management.pdf>
- http://www.pondiuni.edu.in/storage/dde/downloads/mbaii_mm.pdf

Journal Reference

- Journal of Marketing Vistas published by Institute of Public Enterprise Osmania University Campus, Hyderabad
- Journal of Marketing and Communication published by NIILM - Center for Management Studies, Greater Noida

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Core Theory

Paper code: CBA52 Business Law

Credit: 4

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To demonstrate understanding and recognition of the requirements of the contract agreement, contract consideration and capacity and genuineness of assent in contract formation.
2. To identify the fundamental legal principles behind performance of contract.
3. To demonstrate an understanding of the legal knowledge to business transaction.
4. To expose the students to legislations relating to sales.
5. To understand commercial contracts transactions and payment methods.
6. To understand international sales and international payment methods.
7. To enable the students familiarize themselves with all aspects of business law establishing a back ground in business law.

Course Outcome

1. After the study of unit-1, the student will be able to understand the fundamental legal principles in developing various contracts.
2. After the study of unit-2, the student will be able to understand the commercial laws in the business world.
3. After the study of unit-3, the student will be able to identify the common forms of business associations and elements of Corporate Governance.
4. After the study of unit-4, the student will be able to understand the legality and statute of frauds in contracts.
5. After the study of unit-5, the student will be able to develop insights regarding the laws and transactions related to sales of goods.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching hours: 18**

Formation and essential elements of contract - Types of contract and agreements - rules as to offer, acceptance and consideration - capacity to contract - lawful object and free consent.

UNIT- II**Teaching hours: 18**

Performance of contract - Discharge of contract - Breach of contract and remedies - Quasi contract.

UNIT– III**Teaching hours: 18**

Guarantee - features and distinctions - Bailment and pledge - features difference - Rights and duties of bailor and Bailee.

UNIT– IV**Teaching hours: 18**

Contract of agency - definition and meaning - Rights of Principal and agent - relation of Principal with third parties - personal liability of agent - termination of agency.

UNIT– V**Teaching hours: 18**

Sale of goods Act 1930 - definition - sale vs. agreement to sell - express and implied conditions and Caveat and exceptions - Rights of an unpaid seller.

Text Books

1. Dr. J. Jayasankar - Business Law- Margham Publications
2. N.D. Kapoor- Business law- Sultan & Sons
3. Balachandran V and Thothadri S -Business Law - Vijay Nicole Imprints (P) Ltd
4. Dr.M.R.Sreenivasan-Business Law- Margham Publications,Chennai
5. Sheth-Business Law- Pearson Education- New Delhi
6. Kavitha Krishnamurthi-Business Law-Global Academic Publishers- New Delhi.
7. B.S.Moshal, Business and Industrial Law, Ane Books India New Delhi.
8. Daniel V. Davidson, Business Law- Principles and Cases in Legal Environment.
9. G.K. Varshney, Business Law, Sahitya Bhawan Publications.
10. M.C. Kuchhal, Vivek Kuchhal, Business Law, Vikas Publications

Reference Books

1. M.C. Dhandapani - Business Law
2. M.C. Shukla - Business Law, Paperback
3. R.S.N. Pillai & Bagavathi- Business Law
4. P.C. Tulsion - Business Law
5. Mirande Vaibhava, Business Law.
6. Avtar Singh, Business Law, EBC .
7. S.S. Gulshan, Business Law including Corporate Law, New Age International Pvt Ltd
8. Tiwari, Dr.Singh. Business Law, SBPD Publications.
9. O.P. Gupta, Business Law, SBPD Publishing House.

10. Sujit Kumar Das, Business Law, Oxford University Press.

E-Material

- https://www.dphu.org/uploads/attachements/books/books_3498_0.pdf
- <http://www.himpub.com/documents/Chapter1479.pdf>
- <https://www.mobt3ath.com/uplode/book/book-66683.pdf>
- <https://www.freebookcentre.net/Law/Commercial-Law-Books.html>
- <https://www.ebooks.com/en-us/subjects/business-business-law-ebooks/172/>

Journal Reference

- India Business Law Journal published by Vantage Asia Publishing Limited
- Indian Journal of Corporate Law and Policy published by Society for Progress in Research, Education and Development in Law (SPRED LAW), Lucknow.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Core Theory

Paper code: CBA53 Research Methodology

Credit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

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Course Objectives

1. To familiarize students with basic of research and the research process.
2. To enable the students in conducting research work and formulating research hypothesis.
3. To create a basic knowledge on sampling techniques.
4. To have a basic awareness on tools of data collection and its applications.
5. To impart the knowledge on measurement and scaling techniques as well as quantitative data analysis.

Course Outcome

1. After studied unit-1, the student will be able to understand the basic framework of research process
2. After studied unit-2, the student will be able to develop an understanding of various research designs and techniques.
3. After studied unit-3, the student will be able to identify various sources of sampling techniques.
4. After studied unit-4, the student will be able to identify various sources of information for data collection.
5. After studied unit-5, the student will be able to conduct a research and prepare a report.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
55	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching Hours: 15**

Definition of research - meaning - objectives - types of research - research process - qualities of a researcher - criteria of good research - problems encountered in research

UNIT- II**Teaching Hours: 15**

Defining research problem - research design - features of good research design - types of research design factors affecting research design - hypothesis - meaning - definition - need for hypothesis - formulation of hypothesis - types of hypothesis - test of hypothesis- type I and type II error

UNIT– III**Teaching Hours: 15**

Sampling techniques - types of sampling - merits and demerits

UNIT- IV**Teaching Hours:15**

Collection of primary and secondary data - interview techniques - survey and interview – methods - merits and demerits – questionnaire - pre requisites of using questionnaire - structured and unstructured questionnaire - types of secondary data

UNIT– V**Teaching Hours: 15**

Measurement and scaling techniques

Text books

1. C. R. Kothari Research Methodology Methods and Technique 3rd Edition New Age International Publishers New Delhi.
2. P.Ravilochannan Research Methods - Margham Publications, Chennai
3. Prof. Deepak Chawla- Research Methodology 2nd Edition, Vikas Publishing House
4. Bill Taylor, Sinha, Ghoshal, Research Methodology, Eastern Economy Edition, Prentice-Hall of India, New Delhi.
5. T.V.S.Arun Murthy, T.V.S.Padmaja, A Text book on Research Methodology, Scitech Publications(I) Pvt.Ltd., Chennai.
6. P.Saravanavel-Research Methodology-Kitab Mahal-Allahabad
7. Dr.Pawan Kumar Oberoi- Research Methodology-GAPD, New Delhi.
8. Dr. Kirti Gupta, Research Methodology, Nirali Prakashan.
9. Dr. Chaitali Ghosh, Dr. Mamtesh Singh, Research Methodology, Rastogi Publications.
10. Thangamani Ramalingam, S.N. Senthil Kumar, Essentials of Research Methodology- Jaypee Brothers.

Reference Books and Journal

1. B.N.Gosh - Scientific Methods and Social Research 3rd Edition Sterling Publishers Pvt Ltd 2007
2. Dipak Kumar Bhattacharya Research Methodology 2nd Edition Excel Books 2006
3. Ranjit Kumar Research Methodology 4th Edition Sage Publishing New Delhi 2017
4. S. Sachdeva, Research Methodology, Laxminarayan Agarwal.
5. Anubhaa M. Walia, Fundamentals of Research, Notion Press.

6. Panner Selvam , Research Methodology, PHI Learning.
7. Yogesh Kumar Singh, Fundamentals of Research Methodology and Statistics New Age International Publishers.
8. G. Vijayalakshmi, C. Sivapragasam, Research Methodology Tips and Techniques.
9. K.P.R. Chowdary, Research Methodology of Biostatistics Mjp Publishers Pharma Med. Press.
10. Mustafa.A, Research Methodology, AITBS Publishers.

E-Materials

- https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODODOLOGY
- <https://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf>
- <http://manzaramesh.in/prephdbooks/Research%20Methodology%20--20Methods%20and%20Techniques%202004.pdf>
- <http://www.euacademic.org/BookUpload/9.pdf>

Journal Reference

- Journal of Applied Management Research published by KCT Business School, Coimbatore
- KHOJ: Journal of Indian Management Research and Practices published by MIT School of Management, Pune
- Journal of Contemporary Research in Management published by PSG Institute of Management, Coimbatore
- National Journal of Research in Management published by Shrimad Rajchandra Institute of Management and Computer Application, Surat, Gujarat
- National Journal of Research in Management published by Shrimad Rajchandra Institute of Management and Computer Application, Surat, Gujarat

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Core Theory

Paper code: CBA54 Computer Application in Business Credit: 4

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To acquaint the students with special applications of IT in business.
2. To familiarize students regarding IT application in documents handling and various other computer application in business.
3. To help students to know the usage of MS word its benefits in business
4. To help students to know the usage of Excel in reporting and research
5. To help students to know the process of designing presentations using ppt.

Course Outcomes

1. After the study of unit-1, the student will know about the emergence of computers and various software solution used for business
2. After the study of unit-2, the student will be learn to use MS word and its functions
3. After the study of unit-3, the students will learn the application of Excel in problem solving and decision
4. After the study of unit-4, the student will be familiar with uses of PPT and also learn to design presentations
5. After the study of unit-5, the student will know about the emerging trends of computer applications in business

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I

Teaching hours:15

Information Technology Basics - Information definition, Meaning of Data and information - Difference between data and information - Prerequisites of Information - need for Information - components of information Technology - Role of Information Technology in Business. Various business application software: Windows operating system, Open source software, Tally, SPSS - Emergence of computers and evolution of computers.

UNIT– II

Teaching hours:15

Word processing with MS Word: Features, Starting Ms word - MS word environment - working with word documents - working with tools - MS word working with tables - Short cut keys - checking spelling and grammar - printing a document - Format options.

UNIT– III

Teaching hours:15

Spreadsheets and Ms Excel: meaning, Features, Starting MS Excel - Ms Excel environment - Working with Excel workbook - Purpose or uses of excel - working with worksheet: creating, opening, Data management- Formulas and functions - Charting: Meaning and types of charts - Inserting charts - printing in Excel. Excel for data analysis

UNIT– IV

Teaching hours:15

MS power point: Meaning of PPT, features of PPT Making presentation with MS power point - uses of power point - starting MS power point - MS power point environment - working with power point - PPT tools - working with different views - designing presentation - Animation options of PPT - preview and printing in powerpoint.

UNIT– V

Teaching hours:15

Electronic Commerce - meaning features, Types - Advantages and disadvantages - Electronic data interchange (EDI) - How EDI works - EDI benefits - EDI limitations - SMART card - SMART card applications. Recent trends: Business intelligence, cloud computing, quantum computing, Banking platforms: FICO, FINACLE - CIBIL: Meaning, Features and uses

Text books

1. Leon & Leon - Computer Application in Business - Vijay Nicole Imprints Pvt.Ltd
2. Dr.P. Rizwan Ahmed - Computer Application in Business with Tally - Margham Publications
3. Mohan Kumar - Computer Application in Business - Vijay Nicole Imprints Pvt.Ltd.
4. Ananthi Sheshasayee - Computer Application in Business - Margham Publications.
5. Prof. Satish Jain, M.Geetha, Kratika, MS Office 2010 Training Guide, BPB Publications.
6. Ravi Kalakota, Andrew B. Whinston, Frontiers of Electronic Commerce, Pearson.
7. Dr.K. Abirami Devi, Dr. M. Alagammal, E-Commerce, Margham Publications, Chennai.

Reference Books

1. Introduction to Information Technology, ITL ESL, Pearson Education
2. AitJohri, Business Application Software, Himalaya Publication House, First Edition 2016
3. Asok K. Nadhani, Simple Tally 9 , BPB Publications
4. Introduction to Information Technology, ITL Education Solutions Limited, Research and development Wing, 2016, Pearson Education
5. Gary Shelly, Thomas J. Cashman, Misty Vermaat , Microsoft Office 2007: Introductory Concepts and Techniques, ,2007, Thomson Learning publishers

E-Materials

- <https://www.spss-tutorials.com/spss-what-is-it/>
- <https://stats.idre.ucla.edu/spss/>
- https://study.com/articles/Business_Computer_Applications_Courses_and_Training_Programs.html
- <https://tallysolutions.com/>
- <https://www.udemy.com/course/the-fundamentals-of-business-intelligence/>

Journal Reference

- International Journal of Research in Computer Application and Management published from Jagadri, Haryana.
- Indian Journal of Computer Science, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Elective

Paper code: CEBA55A A. Industrial Relations and Labour Laws Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To understand and apply the concept of industrial relations and the system in which it operates.
2. To understand the various process and procedures connected with collective bargaining workers participation, grievance Redressal and employee discipline and dispute resolution.
3. To know the development and judicial set up of Labour laws.
4. To learn the laws relating to industrial relations, social security, factories act and working conditions.
5. To learn the salient features of welfare and wage legislations and the present state of industrial relations and its laws in India.

Course Outcomes

1. After the study of unit-1 student will be able to understand the importance of industrial relation and know the role of trade union and the industrial disputes and their resolutions.
2. After the study of unit-2 the student will be able to understand the meaning of participative management and its structure and know the different committee and find the pre requisite for successful participation in collective bargaining systems.
3. After the study of unit-3 the student will understand the meaning of industrial unrest and the reasons for employee dissatisfaction and disciplinary action. The student also understand the various method of strike and prevention.
4. After the study of unit-4 the student is able to understand the Indian factories Act and provisions regarding welfare, safety and health of workers.
5. After the study of unit-5 the students is able to understand the concepts of workmen's compensation act and its provisions and also know the international labour organisation role and its various functions.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I

Teaching hours :15

Industrial Relations - Meaning And Definition - Role - Importance - Trade Unions - Importance of Trade Union- Industrial disputes - types - and their Resolutions.

UNIT- II

Teaching hours :15

Participative Management - Structure - Scope - Collective Bargaining - Works Committee - Joint Management Councils - Pre-Requisite for successful participation - Role of Government in Collective Bargaining.

UNIT- III

Teaching hours :15

Industrial unrest - employee dissatisfaction - Grievances - Disciplinary Action - Domestic Enquiry - Strikes - lockout - Prevention of Strikes - Lockouts.

UNIT- IV

Teaching hours :15

Factories Act: Meaning, Definition - importance of factories act -need -provision relating to Welfare - Safety - Health Measures.

UNIT- V

Teaching hours :15

Workmen's Compensation Act - meaning and definition and International Labor Organization- importance of ILO- - Role and Function of ILO

Text books

1. Sreenivasan M.R - Industrial Relations & Labor legislations
2. Aswathappa K - Human Resource and Personnel Management
3. Subba Rao P - Human Resource Management and Industrial Relations
4. Monoppa - Industrial Relations
5. Srivastava SC- Industrial Relations and Labour Laws –Vikas Publishing Pvt.Ltd.Noida
6. S.D.Punekar, S.B.Deodhar,Saraswathi Sankaran-Labour Welfare,Trade Unionism and Industrial Relations-Himalaya Publishing House-Mumbai.
7. Dr. Satish Kumar Saha, Dr. Anju Agarwal, Industrial Relations and Labour Laws, SBPD Publications.
8. C.S. Venkata Ratnam, Industrial Relations, Oxford University Press.
9. Dr.Jose Mamman, Prof. Bose Tom, Industrial Relations and Labour Laws, Takur Publications Pvt Ltd.
10. Dr. Ajit Kumar Ghosh, Industrial Relations Text and Cases, Manas Publications.

Reference Books

1. Michael V Industrial Relations in India and Workers Involvement in Management Cowling - Essence of Personnel Management and Industrial Relations - Prentice - Hall of India.
2. Mamoria C.B and Sathish Mamoria,Dynamics of Industrial Relations, Himalaya Publishing House,New Delhi,1998.
3. Dwivedi.R.S Human Relations Organisational Behaviour, Macmillan India Ltd., New Delhi,1997.

4. Pylee.M.V and Simon George ,Industrial Relations and Personnel Management ,Vikas Publishing House (P) Ltd.,New Delhi,1995
5. N.G.Nair,Lata Nair,Personnel Management and Industrial Relations,S.Chand,2001
6. Srivastava,Industrial Relations and Labour Laws,Vikas ,4TH edition,2000
7. C.S.Venkata Ratnam,Globalisation and Labour Mangement Relations,Response Books,2001
8. T.N. Chhabra, R.K. Suri, Industrial Relation Concepts and Issues, Dhanpat Rai & Co.
9. Tripathi. P.C, Gupta.C.B, Kapoor.N.D, Industrial Relations and Labour Laws, Sultan Chand & Sons.
10. Shamshuddin.M, Nadaf, Yasmin Begum.S, Nadeef, Industrial Relations- Current Publications.

E- Materials

- http://www.ebooks-for-all.com/bookmarks/detail/Labour-Laws-in-India/onecat/Electronic-books+Law+Law-by-Country+Asia/0/all_items.html
- <https://www.kopykitab.com/Industrial-Relations-and-Labour-Laws-6th-Edn-by-S-C-Srivastava>
- <https://www.freebookcentre.net/Law/Labour-and-Employment-Law-Books.html>
- <http://elearning.nokomis.in/uploaddocuments/Industrial%20Relations.%20&%20Labour%20laws/Chp%2016%20Labour%20Laws%20An%20Overview/PPT/Chapter%2016.pdf>
- http://www.pondiuni.edu.in/storage/dde/downloads/hrmiii_irm.pdf

Journal Reference

- Indian Labour Journal published by Government Of India Ministry of Labour And Employment Labour Bureau Shimla/Chandigarh
- Indian Journal of Industrial Relations published by Sri Ram Centre for IR and HR
- National Journal of Labour and Industrial Law (NJLIL), Noida

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	M	S	M	S	S	S	S
CO2	S	M	S	M	S	S	M	S	S	S
CO3	S	S	S	S	M	S	S	S	M	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	M	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Elective

Paper code: CEBA55B

B. Reward Management

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

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Course Objectives

1. The course is designed to promote understanding of issues related to the reward or compensation system and practices of corporate sector.
2. To learn the basic compensation concepts and the context of compensation practice.
3. To illustrate the different ways of wage determination.
4. To understand legally required employee benefits.
5. To learn the concepts of wage incentives
6. To learn some of the implications for reward issues and possible employer approaches to manage legally required benefits.

Course Outcome

1. After the study of unit-1, student is able to understand the importance of employee compensation and equity. To know the wages policy and its structure and different levels of wages and major decisions.
2. After the study of unit-2, the student is able to understand the factors of fixation of wages and job pricing. To know the rationalizing and developing wages structures.
3. After the study of unit-3, the student is able to understand the concepts of fringe benefits and other allowances and know the consumer price index and bonus regulations.
4. After the study of unit-4, the student is able to know wages incentives and linking wages to productivity. To know the different types of incentives and productivity sharing plans.
5. After the study of unit-5, the student is able to understand meaning of reward and statutory provision.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I**Teaching hours :15**

Introduction - significance - behavioral aspects of employee compensation and concepts of equity - economic theories. Wages policy - meaning - types - wage structure - wage differentials - wage levels - wage policies - decisions

UNIT- II**Teaching hours :15**

Wage determination - factors influencing wage fixation, job evaluation - methods - job pricing - wage and salary surveys - rationalizing and developing wage structures.

UNIT- III**Teaching hours :15**

Components of pay - fringe benefits - house rent allowance - dearness allowance - money and real wages - consumer price index. Bonus - concept - bonus regulations - negotiations with unions.

UNIT- IV**Teaching hours :15**

Wage incentives - wage and motivation - linking wages with productivity - individual and group incentives - plant. Wide schemes - Scanlon Plan and other productivity gains sharing schemes - experience in India.

UNIT- V**Teaching hours :15**

Reward issues - statutory provision - institutions like wages boards and pay commissions - machinery for resolving disputes - compensative of managers - domestic and multinational companies - rewarding women.

Text Books

- 1.Narain, Laxmi: 'Managerial Compensation & Motivation in Public Enterprises, (Oxford Pub. House).
- 2.Sibson: 'Wages & Salaries', (American Management Association).
- 3.Garry Dressler, "Personnel / Human Resource Management", London, Prentice Hall,
- 4.William B. Werther Jr. and Keith Davis "Human Resource Management". New Jersey:McGrawHill.
- 5.Milkovich & Newman, Compensation, Irwin/McGraw-Hill 8th Ed
- 6.Narain, Laxmi: 'Managerial Compensation & Motivation in Public Enterprises, (Oxford Pub. House).
- 7.Milkovich & Newman, Compensation, Irwin/McGraw-Hill 8th Ed
- 8.Michael Armstrong, Reward Management, Kogan Page.
- 9.B.D. Singh, Compensation & Reward Management, Excel Books.
10. Geoff White, Janet Druker, Reward Management a Critical Text, Rowledge.

Reference Books

1. Michael V Industrial Relations in India and Workers Involvement in Management Cowling - Essence of Personnel Management and Industrial Relations - Prentice - Hall of India.
2. Frans Poets, The Art of HRD - Job Evaluation & Remuneration, Crest Publishing, Volume7 1st Edition
3. Michael Armstrong, Helen Murlis, The Art of HRD - Reward Management, Crest Publishing
4. Michael Armstrong, Employee Reward, (University Press)
5. P.Zingheim, The New Pay, Linking Employee & Organization Performance, Schuster, (Jossey-Bass)

5. Sara Rynes, Compensation in Organization, Gerhart (Jossey BASS)
6. Wendell L French, "Human Resource Management", USA, Houghton Mifflin Company, 1994.
6. David D. Decenzo and Stephen P. Robbins, "Human Resource Management", New Delhi, Prentice Hall, 3rd Edn., 1988.

E-Materials

- https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_CRM_NOTES.pdf
- https://www.academia.edu/22247490/Reward_management
- <https://www.docsity.com/en/lecture-notes/management/compensation-management/>
- <https://www.coursehero.com/file/14598021/HND-BM-HRM-7/>

Journal Reference

- Indian Labour Journal published by Government Of India Ministry of Labour And Employment Labour Bureau Shimla/Chandigarh
- Indian Journal of Industrial Relations published by Sri Ram Centre for IR and HR
- National Journal of Labour and Industrial Law (NJLIL), Noida
- The Indian Journal of Labour Economics published by An Organ of the Indian Society of Labour Economics
- India Wage Report, published by ILO, 2018

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Elective

Paper code: CEBA 55C

C. Change Management

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

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Course objectives

1. To introduce the students the concept of Organizational Change
2. To enable the students to learn change management techniques
3. To identify and overcome obstacles to change.
4. To understand the impact of Organisation culture and change in the Organisation.
5. To understand the requirement for a sound change process within the Organisation.

Course Outcome

1. After the study of unit-1, the student will be able to provide an over view of the change process.
2. After the study of unit-2, the student will be able to review the spectrum of reactions to change.
3. After the study of unit-3, the student will be able to offer techniques for preparing for change.
4. After the study of unit-4, the student will be able to create and stimulate the culture for change.
5. After the study of unit-5, the student will be able to give suggestion for managing uncertainty.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I

Teaching Hours: 15

INTRODUCTION

Concept of organizational change - forces - micro and macro perspective - the process - Requisite for successful change - dimensions of planned change.

UNIT- II

Teaching Hours: 15

RESISTANCE TO CHANGE

Introduction - sources of resistance - individual - organizational overcoming resistance to change - Role of HRD in managing change - change agents and their role in change management.

UNIT- III

Teaching Hours: 15

MANAGING ORGANIZATIONAL CHANGE

Model of change - Lewin's three step model - Kotler's eight step model - organizational development - organizational change implementation process - evaluation of organizational change program

UNIT- IV

Teaching Hours: 15

ORGANIZATIONAL CULTURE AND CHANGE

Creating and sustaining culture - Creating a culture for change - stimulating a culture of innovation.

UNIT- V

Teaching Hours: 15

CONTEMPORARY ISSUES IN ORGANIZATIONAL CHANGE

Technology and its impact in the work place - work stress - creating a learning organization - organizational change in Indian businesses - case studies related to organizational change.

Text books

1. K. Sundar - Essentials of Human Resource Management, Vijay Nicole Imprints
2. Tripathy P.C -.Organization Change - Sultan Chand, 2010.
3. Mark Hughes, Change Management in Organisations, Jaico Publishing House
4. Dawson P-Understanding Organizational Change: The Contemporary Experience of People at work , London, Sage Publications.
5. Robbins S.P- Organizational Behaviour, 11th Edition, New Jersey Pearson Prentice Hall.
6. Senior B, Fleming J- Organisational Change, Harlow Prentice Hall.
7. Brown A – Organisational Culture, 2nd Edition, London, Pitman Publishing .
8. Carnell C.A – Managing Change in Organisations , 4th Edition , Harlow Prentice Hall
9. Collins D - Organisational Change – A Sociological Perspective, London.
10. Hodgetts R.M - Organizational Behaviour, Theory and Practice, New York, MacMillan.

Reference Books

1. Kavita Singh, Organisation Change and Development -Excel Books,
2. Kondalkar V. G, Organisation Effectiveness and Change Management- PHI Learning, 2009.
3. Capon.C, Understanding Organisational Context, Inside and Outside Organisations.
4. Richards T- Creativity and Management of Change, Oxford, Bkchwell Business.
5. Watson T – Organising And Managing work, Harlow Prentice Hall.
6. Tichy. N.M – Managing Strategic Change, Technical, Political and Cultural dynamics, New York, John Wiley and Sons.
7. Creativity And Leading Fundamental Change in Organistion, San Francisco, Jossey Bass.
8. Cunnings T G and Worley C.G – Organisational Development and Change .
9. Daft R L – Organisational Theory and Design , Minneapolis, St.Paul, West Publishing .
10. Fincham R, Rhodes P- Principles of Organisational Behaviour, Oxford University Press.

E-Materials

- <https://bbamantra.com/organizational-change-types-process/>
- <https://searchcio.techtarget.com/definition/change-management>
- <https://www.studocu.com/en-au/document/curtin-university/managing-change/lecture-notes/lecture-notes-all-lectures/513582/view>
- <http://www.mahavirlibrary.org/files/change-management.pdf>

Journal Reference

- Journal of Change Management published by Taylor and Francis.
- Journal of Organizational Change Management published by Emerald

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: V

Paper type: Skill based subject

Paper code: CSBA56

E-Business

Credit: 2

Total Hours per Week: 3

Lecture Hours: 2

Tutorial Hour: 1

Course Objectives

1. To understand the concept of doing business through electronics and appreciating its difference with traditional business
2. To help them know the Infrastructural requirement to conduct Business
3. To learn the methodology of performing various business functions using electronics
4. To familiarize students with the EDI role in business and the importance of Web in Business
5. To introduce various payment methods of electronic banking and How Government uses electronic mode to reach publics.

Course out Comes

1. After the study of unit-1, the student will be able to define appreciate the difference between traditional and electronic business
2. After the study of unit-2, the student will know basic infrastructure required to build an E-Business and secure it
3. After the study of unit-3, the student will be equipped with using electronic as a tool to perform business effectively
4. After the study of unit-4, the student will be familiar electronic data interchange and how does it help in transaction besides learning the importance of Web.
5. After the study of unit-5, the student will be able to use various electronic governance media and tools.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I

Teaching Hours : 9

E- Business Introduction

Fundamentals of E-commerce and E-business: Meaning, Definitions, Features and benefits - E-business Components: People, Hardware, Software, Network and organization - E-business Advantages and disadvantages - E-Commerce Framework - Comparison between Traditional vs. E-Business Applications - Major Categories of E-Commerce - B2C, B2B, C2B and C2C Applications.

UNIT- II

Teaching Hours : 9

Communication Network & Security

Overview of Communication Network - Types of Networks - Wireless Networks - Wireless Internet Access ISDN - Dial-Up - Broadband - Wi-Fi. OSI Models - Network Security and Firewalls: Meaning and features of network security - Protocols - Types of Protocols - Client Server Network Security - Firewalls and Network Security. Security measures of internet payment system: Authentication, public key cryptography, digital signatures,

UNIT- III

Teaching Hours : 9

E-Business Application

e-Business applications - Fintech (Financial Technology): Meaning, Features of Fintech, Importance of Fintech, Emergence of Fintech, Areas of Fintech - Regtech (regulatory Technology) Meaning and importance in India - E-marketing: Meaning, Types of E-marketing - E-CRM: Meaning, Features and Process. E-retailing: Meaning, Features, Advantages and disadvantages of E-tailing, Trends in E-retailing - Electronics Application in HR

UNIT- IV

Teaching Hours : 9

WEB AND EDI

World Wide Web basics: Meaning of WWW, Features of a Web - Web application components - Electronic Data Interchange (EDI) - meaning, Importance of EDI, Advantages and benefits of EDI system - EDI Applications in Business - Meaning of Benefits and features of Intranet - Intranet Application in Business. Cyber crime: cases in India and Indian regulations

UNIT- V

Teaching Hours : 9

E-Payment Systems & Electronic Governance

Electronic banking: Mobile banking meaning and features - Online Payment - Payments Cards - Electronic Cash - Electronic Cheques - Electronic Wallets - Debit Cards- Credit Cards - Smart Cards - Stored Value Cards - E-Governance: Meaning, Features and importance - application of Electronics in Governance - E-tax, E-seva, E-certificates - Advantages and disadvantages of electronic governance.

Text books

1. Dr. P.RizwanAhmed , E-Business & E-Commerce, MarghamPublications
2. Dr.K.Abirami Devi and Dr. M. Algammai , E-Commerce -MarghamPublications
3. Srinivasa Vallabhan SV, E-Commerce,Vijay Nicole Imprints Pvt.Ltd.
4. Mamta Bhusry , E-Commerce, Laxmi Publications Pvt.Ltd.
5. U.S.Pandey, Rahul Srivastava, Saurabh Shukla, E-Commerce and its applications, S.Chand, NewDelhi.
6. Kalakota , Robinson – E-Business2.0 – Pearson Education –New Delhi.
7. L.T.Joseph - E-commerce A managerial perspective - Prentice Hall publications , 2004

8. Murthy C.S.V., E-Commerce - Concepts, Models and Strategies.
9. David Whitley, E-Commerce Strategy, Technology and Application, Tata McGraw Hill Publications, 2004.
10. Dennis P.Curtin, E-Commerce Principles and Introduction Technology, Tata McGraw Hill Publication, 2004

Reference Books

1. Pete Loshin, John Vacca - Electronic Commerce -LaxmiPublications
2. R.Kolkata and A.B.Whinston: Frontiers of Electronic Commerce, New Delhi, Addison Wesley.
3. P.T.Joseph: Electronic Commerce: A Managerial Perspective, Prentice Hall of India Learning, New Delhi, 3rd Edition,2008.
4. Efraim Turbon, Jae Lee, David King, H.Michael Chung, Electronic Commerce, AManagerial Perspective, Pearson Education Asia,2001.
5. Greenstein, Feinman, E-Commerce, Tata McGraw Hill Publications, 2001
6. Mathewson, E-.Business, BHPublishers.

E-Content

- <https://smude.edu.in/smude/programs/bba/e-commerce.html>
- <https://csistudyabroadmaterials.files.wordpress.com/2015/10/e-business-syllabus.pdf>
- <https://www.indiastudycenter.com/Other/Syllabus/...E-Business/default.asp>
- <https://targetstudy.com/courses/diploma-in-e-business.html>
- <https://www.toppr.com/guides/business-studies/...of-business/e-business/>

Journal Reference

- International Journal of Electronic Business (IJEB) published by Inderscience

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

SEMESTER VI

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115 BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Core Theory

Paper code: CBA61

Strategic Management

Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To know the importance of strategic management in an organization.
2. To learn the corporate strategy, strategic planning, formulation of strategy, project life cycle and SWOT analysis.
3. To know generic strategic alternatives, horizontal and vertical diversification.
4. To understand the external growth strategy, mergers, acquisition, amalgamation, joint ventures, problems of an organizational structure and corporate development
5. To learn the implementation of strategy, organizational climate, planning and control of implementation.

Course Outcome

1. After the study of unit-1, student will be able to understand objectives, mission and vision. Appreciate strategic analysis of corporate goals and its capabilities.
2. After the study of unit-2, student will be able to understand the corporate strategy, process of strategic planning, formulation of strategy, project life cycle, portfolio analysis and SWOT analysis.
3. After the study of unit-3, student will be able to learn generic strategic alternatives - horizontal and vertical diversification.
4. After the study of unit-4, student will be able to understand external growth strategy, mergers, acquisition, amalgamation, joint ventures, problems of organizational structure and the management of change.
5. After the study of unit-5, student will be able to learn the implementation of strategy, elements of strategy, significance of leadership and organizational climate, planning and control of implementation.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I**Teaching Hours :18**

The business system - objectives of the business - setting up and balancing the objectives mission - vision - goals strategic analysis of functional areas production - marketing - human resources - finance - analyzing corporate capabilities.

UNIT– II**Teaching Hours : 18**

Corporate strategy - nature and scope - characteristic of corporate strategy - process of strategic planning - formulation of strategy - project life cycle - Portfolio analysis - SWOT.

UNIT– III**Teaching Hours : 18**

Generic strategic alternatives - Michael Porter's generic strategies - Grand strategies/ Directional Strategy - horizontal, vertical diversification - active and passive alternatives.

UNIT- IV**Teaching Hours : 18**

External growth strategy - merger acquisition - amalgamation - joint venture - problems organizational structure and corporate development - line and staff function - evaluation of organization structure - management of change.

UNIT– V**Teaching Hours : 18**

Strategy Implementation and control - elements of strategy - interrelationship between strategy formulation and implementation - issues in strategy implementation - Strategic Business Unit(SBU) and core competencies - leadership and strategic implementation - strategic change - steps to initiate strategic change - Kurt Lewin change process - strategic control - types of strategic control - organizational climate - planning and control of implementation.

Text books

1. Dr. C.B. Mamoria & Dr. Satish Mamoria, Business Planning and Policy (1987) Himalaya Publishing House, Mumbai.
2. Dr. S.Sankaran -Strategic Management,Margham Publications
3. S.C. Bhattacharya - Strategic Management Concepts & Cases - S.Chand & Co
4. Dr.M. Jeyarathnam – Strategic Management – Himalaya Publishing House, New Delhi.
5. Charles. W. L. Hill, Gareth R. Jones – An Integrated Approach to Strategic Management- Cengage Learning , New Delhi.
6. Rustagi P R – Strategic Financial Management – Sultan Chand Publishers NewDelhi.
7. S.P. Singh – Strategic Management, AITBS Publishers,Delhi.
8. L.M.Prasad - Strategic Management, Sultan Chand Publishers NewDelhi

Reference Books

1. Kazmi - Business Policy & Strategic Management - Tata McGraw-Hill.
2. Azhar Kazmi, Strategic Management- Mc Graw Hill.
3. Kazmi Adela, Strategic Management, Mc Graw Hill.
4. Dess, Strategic Management, MHE.
5. Thomas L. Wheelen, Strategic Management of Business Policy, Pearson.
6. John Pearce, Strategic Management, Mc Graw Hill Education.
7. Fred R. David, Strategic Management Concepts, Pearson.
8. Thomas, Strategic Management, Pearson Education India.
9. Carpebter, Salwan, Strategic Management- A Dynamic Perspective.
10. R.M. Srivastava, Shubhra Verma, Strategic Management Concepts- Skills&Practices, PHI.

E-Materials

- http://www.crectirupati.com/sites/default/files/lecture_notes/Strategic%20Management%20Notes-CREC.pdf
- <https://examupdates.in/mba-strategic-management/>
- <http://www.pondiuni.edu.in/sites/default/files/Part%20I%20Startegic%20%20Management.pdf>
- <http://www.geektonight.com/strategic-management-notes-pdf/>

Journal Reference

- Jagannath International Management School published by Jagannath International Management School
- Journal of Strategy and Management published by Emerald

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Core Theory

Paper code: CBA62

International Business

Credit: 5

Total Hours per Week: 6

Lecture Hours: 5

Tutorial Hour: 1

Course Objectives

1. To enable the students to understand the meaning and importance of globalization and international business
2. To familiarize them with various modes of entering global markets.
3. To help them understand how trade policies are used and how trade is restricted
4. To impart the students with regional economic integrations.
5. To examine the international monetary, strategy & marketing environment.

Course Outcome

1. After the study of unit-1, the student will be able to define and explain the importance of globalization and international business
2. After the study of unit-2, the student will be known the options used and various modes of entering global markets.
3. After the study of unit-3, the student will understand how governments use trade policies to restrict movement of goods abroad
4. After the study of unit-4, the student will be familiar with how various regional co operational organization work and their functions.
2. After the study of unit-5, the student will be able make decisions of setting up MNCs and know how to invest abroad to establish MNC

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I

Teaching hours: 18

INTRODUCTION TO INTERNATIONAL BUSINESS

International Business: Meaning, Objectives - Domestic Vs International Business - understanding LPG (Liberalization, Privatisation and Globalisation - Globalisation: Definition, Features and drivers of globalisation - Impediments in International Business, International Business Environment - Political, Legal system, Cultural, Economic, Governments,

UNIT- II

Teaching hours: 18

ENTRY MODES

Modes of International Business - Exports & Imports - Licensing - Franchising - Management Contracts - Joint Ventures - Turnkey Projects - Wholly - owned Subsidiaries - Strategic Alliances - Mergers & Acquisitions - Contract Manufacturing - International Trade theories : Mercantilism, Comparative Advantage Theory - Absolute advantage theory, Heckscher - Ohlin Theory, Product Life cycle theory

UNIT- III

Teaching hours: 18

TRADE POLICIES and WTO

Trade policies: Meaning of trade restrictions, Reasons for trade restrictions tools - Various Trade Restriction tools or policies: Tariffs, Import quota, Voluntary export restraints, Local content requirement, Administrative policies and Anti-dumping policies - GATT (General agreement on tariff and trade: Meaning, Emergence of GATT, Objectives of GATT - Emergence of WTO (World trade organization: Functions, Objectives

UNIT- IV

Teaching hours: 18

REGIONAL ECONOMIC INTEGRATION

Regional Economic Integration: Meaning, Objectives - Levels of Economic Integration - NAFTA - Features & Impact - ASEAN - Vision, Free Trade Areas & Economic Community - SAARC - Objectives- Principles - Potential Areas of Cooperation - Problems - Role of India - BRICS - Objectives - Focus of BRICS - Target Sectors for BRICSTrade.

UNIT- V

Teaching hours: 18

FOREIGN DIRECT INVESTMENT AND MNCs

Foreign Direct Investments: Meaning, Features - Growth of FDI - FDI Sources - Forms of making FDI: Greenfield, Horizontal and vertical - Why Organizations go for FDI? - FDI & Host Nation Advantages and Drawbacks - FDI & Home Nation Advantages - MNC & MNE: Meaning, Features - Types of MNCs: Polycentric, Ethnocentric, region-centric and global centric.

Text books

1. K. Aswathappa, International Business, Tata Mc-Graw Hill, 2012
2. Francis Cherunilam, International Business Environment, Himalaya Publishing House Pvt. Ltd., 2015
3. Sanjay Misra, P.K. Yadav, International Business : Text & Cases, PHI Learning, New Delhi, 2009
4. John Daniels, International Business : Environments & Operations, Pearson Education, 2009
5. Francis Cherunilam, International Business- Text & Cases, PHI Learning.
6. Helen Deresky, International, Textbooks.com
7. John Wild, International Business, Textbooks.com
8. Thingan, International Economics, Vrinda Publications, Pvt Ltd, New Delhi.
9. Subba Rao.P, International Business Text and cases, HPH Mumbai.
10. Bhalla.T.K, International Business, Anmol Publication, New Delhi.

Reference Books

1. Paul Justin, *International Business*, Prentice Hall of India Pvt. Ltd., New Delhi, 5th Edition, 2011
2. Charles W.I. Hill and Arun Kumar Jain, *International Business*, 6th edition, Tata Mc Graw Hill, 2009.
3. Michael R. Czinkota, Ilkka A. Ronkainen and Michael H. Moffet, *International Business*, Thomson, Bangalore, 8th edition, 2009.
4. Aravind V. Phatak, Rabi S. Bhagat and Roger J. Kashlak, *International Management*, Tata Mc Graw Hill, 2nd edition, 2008.
5. Oded Shenkar and Yaong Luo, *International Business*, John Wiley Inc, Noida, 2nd edition, 2007.
6. Anant Sundaram, *The International Business Environment*, PHI, New Delhi.
7. Sumati Varma, *International Business*, Pearson Education.
8. Gary Knight, S. Tamer Cavusgil, *International Business*, Pearson.
9. Marios & Spyros, *International Business- A Global Perspective*, BH.
10. Bholanath Dutta, *International Business Management*, Excel Books.

E- Materials

- <https://www.wto.org/>
- <https://bbamantra.com/introduction-to-international-business/>
- ebooks.lpude.in/.../term.../DCOM501_INTERNATIONAL_BUSINESS.pdf
- https://www.academia.edu/.../BBM_475_NOTES_INTRODUCTION_TO_INTERNATIONAL_BUSINESS
- <https://www.stuvia.com/.../international-business-and-management-studies - ibms>

Journal Reference

- Global Business Review published by SAGE Publications
- FOCUS: Journal of International Business published by Journal Press India
- Indian Journal of International Business and Finance published by Serials Publications Pvt. Ltd.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Core

Paper code: CPBA66

Research Project

Credit: 5

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

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Course Objectives

1. To help students to apply the concepts studied in the institution.
2. To gain 'on the field' experience and identify present problems faced by the industry
3. To help students gain career development skills
4. To gain practical exposure that will bridge the gap of industrial expectation.

INDIVIDUAL / GROUP PROJECT WORK

Each candidate has to undergo Project work for not less than 15 days in any organization, market, industry or institutions in the areas of Business and management during the 6th Semester and has to submit the report for the same in the end of the 6th Semester.

Guidelines For Project Work

- Project can be in any field of specialization (HR, Finance, Systems, Marketing and related Management based topics)
- The project report should be neatly presented in not more than 80 pages.
- Paper size should be A4 1.5 spacing should be used for typing the general text. The text should be 'justified' and typed in the font style (Font: Times New Roman, Font Size:12pt for text, 14pt for sub-headings)
- The candidate should submit the periodical report of the project to the supervisor.
- TWO reviews would be conducted before the viva-voce. (
- Each candidate should submit 2 hard copies and one soft copy in CD to the Department. After the evaluation of the project report one hard copy would be returned to the candidate.

EVALUATION SCHEME

Internal - 20 Marks (10 marks each for reviews)

Project Evaluation - 50 marks

Viva voce - 30 marks

Total Marks - 100

Important NOTE: If a candidate fails to submit the Project report or fails to appear for the viva-voce examination then it will be considered as 'Arrear' Paper and the candidate can appear for Viva-voce next year.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Elective

Paper code: CEBA63A

A. Financial Management

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

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Course Objectives

1. To gain basic understanding about financial management and its concepts
2. To know the various sources of finance
3. To know how to calculate cost of various capitals and to compare on various project finances.
4. To understand the various uses for finance
5. To familiarize oneself with the techniques used in financial management.

Course Outcome

1. After the study of unit-1, the student will be able to calculate time value for money
2. After the study of unit-2, the student will be able to explain Capital structure decision and suggest the best mix of capital structure using theories
3. After the study of unit-3, the student will calculate cost of capital how it is affected
4. After the study of unit-4, the student will be familiar with capital budgeting and develop a basic budget format.
5. After the study of unit-5, the student will know how to make funds available for routine operations.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT- I

Teaching hours:15

INTRODUCTION TO FINANCIAL MANAGEMENT

Basics concepts of Financial Management: Definition, Importance, scope, objectives, functions of financial management - Various Financial decisions - Types - role of the finance manager - relationship of financial management with other functional areas of management - sources of finance - time value of money: Present value, Future value, Annuity due, Ordinary annuity and perpetual.

UNIT- II

Teaching hours:15

FINANCIAL PLANNING AND LEVERAGES

Financial planning: meaning, process and factors - capitalization: - Capital structure: meaning and factors determining the capital structure decision - Capital structure decision theories: Net Income (NI) approach, Net operating income (NOI) approach, Traditional approach and (MM) Modigliani Miller approach. - Problems: Calculation of Indifference Point EBIT - Leverages: Meaning, Types - Problems from Leverages: operating, financial, Composite leverage.

UNIT- III

Teaching hours:15

COST OF CAPITAL

Understanding Cost of Capital: Meaning, significance, types of cost of capital - various measures of cost of capital: cost of debt, cost of preference shares, and cost of equity, cost of retained earnings, and weighted average cost of capital - Capital Asset Pricing Model

UNIT- IV

Teaching hours:15

CAPITAL BUDGETING

Introduction to Capital Budgeting: Meaning, features and importance of capital budgeting - Various techniques of capital budgeting - Investment Evaluation criteria - Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period, Accounting Rate of Return (ARR) - NPV and IRR comparison.

UNIT- V

Teaching hours:15

WORKING CAPITAL MANAGEMENT

Working Capital Management: meaning and significance- constituents of current assets and liabilities - Operating Cycle - classification of working capital - factors determining working capital - Management of working capital - estimation of working capital requirement. Financing of Working Capital and norms of Bank Finance - Sources of Working capital - Factoring services- Various committee reports on Bank Finance - Dimensions of Working Capital Management.

Note: The proportion between Theory and Problem shall be 80:20

Text books

1. Dr. A. Murthy, Financial Management -Margham Publications, Chennai
2. Maheshwari S.N. Financial Management, Sultan & Sons Publications, Delhi
3. S.N. Maheshwari , Elements of Financial Management - Sultan Chand & Sons, Delhi
4. J. Srinivasan, Sridhar & Ramalingam - Financial Management - Vijay Nicole Imprints, Chennai
5. R.K. Sharma, Shashi and K.Gupta , Financial Management -, Kalyani Publication
6. Prasanna Chandra, Fundamentals of Financial Management - Tata McGraw Hills Publishing Company Limited.

Reference Books

1. Periasamy - Financial Management, Vijay Nicole Imprints
2. I.M. Pandey, Financial Management - Vikash Publishing House Pvt.Ltd.
3. M.Y.Khan & P.K. Jain, Theory and Problems in Financial Management - Tata McGraw Hills Publishing Company Limited.
4. P.V. Kulkarni Financial Management - Himalaya Publishing House

Journal reference

- Journal of Managerial Finance & Research published by Institute of Public Enterprise, Osmania University Campus, Hyderabad
- WEALTH - International Journal of Money, Banking and Finance published by ITM-SIA B-School, Mumbai
- International Journal of Financial Management published by Publishing India Group, New Delhi
- Indian Journal of Research in Capital Markets published by Associated Management Consultants Private Limited, New Delhi

E - Materials

- <https://www.businessmanagementideas.com/notes/financial-management-notes/lecture-notes-on-financial-management/3769>
- <https://examupdates.in/financial-management-notes/>
- https://gurukpo.com/Content/MBA/Financial_Management.pdf
- <https://www.docsity.com/en/financial-management-lecture-notes/4340569/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Elective

Paper code: CEBA63B

B.Financial Services

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To equip the students with the basic understanding of financial services and its types
2. To enable the student to understand merchant banking , mutual funds concepts
3. To familiarize the students with the leasing, and venture capital concepts.
4. To help them understand the process of Hire purchasing
5. To familiarize oneself with factoring and its types.

Course Outcome

1. After the study of unit-1, the student will be able to define Financial services and have knowledge on its types, will also be able explain in the Indian context
2. After the study of unit-2, the student will be able to explain how merchant banking works and how securitization is done
3. After the study of unit-3, the student will gain understanding on hire purchasing and leasing finance
4. After the study of unit-4, the student will be familiar with Factoring and RBI regulates them.
5. After the study of unit-5, the student will gain skills on venture capital process.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I

Teaching Hours : 15

BASICS OF FINANCIAL SERVICES

Financial Services Basics: Definitions, Meaning and importance of financial services - Functions of Financial services - Types of financial services - Overview of Financial Service Market - Growth of Financial Services in India - Problems in Financial Services Sector
Financial services and economic environment - Players in Financial Services Sector.

UNIT- II

Teaching Hours : 15

MERCHANT BANKING

Understanding Merchant Banking: Definitions and Meaning - Functions of Merchant banking - Merchant banking Origin - SEBI Guidelines - Classification of Merchant Bankers - Role of Merchant bankers - Issue management: public issue - right issue - Prospectus, pricing - Functions - drawbacks. Securitization - Meaning – process - Benefits and securitization in India

UNIT– III

Teaching Hours : 15

HIRE PURCHASING AND LEASING

Hire purchasing and leasing concept - Legal aspects - merits and demerits of leasing - Types of Leasing - Financial lease Vs Operating Lease - the Indian leasing scenario - Hire purchase: meaning - Features, benefits - Hire purchase Vs Installment - lease vs hire purchase - Housing Finance - Introduction - advantages - Methods of Housing Finance - NHB - NHB - role and functions - powers, rights - HDFC & HUDCO

UNIT– IV

Teaching Hours : 15

FACTORING

Factoring - Meaning, Features, - Types of Factoring - Advantages and Disadvantages of factoring - Functions of Factoring - Factoring Vs. Bills Discounting - Factoring in India - Recommendations of Kalyanasundaram committee - RBI Guidelines - Forfeiting - Working of Forfeiting - Benefits and Drawbacks of Forfeiting - Factoring vs forfeiting

UNIT– V

Teaching Hours : 15

VENTURE CAPITAL

Basics of Venture Capital Funds - Meaning, Features of Venture Capital - Financing Stages - Types of Venture capitalism - Investment criteria - Importance of venture capital - Limitations of Venture capitalism - Private Equity - Angel investors - Venture Capital Investment process - Disinvestment mechanisms. - Credit rating agency - Meaning - basis - merits & defects - credit Rating symbols - types of credit rating - Credit Rating Agencies - CRISIL - IICRA - CARE - Credit Rating Process.

Text Books

1. Dr.S. Gurusamy - Financial Services - Vijay Nicole Imprints Private Ltd, Chennai.
2. B. Santhanam - Financial Services, Margham Publications, Chennai.
3. M.Y. Khan - Indian Financial System - Tata Mc Graw Hill, New Delhi.
4. H. R. Machiraju - Indian Financial System - Vikas Publishing House, Mumbai.
5. Anbarasu Joseph, Boominathan, Financial Services, Sultan Chand and Sons.
6. M.Y. Khan- Financial Services – Paperback, Mc Graw Hill.
7. K.Natarajan and E. Gordan, Financial Markets and Services Education, HPH, Mumbai.
8. Tripathy Nalini Prava, Financial Services, PHI Learning.

9. Shanmugam.R, Financial Services, Wiley India Pvt Ltd.
10. Sandeep Goel, Financial Markets, Institutions and Services, PHI Learning

Reference Books and Journal

1. Dr. N. Premavathy - Financial Services and Stock Exchange -Sri Vishnu Publications
2. E. Gordon and E.Nataraj - Financial Markets & Services, HPH, Mumbai.
3. M.Y.Khan, Financial Services, Amer Media International.
4. S. Mohan, Financial Services, Deep & Deep Publications.
5. G.S. Batra, Financial Services, New Innovations, Deep & Deep Publications.
6. Rajesh Kotari, Financial Services, SAGE Publications.
7. Gopal C. Rama, Management of Financial Services, Vikas Publishing House.
8. Thummuluri Siddaiah, Financial Services, Pearson Learning.
9. Ahluwalla Hemant.S, Banking and Financial Services, Adhyayan Publishers and Distributors.
10. Prasanna Chandra, Financial Services, Mc Graw Hills.

E-Materials

- <https://accountlearning.com/financial-services-meaning-importance/>
- <https://www.businessmanagementideas.com/notes/financial-management-notes/lecture-notes-on-financial-management/3769>
- <https://bbamantra.com/financial-services/>
- https://gurukpo.com/Content/MBA/Financial_services.pdf
- <https://www.docsity.com/en/financial-services-lecture-notes/4340569/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Elective

Paper code: CEBA63C

C. Investment Management

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

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Course Objectives

1. To impart skill on the fundamentals of Investment and Security Analysis.
2. To identify the risk and returns involved in managing investment.
3. To understand different investment alternatives in the market
4. To understand how securities are traded in the market
5. To be able to analyze and price different securities

Course Outcome

1. After the study of unit-1, the student will be able to understand the various alternatives available for investment
2. After the study of unit-2, the student will be able to measure risk and return.
3. After the study of unit-3, the student will be able to find the relationship between risk and return.
4. After the study of unit-4, the student will be able to value the equity and bonds
5. After the study of unit-5, the student will be able to gain knowledge of the various strategies followed by investment practitioners.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I

Teaching Hours : 15

Investment - Meaning - Objectives - Investment Vs. Speculation - Investment Process - Investment information - Management of Investment.

UNIT– II

Teaching Hours : 15

Investment Alternatives - Meaning - variable Income Securities - Fixed Income Securities - Tax Sheltered Saving Schemes -Mutual Funds -Real Assets - Modern Investment -Arts and Techniques.

UNIT– III

Teaching Hours : 15

Risks and Returns - Meaning - Systematic Risks - Unsystematic Risks - Risk Measurement - Capital Returns and Revenue Returns -Computation of Expected Risks and Returns.

UNIT– IV

Teaching Hours : 15

Investment Valuation - Time Value for Money - Bond Valuation - Yield to Maturity - Equity Valuation - capital asset pricing model.

UNIT– V

Teaching Hours : 15

Investment Analysis - Fundamental Analysis -Economic Analysis - Industry Analysis - Company Analysis - Financial Analysis.

Text books

1. Dr. L. Natarajan - Investment Management - Margham Publications
2. V.K.Bhala, Investment Management, S. Chand Publishing.
3. Gurusamy S, Security Analysis and Portfolio Management, Vijay Nicole Imprints Pvt Ltd, Chennai.
4. Geoffrey Hirt and Stanley Block, Fundamentals of Investment Management, Mc Graw Hill
5. Ramanna Vishwanath, Chandra Sekhar Krishnamurthi, Investment Management: A Modern Guide to Social Security Analysis and Stock Selection, Springer.
6. Robert Strong, Practical Investment Management, South Western Publishers.
7. Rustagi.R.P, Investment Management Theory and Practice, Sultan Chand and Sons, New Delhi.
8. Ranganathan, Madhumathi, Investment Analysis and Portfolio Management, Pearson India.
9. Mageswari, Yogesh, Investment Management, PHI Learning.
10. Peter L. Bernstein, Aswath Damodaran, Investment Management, Wiley Frontiers.

Reference Books

1. Prasanna Chandra - Investment Analysis and Portfolio Management ,Tata Mc Graw Hill
2. R.P.Rustagi ,Security Analysis and Portfolio ,HPH
3. S.Kevin,Security Analysis and Portfolio Management ,Prentice Hall
4. Dr.L Natarajan – Investment Management – Margham Publications, Chennai.
5. V.A. Avadhani, Investment Management, HPH Mumbai.
6. Dhanesh Kumar Khatri, Investment Management & Security Analysis – Text and Cases, Laxmi Publications.

E-Materials

- <http://www.himpub.com/documents/Chapter1893.pdf>
- <https://www.studocu.com/in/document/university-of-mumbai/financial-accounting-and-auditing-vii-financial-accounting/lecture-notes/mba-iii-investment-management-notes/4351504/view>
- <https://lecturenotes.in/subject/450/investment-management-im>
- http://www.universityofcalicut.info/SDE/BBA_finance_investment_mgmnt.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Elective

Paper code: CEBA64A

A. Marketing Research

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To learn why marketing managers, use marketing research to help them make better decisions.
2. To define marketing research.
3. To establish the importance of collecting accurate data and the problems in doing so.
4. To understand the concept of sampling techniques in marketing research
5. To study the areas of applying the concept of marketing research

Course Out Comes

1. After studied unit-1, the student will be able to understand scope and concept of marketing research.
2. After studied unit-2, the student will be able to define the Marketing Research process.
3. After studied unit-3, the student will be able to identify the appropriate tool for collecting data.
4. After studied unit-4, the student will be able to choose the correct sampling method.
5. After studied unit-5, the student will be able to apply the concepts of marketing research in sales, product, market and advertising.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1

Teaching Hours: 15

Introduction to Marketing Research - Definition - Objectives - Growing importance of Marketing Research - Main Divisions of Marketing Research - Uses of Marketing Research - Limitations and Threats to Marketing Research.

Unit-2

Teaching Hours: 15

Marketing Research Process - steps- Problem Definition - Research Purpose - Research Objective - Research Design - data collection methods - research instruments - data analysis - report preparation

Unit-3**Teaching Hours: 15**

Data Collection - Methods of Data Collection - Secondary Data - Sources of Secondary Data - different types of secondary data - sources of external secondary data - Primary Data - Collection of Primary Data - types - structured questionnaire - unstructured questionnaire - Questionnaire - Designing a Questionnaire - determining type of questions - sequencing the questions - revising and pretesting the questions - Interviewing - Interviewing skills on the part of the investigator - observation method - disguised vs undisguised - controlled vs uncontrolled observation - limitations.

Unit-4**Teaching Hours:15**

Basics of Sampling - methods of sampling - Advantages and Limitations of Sampling - Sampling Process - Sampling Techniques - define universe - sampling frame - sampling methods - sampling size - Probability sampling - types - and Non-Probability Sampling - types.

Unit-5**Teaching Hours: 15**

Applications of Marketing Research - Product Research - new product research - test marketing - commercialization - Advertising Research - product appeal research - copy testing - media selection research - Motivation research - nature - kinds of information sought - techniques - limitations of motivation research.

Text book

1. Dr.P. Ravilochanan - Marketing Research - Margham Publications, Chennai.
2. Sharma D.D - Marketing Research - Marketing Research - Sultan Chand and Sons, New Delhi.
3. S.L. Gupta - Marketing Research
4. Harper.W.Boyd, Ralph West Wall, Stanley F. Stasch – Marketing Research – AITBS Publishers, Delhi.
5. 5.Ramanuj Majumdar – Marketing Research.
6. 6.William G. Zikmund, Barry, Babin, Business Research Methods, Cengage India Pvt Ltd.
7. 7.Karl Mc Daniel, Marketing Research Essentials, Wiley.
8. Pamela.S Schindler, Business Research Methods, Mc Graw Hill Education India Pvt Ltd.
9. Rajendra Nargundkar, Marketing Research Text and Cases, Tata Mc Graw Hill Education.
10. 10.Barry Babin, Exploring Marketing Research, South Western College Publishing.

Reference Books

1. Tull and Hawking - Marketing Research, Pearson Education.
2. Boyd and Westfall- Marketing Research, Richard Irwin INC.
3. David A. Aaker - Marketing Research, John Wiley & Sons.
4. David. J.Luck, Ronald S. Rubin, Marketing Research . Prentice Hall of India. New Delhi.
5. Harper W Boyd-Marketing Resarch Text and Cases , Mc Graw Hill.
6. Paul Hague- Market Research In Practice-Kogan Page; 4th edition
7. 7.Dawn Iacobucci-Marketing Research Methodological foundations-Thomson South Western
8. Prof. Dr.A Mustafa – Marketing Research – AIBTS Publishers Delhi.
9. Naresh K. Malhotra, Satyabhushan Dash- Marketing Research- Pearson Education , New Delhi.
10. Naval Bajpai, Marketing Research, Pearson Education.

Course Material: website links, e-Books and e-journals

- <http://www.pondiuni.edu.in/sites/default/files/MARKETING%20RESEARCH200813.pdf>
- <https://bbamantra.com/market-research-process-techniques/>
- <http://www.gupshupstudy.com/classnotes/management-32/bba-3130/marketing-research-313030>
- [https://gurukpo.com/Content/BBA/Marketing%20Management\(BBA\)P-2.pdf](https://gurukpo.com/Content/BBA/Marketing%20Management(BBA)P-2.pdf)
- http://164.100.133.129:81/econtent/Uploads/Marketing_Research.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	M	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	M	S	S	S	S	S	M	S	S
CO4	S	S	M	M	M	M	M	S	M	S
CO5	S	M	S	M	M	M	M	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Elective

Paper code: CEBA64B

B. Rural Marketing Management

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To enable the students to understand the elements of the unexplored rural market.
2. To identify the significance and strategies of rural market.
3. To equip the students in appropriate concepts and techniques in the area of rural marketing.
4. To understand the marketing mix in the area of rural marketing.
5. To identify the challenges and opportunities in the field of rural marketing.

Course Out Comes

1. After the study of unit-1, the student will be able to explore the special areas in rural marketing environment and to identify opportunities and emerging challenges in upcoming rural markets.
2. After the study of unit-2, the student will be able to aware of categorizing the rural products and branding the products in rural areas.
3. After the study of unit-3, the student will be able to make sound marketing decisions n pricing strategies in rural market.
4. After the study of unit-4, the student will be able to analyse the distribution channels marketing strategies etc in the context of rural markets in India
5. After the study of unit-5, the student will be able to identify the appropriate promotion mix for rural market.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-I**Teaching Hours: 15**

Understanding rural economy - Defining rural India - Evolution of rural marketing - Rural Market Structure - Constitution of rural market - Size of rural market - rural marketing - concept Rural Market Environment - characteristics of rural consumers - rural vs urban markets - buying decision process - rural marketing information system - potential and size of the rural market - challenges of rural marketing.

Unit-II**Teaching Hours: 15**

Segmentation - definition - bases of segmentation - Product Strategy - concept and classification - Rural Product Categories - New Product Development - Packaging - levels of packaging - Branding in rural India.

Unit-III**Teaching Hours: 15**

Pricing Strategy - what is price? - importance of pricing - significance of price factor - price as a measure of value - multistage price determination process - Rural Pricing Strategy - Market Entry Strategy.

Unit-IV**Teaching Hours: 15**

Channel of Distribution - Evolution of Rural Distribution System - Behaviour of Channels - Prevalent Ideal Rural Distribution Model

Unit-V**Teaching Hours: 15**

Promotion - Promotion Mix - advertising - publicity - personal selling - sales promotion - process of communication in marketing - Creating the Advertisement of Rural Audiences - Rural Media - Conventional and Non- Conventional Media - Innovation in Rural Markets.

Text books

1. P. Kashyap , The Rural Marketing, Perason Education India.
2. C.S.G. Krishnamacharyulur, Rural Marketing - Text and Cases, Perason Education India.
3. Sukhpal Sing, Rural Marketing on Agricultural Inputs, Vikas Publishing.
4. Balaram Dogra & Karminder Ghuman, Rural Marketing: Concept & Cases, Tata McGraw-Hill Publishing Company, New Delhi, 2008.
5. Philip Kotler, Marketing Management, Prentice - Hall India Ltd. New Delhi.
6. Bajaj, Chetan, Bajaj Nandhini, Shenoy, Veena, Introduction to Rural Marketing, New Age International Pvt Ltd Publishers.
7. Rural Marketing 16 November MS 611, Help Book Edition.
8. Dinesh Kumar, Rural Marketing Challenges & Opportunities, Sage Publication.
9. Dogra-. Rural Marketing, Tata Mc Graw Hill Education.

Reference Books

1. M. Kamath & R. Ramakrishnamurthy - A Text Book on Rural Marketing, Himalaya Publishers.
2. Shipra Chawla , A Text of Rural Marketing, Dominant Publishers and Distributors.
3. Rama Bijapurkar (2007), We are Like That Only, the logic of Consumer India, Penguin Books
4. Prahalad C.K (2008), Fortune at the Bottom of the Pyramid, Pearson Publication
5. R V Badi, N V Badi, Rural Marketing, 2008, Himalaya Publishing House.
6. U C Mathur, Rural marketing, Text and Cases, 2008, Excel books
7. CSG Krishnamacharyulu, Lalitha Ramakrishnan, Cases in Rural Marketing, An Integrated Approach, 2006, Pearson Publication.
8. Sanal Kumar, Velayudham, Rural Marketing: Targeting on Non-Urban Consumer, Sage Response.
9. G.Srinivasa Rao, Rural Marketing in India, Anmol Publications.
10. Madhusudan Narayan, Rural Marketing, Scientific Publishers.

E- Materials

- http://www.pondiuni.edu.in/storage/dde/downloads/markiv_rm.pdf
- <http://jnujprdistance.com/assets/lms/LMS%20JNU/MBA/MBA-Rural%20&%20Agri%20Business%20Management/Sem%20III/Rural%20Marketing/Rural%20Marketing.pdf>
- https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_RM_NOTES_2.pdf
- <http://www.ddegjust.ac.in/studymaterial/mba/mm-310.pdf>
- https://sg.inflibnet.ac.in/bitstream/10603/74309/4/04_chapter%201.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Elective

Paper code: CEBA64C

C. Advertising and Sales Management

Credit: 3

Total Hours per Week: 5

Lecture Hours: 4

Tutorial Hour: 1

Course Objectives

1. To enable the students to learn the fundamentals of advertising and its strategies.
2. To analyze the creative strategies used in different advertising campaigns and be able to apply the basic principles in designing advertising programs for a given brand or product.
3. To introduce the students to the concepts of media planning and measuring effectiveness of different media.
4. To identify the importance of sales management and salesman oriented promotion techniques.
5. To study the various techniques of sales promotion.

Course out Comes

1. After the study of unit-1, the student will be able to set up advertising objectives and know the legal implications of advertising.
2. After the study of unit-2, the student will be able to design copy of advertisement.
3. After the study of unit-3, the student will be able to select the appropriate media for promotion.
4. After the study of unit-4, the student will be able to know the functions of salesmen.
5. After the study of unit-5, the student will be able to discover and demonstrate various sales promotion technique and their advantages.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Unit-1**Teaching Hours: 15**

Definition - concept and functions of advertising - types of advertising - evolution and steps in development of advertising - social, economic and legal implications of advertising.

Unit-2**Teaching Hours: 15**

Advertising design - types of advertising appeals - structure of advertisement copy - message strategies - advertising effectiveness - AIDA Model.

Unit-3**Teaching Hours: 15**

Media planning - importance of media - media plan - media objectives - reach and frequency of advertisement - cost of advertisement related to sales - media strategy and scheduling - effectiveness

Unit-4**Teaching Hours: 15**

Sales management - definition- objectives - functions of sales men - qualities and skills of salesmen - personal selling - management of sales territories and Quotas.

Unit-5**Teaching Hours: 15**

Scope and role of sales promotion - definition - objectives of sales promotion - Importance and functions of sales promotion- techniques in sales promotion - online sales promotion.

Text books

1. S. Raj Kumar, V. Rajagopalan Sales and Advertisement Management - - S. Chand and Co
2. G.R. Basotia, N.K.Sharma, Advertising and Sales Management - Mangal Deep Jaipur
3. Chunawallah K.C Sethia, Advertising-Himalaya Publishing House, New Delhi
4. R.S.N.Pillai and Bagavathi, Modern Marketing- (Principles and Practices) S.Chand & Co, New Delhi.
5. S.H. H. Kazmi and Sathish K. Batra Advertising and Sales Promotion, Excel Book India.
6. Still, Cundiff, Goroni – Sales Management, Pearson Education New Delhi.
7. Sanjay Gupta, Pooja Nasa, Advertisement Management, SBPD.
8. Batra Myer, Aaber, Advertisement Management, Pearson India.
9. Mahendra Kumar Padhy, Advertisement Management and Theory And Practice Laxmi Publishers
10. Dr. Martin Khan, C.B and Advertising Management New Age International Pvt.,Ltd.,

Reference Books

1. George Belch, Michael Belch, and KeyoorPurani, Advertising & Promotion - An Integrated Marketing Communications Perspective, Tata Mc Graw Hill,
2. Kruti Shah & Alan DSouza, Advertising and Promotions: An IMC Perspective, Tata Mc Graw Hill,
3. Dr. Varma & Aggarwal Advertising Management, King Books
4. Kotler & Armstrong Principles of Marketing, Prentice-Hall of India, New Delhi.
5. S. A. Chunawalla Advertising: An Introduction Text, Himalayan Publishing House, Mumbai.
6. Wells Burnett Moriarty Advertising Principles and Practice, PHI, New Delhi.
7. S.A. Chunawalla, KC Sethia Foundations of Advertising, Himalayan Publishing House, Mumbai

Course Material: website links, e-Books and e-journals

- http://www.pondiuni.edu.in/storage/dde/downloads/markiv_asp.pdf
- http://ebooks.lpude.in/management/mba/term_3/DMGT507_SALES_AND_PROMOTIONS_MANAGEMENT.pdf
- <http://www.eiilmuniversity.co.in/downloads/Advertising-Management.pdf>
- <http://www.himpub.com/documents/Chapter1060.pdf>
- <http://jnujprdistance.com/assets/lms/LMS%20JNU/MBA/MBA%20-%20Marketing%20Management/Sem%20IV/Advertising%20and%20Sales%20Promotion/Advertising%20and%20Sales%20Promotion.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
BACHELOR OF BUSINESS ADMINISTRATION– 2022-2023

Semester: VI

Paper type: Skill based subject

Paper code: CSBA65 Creativity and Innovation Management Credit: 2

Total Hours per Week: 3 Lecture Hours: 2 Tutorial Hour: 1

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Course Objectives

1. To learn What is Creativity
2. To understand the various Thinking Hats Methods
3. To enable practice of Creativity Exercises
4. To understand creative problem-solving techniques: Analogies - Lateral Thinking .
5. To learn the differences between various Creativity Techniques.

Course Outcome

1. After the study of unit-1, the student will be able to define Creativity .
2. After the study of unit-2, the student will be able to think creativity .
3. After the study of unit-3, the student will be able to practice Creativity Exercises.
4. After the study of unit-4, the student will be able to learn Innovation.
5. After the study of unit-5, the student will be able to compare various creativity techniques.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

UNIT– I

Teaching hours: 9

What is Creativity - Individual and Group Creativity - Convergent Thinking - Divergent Thinking and Generation of Creative Ideas?

UNIT- II

Teaching hours: 9

Thinking Hats Methods - Redefinition Techniques - Random Stimulus - Generation of Creative Ideas in Groups - Brainstorming - Reverse Brainstorming - Synaptic - Morphological Method.

UNIT– III

Teaching hours: 9

Creativity Exercises - Mental Gym - The Way the Mind Works - Difference Between Lateral and Vertical Thinking - Attitudes Towards Lateral Thinking - Basic Nature of Lateral Thinking - Techniques - The Generation of Alternatives - Challenging Assumptions.

UNIT- IV

Teaching hours: 9

Innovation - Suspended judgment - Analogies - Lateral Thinking - What is a Problem - Defined Problems - Creative Problem Solving - Models of Techniques of Creative Problem Solving

UNIT- V

Teaching hours: 9

Comparison of Creativity Techniques - Mental Gym Quiz - Blocks of Creativity - Fears and Disabilities - Energy for your Creativity - Creative - Making Your Environment More Creative - The Creative Life Quiz - Case Study

Text books

1. Dr.P.Rizwan Ahmed,Creativity and Innovation Management,Margham Publications, Chennai
2. Rastogi - Managing Creativity for Corporate Excellence - Mc Millan
3. Pradip NCTE and Khandwalla - Lifelong Creativity - Tata Mc Graw Hill.
4. Arvind Kumar Bhat – Innovation and Entrepreneurship, Lakshmi Publications Pvt. Ltd.
5. Ashwini Kumar Singh – Creativity and Innovation – Notion Press.
6. Madan Birla – Unleashing Creativity and Innovation, Wiley India
7. Jonathan Littman, Wiley, Tom Kelley, The Art of Innovation, Profile Books.
8. Managing Creativity- Harvard Business School.
9. Dr.M.Adithan – Management of Innovation and Creativity, Atlantic Publishers and Distributors Pvt. Ltd.

Reference Books

1. Davis Gary and Scot - Training creative Thinking - New York Publishers.
2. Edward de Bono - Lateral Thinking -Penguin Publishers.
3. Peter F. Drucker - Innovation and Entrepreneurship, Harper Collins Publishers India.
4. James Harrington – Creativity, Innovation and Entrepreneurship .C Tony Wagner – Creativity Innovation- Scribner.
5. Johnathan A. Plucker, Creativity and Innovation: Theory, Research and Practice, Routledge.
6. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation, HarperCollins e-books
7. Brian Clegg, Creativity and Innovation for Managers, Routledge
8. Jonathan A. Plucker Creativity and Innovation Theory, Research, and Practice, Routledge.
9. Michael L. Ray, Rochelle Myers, Creativity in Business, Goodreads
10. S.S. Khanka Creativity and Innovation in Entrepreneurship, Sultan Chand & Sons

Creativity and Innovation Management Wiley online library E- Materials

- <https://www.cambridgeinternational.org/Images/426483-chapter-4-innovation-and-creativity.pdf>
- <https://www.creativityatwork.com/2014/02/17/what-is-creativity/>
- <https://study.com/academy/lesson/types-of-creativity-descriptions-examples.html>
- <https://www.destination-innovation.com/what-is-the-difference-between-creativity-and-innovation/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low

THIRUVALUVAR UNIVERSITY

BACHELOR OF COMPUTER APPLICATIONS DEGREE COURSE

CBCS PATTERN

(With effect from 2022-2023 onwards)

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
		SEMESTER I							
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-1	6	4	Programming in C	25	75	100
4.	III	Core Practical	Practical-1	3	2	Programming in C Lab	25	75	100
5.	III	Allied -1	Paper-1	7	3	Mathematical Foundations - I	25	75	100
6.	III	PE	Paper 1	6	3	Professional English I	25	75	100
7.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		Total		36	22		175	525	700
		SEMESTER II					CIA	Uni. Exam	Total
8.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9.	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
10.	III	Core Theory	Paper-2	5	4	C++ and Data Structures	25	75	100
11.	III	Core Practical	Practical-2	2	2	C++ and Data Structures Lab	25	75	100
12.	III	Allied-1	Paper-2	7	5	Mathematical Foundations - II	25	75	100
13.	III	PE	Paper 2	6	3	Professional English II	25	75	100
14.	IV	Value Education		2	2	Value Education	25	75	100
15.	IV	Soft Skill		2	1	Soft Skill	25	75	100
		Total		36	25		200	600	800

SEMESTER III							CIA	Uni. Exam	Total
16.	III	Core Theory	Paper-3	5	4	Programming in JAVA	25	75	100
17.	III	Core Theory	Paper-4	4	4	E-Commerce	25	75	100
18.	III	Core Theory	Paper-5	5	4	Operations Research	25	75	100
19.	III	Core Practical	Practical-3	4	3	Programming in JAVA Lab	25	75	100

B.C.A. Computer Applications (CBCS)

20.	III	ALLIED-2	Paper-3	7	3	Financial Accounting-I	25	75	100
21.	IV	Skill based Subject I	Paper-1	3	2	Web Technology	25	75	100
22.	IV	Non-Major Elective	Paper-1	2	2	Introduction to Information Technology	25	75	100
		Sem. Total		30	22		175	525	700
SEMESTER IV							CIA	Uni. Exam	Total
23.	III	Core Theory	Paper-6	5	4	Relational Database Management Systems	25	75	100
24.	III	Core Theory	Paper-7	4	4	Enterprise Resource Planning	25	75	100
25.	III	Core Theory	Paper-8	5	4	Wireless Data Communications	25	75	100
26.	III	Core Practical	Practical-4	4	3	RDBMS Lab	25	75	100
27.	III	ALLIED-2	Paper-4	7	5	Financial Accounting-II	25	75	100
28.	IV	Skill based Subject -II	Paper-2	3	2	Internet Of Things	25	75	100
29.	IV	Non-Major Elective	Paper-2	2	2	Internet Technology	25	75	100
		Sem. Total		30	24		175	525	700
SEMESTER V							CIA	Uni. Exam	Total
30.	III	Core Theory	Paper-9	6	4	Mobile Application Development	25	75	100
31.	III	Core Theory	Paper-10	6	4	Operating System	25	75	100
32.	III	Core Theory	Paper –11	4	2	Design and Analysis of Algorithms	25	75	100
33.	III	Core Practical	Practical-5	4	3	Mobile Applications Development-Lab	25	75	100
34.	III	Core Practical	Practical-6	4	3	Operating System-Lab	25	75	100
35.	III	Internal Elective I	Paper-1	3	3	(Choose any one) A. Data Mining B. Information Security C. Software Testing	25	75	100
36.	IV	Skill Based Subject III	Paper– 3	3	2	Software Engineering	25	75	100

B.C.A. Computer Applications (CBCS)

		Sem. Total		30	21		175	525	700
SEMESTER VI							CIA	Uni. Exam	Total
37.	III	Core Theory	Paper-12	4	4	Open Source Software	25	75	100
38.	III	Core Theory	Paper-13	4	4	Python programming	25	75	100
39.	III	Core Practical	Practical-7	4	2	Python programming Lab	25	75	100
40.	III	Core Practical	Practical-8	4	2	Open Source Programming - Lab	25	75	100
41.	III	Core Project		5	5	Group/ Individual Project Work	25	75	100
42.	III	Internal Elective II	Paper-2	3	3	(Choose any one) 1. Big Data Analytics 2. Cryptography 3. Digital Image Processing	25	75	100
43.	III	Internal Elective III	Paper-3	3	3	(Choose any one) 1. Artificial Intelligence 2. System Software 3. Mobile Computing	25	75	100
44.	IV	Skill Based Subject IV	Paper-4	3	2	Object Oriented analysis and design	25	75	100
45.	V	Extension Activities		0	1		100	0	100
		Sem. Total		30	26		300	600	900
					140				4500

Part	Subject	Paper s	Credi t	Total Credit s	Marks	Total Marks
Part I	Languages	2	4	8	100	400
Part II	Communicative English & English	2	4	8	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Electives	3	3	9	100	300
	Core	13	(3-5)	50	100	1300
	Core practical	8	(2-3)	20	100	800
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	45		140		4500

ANNEXURE - I

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

Bachelor of Computer Applications – 2022-2023 onwards

Programme Objectives:

1. To prepare students for careers in software industry.
2. Understanding and skills related to the use of computers and its application.
3. To impart quality computer education
4. To enhance logical computing and programming skills.
5. Identify, explain and apply fundamental structured programming techniques.

Programme Educational Objectives:

1. To impart advance knowledge about various sub-domains related to the field of computer applications.
2. To provide the strong character to uphold the spiritual and cultural values of our country to make students acceptable to both industries and higher education.
3. Graduates will be capable of attaining higher position in their professional carrier, capable to do quality research by strengthening their mathematical, scientific and basic engineering fundamentals.
4. Graduate will be capable of adopting the changing technologies, tools, and industrial environment.
6. Graduates will promote collaborative learning and spirit of team work through multidisciplinary projects and diverse professional activities.

Programme Specific Outcomes:

1. An ability to enhance the application of knowledge of theory subjects in diverse fields.
2. Develop language proficiency to handle corporate communication demands.

3. Preparing students in various disciplines of technologies such as computer applications, computer networking, software engineering, JAVA, database concepts and programming.
4. In order to enhance programming skills of the young IT professionals, the concept of project development in using the technologies learnt during the semester has been introduced.
5. To enhance knowledge in robotics, provide experimental hardware equipment for teaching the basics of robotics, robot dynamics and control, and robot system design and application.
7. To enhance logical ability and programming concepts by implementing programming lab.
8. Preparing students for future aspects by building and improving their creativity, social awareness, and general knowledge.
9. Encouraging students to convert their start-up idea to reality by implementing.
10. Ability to understand the changes or future trends in the field of computer application.
11. Ability to identify, formulate, analyse and solve problems of programming using different languages.

Programme Outcomes:

1. Acquire skills and information not only about Computer and Information Technology but also in communication, organization and management.
2. Get to learn programming languages such as C, C++, HTML, SQL, DBMS, and Networking etc
3. Develop an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
4. Ability to work in team and build leadership qualities.
5. Understand the professional, ethical, legal, security, and social issues and responsibilities in computing profession.
6. Will be able to choose appropriate techniques, skills, and tools necessary for Designing of correct models in the construction of software systems of varying complexity.
7. Recognition of the need for and ability to engage in continuing professional development.
8. Analyse impacts of computing on individuals, organizations, and society.
9. Will be well equipped with thorough knowledge of various softwares.
10. Design, implement, and evaluate a computational system to meet desired needs within realistic constraints.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(B.C.A) – 2022-2023 onwards****Semester: I Paper type: Core Theory – Paper 1****Paper code: Name of the Paper: Programming in C Credit: 4****Total Hours per Week: 6 Hrs. Lecture Hours: 78 Hrs. Tutorial Hours: - Practical Hours: -****Course Objectives**

1. To understand simple algorithms,
2. To understand language constructs
3. To understand and develop programming skills in C.
4. To understand the basic concepts of decision making and looping statements.
5. To understand the concepts of arrays, structures, union, pointers and files.

Course Outcomes

1. After studied unit-1, the student will be able to understand the concepts of Constants, Variables, and Data Types, Operators and Expressions
2. After studied unit-2, the student will be able to understand the concepts of Managing Input and Output Operations, Decision Making and Branching, Decision Making and Looping.
3. After studied unit-3, the student will be able to understand the concepts of Arrays, Character Arrays and Strings, User Defined Functions.
4. After studied unit-4, the student will be able to understand the concepts of Structure and Unions, Pointers, File Management in C.
5. After studied unit-5, the student will be able to understand the concepts of Fundamental Algorithms, Factoring Methods.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: OVERVIEW OF C

Teaching Hours: 15 Hrs.

Overview of C: History – Importance – Sample Programs – Basic Structure – Programming Style – Executing – Unix System – MS-DOS System - **Constants, Variables, and Data Types:** Character Set – C Token – Keyword and Identifiers – Constants – Variables – Data Types – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaration – Overflow and Underflow of Data - **Operators and Expressions:** Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional, Bitwise, Special Operators – Arithmetic Expressions, Evaluation of Expressions – Precedence of Arithmetic Operators – Some Computational Problems – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical Functions .

Unit-2: MANAGING INPUT AND OUTPUT OPERATIONS

Teaching Hours: 15 Hrs.

Managing Input and Output Operations: Reading, Writing a Character – Formatted Input, Output - **Decision Making and Branching:** Decision Making with If statement – Simple If Statement – The If...Else Statement – Nesting of If...Else Statements – The Else If Ladder – The Switch Statement- The ?: Operator – The Goto Statement - **Decision Making and Looping:** The while Statement – The do Statement – The for Statement – Jumps in Loops – Concise Test Expressions.

Unit-3: ARRAYS

Teaching Hours: 16 Hrs.

Arrays: One-Dimensional Arrays - Declaration, Initialization of One-Dimensional Arrays – Two-Dimensional Arrays - Initializing Two-Dimensional Arrays – Multi-Dimensional Arrays – Dynamic Arrays - **Character Arrays and Strings:** Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – Arithmetic Operations on Characters – Putting String Together – Comparison of Two Strings –String-Handling Functions – Table of Strings – Other Features of Strings - **User Defined Functions:** Need for User-Defined Functions – A Multi-Function Program – Elements of User-Defined Functions – Definition of Functions – Return Values and Their Types – Function Calls – Function Declaration – Category of Functions – No Arguments and No Return Values – Arguments but no return values – Arguments with Return Values – No Arguments but Returns a value – Functions that Return Multiple Values – Nesting of Functions – Recursion – Passing Arrays, Strings to Functions – The Scope, Visibility and Lifetime of Variables –Multi file Programs.

Unit-4: STRUCTURE AND UNIONS

Teaching Hours: 16 Hrs.

Structure and Unions: Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization and Copying and Comparing Structure Variable – Operations on Individual Members – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions – Size of Structures – Bit Fields **Pointers:** Understanding Pointers – Accessing the Address of Variable – Declaring, Initialization of Pointer Variables – Accessing a Variable through its pointer – Chain of Pointers – Pointer Expression –

Pointer Increments and Scale Factor – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Pointers as Function Arguments – Functions Returning Pointers – Pointers to Functions – Pointers and Structures – Troubles with Pointers **File Management in C:** Defining and Opening a File – Closing a File – Input/Output Operations on File – Error Handling During I/O Operations – Random Access to Files – Command Line Arguments.

Unit-5: FUNDAMENTAL ALGORITHMS

Teaching Hours: 16 Hrs.

Fundamental Algorithms: Exchanging the values of Two Variables- Counting- Summation of a Set of Numbers-Factorial Computation -Sine Function Computation –Generation of the Fibonacci Sequence-Reversing the Digits of an Integer- Base Conversion – Character to Number Conversion
- Factoring Methods: Finding the square Root of a Number –The Smallest Divisor of an Integer-The Greatest Common Divisor of the two integers-Generating Prime Numbers- Computing the Prime Factors of an integer –Generation of Pseudo-random Numbers-Raising a Number to a Large Power-Computing the nth Fibonacci Number (Chapters: 2 & 3)

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text books:

1. Programming in ANSI C, E. Balagurusamy, Tata McGrawhill Education, 6th Edition, 2013. (Unit I to IV)
2. How to Solve it by Computer, R.G.Dromey, PHI International (Unit V)

Reference Books:

1. The C Programming Language (ANSI C), Kernighan, B.W. and Ritchie, D.M., PHI.
2. C by Discovery , Foster & Foster , Penram International Publishers, Mumbai

E-References

1. NPTEL, Introduction to C Programming, Prof.SatyadevNandakumar , IIT, Computer Science and Engineering Kanpur.
2. NPTEL, Introduction to Problem Solving & Programming, by Prof. Deepak Gupta Department of Computer Science and Engineering IIT Kanpur.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	S	M	S
CO2	S	M	M	S	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S	S
CO4	S	M	M	M	M	M	S	S	S	S
CO5	S	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALUVAR UNIVERSITY, VELLORE – 632 115**(B.C.A) – 2022-2023 onwards****Semester: I Paper type: Core Practical – Practical - 1****Paper code: Name of the Paper: Programming in C Lab Credit: 2 Total****Hours per Week: 3 Hrs. Lecture Hours: Tutorial Hours:. Practical Hours:39****Course Objectives**

1. To understand concepts of for/while loop and switch.
2. To understand language Functions and recursions.
3. To understand and develop String Manipulations.
4. To understand the basic concepts of searching and sorting.
5. To understand the concepts of structures.

Course Outcomes

1. After studied , the student will be able to Enhance the analysing and problem solving skills and use the same for writing programs in C
2. After studied, the student will be able to Write diversified solutions, draw flowcharts and develop a well-documented and indented program according to coding standards
3. After studied, the student will be able to Learn to debug a given program and execute the C program
4. After studied, the student will be able to have enough practice the use of conditional and looping statements
5. After studied, the student will be able to implement arrays, functions and pointers.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

Control Statements:

1. Print n Fibonacci numbers – (using for)
2. Print n Prime numbers – (using while)
3. Simple arithmetic on two numbers – (using switch/case)

Functions:

4. Swap two values using call by value / call by reference.

Recursion:

5. To compute NcR and NpR
6. To Compute GCD and LCM

String Manipulation.

7. Operations on string such as length, concatenation, reverse, counting, and copy of a string to another.

Matrices:

8. Matrix Addition, Subtraction, Multiplication, Transpose of n x m matrices.
9. Inverse of a square matrix.

Searching:

10. Binary Search.

Sorting:

11. Bubble Sort
12. Insertion Sort

Structures:

13. Students Mark statement

Pointers:

14. Arithmetic operations on pointers.

Files

15. Creating/ Reading/ Writing a text/binary file.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Reference Book:

1. Programming in ANSI C, E. Balagurusamy, Tata McGrawhill Education, 6th Edition, 2013.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	M	S	M	M	S	S	S	S
CO5	S	M	M	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(B.C.A) – 2022-2023 onwards****Semester: I Paper type: Allied 1 Paper - 1****Paper code: Name of the Paper: Mathematical Foundations– 1 Credit: 3 Total****Hours per Week: 7 Hrs. Lecture Hours: 91 Hrs. Tutorial Hours: Practical Hours:**
.....**Course Objectives**

1. To understand the concepts of symbolic and logical operators
2. To understand the concepts of Set Theory
3. To understand the concepts of Binary Operations
4. To understand the concepts of differentiation
5. To understand the concepts Two dimensional analytical geometry

Course Outcomes

1. After completion of unit 1 student can able to understand about symbolic and logical operators
2. After completion of unit 2 student can able to understand about Set Theory
3. After completion of unit 3 student can able to understand about Binary Operations.
4. After completion of unit 4 student can able to understand about Differentiation
5. After completion of unit 5 student can able to understand about Two dimensional analytical geometry

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: SYMBOLIC LOGIC**Teaching Hours: 18 Hrs.**

Proposition, Logical operators, conjunction, disjunction, negation, conditional and bi-conditional operators, converse, Inverse, Contra Positive, logically equivalent, tautology and contradiction. Arguments and validity of arguments.

Unit-2: SET THEORY**Teaching Hours: 18 Hrs.**

Sets, set operations, venn diagram, Properties of sets, number of elements in a set, Cartesian product, relations & functions,

Unit-3: BINARY OPERATIONS**Teaching Hours: 18 Hrs.**

Types of Binary Operations: Commutative, Associative, Distributive and identity, Boolean algebra: simple properties. Permutations and Combinations.

Unit-4: DIFFERENTIATION**Teaching Hours: 19 Hrs.**

Simple problems using standard limits,

$$\begin{array}{ccccccc} \text{Lt} & x^n - a^n, \text{lt} & \sin x, & \tan x & e^x - 1, & (1 + 1/n)^n, \text{lt} & (1 + n)^{1/n} \\ & \text{lt} & \text{lt} & \text{t} & \text{lt} & & \\ \hline X \rightarrow & x - a & x & \rightarrow x & x & 0 & x \rightarrow \infty \rightarrow n \rightarrow 0 \rightarrow \end{array}$$

Differentiation, successive differentiation, Leibnitz theorem, partial differentiation, Applications of differentiation, Tangent and normal, angle between two curves.

Unit-5: TWO DIMENSIONAL ANALYTICAL GEOMETRY**Teaching Hours: 18 Hrs.**

Straight Lines - Pair Straight Lines

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc

Text book:

1. P.R. Vittal, Mathematical Foundations – Maragham Publication, Chennai.

Reference Books:

1. U. Rizwan, Mathematical Foundation - SciTech, Chennai
2. V.Sundaram& Others, Dircrete Mathematical Foundation - A.P.Publication, sirkali.
3. P.Duraipandian& Others, Analytical Geometry 2 Dimension - Emerald publication 1992 Reprint.
4. Manicavachagompillay&Natarajan. Analytical Geometry part I - Two Dimension - S.Viswanathan (printers & publication) Put Ltd., 1991.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	M	S
CO2	S	S	M	M	S	S	M	M	S	S
CO3	S	M	M	S	S	S	S	S	S	S
CO4	S	S	M	S	S	M	M	S	S	S
CO5	S	S	S	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLOVAR UNIVERSITY, VELLORE – 632 115

(B.C.A) – 2022-2023 onwards

Semester: II Paper type: Core Theory – Paper 2

Paper code: Name of the Paper: C++ & Data Structures Credit: 4

Total Hours per Week: 5 Hrs. Lecture Hours: 65 Hrs. Tutorial Hours:..... Practical Hours:..

.....

Course Objectives

1. To understand the concepts of object-oriented programming and master OOP using C++.
2. To understand the concepts of Inheritance, polymorphism and templates.
3. To understand the concepts of different view of data, stack and queues.
4. To understand the concepts of Programming with Recursion, Binary Search Tree and graphs.
5. To understand the concepts of Sorting and Searching Algorithms

Course Outcomes

1. After studied unit-1, the student will be able to understand the concepts of object oriented programming Apply structure and inline functions.
2. After studied unit-2, the student will be able to understand the concepts of the types of inheritances and Applying various levels of Inheritance for real time problems Apply the OOPs concepts class and object. Understand Explain the file concept and exception handlings in C++
3. After studied unit-3, the student will be able to understand the concepts of Stacks and Queue using array and pointers.
4. After studied unit-4, the student will be able to understand the concepts of Recursion, Binary Search Tree and graphs.
5. After studied unit-5, the student will be able to understand the concepts of Sorting and Searching Algorithms

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: BASIC CONCEPTS OF OOPS**Teaching Hours: 13 Hrs.**

Principles of Object Oriented Programming – Beginning with C++ – Token , Expressions and Control Structures- Functions in C++ – Classes and Objects – Constructors and Destructors.

Unit-2: OPERATORS**Teaching Hours: 13 Hrs.**

Operator Overloading and Type Conversions – Inheritance: Extending Classes – Pointers, Virtual Functions and Polymorphism - Managing Console I/O Operations. Working with Files - Templates – Exception Handling – Manipulating Strings.

Unit-3: DATA DESIGN & IMPLEMENTATIONS**Teaching Hours: 13Hrs;**

Hrs. Different views of data – Abstraction and Built-in Types – Arrays ADTs Stacks and Queue (Linear and Linked) , Stack (Array and Pointer)- Applications- Infix to Postfix Conversions – Queue(Array and Pointer) – List(Array and Pointer) – Applications: (Polynomial Addition) - Doubly Linked Lists.

Unit-4: GRAPH AND TREE**Teaching Hours: 13 Hrs.**

Programming with Recursion: Recursion – Verifying and Writing Recursive Functions – **Binary Search Tree** :Implementation – Tree Traversal – **Graphs:** Implementations – BFS – DFS – Dijkstras Shortest Path Algorithm.(Chapter 7:Section 7.1,7.4 7.5, Chapter 8:Section 8.1,8.4, Chapter 9:Section 9.3)

Unit-5: SORTING AND SEARCHING ALGORITHMS**Teaching Hours: 13 Hrs.**

Sorting – Searching – Hashing (Chapter 10: Section 10.1,10.2,10.3)

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text books:

1. Object Oriented Programming with C++, E Balagurusamy , Tata McGraw Hill, 6th Edition, 2014. (Units I, II)
2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers , 4th Edition, 2010. (Units III, VI & V)

Reference Books:

1. C++ The Complete Reference, Herbert Schildt, Tata McGraw Hill, 4th Edition, 2003.
2. OOP In ANSI C and Turbo C, Ashok N.Kamthene, Pearson Education, 6th Edition, 2008.
3. Data Structures and Algorithms, Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, Addison Wesley Longman Inc., 2nd Edition, 1999.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	M	S	S	S	S
CO2	S	M	M	S	S	M	S	M	S	S
CO3	S	M	S	S	M	S	S	S	S	M
CO4	S	S	M	S	M	S	S	S	M	S
CO5	S	S	S	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALUVAR UNIVERSITY, VELLORE – 632 115**(B.C.A) – 2022-2023 onwards****Semester: II Paper type: Core Practical – Practical - 2****Paper code: Name of the Paper: C++ & Data structures Lab Credit: 2 Total Hours per****Week: 2 Hrs. Lecture Hours: Tutorial Hours:. Practical Hours:26 Hrs.****Course Objectives**

1. To develop C++ programming skills in design
2. To understand the basic concepts of different abstract types and structure of data.
3. To understand the concepts of Function Overloading
4. To understand the concepts of Stack, Queue, List, Doubly Linked List - using Pointers- using Arrays.
5. To understand the concepts of Searching and Sorting Algorithms.

Course Outcomes

1. Understand the Creating and Deleting the Objects with the Concepts of Constructors and Destructors.
2. Demonstrate the Polymorphism Concepts and Operator Overloading.
3. Understand basic Data Structures such as Arrays, Linked Lists, Stacks, Queues, Doubly Linked List and Infix to Postfix Conversion.
4. Apply Algorithm for solving problems like Sorting and Searching.
5. Apply Algorithms and use Graphs and Trees as tools to visualize and simplify Problems

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Constructors & Destructors, Copy Constructor.
2. Friend Function & Friend Class.
3. Inheritance.
4. Polymorphism & Function Overloading.
5. Virtual Functions.
6. Overload Unary & Binary Operators Both as Member Function & Non Member Function.
7. Class Templates & Function Templates.
8. Exception Handling Mechanism.
9. Standard Template Library concept.
10. File Stream classes.
11. Array implementation of Stack, Queue : Infix to postfix
12. Implementation of Stack, Queue, List, Doubly Linked List - using Pointers-Polynomial Addition
13. Implementation of Binary Search Tree, Traversal
14. Implementation of Searching and Sorting Algorithms.
15. Graph Implementation of shortest path (Dijkstra's)

Reference Books:

1. Object Oriented Programming with C++, E Balagurusamy , Tata McGraw Hill, 6th Edition, 2014.
2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers , 4th Edition, 2010

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course

- study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
 - Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
 - Forming digital library: collecting text and reference books, course material.
 - Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
 - Extracurricular and cultural activities may be framed through the syllabus content. Grouping students for self-discussion, self-learning process.
 - Grouping students for self-discussion, self-learning process.
 - Following institution and intellectual and writing reports in the course field.
 - Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
 - For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
 - Extracurricular activities may be framed through their syllabus content.
 - Bring the industries to the campus. Bring the students to the industry.
 - Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Reference Book:

- Programming in ANSI C, E. Balagurusamy, Tata McGrawhill Education, 6th Edition, 2013.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	S	S	S
CO2	S	M	M	M	S	S	S	M	S	S
CO3	S	M	M	M	M	S	S	S	S	S
CO4	S	M	M	S	M	S	M	M	S	S
CO5	S	S	S	M	M	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALUVAR UNIVERSITY, VELLORE – 632 115

Bachelor of Computer Applications (B.C.A) – 2022-2023 onwards

Semester: II Paper type: Allied - Paper 2

Paper code: Name of the Paper: Mathematical Foundations – 2 Credit: 5

Total Hours per Week: 7 Hrs. Lecture Hours: 91 Hrs. Tutorial Hours:..... Practical Hours:..

.....

Course Objectives

- 1. Students to understand the concepts of Matrices**
- 2. Students to understand the concepts of Matrices**
- 3. Students to understand the concepts of Integration**
- 4. Students to understand the concepts of properties of definite integrals**
- 5. Students to understand the concepts of analytical geometry of three dimension**

Course Outcomes

- 1. After completion of unit 1 the student can able to understand the basic concept of Matrices.**
- 2. After completion of unit 2 the student can able to understand the basic concept of Matrices**
- 3. After completion of unit 3 the student can able to understand the basic concept of Integration**
- 4. After completion of unit 4 the student can able to understand the basproperties of definite integrals**
- 5. After completion of unit 5 the student can able to understand the basic concept of analytical geometry of three dimension**

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: MATRICES

Teaching Hours: 18 Hrs.

Multiplication of matrices, Singular and Non-Singular matrices, Adjoint of a Matrix, Inverse of a matrix Symmetric and Skew-Symmetric, Hermitian and Skew-Hermitian, Orthogonal and unitary matrices, Rank of a matrix, Solution of Simultaneous Linear equations by

- i. Cramer's rule.
- ii. Matrix Inversion Method.

UNIT-II: MATRICES

Teaching Hours: 18 Hrs.

Test for Consistency and Inconsistency of linear equations, (Rank Method), characteristic roots and characteristic vectors, Cayley - Hamilton theorem, matrix of linear transformations: reflection about the x, y axes and the line y=x, rotation about the origin through an angle, expansion or compression, shears, translation.

UNIT-III INTEGRATION

Teaching Hours: 19 Hrs.

Integration Simple problems, integration of rational function involving algebraic expressions of the form

$$\frac{1}{ax^2+bx+c}, \frac{1}{\sqrt{ax^2+bx+c}}, \frac{px+q}{ax^2+bx+c}, \frac{px+q}{\sqrt{ax^2+bx+c}}, \frac{px+q}{\sqrt{ax^2+bx+c}}$$

integrations using simple substitutions integrations involving trigonometric functions of the form

$$\frac{1}{\sqrt{a^2-x^2}}, \frac{1}{a^2+x^2},$$

$$\frac{a+b\cos x}{x^2} = \frac{a^2\sin^2 x + b^2\cos^2 x}{x^2}$$

Integration by parts.

UNIT-IV PROPERTIES OF DEFINITE INTEGRALS**Teaching Hours: 18 Hrs.**

Properties of definite integrals. Reduction formulae for

$\int x^n e^{ax} dx$, $\int \sin^n x dx$, $\int \cos^n x dx$, $\int x^m (1-x)^n dx$, applications of integration for (i) Area under plane curves, (ii) Volume of solid of revolution.

UNIT-V: ANALYTICAL GEOMETRY OF THREE DIMENSION**Teaching Hours: 18 Hrs.**

Planes, straight lines.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
-
- Grouping students for self discussion, self learning process. Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
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- Extracurricular activities may be framed through their syllabus content.
- Bring the industries to the campus. Bring the students to the industry.
- Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

P.R.Vittal, Mathematical Foundations - Margham Publication, Chennai.

Reference Books:

1. U. Rizwan, Mathematical Foundation - SciTech, Chennai
2. V.Sundaram& Others, Discrete Mathematical Foundation - A.P.Publication, Sirkali.
3. P.Duraipandian& Others, Analytical Geometry 3 Dimension – Emerald publication 1992 Reprint.
4. Manicavachagompillay&Natarajan. Analytical Geometry part II - three Dimension - S.Viswanathan (printers & publication) Put Ltd., 1991.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	S	S	S
CO2	S	M	M	M	M	S	S	S	S	S
CO3	S	S	S	M	M	S	S	M	S	S
CO4	S	M	M	M	S	S	S	M	S	S
CO5	S	S	M	M	M	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards**Semester: III****Paper type: Core theory Paper 3****Paper code:****Name of the Paper: Programming in Java****Credit:4****Total Hours per Week: 5****Lecture Hours: 65****Tutorial Hours:****Practical Hours:**
.....**Course Objectives**

1. To learn the concepts of java and practice it.
2. To get insight knowledge in object-oriented programming.
3. To study the concepts of java paradigms.
4. To master the java concepts.
5. To gather programming knowledge in java.

Course Outcomes (five outcomes for each units should be mentioned)

CO1. After studied unit-1, the student will be able to know about the object-oriented concepts in java.

CO2. After studied unit-2, the student will be able to know about primitive data types and operators.

CO3. After studied unit-3, the student will be able to work with arrays, control structures and handling exceptions.

CO4. After studied unit-4, the student will be able to work with files and packages.

CO5. After studied unit-5, the student will be able to know about Applets and GUI concepts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	No	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	Yes
5	Yes	Yes	No	Yes	No	Yes

Unit-1: INTRODUCTION**Teaching Hours: 15 Hrs.**

Declarations and Access Control: Identifiers and Keywords: Oracle's Java Code Conventions. Define Classes: Import Statements and the Java API - Static Import Statements. Use Interfaces: Declaring an Interface- Declaring Interface Constants. Declare Class Members: Access Modifiers - No access Member Modifiers - Constructor Declarations – Variable Declarations. Declare and Use enums: Declaring enums. Object

Orientation: Encapsulation- Inheritance and Polymorphism-Polymorphism - Overriding / Overloading: Overridden Methods -Overloaded

Unit-2: OBJECTS ORIENTATION

Teaching Hours: 15 Hrs.

Object Orientation: Casting - Implementing an Interface - Legal Return Types: Return Type Declarations - Returning a Value. Constructors and Instantiation: Overloaded Constructors - Initialization Blocks. Statics: Static Variables and Methods. Assignments: Stack and Heap - Literals, Assignments, and Variables: Literal Values for All Primitive Types. Scope - Variable Initialization - Passing Variables into Methods: Passing Object Reference Variables - Passing Primitive Variables. Garbage Collection. Operators: Java Operators - Assignment Operators -Relational Operators - instanceof Comparison - Arithmetic Operators - Conditional Operator - Logical Operators.

Unit-3: STRINGS AND ARRAYS

Teaching Hours: 15 Hrs.

Working with Strings, Arrays, and Array Lists: Using String and String Builder: The String Class - The StringBuilder Class - Important Methods in the String Builder Class. Using Arrays: Declaring an Array - Constructing an Array- Initializing an Array. Using Array List: Array List Methods in Action - Important Methods in the Array List Class. Flow Control and Exceptions: Using if and switch Statements -Creating Loops Constructs- Handling Exceptions - Catching an Exception Using try and catch - Using finally. String Processing, Data Formatting Resource Bundles: String, String Builder, and String Buffer -Dates, Numbers, Currencies, and Local

Unit-4: FILE

Teaching Hours: 15 Hrs.

I/O and NIO: File Navigation and I/O: Creating Files Using the File Class - Using File Writer and File Reader. File and Directory Attributes -Directory Stream - Serialization. Generics and Collections: to String(), hash Code(), and equals(): The to String() Method - Generic Types -Generic Methods - Generic Declarations. Inner Classes: Method – Local. Inner Classes - Static Nested Classes - Threads: Defining, Instantiating, and Starting Threads - Thread States and Transitions - Synchronizing Code, Thread Problems - Thread Interaction. Concurrency: Concurrency with the java. util. concurrent Package - Apply Atomic Variables and Locks - Use java. util.concurrent Collections - Use Executors and Thread Pools.

Unit-5: APPLETs

Teaching Hours: 15 Hrs.

Applets: Applet fundamentals - Applet class - Applet life cycle - Steps for developing an applet program - Passing values through parameters -Graphics in an applet - Event-handling. GUI Applications - Part 1: Graphical user interface - Creating windows - Dialog boxes - Layout managers - AWT component classes - Swing component classes. GUI Applications - Part 2: Event handling - Other AWT components - AWT graphics classes - Other swing controls.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Kathy Sierra, Bert Bates — OCA/OCP Java SE 7 Programmer I & II Study Guide, Oracle Press. (Unit I,II,III,IV).
2. Sagayaraj, Denis, Karthik and Gajalakshmi, 2018, Java Programming - For Core and Advanced Learners,

University Press (India) Private Limited, Hyderabad. (Unit V).

Reference Books:

1. Hebert Schild, 2002, The Complete Reference Java2, [Fifth Edition]. Tata McGraw-Hill, New Delhi.
2. John Hubbard, R.2004. Programming with Java. [Second Edition]. Tata McGraw-Hill, New Delhi.
3. Debasish Jana. 2005. Java and Object-Oriented Programming Paradigm, [SecondPrinting]. Prentice-Hall of India, New Delhi.
4. Sagayaraj, Denis, Karthik and Gajalakshmi 2018, Java Programming for core and advanced Learners, University Press India Pvt. Ltd., Hyderabad.

E- References:

1. www.tutorialspoint.com/java/java-quick-guide.htm
2. www.tutorialspoint.com/java/java_overview.htm

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	M	S	S	S	S	M	S	M	S
CO3	M	S	M	S	S	M	S	M	S	M
CO4	S	M	S	M	S	S	S	M	M	S
CO5	S	S	M	M	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards**Semester: III****Paper type: Core theory Paper 4****Paper code:****Name of the Paper: E-Commerce****Credit: 4****Total Hours per Week: 4****Lecture Hours: 52****Tutorial Hours:****Practical Hours:**
.....**Course Objectives**

1. To provide the knowledge about commerce through electronic medium & information system.
2. To understand the concepts of security.
3. To understand the basic knowledge of E- Payments.
4. To understand the concepts of EDI.
5. To understand the concepts of trading relationships.

Course Out Comes (five outcomes for each unit should be mentioned)

- CO1. After studied unit-1, the student will be able to demonstrate E-Commerce Frameworks. Distinguish E-Commerce and media Convergence. Illustrate E-Commerce Applications.
- CO2. After studied unit-2, the student will be able to describe the E-Commerce Networks and Research Networks, Analyses the Internet Commercialization
- CO3. After studied unit-3, the student will be able to Evaluate the E-Commerce how incorporate the Internet, Construct the Web Security.
- CO4. After studied unit-4, the student will be able to Distinguish the different payment system. Illustrate the data interchange.
- CO5. After studied unit-5, the student will be able to Understanding the Advertising and Marketing on the Internet, Describe Software Agents.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	Yes	No	Yes	Yes
5	Yes	No	No	Yes	Yes	Yes

Unit-1: INTRODUCTION TO E- COMMERCE

Teaching Hours: 12 Hrs.

Electronic Commerce Framework, Traditional Vs. Electronic Business Application, The Anatomy of E-Commerce Applications. Network infrastructure for E-Commerce – Components of the I-way – Global Information Distribution Networks – Public policy issues shaping the I – way. Network Access Equipment.

Unit-2: NETWORK SECURITY

Teaching Hours: 10 Hrs.

The internet as a Network Infrastructure, Network Security and Firewalls – Client Server Network Security – Firewalls and Network Security – Data and Message Security – Encrypted Documents and Electronic Mail.

Unit-3: E-COMMERCE

Teaching Hours: 10 Hrs.

Electronic Commerce and World Wide Web, Consumer Oriented E-Commerce, Electronic Payment Systems.

Unit-4: EDI and E-COMMERCE

Teaching Hours: 10 Hrs.

Electronic Data Interchange (EDI), EDI application in business, EDI and E- commerce – EDI implementation. Intra-organizational Electronic Commerce - Supply Chain Management.

Unit-5: E-COMMERCE TOOLS

Teaching Hours: 10 Hrs.

Corporate Digital Library – Advertising and marketing on the Internet – E-Commerce Catalogues or Directories- On demand Education and Digital Copyright – Applets, Browsers & Software Agents.

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.

- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXTBOOKS:

- 1. Ravi Kalakota & Andrew Whinston, "Frontiers of Electronic-Commerce", Addison Wesley.
- 2. Efraim Turvan, J. Lee, David Kug and Chung, "Electronic Commerce", Pearson Education, Asia.

REFERENCE BOOK:

- 1. Manlyn Greenstein and Miklos, "Electronic Commerce", TMH.

E-REFERENCES:

- 1. <https://www.the-reference.com/en/expertise/creation-and.../e-commerce>
- 2. <https://en.wikipedia.org/wiki/E-commerce>
- 3. https://www.tutorialspoint.com/e_commerce/index.htm

Mapping with Programme Outcomes:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	M	S	S
CO2	S	S	S	M	S	S	M	S	M	S
CO3	M	S	M	S	S	M	S	M	S	M

B.C.A. Computer Applications (CBCS)

CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	M	M	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards

Semester: III

Paper type: Core theory Paper 5

Paper code:**Name of the Paper: Operations Research****Credit: 4****Total Hours per Week: 5****Lecture Hours: 65****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand the concepts of Linear Programming.
2. To understand the concepts of Transportation, Assignment problem.
3. To understand the concepts of sequence problem.
4. To understand the concepts of PERT and CPM.
5. To understand the concepts of Cost Flow Problem.

Course Out Comes

- CO1. After studied unit-1, The Student will be able to understand the concepts of optimization and to formulate and Solve Linear Programming problems.
- CO2. After studied unit-2, The Student will be able to understand the concepts of Transportation problem and Assignment problem.
- CO3. After studied unit-3, The Student will be able to understand the concepts of sequencing problem.
- CO4. After studied unit-4, The Student will be able to understand the concepts of PERT-CPM and their applications in product planning control.
- CO5. After studied unit-5, The Student will be able to understand the concepts of Solve the Minimal Spanning Tree Problem, Shortest Route Problem, Maximal Flow Problem and Minimal Cost Capacitated Flow Problem.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	No	Yes	Yes	Yes
4	Yes	Yes	No	Yes	Yes	Yes
5	Yes	Yes	No	Yes	Yes	Yes

Unit-1: LINEAR MODELS**Teaching Hours: 15 Hrs.**

Basics of OR & Decision making - Role of computers in OR, Linear Programming Problem – Formulation, Graphical solution of two variables Canonical & standard form of LPP, Simplex method, Charne's method of

penalties.

Unit-2: TRANSPORTATION AND ASSIGNMENT PROBLEMS

Teaching Hours:13

Transportation algorithm - Degeneracy algorithm- Unbalanced Transportation problem Unbalanced assignment algorithm.

Unit-3: SEQUENCING PROBLEM

Teaching Hours: 13 Hrs

Processing of n jobs through two machines -Processing of n jobs through three machines- Processing of n jobs through m machines.

Unit-4: PERT & CPM

Teaching Hours: 12 Hrs

Network - Fulkerson's rule- Measure of activity- PERT computation- CPM computation.

Unit-5: NETWORK MODELS

Teaching Hours: 12 Hrs

Network definition- Minimal spanning tree problem- Shortest route problem- Maximal flow problem- Minimal cost capacitated flow problem.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.

- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXTBOOKS:

- 1. KantiSwarub, P.K. Gupta, Manmohan, “Operations Research”, S. Chand & Sons.
- 2. Ackoff R. L. and Sasieni M.W, “Fundamentals of Operations Research”, John Wiley & Sons, New York.

REFERENCE BOOKS:

- 1. Charnes A. Cooper W. and Hendersen A., “Introduction to Linear Programming”, Wiley & Sons. New York.
- 2. Srinath L.S.” PERT and CPM Principles and Applications”, Affiliated East West Press Pvt. Ltd., New York.

E-REFERENCES:

- 1. https://en.wikipedia.org/wiki/Operations_research

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	M	S	M
CO2	S	M	S	S	M	S	M	M	M	S
CO3	M	S	S	S	S	M	S	M	S	S
CO4	S	M	S	M	S	S	S	M	M	S
CO5	M	S	M	S	S	S	M	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

(B.C.A) - 2022-2023 onwards**Semester: III****Paper type: Core Practical - Practical 3****Paper code:****Name of the Paper: Programming in Java lab****Credit: 3****Total Hours per Week: 4****Lecture Hours:****Tutorial Hours:****Practical Hours: 52**
.....**Course Objectives**

1. To use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.
2. To read and make elementary modifications to Java programs that solve real-world problems.
3. To be able to create an application using string concept.
4. To be able to create a program using files in application.
5. To be able to create an Applet to create an application and identify and fix defects and common security issues in code.

Course Outcomes

- CO1. After studied unit-1, the student will be able to know about the working of object-oriented concepts in java.
- CO2. After studied unit-2, the student will be able to practically know about primitive data types and operators.
- CO3. After studied unit-3, the student will be able to practically work with arrays, control structures and handling exceptions.
- CO4. After studied unit-4, the student will be able to practically work with files and packages.
- CO5. After studied unit-5, the student will be able to practically know about Applets and GUI concepts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	No	Yes	No	Yes	Yes
5	Yes	No	No	Yes	Yes	Yes

List of Practical Exercises:

1. Implementation of Classes and Objects
2. Implementation of Inheritance and Polymorphism
3. Implementation of Interface and Package concepts
4. Implementation of Flow, Border, Grid Layouts
5. Implementation of Tic-Tac Toe Application Using Applets
6. Implementation of Frames, Menus, Dialog
7. Implementation of Swing concepts
8. Implementation of Exception Handling
9. Implementation of Multi-Threading
10. Implementation of I/O Streams
11. Implementation of Java Networking concepts
12. Implementation of Java Servlets (Connecting Database)
13. Implementation of RMI
14. Implementation of Java Beans.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Kathy Sierra, Bert Bates — OCA/OCP Java SE 7 Programmer I & II Study Guide, Oracle Press. (Unit I, II, III, IV).
2. Sagayaraj, Denis, Karthik and Gajalakshmi, 2018, Java Programming - For Core and Advanced Learners, University Press (India) Private Limited, Hyderabad. (Unit V).
- 3.

Reference Books:

1. Hebert Schild, 2002, The Complete Reference Java2, [Fifth Edition]. Tata McGraw-Hill, New Delhi.
2. John Hubbard, R.2004. Programming with Java. [Second Edition]. Tata McGraw-Hill, New Delhi.
3. Debasish Jana. 2005. Java and Object-Oriented Programming Paradigm, [Second Printing]. Prentice-Hall of India, New Delhi.
4. Sagayaraj, Denis, Karthik and Gajalakshmi 2018, Java Programming for core and advanced Learners, University Press India Pvt. Ltd., Hyderabad.

E- References:

1. www.tutorialspoint.com/java/java-quick-guide.htm
2. www.tutorialspoint.com/java/java_overview.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	S	S	M	S	M
CO2	S	M	M	S	S	S	M	S	S	S
CO3	M	S	S	S	S	M	S	S	S	M
CO4	S	S	S	M	S	M	S	M	M	S
CO5	S	S	S	M	S	S	M	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards**Semester: III****Paper type: Allied 2 Paper 3****Paper code:****Name of the Paper: FINANCIAL ACCOUNTING I****Credit: 3****Total Hours per Week: 7****Lecture Hours: 91****Tutorial Hours:****Practical Hours:****OBJECTIVES**

1. To understand the basic concepts and conventions and Users of Accounting Information.
2. To acquire knowledge about Double entry system and Rectification of Errors in Accounting.
3. To acquire knowledge about Final Accounts (Trading & Profit & Loss A/c and Balance Sheet).
4. To acquire knowledge about Single entry system (incomplete records of Accounts).
5. To acquire knowledge about Average Due Date and Preparation of in the preparation of Bank Reconciliation Statement.

COURSE OUT COMES

- Unit 1 After studied unit-1, to introduce the basic concepts and conventions to the students, this would help in development of accounting knowledge..
- Unit2 After studied unit-2 ,to understand the concept of Double entry system this helps in preparation of various books of accounts.
- Unit3 After studied unit-3 , to develop the capability of students to prepare the Final Accounts of a Small Business Concern.
- Unit 4 After studied unit 4, To introduce the concept of Single entry system of Accounting which helps them to prepare the accounts from incomplete records.
- Unit 5 After studied unit 4, To enhance the Accounting Knowledge by introducing the practical uses of Average Due Date and Bank Reconciliation Statement.

Matching Table (Put Yes / No in the appropriate box)

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes

5	Yes	Yes	Yes	Yes	Yes	Yes
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Unit-I**INTRODUCTION TO ACCOUNTING****Teaching Hrs. : 10 Hrs.**

Meaning- Definition- Functions- Objectives- Users of Accounting Information- Accounting Concepts and Conventions – Advantages and Limitations of Accounting.

Unit-II DOUBLE ENTRY SYSTEM OF ACCOUNTING**Teaching Hrs. : 12 Hrs.**

Meaning and concepts - Golden Accounting Rules- Journal Entries- Ledger- Trail Balance – Rectification of Errors (Simple Problems).

Unit-III FINAL ACCOUNTS**Teaching Hrs, : 10 Hrs.**

Preparation of Trading Account, Profit and Loss Account and Balance Sheet- Adjustment Entries (Simple Problems).

Unit-IV SINGLE ENTRY SYSTEM**Teaching Hrs. : 10 Hrs.**

Meaning - Features - Advantages - Limitations - Methods- Net Worth Method – Conversion Method (Simple Problems).

Unit-V AVERAGE DUE DATE AND BANK RECONCILIATION STATEMENT**Teaching Hrs. : 10 Hrs.**

Average Due Date - Meaning -Uses – Problems - Bank Reconciliation Statement- Meaning- Reasons for Preparation- Procedures and Preparation of Bank Reconciliation statement (Simple Problems).

TEXTBOOK

S.No	Author	Title	Publisher	Year of Publication
1	T.S.Reddy and Murthy	Financial Accounting	Margham Publications	2018

REFERENCE BOOKS

S.No	Author	Title	Publisher	Year of Publication
1	M.C. Shukla and T.S. Grewal&co	Advanced Accounts	S. Chand & Co	2016
2	R.L. Gupta	Financial Accounting	Sultan chand	2014
3	S.P. Jain &K.L Narang,	Financial Accounting	Kalyani Publication	2017
4	R.S.N Pillai&V.Bagavathi	Fundamental of Advanced Accounting, Volume – I	S. Chand & Co	2013

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards**Semester: III****Paper type: Skill Based Subject 1 Paper - 1****Paper code:****Name of the Paper: Web Technology****Credit: 2****Total Hours per Week: 3****Lecture Hours: 39****Tutorial Hours:****Practical Hours:**

.....

Course Objectives

1. This course introduces the concepts of HTML.ASP, VB Script,
2. This course introduces the concepts of control statements and looping statements in Java script.
3. This course introduces the concepts of Java Script Cookies.
4. This course introduces the concepts of ASP.NET
5. This course introduces the concepts of OLEDB connection.

Course Outcomes

- CO1. After studied unit-1, The Student will be able to understand the concepts of HTML.
- CO2. After studied unit-2, The Student will be able to understand the concepts of java scripts.
- CO3. After studied unit-3, The Student will be able to understand the concepts of user defined functions.
- CO4. After studied unit-4, The Student will be able to understand the concepts of Active Server Page.
- CO5. The student will be able to understand the concepts of – OLEDB connection class.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	No	Yes	No
2	Yes	No	Yes	Yes	Yes	Yes
3	Yes	Yes	No	Yes	No	Yes
4	Yes	Yes	Yes	No	Yes	Yes
5	Yes	Yes	Yes	Yes	No	Yes

Unit-1: INTRODUCTION TO VBSCRIPT**Teaching Hours: 7 Hrs**

Introduction to VBScript - Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants - VBScript Operators – mathematical- comparison-logical - Using Conditional Statements - Looping Through Code - VBScript Procedures – type casting variables - math functions –date functions – string functions –other functions - VBScript Coding Conventions - Dictionary Object in VBScript - Err Object.

Unit-2: INTRODUCTION TO JAVASCRIPT

Teaching Hours: 8 Hrs

Introduction to Javascript – Advantages of Javascript – Javascript syntax - Data type – Variable - Array – Operator & Expression – Looping – control structures - Constructor Function – user defined function Dialog Box.

Unit-3: JAVASCRIPT DOCUMENT OBJECT MODEL

Teaching Hours: 8 Hrs

Javascript document object model – Introduction – Object in HTML – Event Handling – Window object – Document object – Browser object – Form object – Navigator object – Screen object – Build in object – User defined object – Cookies.

Unit-4: ASP.NET

Teaching Hours: 8 Hrs

ASP.NET Language Structure – Page Structure – Page event, Properties & Compiler Directives. HTML server controls – Anchor, Tables, Forms, Files. Basic Web server Controls – Label, Text box, Button, Image Links, Check & radio Button, Hyperlink, Data List Web Server Controls – Check box list. Radio button list, Drop down list, List box, Data grid, Repeater.

Unit-5: ERROR HANDLING AND SECURITY

Teaching Hours: 8 Hrs

Request and Response Objects, Cookies, Working with Data – OLEDB connection class, command class, transaction class, data adaptor class, data set class. Advanced issues – email, Application issues, working with IIS and page Directives, error handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXTBOOKS:

1. I.Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.
2. A. Russell Jones, Mastering Active Server Pages 3, BPB Publications.

REFERENCE BOOKS:

1. HathleenKalata, Internet Programming with VBScript and JavaScript, Thomson Learning
2. Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications
3. T.A. Powell, 2002, Complete Reference HTML, TMH.
4. J. Jaworski, 1999, Mastering Javascript, BPB Publications.
5. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition2004, TMH

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	M	S	S	S
CO3	S	S	S	M	S	M	S	M	S	S
CO4	S	M	S	M	S	S	S	M	M	S
CO5	M	S	S	M	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards

Semester: III

Paper type: Non Major Elective Paper - 1

Paper code:

Name of the Paper: Introduction to Information Technology

Credit: 2

Total Hours per Week: 2

Lecture Hours: 26

Tutorial Hours:

Practical Hours:

.....

Course Objectives

The subject aims to build the concepts regarding:

1. Major components of Computer System and its working principles.
2. Role of an Operating System and basic terminologies of networks.
3. How the Information Technology aids for the Current Scenario.
4. To understand the Computer Software.
5. To understand internet applications

Course Outcomes

1. After studied unit-1, the student will be able to understand the Major components of Computer System and its working principles.
2. After studied unit-2, the student will be able to know the Role of an Operating System and basic terminologies of networks.
3. After studied unit-3, the student will be able to know How the Information Technology aids for the Current Scenario.
4. After studied unit-4, the student will be able to understand the Computer Software
5. After studied unit-5, the student will be able to understand internet applications

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION

Teaching Hours: 6 Hrs.

Characteristics of Computers-Technological Evolution of Computers-The Computer Generations- Categories of Computer. **Data and Information:** Introduction-Types of Data-A Simple Model of a Computer-Data Processing Using a Computer-Desktop Computer. **Acquisition of Number and Textual Data:** Introduction- Input Units-Internal Representation of Numeric Data-Representation of Characters in Computers-Error-Detecting Codes.

Unit-2: DATA STORAGE

Teaching Hours: 5 Hrs.

Introduction-Memory Cell-Physical Devices Used as Memory Cells-Random Access Memory- Read Only Memory- Secondary Memory- Floppy Disk Drive- Compact Disk Read Only Memory (CDROM)-Archival Memory. **Central Processing Unit:** The Structure of a Central Processing Unit- Specification of a CPU-Interconnection of CPU with Memory and I/O Units.

Unit-3: COMPUTER NETWORKS

Teaching Hours: 5 Hrs.

Introduction-Local Area Network (LAN)- Applications of LAN-Wide Area Network (WAN)-The Future of Internet Technology. **Output Devices:** Introduction- Video Display Devices-Flat Panel Displays-Printers.

Unit-4: COMPUTER SOFTWARE

Teaching Hours: 5 Hrs.

Introduction-Operating System-Programming Languages-A Classification of Programming Languages. **Data Organization:** Introduction-Organizing a Database-Structure of a Database- Database Management System-Example of Database Design.

Unit-5: SOME INTERNET APPLICATIONS

Teaching Hours: 5 Hrs.

Introduction- E-mail- Information Browsing Service- The World Wide Web- Information Retrieval from the World-Wide-Web -Other Facilities Provided by Browsers - Audio on the Internet. **Societal Impacts of Information Technology:** Careers in Information Technology.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study

- for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
 - d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
 - e. Forming digital library: collecting text and reference books, course material.
 - f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
 - g. Extracurricular and cultural activities may be framed through the syllabus content.
 - h. Grouping students for self-discussion, self-learning process.
 - i. Following institution and intellectual and writing reports in the course field.
 - j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
 - k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
 - l. Extracurricular activities may be framed through their syllabus content.
 - m. Bring the industries to the campus. Bring the students to the industry.
 - n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Rajaraman, V.2008.IntroductiontoInformationTechnology.[SixthPrinting].
PrenticeHall of India Pvt. Limited, New Delhi.(UNIT I toV)
2. Nagpal,
D.P.2010.ComputerFundamentals.[FirstEdition,Revised].S.Chand&CompanyLtd,
New Delhi. (UNIT I(Introduction: Characteristics of Computers to Categories of
Computer))

Reference Books:

1. ITL EducationsSolution Limited. 2009. **Introduction toComputer Science**. [Fourth Impression].Pearson Education, New Delhi.
2. Alexis Leon and Mathews Leon. 1999. **Fundamentals of Information Technology**. [FirstEdition]. Leon TECHWorld, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	M	M	S
CO2	S	S	S	M	S	S	M	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards**Semester: IV****Paper type: Core theory Paper 6****Paper code:****Name of the Paper: Relational Database Management Systems****Credit:4****Total Hours per Week: 5****Lecture Hours: 65****Tutorial Hours:****Practical Hours:**
.....**Course Objectives**

1. The students are able to understand database concepts and database management system software and have a high-level understanding of major DBMS components and their function.
2. The students are able to understand the E R model and relational model.
3. The students are able to be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
4. The students are able to Understand Functional Dependency and Functional Decomposition.
5. The students are able to understand the architecture of database management system and also understand the various different architecture such as server system architecture, parallel systems and distributed database systems.

Course Outcomes

1. After studied unit-1, the student will be able to describe the database architecture and its applications Sketch the ER diagram for real world applications Uses various ER diagram for a similar concept from various sources
2. After studied unit-2, the student will be able to discuss about the relational algebra and calculus Construct various queries in SQL and PL/SQL Compiles various queries in SQL, Relational Calculus and Algebra.
3. After studied unit-3, the student will be able to describe the various normalization forms apply the normalization concepts for a table of data Practices a table and implement the normalization concepts.
4. After studied unit-4, the student will be able to explain the storage and accessing of data.
5. After studied unit-5, the student will be able to illustrate the query processing in database management and to define the concurrency control and deadlock concept.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	No	No	Yes	Yes	No
4	Yes	Yes	No	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	No	No

Unit-1: DATABASE ARCHITECTURE AND ER DIAGRAM

Teaching Hours: 13 Hrs

Database system applications - Purpose of database systems - View of data- Database languages - Database architecture - Database users and administrators - History of database systems-Entity relationship modelling: entity types, entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modelling, sub classes; super classes, inheritance, specialization and generalization.

Unit-2: RELATIONAL DATA MODEL

Teaching Hours: 13 Hrs

Relational model concepts, Relational constraints, Relational Languages: Relational Algebra, The Tuple Relational Calculus - The Domain Relational Calculus - SQL: Basic Structure-Set Operations- Aggregate Functions-Null Value-Nested Sub Queries-Views Complex Queries Modification Of Database-Joined Relations-DDL-Embedded SQL-Dynamic SQL-Other SQL Functions- -Integrity and Security.

Unit-3: DATA NORMALIZATION

Teaching Hours: 13 Hrs

Pitfalls in relational database design – Decomposition – Functional dependencies – Normalization – First normal form – Second normal form – Third normal form – Boyce-Codd normal form – Fourth normal form – Fifth normal form.

Unit-4: STORAGE AND FILE ORGANIZATION

Teaching Hours: 13 Hrs

Disks - RAID -Tertiary storage - Storage Access -File Organization – organization of files - Data Dictionary storage.

Unit-5: QUERY PROCESSING AND TRANSACTION MANAGEMENT

Teaching Hours: 13 Hrs

Query Processing - Transaction Concept - Concurrency Control –Locks based protocol Deadlock Handling -Recovery Systems.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.

- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXTBOOKS:

1. Pranab Kumar Das Gupta and P. Radha Krishnan, "Database Management System Oracle SQL and PL/SQL", Second Edition, 2013, PHI Learning Private Limited.
2. RamezElmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Publications

REFERENCE BOOKS:

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database System Concepts", Seventh Edition, TMH.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	M	S	S
CO2	S	M	S	S	S	S	M	S	M	S
CO3	S	S	M	S	S	S	S	S	S	M
CO4	S	M	S	S	M	S	S	M	M	S
CO5	S	M	S	M	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards

Semester: IV

Paper type: Core theory Paper - 7

Paper code:

Name of the Paper: Enterprise Resource Planning

Credit: 4

Total Hours per Week: 4

Lecture Hours: 52

Tutorial Hours:

Practical Hours:

.....

Course Objectives

1. With the basic concepts of ERP systems the students are able to understand the business process, business function and differences between business process and business functions. They also came to know the key differences between raw data and raw materials.
2. The students are able to understand the exchange of information between AF, SCM, HR and MS. And they also learn about CRM, budget and preparing balance sheets.
3. The students are able to understand the key factors related to marketing and sales in the companies, and the differences among (Material Requirement Planning) MRP, MRP II, and ERP systems.
4. They also understand the inter relationship between the other functional areas like SCM, AF, HR and customer. Concepts and techniques.
5. The students are able to understand the power of human resources such as managing man power, job skills preparing pay bills and taking legal actions to the compliances and hiring needs.

Course Outcomes

1. After studied unit-1, the student will be able to know to understand the functionalities of Enterprise resource planning.
2. After studied unit-2, the student will be able to know to Understand Characterize the ERP implementation procedures.
3. After studied unit-3, the student will be able to work to understand the elements of ERP.
4. After studied unit-4, the student will be able to understand the available ERP packages.
5. After studied unit-5, the student will be able to know to understand the models of ERP with other related technologies.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	No	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	No	Yes	Yes
5	Yes	Yes	Yes	Yes	No	No

Unit-1: INTRODUCTION**Teaching Hours: 12 Hrs**

ERP: An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, OLAP, SCM

Unit-2: ERP IMPLEMENTATION**Teaching Hours: 10 Hrs**

ERP Implementation Lifecycle, Implementation Methodology, Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contract with Vendors.

Unit-3: THE BUSINESS MODULES**Teaching Hours: 10 Hrs**

Business modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

Unit-4: ERP PACKAGES**Teaching Hours: 10 Hrs**

ERP Market Place, SAP AG, PeopleSoft, Baan, JD Edwards, Oracle, QAD, SSA.

Unit-5: PRESENT AND FUTURE**Teaching Hours: 10 Hrs**

Turbo Charge the ERP System, EIA, ERP and e-Commerce, ERP and Internet, Future Directions.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.

- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXTBOOKS:

1. Alexis Leon, “ERP Demystified”, Tata McGraw Hill, New Delhi, 2000

REFERENCES

1. Joseph A Brady, Ellen F Monk, Bret Wagner, “Concepts in Enterprise Resource Planning”, Thompson Course Technology, USA, 2001.
2. Vinod Kumar Garg and Venkata Krishnan N K, “Enterprise Resource Planning – Concepts and Practice”, PHI, New Delhi, 2003

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	M	S
CO3	S	S	M	M	S	M	S	S	S	M
CO4	S	M	S	S	S	S	S	S	M	S
CO5	S	M	S	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(B.C.A) - 2022-2023 onwards

Semester: IV

Paper type: Core theory Paper 8

Paper code:

Name of the Paper: Wireless data Communication

Credit:4

Total Hours per Week: 5

Lecture Hours: 65

Tutorial Hours:

Practical Hours:

.....

Course Objectives

1. This course introduces the concepts and theories of networking.
2. To apply them to various situations, classifying networks, analysing performance and implementing new technologies.
3. To implement the various new wireless technologies.
4. To implement the various TCP/IP protocols.
5. To implement the various security threads.

Course Out Comes

- CO1. After studied unit-1, the student will be able to define computer networks, demonstrate the types of networks, and distinguish topologies, Differentiate Transmission mode, Design OSI and TCP/IP Reference model.
- CO2. After studied unit-2, the student will be able to Illustrate Transmission media, Analyse the wireless media, Create the structure of Telephone system
- CO3. After studied unit-3, the student will be able to formulate framing control and flow control, Explain error correcting codes and error detecting codes
- CO4. After studied unit-4, the student will be able to discuss store and forward switching network, Explain Routing algorithm, and examine congestion control algorithm.
- CO5. After studied unit-5, the student will be able to know to summarize the elements of transport protocol, Describe DNS, EMAIL, WWW.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	No	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	Yes
5	Yes	Yes	No	No	Yes	Yes

Unit-1: BASIC CONCEPTS OF OSI LAYERS

Teaching Hours: 13 Hrs

Data Communication – Networks – Protocol and Standards – Line Configuration – Topology – Transmission Modes – Categories of Networks – Internetworks- OSI Models – Functions of OSI Layers.

Unit-2: SIGNALS AND TRANSMISSION MEDIA

Teaching Hours: 13 Hrs

Analog and digital – Periodic and Non-Periodic signals – Analog Signals – Time And Frequency Domain - Composite Signals- Digital signals – Guided Media – Unguided Media – Transmission Impairment – Performance.

Unit-3: ERROR DETECTION, CORRECTION AND DATA LINK CONTROL

Teaching Hours: 13 Hrs

Type of errors –Detection-Vertical Redundancy Check (VRC) -Longitudinal Redundancy Check (LRC) Cyclic Redundancy Check (CRC) – check sum – Error Corrections – Flow Control – Error Control.) **SWITCHING& NETWORK DEVICES:** Circuit Switching-Packet Switching-Message Switching Repeaters – Bridges –Routers – Gateways-other Devices - Routing Algorithms-Distance Vectors Routing- Link State Routing.

Unit-4: WIRELESS NETWORKS

Teaching Hours: 13 Hrs

Wireless LAN: Advantages and Disadvantages-Infrared Vs Radio Transmission – Infrastructure Networks- Ad hoc Networks – Bluetooth- Wireless ATM: Working Group Services- Reference Model – Functions – Radio Access Layer – Handover- Handover reference model- Requirements and Types.

Unit-5: TCP/IP PROTOCOL SUITE: PART I, PROTOCOLS & NETWORK SECURITY

Teaching Hours: 13 Hrs

Overview Of TCP/IP – Network Layer – Addressing – Subnetting – Other Protocols In The Network Layer – Transport Layer – Client/Server Model – Bootstrap Protocol and DHCP - Domain Name System (DNS) – Tel Net –File Transmission Protocol (FTP) – Simple Mail Transfer Protocol (SMTP) – SNMP Protocol – Hyper Text Transmission Protocol (HTTP) – World Wide Web (WWW) –Four Aspects of Security – Privacy – Digital Signature – PGP – Access Authorization.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
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- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXTBOOKS:

1. Andrew S. Tanenbaum and David J. Wetherall, “Computer Networks”, Fifth edition, 2011, PHI.
2. Behrouz A. Forouzan, “Data Communication and Networking”, Fifth Edition, Tata McGraw Hill.

REFERENCE BOOKS:

1. William Stallings, “Data and Computer Communications”, Eighth Edition, Pearson education Asia.

E-REFERENCES:

1. http://nptel.iitm.ac.in/courses/IIT-MADRAS/Computer_Networks/index.php
2. <http://www.cse.iitk.ac.in/users/dheeraj/cs425/>
3. http://people.du.ac.in/~ngupta/teach_networks.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	S	S	M	S	S
CO2	S	M	S	S	S	M	S	S	M	S
CO3	M	S	S	S	S	S	M	S	S	M
CO4	S	M	S	S	S	M	S	M	S	S
CO5	S	M	M	S	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.C.A) - 2022-2023 onwards

Semester: IV**Paper type: Core Practical - Practical - 4****Paper code:****Name of the Paper: RDBMS Lab****Credit: 3****Total Hours per Week: 4 Lecture Hours: Tutorial Hours: Practical Hours: 52**
.....**Course Objectives**

1. To understand the concepts of DDL/DML/DCL/TCL commands.
2. To understand the concepts of Join queries.
3. To understand the concepts of exception handling.
4. To understand the concepts of cursors.
5. To understand the concepts of packages.

Course Outcomes

1. Design and Implement a database schema for a given problem domain.
2. Populate and Query a database using SQL, DDL/DML Commands.
3. Build well formed in String Date/Aggregate Functions.
4. Design and Implement a database query using Joins, Sub-Queries and Set Operations.
5. Program in SQL including Objects (Functions, Procedures, and Triggers).

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	No	Yes	Yes
2	Yes	Yes	No	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	Yes
4	Yes	Yes	No	No	Yes	Yes
5	Yes	No	Yes	Yes	No	Yes

LIST OF PRACTICAL EXERCISES:

1. Execute a single line query and group functions.
2. Execute DDL Commands.

3. Execute DML Commands
4. Execute DCL and TCL Commands.
5. Implement the Nested Queries.
6. Implement Join operations in SQL
7. Create views for a particular table
8. Implement Locks for a particular table.
9. Write PL/SQL procedure for an application using exception handling.
10. Write PL/SQL procedure for an application using cursors.
11. Write a PL/SQL procedure for an application using functions
12. Write a PL/SQL procedure for an application using package.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

REFERENCE BOOK:

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, Database Systems Concepts, Sixth Edition, McGraw Hill, 2010. 2. Raghu Ramakrishnan and Johannes Gehrke, Database management systems, Third Edition, 2002.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	M	S
CO3	M	S	S	S	S	M	M	S	S	M
CO4	M	M	S	S	S	S	S	M	S	S
CO5	S	S	S	M	S	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.C.A) - 2022-2023 onwards**Semester: IV** **Paper type: Allied II - Paper - 4****Paper code:** **Name of the Paper: Financial accounting II** **Credit: 5****Total Hours per Week: 7** **Lecture Hours: 91** **Tutorial Hours:** **Practical Hours:**
.....**Course Objectives:**

1. To understand the branch accounts and its types
2. To have practical knowledge in the preparation departmental accounting
3. To draft the Hire purchase systems
4. To acquire practical knowledge in Partnership accounts of fundamentals and reconstitution of partnership.
5. To acquire practical knowledge in Partnership accounts of Dissolution of partnership firms.

Course Out Comes

Unit1	After studied unit-1, the student will be able to	Understand the basic fundamentals of branch accounting
Unit2	After studied unit-2, the student will be able to	Understand the basic fundamentals of Departmental accounting
Unit3	After studied unit-3, the student will be able to	Understand the Hire purchase System of accounting
Unit4	After studied unit-4, the student will be able to	Prepare the accounts partnership in fundamentals and reconstitution of partnership.
Unit 5	After studied unit-5, the student will be able to	Understand the accounts of Dissolution of partnership firms.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes

4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit – I BRANCH ACCOUNTS**Teaching Hrs. 19**

Branch Accounts –Objectives – Types of Branches – Debtors System (at cost price and Invoice Price) – Independent Branch.

Unit – II DEPARTMENTAL ACCOUNTS**Teaching Hrs 17**

Departmental Accounts – Objectives – Distinction between Departments and Branches – Allocation of common expenses – Expenses which cannot be allocated – Inter Department transfer at cost price and selling price.

Unit – III HIRE PURCHASE SYSTEM**Teaching Hrs 18**

Hire Purchase system – Meaning – Journal Entries and Ledger Accounts in the books of Hire Purchaser and Hire Vendor – Default and Repossession -Complete Repossession only.

Unit – IV PARTNERSHIP ACCOUNTS – I**Teaching Hrs 19**

Partnership Accounts – Admission of Partner– Retirement of Partner – Death of a Partner (Simple Problems)

Unit – V PARTNERSHIP ACCOUNTS – II**Teaching Hrs 18**

Dissolution of Partnership Firm - Insolvency of a Partner -Insolvency of all Partners (Garner vs. Murray). (Simple Problems)

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
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- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.
- Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.

- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXT BOOK

S.No	Author	Title	Publisher	Year of Publication
1	T.S.Reddy and Murthy	Financial Accounting	Margham Publications	2018

REFERENCE BOOKS

S.No	Author	Title	Publisher	Year of Publication
1	M.C. Shukla and T.S. Grewal&co	Advanced Accounts	S. Chand & Co	2016
2	R.L. Gupta	Financial Accounting	Sultan chand	2014
3	S.P. Jain &K.L Narang,	Financial Accounting	Kalyani Publication	2017
4	R.S.N Pillai&V.Bagavathi	Fundamental of Advanced Accounting, Volume – I	S. Chand & Co	2013

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.C.A) - 2022-2023 onwards**Semester: IV****Paper type: Skill based Subjects II Paper 2****Paper code: CSCA44****Name of the Paper: INTERNET OF THINGS****Credit: 2****Total Hours per Week: 3****Lecture Hours:39****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To learn about the basics of IOT protocols.
2. To understand the fundamentals of Internet of Things.
3. To build a small low-cost embedded system using Raspberry Pi.
4. To apply the concept of Internet of Things in the real-world scenario.
5. To understand the real-world application concepts.

Course Outcomes

1. After studied unit-1, the student will be able to know and analyze various protocols for IoT
2. After studied unit-2, the student will be able to develop web services to access/control IoT devices.
3. After studied unit-3, the student will be able to design a portable IoT using Raspberry Pi
4. After studied unit-4, the student will be able to deploy an IoT application and connect to the cloud.
5. After studied unit-5, the student will be able to analyze applications of IoT in real time scenario.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	No	No	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	No	Yes	Yes	Yes
5	Yes	Yes	Yes	No	No	Yes

Unit-1: INTRODUCTION TO IoT**Teaching Hrs: 7 Hrs.**

Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology.

Unit-2: IoT ARCHITECTURE

Teaching Hrs. 8 Hrs.

M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture.

Unit-3: IoT PROTOCOLS

Teaching Hrs. 8 Hrs.

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP– Security.

Unit-4: BUILDING IoT WITH RASPBERRY PI & ARDUINO

Teaching Hrs. 8 Hrs.

Building IOT with RASPBERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi - Raspberry Pi Interfaces - Programming Raspberry Pi with Python - Other IoT Platforms - Arduino.

Unit-5: CASE STUDIES AND REAL-WORLD APPLICATIONS

Teaching Hrs. 8 Hrs.

Real world design constraints - Applications - Asset management, Industrial automation, smart grid, Commercial building automation, Smart cities - participatory sensing - Data Analytics for IoT – Software & Management Tools for IoT Cloud Storage Models & Communication APIs-Cloud for IoT - Amazon Web Services for IoT.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.
- Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.

- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

TEXT /REFERENCES BOOKS:

1. Arshdeep Bahga, Vijay Madisetti, —Internet of Things – A hands-on approach, Universities Press, 2015
2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), —Architecting the Internet of Things, Springer, 2011.
3. Honbo Zhou, —The Internet of Things in the Cloud: A Middleware Perspective, CRC Press, 2012.
4. Jan Höller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.
5. Olivier Hersent, David Boswarthick, Omar Elloumi, —The Internet of Things – Key applications and Protocols, Wiley, 2012

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	S	S	M	S	S
CO2	S	S	S	M	S	S	S	S	M	M
CO3	S	S	S	M	S	M	S	S	S	M
CO4	S	M	S	S	S	M	S	S	M	S
CO5	S	M	S	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
((BCA) – 2022-2023 onwards)

Semester: IV Paper type: Non Major Elective – Paper 2

Paper code: Name of the Paper: Internet Technology Credit: 2

Total Hours per Week: 2 Hrs. Lecture Hours: 26 Hrs. Tutorial Hours:.. Practical

Hours:

Course Objectives

1. Aims to build the concepts regarding Fundamentals of Internet, Connectivity and its Resource Requirements.
2. To understand the Internet Technology and its applications
3. To Understand WWW and Web Browsers.
4. To Understand Mailing system and applications of Internet.
5. To Understand relay chat

Course Outcomes

1. After studied unit-1, the student will be able to understand the Fundamentals of Internet, Connectivity and its Resource Requirements.
2. After studied unit-2, the student will be able to understand the Internet Technology and its applications
3. After studied unit-3, the student will be able to understand the basis of WWW and Web Browsers.
4. After studied unit-4, the student will be able to learn how to Mailing system and applications of Internet.
5. After studied unit-5, the student will be able to Understand relay chat that is how to read e-contents.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO INTERNET:

Teaching Hours: 5 Hrs.

What is Internet? Evolution and History of Internet- Growth of Internet-Owners of Internet- Internet Services- How does the Internet Works?-Anatomy of Internet-Internet Addressing-Internet vs Intranet-Impact of Internet- Governance of Internet.

Unit-2: INTERNET TECHNOLOGY AND PROTOCOL:

Teaching Hours: 5 Hrs.

ISO-OSI Reference Model-**Internet Connectivity:** Getting Connected- Different Types of Connections- Levels of Internet Connectivity- Internet Service Provider. **Internet Tools and Multimedia:** Current Trends on Internet-Multimedia and Animation.

Unit-3: WWW AND WEB BROWSER:

Teaching Hours: 5 Hrs.

WWW-Evolution of Web-Basic Elements of WWW-Web Browsers- Search Engines- Search Criteria. **Web Publishing:** Web Publishing- Web Page Design.

Unit-4: EMAIL:

Teaching Hours: 5 Hrs.

E-Mail Basics- E-Mail System-E-Mail Protocol-E-Mail Addresses-Structure of an E- Mail Message-E-Mail Clients& Servers-Mailing List-E-Mail Security.

Unit-5: USENET AND INTERNET RELAY CHAT:

Teaching Hours: 6 Hrs.

What is Usenet?-Newsgroup Hierarchies-What is a Newsreader?- How do you Read Newsgroups?- Who Administers Usenet?- Common News reading Tasks- How to Read Articles from Network News?- Relationship between Netnews and E-Mail-What is IRC?-Channels- Nicknames- Microsoft NetMeeting. **Internet and Web Security:** Overview of Internet Security- Aspects and Need of Security-E-Mail Threats and Secure E-mail-Web Security and Privacy Concepts-Firewall.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. ISRD Group. 2012. **Internet Technology and Web Design**. [Fourth reprint]. Tata McGraw-Hill Education Private Limited., New Delhi.

Reference Books:

1. Deitel, H.M Dietel, P.J. and Goldberg A.B. 2008. **Internet & Worldwide Web- How to Program**. [Third Edition]. PHL, New Delhi.
2. Comdex 2000. **Teach yourself computers and the internet visually**. [First Edition]. IDG Book India (p) Ltd.
2. Ramachandran, T.M. Nambissan. 2003. **An Overview of internet and web development**. [First Edition]. T M-Dhruv Publications.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	S	M	S	S	S	S	S	M	S
CO5	S	S	M	M	M	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: V****Paper type: Core Theory Paper 9****Paper code:****Name of the Paper: Mobile Application Development****Credit: 4****Total Hours per Week: 6****Lecture Hours: 78 .****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand the basics concept of mobile applications
2. To understand the structure of mobile applications
3. To understand simple mobile applications
4. To understand the mobile application services
5. To understand the real life mobile application development.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the basics of smart phones and android platforms.
2. After studied unit-2, the student will be able to understand the basic concepts of user interface related to app development.
3. After studied unit-3, the student will be able to understand the important of data persistence in mobile environment.
4. After studied unit-4, the student will be able to understand the various services and network facilities provided by android platform.
5. After studied unit-5, the student will be able to understand the various apps deployed and developed on by mobile platform.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION

Teaching Hours: 16 Hrs.

Introduction to Mobile Application Development – Various platforms– Smartphones–Android platform: features – Architecture – Versions–ART(Android Runtime)–ADB(Android Debug Bridge) –Development environment/IDE: Android studio and its working environment – Emulator setup –Application framework basics–XML representation and Android manifest file –Creating a simple application.

Unit-2: GUI

Teaching Hours: 15 Hrs.

GUI for Android: activities lifecycle–Android v7 support library –Intent: Intent object – Intent filters– Adding categories – Linking activities – User Interface design components–Basic Views – Picker Views – List View –Specialized Fragment– Gallery and Image View – Image Switcher – Grid View, Options Menu – Context Menu – Clock View –Web view–Recycler View.

Unit-3:DATA PERSISTENCE SCHEMES

Teaching Hours: 12 Hrs.

Different Data Persistence schemes: Shared preferences–File Handling–Managing data using SQLite database –Content providers: user content provider– Android in build content providers.

Unit-4: SERVICES

Teaching Hours: 19 Hrs.

Services: Introduction to services – Local service – Remote service – Binding the service –Communication between service and activity –Intent Service – Multi–Threading: Handlers – Async Task– Android network programming: Http Url Connection– Connecting to REST–based –SOAP based Web services –Broad cast receivers: Local Broadcast Manager–Dynamic broadcast receiver – System Broadcast –Telephony Manager: Sending SMS and making calls.

Unit-5: LOCATION BASED SERVICES

Teaching Hours: 16 Hrs.

Location based services: Google maps V2 services using Google API–Animations and Graphics: Property Animation –View Animations –Drawable Animations –Media and Camera API: Working with video and audio inputs – camera API –Sensor programming: Motion sensors–Position sensors– Environmental sensors –Publishing Android Apps: Guide lines– policies and process of uploading Apps to Google play.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.

- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. "Head First: Android Development", Dawn Griffiths, David Griffiths, O'Reilly, 1st Edition, 2015.
2. Barry Burd, "Android Application Development – All-in-one for Dummies", 2nd Edition, Wiley India, 2016.

Reference Book:

1. "Professional Android™ Sensor Programming", Greg Milette, Adam Stroud, John Wiley and Sons, Inc 2012.
2. "Android 6 for Programmers, App Driven approach", Paul Deitel, Harvey Deitel, Alexander Wald, Prentice Hall, 2015.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	S	L	M
CO2	S	S	M	M	S	M	S	S	L	M
CO3	S	S	S	S	M	S	S	M	M	S
CO4	S	S	S	L	S	S	S	M	S	S
CO5	M	S	M	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: V****Paper type: Core Theory Paper - 10****Paper code:****Name of the Paper: Operating System****Credit: 4****Total Hours per Week: 6****Lecture Hours: 78 . Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand the structure and functions of operating systems.
2. To understand the principles of scheduler, scheduler algorithms and Deadlock.
3. To learn various memory management schemes.
4. To understand the memory management services
5. To study I/O management, File system and Mass Storage Structure.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the basics of smart phones and android platforms.
2. After studied unit-2, the student will be able to understand the basic concepts of user interface related to app development.
3. After studied unit-3, the student will be able to understand the important of data persistence in mobile environment.
4. After studied unit-4, the student will be able to understand the various services and network facilities provided by android platform.
5. After studied unit-5, the student will be able to understand the various apps deployed and developed on by mobile platform.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION

Teaching Hours: 16 Hrs.

Basic Concepts of Operating System – Services of Operating System – Operating System Types – Computer System Operation – I/O Structure – Storage Structure – Memory Hierarchy – System Components – System Calls – System Programs – System Design and Implementation – Introduction to Process – Process State – Process Control Block – Process Scheduling – Operations on Process – Interprocess Communication – Communication in Client/Server Systems – Threads .

Unit-2: CPU SCHEDULER

Teaching Hours: 15 Hrs.

Types of CPU Scheduler – Scheduling Criteria – Scheduling Algorithms – Semaphores – Classic Problems of Synchronization – Basic Concept of Deadlocks – Deadlock Characterization – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery of Deadlock.

Unit-3: MEMORY MANAGEMENT

Teaching Hours: 12 Hrs.

Memory Management – Basics Concept of Memory – Address Binding – Logical and Physical Address Space – Memory Partitioning – Memory Allocation – Paging – Segmentation – Segmentation and Paging – Protection – Fragmentation – Compaction – Demand Paging – Page Replacement Algorithm – Classification of Page Replacement Algorithm .

Unit-4: FILE SYSTEM

Teaching Hours: 19 Hrs.

File System Storage – File Concept– File Access Methods – Directory Structure – File Sharing – File Protection – File System Implementation – File System Structure – Allocation Methods – Free Space Management – Mass Storage Structure – Disk structure – Disk Scheduling and Management – RAID Levels.

Unit-5: UNIX SYSTEM

Teaching Hours: 16 Hrs.

UNIX System – A Case Study – LINUX System – Case Study – Design Principles – Process Management – Scheduling – Memory Management – File Systems – Security .

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.

- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. “Operating System Concepts” –Abraham Silberschatz Peter B. Galvin, G. Gagne, Sixth Edition, Addison Wesley Publishing Co., 2003.
2. “Operating System” – Willam Stalling, Fourth Edition, Pearson Education, 2003.

Reference Book:

1. “Operating systems – Internals and Design Principles”, W. Stallings, 6th Edition, Pearson.
2. “Modern Operating Systems”, Andrew S.Tanenbaum, Second Edition Addison Wesley, 2001.
3. “Fundamentals of Operating System”, Prof. R. Sridhar, Dynaram Publication, Bangalore Company.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	S	L	M
CO2	S	S	M	M	S	M	S	S	M	L
CO3	S	S	S	S	M	S	S	M	M	S
CO4	S	S	S	L	S	S	S	S	S	S
CO5	M	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: V****Paper type: Core Theory Paper - 11****Paper code:****Name of the Paper: Design and Analysis of Algorithms****Credit: 2****Total Hours per Week: 4****Lecture Hours: 52.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To learn about the basics various algorithms.
2. To understand the fundamentals of divide and conquer techniques.
3. To understand the basic algorithms that using greedy methods.
4. To apply the concept of traversal and searching algorithms.
5. To understand the concept of backtracking methods.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to Understanding various algorithm design techniques.
2. After studied unit-2, the student will be able to understand the basis of efficient algorithms for all kinds of problems.
3. After studied unit-3, the student will be able to use simple approach which tries to find the best solution at every step.
4. After studied unit-4, the student will be able to providing a general insight into the dynamic programming approach.
5. After studied unit-5, the student will be able to understand the algorithm design paradigm for discrete and combinatorial optimization problems.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO DATA STRUCTURE

Teaching Hours: 10 Hrs,

Elementary Data Structures: Stack – Queues – Trees – Priority Queue – Graphs – What is an Algorithm? – Algorithm Specification – Performance Analysis: Space Complexity – Time Complexity – Asymptotic Notation – Randomized Algorithms.

Unit-2: SEARCH AND SORTING

Teaching Hours: 11 Hrs.

General Method – Binary Search – Recurrence Equation for Divide and Conquer – Finding the Maximum and Minimum— Merge Sort – Quick Sort – Performance Measurement – Randomized Sorting Algorithm – Selection Sort – A Worst Case Optimal Algorithm – Implementation of Select2 – Stassen's Matrix Multiplications.

Unit-3: TREES

Teaching Hours: 11 Hrs.

The General Method – Container Loading – Knapsack Problem – Tree Vertex Splitting – Job Sequencing with Deadlines – Minimum Cost Spanning Trees – Prim's Algorithm – Kruskal's Algorithm – An optimal Randomized Algorithm – Optimal Storage on Tapes – Optimal Merge Pattern – Single Source Shortest Paths.

Unit-4: GRAPHS

Teaching Hours: 10 Hrs.

The General Method – Multistage Graphs – All Pair Shortest Path – Optimal Binary Search Trees – String Editing – 0/1 Knapsack – Reliability Design – The Traveling Salesperson Problem. Techniques for Binary Trees – Techniques for Graphs – BFS – DFS.

Unit-5: PROBLEM SOLVING METHODS

Teaching Hours: 10 Hrs.

The General Method – The 8– Queens Problem – Sum of Subsets– Graph Coloring – Hamiltonian Cycles – Branch and Bound: General Method – LC Branch and Bound – FIFO Branch and Bound.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. "Fundamentals of Computer Algorithms", Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Galgotia Publications, Second Edition 2015.
2. "Introduction to Algorithms", Cormen T.H., Leiserson C.E. and Rivest R.L., PHI Publications, Third Edition, 1998.

Reference Book:

1. "Introduction to the Design and Analysis of Algorithms", Anany Levitin, Pearson Education, 2nd Edition.
2. "Introduction to Algorithms" Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, Prentice Hall of India, New Delhi, Second Edition, 2007.
3. "Computer Algorithms – Introduction to Design & Analysis" Sara Baase and Allen Van Gelder, Pearson Education New Delhi, Third Edition, 2000.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	L	M
CO2	S	S	M	M	S	M	S	S	M	L
CO3	M	S	S	S	M	S	M	S	M	S
CO4	S	S	S	L	M	S	S	S	S	S
CO5	S	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(BCA) – 2022-2023 onwards

Semester: V

Paper type: Core Practical - Practical - 5

Paper code:

Name of the Paper: Mobile Application Development Lab

Credit: 3

Total Hours per Week: 4

Lecture Hours:

Tutorial Hours:

Practical Hours: 52

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Course Objectives

1. To learn about the basics of developing android applications.
2. To understand the usage of the controls in android application.
3. To understand the advanced controls that are used in android applications.
4. To understand how the alerts are worked in application.
5. To understand the concept of connecting a database into the application.

Course Outcomes:

- 1, Able to understand about the basic developments of android applications
2. Able to understand the usage of the controls in android application.
3. Able to understand the advanced controls that are used in android applications.
4. Able to understand how the alerts are worked in application.
5. Able Tt understand the concept of connecting a database into the application.

List of Practical Exercises:

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Intent and Activity.
3. Develop an application that uses Layout Managers and event listeners.
4. Develop an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of RSS Feed.
6. Develop an application that implements Multithreading.

7. Develop an application that create alarm clock.
8. Develop an application Using Widgets.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Develop an application that makes use of database.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Course Material: website links, e-Books and e-journals

1. www.tutorialpoint.com
2. www.developer.android.com
3. www.toptal.com

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	L	M

B.C.A. Computer Applications (CBCS)

CO2	S	S	M	M	S	M	S	S	M	L
CO3	M	S	S	S	S	S	M	S	M	S
CO4	S	S	M	L	S	S	S	S	S	M
CO5	S	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(BCA) – 2022-2023 onwards

Semester: V Paper type: Core Practical - Practical - 6

Paper code: Name of the Paper: Operating System Lab Credit: 3

Total Hours per Week: 4 Lecture Hours: Tutorial Hours: Practical Hours: 52

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Course Objectives

1. To learn about the basics of UNIX commands and shell programming.
2. To understand the programming knowledge of scheduling algorithms.
3. To understand the working of semaphores in operating system.
4. To understand how to code various algorithm used in operating system.
5. To understand how to code and working procedure of file management concepts in operating system.

Course Outcomes:

1. Able to understand the basics of UNIX commands and shell programming.
2. Able to understand the programming knowledge of scheduling algorithms.
3. Able to understand the working of semaphores in operating system.
4. Able to understand how to code various algorithm used in operating system.
5. Able to understand how to code and working procedure of file management concepts in operating system.

List of Practical Exercises:

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
 - a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies
 - a) Sequential b) Indexed c) Linked
5. Implement Semaphores

6. Implement all File Organization Techniques
 - a) Single level directory b) Two level c) Hierarchical d) DAG
7. Implement Bankers Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement all page replacement algorithms
 - a) FIFO b) LRU c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Course Material: website links, e-Books and e-journals

1. www.tutorialpoint.com
2. www.javapoint.com
3. www.w3school.com

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	L	M
CO2	S	S	M	M	S	M	S	S	M	L
CO3	M	S	S	S	S	S	M	S	M	S
CO4	S	S	M	L	S	S	S	S	S	M
CO5	S	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: V Paper type: Internal Elective 1 Paper-1****Paper code: Name of the Paper: Data Mining Credit: 3****Total Hours per Week: 3 Lecture Hours: 39 . Tutorial Hours: Practical Hours:****Course Objectives**

1. To learn about the basics of data and data mining concepts.
2. To understand the fundamentals of analytical and data warehousing concepts
3. To understand the techniques that are followed in data mining.
4. To understand the basics of outlier detection and clustering concepts
5. To understand the tools that are used in data mining.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand about the basics of data mining and data.
2. After studied unit-2, the student will be able to understand about the methods of Data Warehousing
3. After studied unit-3, the student will be able to understand about the techniques of Data Mining
4. After studied unit-4, the student will be able to understand about the importance of Cluster and outlier detection
5. After studied unit-5, the student will be able to improve the student's knowledge with recent trends and tools

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	Yes	Yes

Unit-1: INTRODUCTION

Teaching Hours: 8 Hrs.

What is Data Mining– Kinds of Data – Kinds of patterns – Technologies used for Data Mining– Major Issues in Data Mining– Data –Data Objects and Attribute types– Data Visualization– Measuring Data Similarity and Dissimilarity–Data Preprocessing– overview– Data Cleaning– Data Integration– Data Reduction– Data Transformation and Data Discretization?

Unit-2: CONCEPTS OF DATA WARHOUSE

Teaching Hours: 7 Hrs.

Data Warehouse– Basic concepts–Data Warehouse Modelling: Data Cube and OLAP– Data Warehouse Design and Usage– Data Warehouse Implementation– Data Generalization by Attribute–Oriented Induction– Data Cube Technology– Data Cube Computation Methods– Exploring Cube Technology–Multidimensional Data Analysis in cube space.

Unit-3: CONCEPTS OF PATTERN

Teaching Hours: 9 Hrs.

Patterns– Basic concepts– Pattern Evaluation Methods–Pattern Mining: Pattern Mining in Multilevel– Multidimensional space–Constraint–Based Frequent Pattern Mining– Mining High Dimensional Data and Colossal patterns– Mining compressed or Approximate patterns– Pattern Exploration and Application. Classification– Decision tree Induction– Bayes Classification methods– Rule based Classification– Model Evaluation and selection– Techniques to Improve Classification Accuracy– Other Classification methods.

Unit-4: CLUSTERS

Teaching Hours: 8 Hrs.

Cluster Analysis– Partitioning Methods – Hierarchical Methods – Density – Based Methods– Grid – Based Methods – Evaluation of Clustering.– Clustering High – Dimensional Data–Clustering Graph and Network Data – Clustering with Constraints – Web Mining – Spatial Mining. Outlier Detection – Outliers and Outliers Analysis – Outlier Detection Methods–Outlier Approaches – Statistical – Proximity–Based – Clustering–Based– Classification Based – High–Dimensional Data.

Unit-5: DATA MININ METHODOLOGIES

Teaching Hours: 7 Hrs.

Other Methodologies of Data Mining – Data Mining Applications – Data Mining Trends – Recent Data Mining Tools – Rapid miner – Orange – Weka–Knime–Sisense –Ssd (SQL Server Data Tools) – Oracle – Rattle – Data melt – Apache Mahout.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. "Data Warehousing Fundamentals", PaulrajPonnaiah, Wiley Publishers, 2001.
2. "Data Mining: Concepts and Techniques", Jiawei Han, MichelineKamber, Morgan Kaufman Publishers, 2006.
3. "Introduction to Data mining with case studies", G.K. Gupta, PHI Private limited, New Delhi, 2008. 2nd Edition, PHI, 2011

Reference Book:

1. "Advances in Knowledge Discover and Data Mining", Usama M. Fayyad, Gregory Piatetsky Shapiro, Padhrai Smyth RamasamyUthurusamy, the M.I.T. Press, 2007.
2. "The Data Warehouse Toolkit", Ralph Kimball, Margy Ross, John Wiley and Sons Inc., 2002
3. "Building Data Mining Applications for CRM", Alex Berson, Stephen Smith, Kurt Thearling, Tata McGraw Hill, 2000.
4. "Data Mining: Introductory and Advanced Topics", Margaret Dunham, Prentice Hall, 2002.
5. "Discovering Knowledge in Data: An Introduction to Data Mining", Daniel T. Larose John Wiley & Sons, Hoboken, New Jersey, 2004

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	L	M
CO2	S	S	M	M	S	M	S	S	M	L
CO3	M	S	S	S	S	S	M	S	M	S
CO4	S	S	S	L	S	S	S	S	S	S
CO5	S	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: V Paper type: Internal Elective 1 Paper - 1****Paper code: Name of the Paper: Information Security Credit: 3****Total Hours per Week: 3 Lecture Hours: 39. Tutorial Hours: Practical Hours:****Course Objectives**

1. To learn about the basics of information security.
2. To understand the fundamentals of information security.
3. To understand the risk management techniques.
4. To understand the current techniques that are used in information security.
5. To understand the concept of networking concept and techniques.

Course out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the basic concepts of Information Security
2. After studied unit-2, the student will be able to understand the legal, ethical and professional issues in Information Security
3. After studied unit-3, the student will be able to know about risk management
4. After studied unit-4, the student will be able to understand the technological aspects of Information Security
5. After studied unit-5, the student will be able to understand the concepts of Cryptography and Hacking methods

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	Yes
2	Yes	No	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	No	Yes

Unit-1: INFORMATION SECURITY BASICS

Teaching Hours: 6 Hrs.

Introduction –History – What is Information Security? – Critical Characteristics of Information – NSTISSC Security Model – Components of an Information System – Securing the Components – Balancing Security and Access – The SDLC – The Security SDLC.

Unit-2: SECURITY INVESTIGATION

Teaching Hours: 7 Hrs.

Security – Business Needs – Threats – Attacks – Legal – Ethical and Professional Issues – Relevant U.S. Laws – International Laws and Legal Bodies – Ethics and Information Security – Codes of Ethics and Professional Organizations

Unit-3: SECURITY ANALYSIS

Teaching Hours: 9 Hrs.

Risk Management – Introduction – An Overview of Risk Management – Risk Identification – Risk Assessment – Risk Control Strategies – Selecting a Risk Control Strategy –Quantitative versus Qualitative Risk Control Practices – Risk Management Discussion Points

Unit-4: SECURITY MODELS

Teaching Hours: 10 Hrs.

Logical Design – Blueprint for Security – Information Security Policy – Standards and Practices– ISO 17799/BS 7799– NIST Models– VISA International Security Model – Design of Security Architecture – Planning for Continuity – Security Physical Design –Firewalls –Security Technology – IDS – IPS – Honey Pots – Honey Nets – Padded cell Systems Scanning and Analysis Tools – Access Control Devices.

Unit-5: CRYPTOGRAPHY AND ETHICAL HACKING

Teaching Hours: 7 Hrs.

Cipher methods – Cryptographic Algorithms and Tools – Attacks on Cryptosystems–Hacking – Effects of Hacking – Hacker – Types of Hacker– Ethical Hacker –Hacktivism– Networking & Computer Attacks – Malicious Software (Malware) – Protection Against Malware – Intruder Attacks on Networks and Computers – Wireless Hacking– Windows Hacking – Linux Hacking Session.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.

- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

- 1. “Principles of Information Security”, Michael E Whitman and Herbert J Mattord, 5th Edition, Vikas Publishing House, New Delhi, 2003.
- 2. “Fundamentals of Information Systems Security”, David Kim, Michael G. Solomon, 3rd Edition, Jones & Bartlett Learning, October 2016.
- 3. “The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy”, Patrick Engebretson, 2nd Edition, Syngress Basics Series – Elsevier, 2011.
- 4. “Hands-On Ethical Hacking and Network Defense”, Michael T. Simpson, Kent Backman, James E. Corley, Second Edition, CENGAGE Learning, 2010.

Reference Book:

- 1. “Handbook of Information Security Management”, Micki Krause, Harold F. Tipton, sixth Edition, CRC Press LLC, 2004.
- 2. “Hacking Exposed”, Stuart McClure, Joel Scrambray, George Kurtz, Tata McGraw–Hill, 2003.
- 3. “Computer Security Art and Science”, Matt Bishop, 2nd Edition, Pearson/PHI, 2002.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	L	M
CO2	S	S	M	M	S	M	S	S	M	L
CO3	M	S	S	S	S	S	M	S	M	S
CO4	S	S	M	L	S	S	S	S	S	M
CO5	S	S	M	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: V Paper type: Internal Elective 1 Paper - 1****Paper code: Name of the Paper: Software Testing Credit: 3****Total Hours per Week: 3 Lecture Hours: 39 . Tutorial Hours: Practical Hours:****Course Objectives**

1. To understand about the basics of software testing.
2. To understand the fundamentals of software development models.
3. To understand the structural testing methods.
4. To understand the current techniques that are used in object oriented testing models.
5. To understand the concept of software testing quality details.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the concept of software testing, and software quality
2. After studied unit-2, the student will be able to learn to inspect and detect errors by going through each and every code segment
3. After studied unit-3, the student will be able to gain knowledge of various functional and structural testing techniques
4. After studied unit-4, the student will be able to understand basic concept of Software Management tools and object oriented testing
5. After studied unit-5, the student will be able to understand basic concept of Software quality and software quality assurance

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO SOFTWARE TESTING

Teaching Hours: 6 Hrs.

Fundamentals of software testing – need for software testing– Psychology of testing – various approaches – characteristics of testing – principles of testing – testing strategies – verification and validation – Defect and Prevention strategies.

Unit-2: SOFTWARE DEVELOPMENT MODEL AND TESTING

Teaching Hours: 7 Hrs.

Water fall model– V–model– Spiral model– Agile model – Life cycle of testing– Static Testing – dynamic testing – White box testing – Block box testing – Regression testing – Integration Testing – System and Performance Testing – Usability Testing

Unit-3: FUNCTIONAL AND STRUCTURAL TESTING

Teaching Hours: 9 Hrs.

Boundary Value Analysis – Equivalence Class Testing – Decision Table – Based Testing – Cause Effect Graphing Technique – Path testing –Cyclomatic Complexity – Graph Metrics – Data Flow Testing – Slice based testing

Unit-4: TEST MANAGEMENT AND TOOLS

Teaching Hours: 10 Hrs.

Test planning – cost–benefit analysis of testing – monitoring and control– test reporting – test control – Specialized testing – Object Oriented Testing – Automated Tools for Testing – Tool Selection and Implementation – Challenges in test automation– GUI Testing

Unit-5: SOFTWARE QUALITY AND SOFTWARE QUALITY ASSURANCE

Teaching Hours: 7 Hrs.

Introduction to software quality and software quality assurance – basic principles about the software quality and software quality assurance – Planning for SQA – various models for software product quality and process quality – SCM – RAD – System Documentation

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.
- Following institution and intellectual and writing reports in the course field.

- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Software Testing– A Craftsman’s Approach” – Paul C. Jorgensen – Second Edition – CRC Press 2008
2. “Software Testing”, – Ron Patton, Second Edition –Sams Publishing, Pearson Education, 2007.
3. “Software Testing– A Craftsman’s Approach” – Paul C. Jorgensen, Second Edition – CRC Press, 2008

Reference Books:

1. “Software Testing and Analysis: Process, Principles and Techniques” – Mauro Pezze, Michal Young – Wiley India , 2008
2. “Software Engineering” – K.K. Aggarwal&Yogesh Singh – New Age International Publishers – New Delhi, 2003.
3. “Software Testing – Principles and Practices” –SrinivasanDesikan and Gopalaswamy Ramesh, Pearson Education, 2006.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	M	S	M	S	S	L	M
CO2	S	S	M	M	S	M	S	S	M	S
CO3	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	L	S	S	S	S	S	M
CO5	S	S	S	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: V****Paper type: Skill Based Subject III Paper - 3****Paper code:****Name of the Paper: Software Engineering****Credit: 2****Total Hours per Week: 3****Lecture Hours: 39.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand about the basic method to develop a software.
2. To understand the fundamentals for choosing requirements of the project.
3. To understand the concept of software engineering.
4. To understand the methods involve in software testing.
5. To understand the basic knowledge in software project management.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to the concepts and methods required for the construction of large software intensive systems.
2. After studied unit-2, the student will be able to Gets the idea of choosing the Requirements in Software Engineering.
3. After studied unit-3, the student will be able to Gives an understanding the concept of Data Engineering.
4. After studied unit-4, the student will be able to impart knowledge on Testing and Debugging.
5. After studied unit-5, the student will be able to enable the students to learn the basic of Project Management & Scheduling.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO EVOLVING SOFTWARE**Teaching Hours: 6 Hrs.**

Evolving Role of Software – Nature of Software – Software Engineering – The Software Process – Software Engineering Practices – Software Myths – A Generic View of Process Model – Process Assessment and Improvement – Process Models : Waterfall Model – Incremental Process Models – Evolutionary Process Models – Concurrent Models.

Unit-2: REQUIREMENTS ENGINEERING

Teaching Hours: 7 Hrs.

Requirements Engineering: Establishing the Groundwork – Initiating the Requirements Engineering Process – Eliciting Requirements – Collaborative Requirements Gathering – Quality Function Deployment – Usage Scenarios – Elicitation work Products – Building the Requirements Model – Elements of Requirements Model – Analysis Pattern – Requirements Analysis – Data Modeling Concepts.

Unit-3: DATA ENGINEERING

Teaching Hours: 9 Hrs.

Data Engineering: Design Process and Design Quality – Design Concepts – The Design Model - Creating an Architectural Design – Software Architecture – Data Design – Architectural style – Architectural Design – Architectural Mapping Using Data Flow – Performing User Interface Design – Golden Rules.

Unit-4: TESTING STRATEGIES

Teaching Hours: 10 Hrs;

Testing Strategies: Strategic Approach to Software Testing – Strategic Issues – Test Strategies for Conventional and Object Oriented Software – Validation Testing – System Testing – Art of Debugging. Software Testing Fundamentals – White Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing – Model Based Testing.

Unit-5:PROJECT MANAGEMENT

Teaching Hours: 7 Hrs.

Project Management: Management Spectrum – People – Product – Process – Project – Critical Practices – Estimation: Project Planning Process – Software Scope and Feasibility – Resources – Software Project Estimation – Project Scheduling – Quality Concepts – Software Quality Assurance – Elements of Software Quality Assurance – Formal Technical Reviews.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

- 1. "Software Engineering – A Practitioner's Approach", Roger S Pressman, McGraw Hill International Edition, New York: 2005, Seventh Edition.
- 2. "Software Engineering", Mall Rajib, PHI Learning, 2009, 3 Third Edition.

Reference Book:

- 1. "Software Engineering", Ian Somerville, Pearson Education, 2006, 7th Edition.
- 2. "Software Engineering Concepts" Richard Fairley, Tata McGraw–Hill Education, 2011.
- 3. "Software Engineering: Theory and Practice ", Pfleeger and Lawrence, Pearson Education, 2001, Second Edition.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	S	S	L	M
CO2	M	M	M	M	S	M	S	S	M	S
CO3	M	S	S	S	S	M	M	S	S	S
CO4	S	S	S	L	S	S	S	S	S	M
CO5	S	M	S	M	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Core Theory Paper - 12****Paper code:****Name of the Paper: Open Source Software****Credit: 4****Total Hours per Week: 4****Lecture Hours: 52.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand about use pre-existing code to improve the software and even come up with their own innovations.
2. To understand the fundamentals of LINUX operating system.
3. To understand the concept of scripting code for a website.
4. To understand the fundamentals of PHP language combined with HTML.
5. To understand the fundamentals of PERL languages.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the concept of HTML, HTML5 and CSS.
2. After studied unit-2, the student will be able to learn to inspect and detect errors by going through each and every code segment.
3. After studied unit-3, the student will be able to understand basic concept of Java Script and MySQL.
4. After studied unit-4, the student will be able to understand basic concept of PHP
5. After studied unit-5, the student will be able to understand basic concept of PERL

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO HTML, CSS

Teaching Hours: 10 Hrs.

Need of Open Source –Advantages of Open source –Application of Open Source – HTML – HTML tags – Dynamic Web content– HTTP Request and Response Procedure–Introduction to HTML5– HTML5 Canvas – HTML5 Audio and Video–Introduction to CSS– CSS Rules–Style Types–CSS Selectors– CSS Colors.

Unit-2: LINUX

Teaching Hours: 11 Hrs.

Introduction: Linux Essential Commands – Kernel Mode and user mode –File system Concept – Standard Files – The Linux Security Model – Vi Editor – Partitions Creation – Shell Introduction – String Processing – Investigation and Managing Processes – Network Clients – Installing Application.

Unit-3: JAVA SCRIPT AND MYSQL

Teaching Hours: 10 Hrs.

Java script :Advantages of JavaScript –JavaScript Syntax–Data type– Variable– Array – Operators and Expressions– Loops – functions – Dialog box– MySQL – The show Databases and Table – The USE command – Create Database and Tables – Describe Table – Select, Insert, Update, and Delete statement.

Unit-4: PHP

Teaching Hours: 11 Hrs.

PHP Introduction – General Syntactic Characteristics – PHP Scripting – Commenting your code – Primitives, Operations and Expressions – PHP Variables – Operations and Expressions Control Statement – Array – Functions – Basic Form Processing – File and Folder Access – Cookies – Sessions – Database Access with PHP.

Unit-5:PERL

Teaching Hours: 10 Hrs.

PERL : Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules– Working with Files – Data Manipulation.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.

- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “The Complete Reference Linux”, Peterson, Tata McGraw HILL–2010
2. “Perl: The Complete Reference”, Martin C. Brown, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
3. “MYSQL: The Complete Reference”, VikramVaswani, 2nd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2009
4. “PHP: The Complete Reference”, Steven Holzner, 2nd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2009.
5. “Complete Reference HTML”, T. A. Powell, 3rd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2002.
6. “Mastering Java script” –J. Jaworski, BPB Publications, 1999

Reference Books:

1. “Fundamentals of Open Source Software”, by M.N. Rao, PHI publishers.
2. “MySQL Bible”, Steve Suchring, John Wiley, 2002
3. “The Linux Kernel Book”, Remy Card, Eric Dumas and Frank Mevel, Wiley Publications, 2003
4. Ivan Byross, HTML, DHTML, Javascript, Perl, BPB Publication

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	S	S	L	M
CO2	M	M	M	M	S	M	S	S	M	S
CO3	M	S	S	S	S	M	M	S	S	S
CO4	S	S	S	L	S	S	S	S	S	M
CO5	S	M	S	M	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Core Theory Paper - 13****Paper code: CCA51****Name of the Paper: PYTHON Programming****Credit: 4****Total Hours per Week: 4****Lecture Hours: 52.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand the basic building blocks for PYTHON programming.
2. Build basic programs using fundamental programming constructs like variables, conditional logic, looping, and functions
3. Work with user input to create fun and interactive programs
4. To acquire Object Oriented Skills in Python
5. To develop the skill of designing Graphical user Interfaces in Python

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the basic building blocks for creating PYTHON programming in details.
2. After studied unit-2, the student will be able to understand the control statements and basic methods used in PYTHON programming
3. After studied unit-3, the student will be able to understand the basic build in functions.
4. After studied unit-4, the student will be able to understand the some advanced methods to use in PYTHON
5. After studied unit-5, the student will be able to understand the concept of objects used in PYTHON

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION

Teaching Hours: 6 Hrs.

Identifiers – Keywords – Statements and Expressions – Variables – Operators – Arithmetic operators – Assignment operators – Comparison operators – Logical operators – Bitwise operators – Precedence and Associativity – Data types – Number – Booleans – Strings – Indentation – Comments – Single line comment – Multiline comments – Reading Input – Print Output – Type Conversions – int function – float function – str() function – chr() function – complex() function – ord() function – hex() function – oct() function – type() function and Is operator – Dynamic and Strongly typed language.

Unit-2: CONTROL FLOW STATEMENTS

Teaching Hours: 7 Hrs.

Control Flow Statements – If statement – If else statement – If elif else statement – nested if statement – while loop – for loop – continue and break statements – catching exceptions using try and except statement – syntax errors – exceptions – exception handling – Strings – str() function – Basic string operations – String comparison – Built in functions using strings – Accessing characters in string – String slicing – String joining – split() method – string traversing.

Unit-3: FUNTIONS

Teaching Hours: 9 Hrs.

Functions – Built in functions – function definition and calling – return statement – void function – scope and lifetime of variables – args and kwargs – command line arguments – Tuples – creation – basic tuple operations – tuple() function – indexing – slicing – built-in functions used on tuples – tuple methods – packing – unpacking – traversing of tuples – populating tuples – zip() function – Sets – Traversing of sets – set methods – frozenset.

Unit-4: LISTS

Teaching Hours: 9 Hrs.

Lists: Using List- List Assignment and Equivalence – List Bounds- Slicing – Lists and Functions- Prime Generation with a List. List Processing: Sorting-Flexible Sorting- Search- List Permutations- Randomly Permuting a List- Reversing a List.

Unit-5:OBJECTS

Teaching Hours: 8 Hrs.

Objects: Using Objects- String Objects- List Objects. Custom Types: Geometric Points- Methods- Custom Type Examples- Class Inheritance. Handling Exceptions: Motivation- Exception Examples- Using Exceptions – Custom Exceptions.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.

- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. **Gowrishankar S, Veena A, "Introduction to Python programming", 1st Edition, CRC Press/Taylor & Francis, 2008. (Units 1-3)**
2. **Learn to Program with Python, 3th Edition, Richard L. Halterman, Southern Adventist University. (Units 4-5)**

Reference Book:

1. **Core Python Programming, 2thEdition, Wesley J. Chun, Prentice Hall.**
2. **Jake VanderPlas,"Python Data Science Handbook: Essential Tools for working with Data",1st edition, O'Reilly Media, 2016.**

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	S	S	L	M
CO2	M	M	M	M	S	M	S	S	M	S
CO3	M	S	S	S	S	M	M	S	S	S
CO4	S	S	S	L	S	S	S	S	S	M
CO5	S	M	S	M	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(Bachelor of Computer Science) – 2022-2023 onwards

Semester: VI

Paper type: Core – Practical -7

Paper code:

Name of the Paper: Python Programming Lab

Credit: 2

Total Hours per Week: 4 Hrs. Lecture Hours:.. Tutorial Hours: Practical Hours: 52 Hrs.

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Course Objectives

1. To know about basic data types, operators in Python.
2. To understand Loops in Python.
3. To understand the concepts of Arrays.
4. To understand how to handle string.
5. To know about functions.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to write a program using operators.
2. After studied unit-2, the student will be able to develop a program using loops.
3. After studied unit-3, the student will be able to implement program using Arrays.
4. After studied unit-4, the student will be able to implement the concept of String functions.
5. After studied unit-5, the student will be able to build application with basic expressions

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes

4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Develop a Python program to find the area and perimeter of a circle.
2. Develop a Python program to generate Fibonacci series.
3. Develop a Python program to compute the GCD of two numbers.
4. Develop a Python program to generate first n prime numbers.
5. Develop a Python program to find the sum of squares of n natural numbers.
6. Develop a Python program to find the sum of the elements in an array.
7. Develop a Python program to find the largest element in the array.
8. Develop a Python program to check if the given string is a palindrome or not.
9. Develop a Python program to store strings in a list and print them.
10. Develop a Python program to find the length of a list, reverse it, copy it and then clear it.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	S
CO2	S	S	M	M	S	M	S	M	S	S
CO3	S	M	M	M	S	M	S	M	S	S
CO4	S	S	S	M	S	S	S	S	M	S
CO5	S	M	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(Bachelor of Computer Science) – 2022-2023 onwards**Semester: VI Paper type: Core - Practical - Practical - 8****Paper code: Name of the Paper: Open Source Programming Lab Credit: 2****Total Hours per Week: 4 Hrs. Lecture Hours: Tutorial Hours: .. Practical Hours: 52 Hrs.**

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Course Objectives

1. To understand the basic HTML Tags.
2. To understand the types of CSS.
3. To learn Javascript functions.
4. To know about PHP form elements.
5. To learn PHP with MYSQL database connectivity.

Course Outcomes

1. After studied unit-1, the student will be able to design static web pages.
2. After studied unit-2, the student will be able to link common style to the web pages using CSS.
3. After studied unit-3, the student will be able to validate form controls using javascript.
4. After studied unit-4, the student will be able to design dynamic webpages using PHP.
5. After studied unit-5, the student will be able to develop PHP program with MYSQL database connection.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Create a web page with Frames and Tables.
2. Create a web page incorporating CSS (Cascading Style Sheets).
3. Develop a shell program to find the factorial of an integer positive number.
4. Develop a shell program to find the details of a user session.
5. Create a simple calculator in JavaScript.
6. Develop a JavaScript program to scroll your name in the scrollbar.
7. Develop a program and check message passing mechanism between pages.
8. Application for Email Registration and Login using PHP and MySQL.
9. Program to Create a File and write the Data into it using PHP.
10. Program to perform the String Operation using Perl.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.

- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	S
CO2	S	S	M	S	S	S	M	M	S	S
CO3	S	M	M	S	M	M	S	M	M	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	S	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Internal Elective II Paper - 2****Paper code:****Name of the Paper: Big Data Analytics****Credit: 3****Total Hours per Week: 3****Lecture Hours: 39.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To explore the fundamental concepts of big data analytics.
2. To learn to use various techniques for mining data stream.
3. To learn the Big data Business Perspective
4. To understand the applications using Map Reduce Concepts.
5. To introduce programming tools HIVE in Hadoop ecosystem.

Course Outcomes

1. After studied unit-1, the student will be able to understand the key issues in big data management.
2. After studied unit-2, the student will be able to outline big data planning, processing.
3. After studied unit-3, the student will be able to Acquire fundamental enabling techniques and scalable.
4. After studied unit-4, the student will be able to examine various big data tools and techniques.
5. After studied unit-5, the student will be able to achieve adequate perspectives of Big Data Analytics in various Applications like recommender system, Social Media Applications and etc.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO BIG DATA**Teaching Hours: 8 Hrs.**

Introduction to big data: Introduction to Big Data Platform – Challenges of Conventional Systems – Intelligent data analysis – Nature of Data – Characteristics of Data – Evolution of Big Data – Definition of Big Data – Challenges

with Big Data – Volume, Velocity, Variety – Other Characteristics of Data – Need for Big Data–Analytic Processes and Tools – Analysis vs. Reporting.

Unit-2: MINING DATA STREAMS

Teaching Hours: 8 Hrs.

Mining data streams: Introduction To Streams Concepts – Stream Data Model and Architecture – Stream Computing – Sampling Data in a Stream – Filtering Streams –Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window – Real time Analytics Platform(RTAP) Applications – Case Studies – Real Time Sentiment Analysis– Stock Market Predictions.

Unit-3: BIG DATA FROM DIFFERENT PERSPECTIVES

Teaching Hours: 7 Hrs.

Big data from business Perspective: Introduction of big data–Characteristics of big data–Data in the warehouse and data in Hadoop– Importance of Big data– Big data Use cases– Patterns for Big data deployment. Big data from Technology Perspective:–Application Development in Hadoop–Getting your data in Hadoop.

Unit-4: HADOOP AND MAP REDUCE

Teaching Hours: 9 Hrs.

Hadoop: The Hadoop Distributed File System – Components of Hadoop Analysing the Data with Hadoop– Scaling Out–Hadoop Streaming– Design o fHDFS–Java interfaces to HDFS Basics– Developing a Map Reduce Application–How MapReduce Works–Anatomy of a Map Reduce Job run–Failures–Job Scheduling–Shuffle and Sort – Task execution – Map Reduce Types and Formats– Map Reduce Features–Hadoop environment.

Unit-5:FRAMEWORKS

Teaching Hours: 7

Objective: To introduce programming tools HIVE in Hadoop ecosystem.

Frameworks: Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive – fundamentals of HBase and ZooKeeper– IBM Info Sphere Big Insights and Streams.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
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- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.
- Following institution and intellectual and writing reports in the course field.

- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. “Intelligent Data Analysis”, Michael Berthold, David J. Hand, Springer, 2007.
2. “Hadoop: The Definitive Guide “, Tom White Third Edition, Oreilly Media, 2012.

Reference Book:

1. “Big Data and Analytics” Seema Acharya, Subhasini Chellappan, Wiley 2015.
2. “Mining of Massive Datasets”, Anand Rajaraman and Jeffrey David Ullman, CUP, 2012.
3. “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data” .Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, McGrawHill Publishing, 2012.
4. “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, Bill Franks, John Wiley & sons, 2012.
5. “Making Sense of Data”, Glenn J. Myatt, John Wiley & Sons, 2007.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	M	S	S	S
CO2	S	S	S	S	M	S	M	M	S	S
CO3	S	S	S	S	S	S	M	M	S	S
CO4	S	M	M	S	M	S	M	M	S	S
CO5	S	M	M	M	M	S	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Internal Elective II Paper - 2****Paper code:****Name of the Paper: Cryptography****Credit: 3****Total Hours per Week: 3****Lecture Hours: 39.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. Understand OSI security architecture and classical encryption techniques.
2. Understand the different cryptographic operations of symmetric cryptographic algorithms.
3. Understand the different cryptographic operations of Public key cryptographic algorithms.
4. To make use of application protocols to design and manage a secure system.
5. To learn the configuration and manage E-mail and WLAN Security.

Course Outcomes

1. After studied unit-1, the student will be able to know the security attacks and services.
2. After studied unit-2, the student will be able to understand the concept of Encryption Standards.
3. After studied unit-3, the student will be able to understand public key cryptographic algorithms.
4. After studied unit-4, the student will be able to learn the concept of hash functions.
5. After studied unit-5, the student will be able to understand the Email security.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: COMPUTER AND NETWORK SECURITY

Teaching Hours: 8 Hrs.

Computer Security Concepts –OSI security architecture –Security trends–Security attacks – Security Services– Security Mechanisms –Fundamental Security Design Principles – Attack Surfaces and Attack Trees – Model for Network Security – Network Standards.

Unit-2: SYMMETRIC CRYPTOGRAPHY

Teaching Hours: 8 Hrs.

Symmetric Cipher – Classical Encryption Technique – Symmetric Cipher Model – Substitution Techniques, Transposition Technique – Steganography – Block Cipher and the Data Encryption Standard – The Data Encryption Standard – Differential and Linear Cryptanalysis – Block Cipher Principles. Advanced Encryption Standard – AES Structure – AES Transformation Function.

Unit-3: PUBLIC KEY CRYPTOGRAPHY

Teaching Hours: 7 Hrs.

Public Key Cryptography and RSA Principles– RSA Algorithm, Key Management and other Public Key Cryptosystems Key Management, Diffie–Hellman Key Exchange, Elliptic Curve Arithmetic – Elliptic Curve Cryptography – Pseudorandom Number Generation.

Unit-4: HASH FUNCTIONS AND DIGITAL SIGNATURES

Teaching Hours: 9 Hrs.

Cryptographic Hash Functions – Application of Hash Functions – Two Simple Hash Functions – Secure Hash Algorithm(SHA) –Message Authentication Codes –Authentication requirement – Authentication function – MAC – HMAC – CMAC – Digital signature and authentication protocols – Digital Signature Standards –Digital Signatures Schemes–Digital Certificate – Key Management and Distribution.

Unit-5:SECURITY APPLICATIONS

Teaching Hours: 7 Hrs.

Objective: To learn the configuration and manage E–mail and WLAN Security.

Intrusion Detection System– Password Management – Introduction to Firewall– Firewall Generations– Web Security – Wireless network Security – Electronic Mail Security– Internet Mail Architecture–S/MIME – Pretty Good Privacy (PGP).

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.

- h) Grouping students for self discussion, self learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. “Cryptography and Network security Principles and Practices”, William Stallings, Pearson/PHI, Seventh Edition, 2017.

2. “CRYPTOGRAPHY & NETWORK SECURITY” – Principles and Practices, William Stallings, Pearson Education, Third Edition.

Reference Book:

- 1. “Modern Cryptography Theory and Practice”, Wenbo Mao, Pearson Education, 2004.**
- 2. “Cryptography and Network Security”, Behrouz Forouzan, Debdeep Mukhopadhyay, Tata McGraw Hill Education Pvt. Ltd, New Delhi, 2010.**
- 3. “Quantum Cryptography and Secret–Key Distillation”, Gilles van Assche, Cambridge University Press, 2010.**

Course Material: website links, e-Books and e-journals
Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	M	S	S	S
CO2	S	S	S	M	M	M	M	S	M	S
CO3	S	M	M	M	M	M	M	S	S	S
CO4	S	S	M	M	M	S	S	S	M	S
CO5	S	S	S	M	M	M	M	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Internal Elective II Paper - 2****Paper code:****Name of the Paper: DIGITAL IMAGE PROCESSING****Credit: 3****Total Hours per Week: 3****Lecture Hours: 39.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To know the basics of Digital image and techniques.
2. To understand various Image enhancement ideas.
3. To understand Image restoration techniques.
4. To understand degrees of image resolution and compression methods.
5. To understand concepts of image representation and recognition.

Course Outcomes

1. After studied unit-1, the student will be able to understand the concepts like Mat Lab, DIP, electromagnetic spectrum and etc.
2. After studied unit-2, the student will be able to analyze smoothing and sharpening techniques.
3. After studied unit-3, the student will be able to know about image filters.
4. After studied unit-4, the student will be able to gain knowledge about compression techniques.
5. After studied unit-5, the student will be able to know about image representation.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: FUNDAMENTALS

Teaching Hours: 8 Hrs.

Introduction – Origin – Steps in Digital Image Processing – Components – Applications of DIP – Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Images in Matlab– Pixels – Color models – Digital Image Processing in Multimedia.

Unit-2: IMAGE ENHANCEMENT

Teaching Hours: 8 Hrs.

Spatial Domain – Gray level transformations – Histogram Quantization – Histogram matching and processing – Basics of Spatial Filtering – Smoothing and Sharpening Spatial Filtering – Introduction to Fourier Series – Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal – Butterworth and Gaussian filters

Unit-3: IMAGE RESTORATION AND SEGMENTATION

Teaching Hours: 7 Hrs.

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters – Notch Filters – Optimum Notch Filtering – Inverse Filtering – Wiener filtering Segmentation: Detection of Discontinuities–Edge Linking and Boundary detection – Region based segmentation– Active Contour Models – Snakes – Fuzzy Connectivity – Morphological processing– erosion and dilation.

Unit-4: WAVELETS AND IMAGE COMPRESSION

Teaching Hours: 9 Hrs.

Wavelets – Sub band coding – Multi resolution expansions – Compression: Fundamentals – Image Compression models – Error Free Compression – Predictive Compression Methods – Vector Quantization – Variable Length Coding – Bit–Plane Coding – Lossless Predictive Coding – Lossy Compression – Lossy Predictive Coding – Compression Standards

Unit-5: IMAGE REPRESENTATION AND RECOGNITION

Teaching Hours: 7 Hrs.

Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems – Chain Code – Polygonal approximation, signature, boundary segments – Shape number – Fourier Descriptor moments – Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

1. "Digital Image Processing," Rafael C. Gonzalez, Richard E.Woods, Prentice Hall, Third Edition, 2008.
2. "Digital Image Processing and Computer Vision," Sonka, Hlavac, Boyle, Cengage Learning, 2009
3. "Fundamentals of Digital Image Processing", Anil Jain K, PHI Learning Pvt. Ltd., 2011.

Reference Book:

1. "Digital Image Processing", S. Sridhar, Oxford University Press; Second edition, 2016.
2. "Digital Image Processing", Gonzalez &woods, Pearson Education India, 2016.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	M	S	S
CO2	S	S	ggM	M	M	M	S	M	S	S
CO3	S	S	M	M	M	S	S	S	M	S
CO4	S	M	S	M	S	M	M	S	S	S
CO5	S	M	M	M	S	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Internal Elective III Paper - 3****Paper code:****Name of the Paper: ARTIFICIAL INTELLIGENCE****Credit: 3****Total Hours per Week: 3****Lecture Hours: 39.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To know the basics of Artificial Intelligence.
2. To Understand the Methods and algorithms in AI.
3. To learn to represent knowledge in solving AI problems.
4. To Understand Statistical logics and know about Software agents.
5. To learn how Machine learning is related to AI.

Course Outcomes

1. After studied unit-1, the student will be able to recall the fundamentals of artificial intelligence
2. After studied unit-2, the student will be able to understand the techniques used for AI
3. After studied unit-3, the student will be able to know about knowledge representation.
4. After studied unit-4, the student will be able to gain knowledge about fuzzy logic.
5. After studied unit-5, the student will be able to evaluate the design of new artificial intelligence and machine learning applications

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO ARTIFICIAL INTELLIGENCE:

Teaching Hours: 8 Hrs.

History of AI – Artificial Narrow Intelligence (ANI) – Artificial General Intelligence (AGI) – Artificial Super Intelligence (ASI) – Characteristics – Types of AI – Domains – Programming Languages of AI – Applications of AI – Future of AI.

Unit-2: AI – PROBLEM SOLVING METHODS:

Teaching Hours: 8 Hrs.

Problem solving Methods – Search Strategies: Uninformed – Informed – Heuristics – Generate and test – hill climbing – Best first search – problem reduction – Local Search Algorithms and Optimization – Game Playing mini-max procedure – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games

Unit-3: AI – KNOWLEDGE REPRESENTATION:

Teaching Hours: 7 Hrs.

Procedural Versus declarative knowledge – logic programming – Forward Versus backward reasoning – Matching – Control knowledge – Ontological Engineering– Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories –Reasoning with Default Information.

Unit-4: STATISTICAL REASONING AND AGENTS:

Teaching Hours: 9 Hrs.

Probability and Bayes Theorem – Certainty factors – Probabilistic Graphical Models – Bayesian Networks – Markov Networks – Fuzzy Logic. Architecture for Intelligent Agents – Agent communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-agent systems.

Unit-5: MACHINE LEARNING AND APPLICATIONS

Teaching Hours: 7 Hrs.

Types of Machine Learning – Neural Networks – Deep Learning – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.
- Following institution and intellectual and writing reports in the course field.

- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Artificial Intelligence”, Elaine Rich, Kevin Knight, Tata McGraw Hill, II Edition.
2. "Artificial Intelligence: A Modern Approach," Stuart Russell, Peter Norvig, Third Edition, Prentice Hall of India, New Delhi, 2010.
3. “Prolog: Programming for Artificial Intelligence”, I. Bratko, Addison – Wesley Educational Publishers Inc., Fourth edition 2011.

Reference Book:

1. “Machine Learning for Beginners 2019”, Matt Henderson, This Is Charlotte, 2019
2. “Introduction to Artificial Intelligence and Expert Systems”, Dan W. Patterson, Pearson, 2015

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	M	S	S
CO2	S	M	S	S	M	M	S	M	S	S
CO3	S	S	M	M	S	M	M	S	S	S
CO4	S	M	S	M	M	M	M	S	S	S
CO5	S	S	M	M	S	S	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Internal Elective III Paper - 3****Paper code:****Name of the Paper: SYSTEM SOFTWARE****Credit: 3****Total Hours per Week: 3****Lecture Hours: 39.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand the basic concepts of system software
2. Ability to trace the path of a source code to object code and to executable file
3. To design and implementation of loaders and linkers
4. To understand the concepts of macro processor
5. Ability to analyse the functions of compilers

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to analyse CISC and RISC machines.
2. After studied unit-2, the student will be able to know how assemblers are working.
3. After studied unit-3, the student will be able to distinguish Linker and Loader.
4. After studied unit-4, the student will be able to learn macro processor.
5. After studied unit-5, the student will be able to understand the functions of compilers.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analysing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO SYSTEM SOFTWARE

Teaching Hours: 8

Hrs.

System software vs. Application software – Different types of system software – SIC& SIC/XE Architecture – traditional (CISC) machines – RISC machines.

Unit-2: ASSEMBLERS

Teaching Hours: 8

Hrs.

Basic assembler functions– Machine dependent and independent assembler features– Assembler design options– One pass assemblers–Multi pass assemblers– MASM assembler.

Unit-3: LOADERS AND LINKERS

Teaching Hours: 7

Hrs.

Basic loader functions–Simple bootstrap loaders – Machine dependent and independent loader features–Linkage editors– Dynamic linking

Unit-4: MACRO PROCESSOR

Teaching Hours: 9

Hrs.

Basic macro processor functions–Machine dependent and independent macro processor features–Macro processor design options.

Unit-5: COMPILERS

Teaching Hours: 7

Hrs.

Basic compiler functions–Machine dependent compiler features–Machine independent compiler features– Compiler design options the YACC compiler–Compiler.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.
- Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.

- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “System Software–An introduction to system programming”, Leland L. Beck & D. Manjula, Pearson Education, 3rd edition, 2007.
2. “Compilers – Principles, techniques and tools”, A.V. Aho, Ravi Sethi, J.D. Ullman, 2nd Edition, Pearson Education, 2011.

Reference Books:

1. ““Systems Programming and Operating Systems”, D.M. Dhamdhare, Second Revised Edition, Tata McGraw Hill, 2000.
2. “Systems Programming”, John J. Donovan, Tata McGraw Hill Edition, 2000.
3. “Systems Programming”, Srimanta Pal, Oxford University Press, 2011.

Course Material: website links, e-Books and e-journals
Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	M	M	S
CO2	S	S	M	M	S	M	S	M	S	S
CO3	S	M	M	S	M	S	M	M	S	S
CO4	S	M	S	S	M	S	M	S	S	S
CO5	S	M	M	M	M	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI****Paper type: Internal Elective III Paper - 3****Paper code:****Name of the Paper: MOBILE COMPUTING****Credit: 3****Total Hours per Week: 3****Lecture Hours: 39.****Tutorial Hours:****Practical Hours:****Course Objectives**

1. To understand basic concepts of mobile computing.
2. To learn the basics of mobile telecommunication system
3. To comprehend wireless LAN and cellular systems.
4. To understand protocols at network and transport layer.
5. To learn development of applications in mobile computing platform.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand basic concepts of mobile computing.
2. After studied unit-2, the student will be able to learn the basics of mobile telecommunication system
3. After studied unit-3, the student will be able to comprehend wireless LAN and cellular systems.
4. After studied unit-4, the student will be able to understand protocols at network and transport layer.
5. After studied unit-5, the student will be able to learn development of applications in mobile computing platform.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: WIRELESS COMMUNICATION FUNDAMENTALS

Teaching Hours: 8

Hrs.

Introduction–Applications–A short History of wireless Communications–Wireless Transmission – Frequencies for Radio transmission–Signals–Antennas–Signal Propagation–Multiplexing–Modulations–Amplitude shift keying–Frequency shift keying–Phase shift keying–Spread Spectrum.

Unit-2: MEDIUM ACCESS CONTROL AND TELECOMMUNICATION SYSTEM

Teaching Hours: 8

Hrs..

SDMA–FDMA–TDMA–Fixed TDM–Classical Aloha–CDMA–Global System for Mobile Communications – GPRS–Satellite Systems –Basics –Applications–Broadcast Systems – Digital Audio Broadcasting – Digital Video Broadcasting. learn development of applications in mobile computing platform.

Unit-3: WIRELESS NETWORKS

Teaching Hours: 7

Hrs.

Infrared vs. Radio Transmission– Infrastructure Networks–Ad hoc Networks – IEEE 802.11 –System Architecture–Protocol Architecture–Bluetooth–User scenarios–Bluetooth Architecture–Introduction to Wireless ATM – Services–Location Reference Model.

Unit-4: MOBILE NETWORK LAYER

Teaching Hours: 9

Hrs.

Mobile IP–Goals– Assumption–Entities and Terminology– IP Packet delivery – Agent advertisement and discovery–Registration–Tunnelling and encapsulation–Optimizations–Dynamic Host Configuration Protocol (DHCP) – Routing –DSDV–DSR – Alternative Metrics.

Unit-5: WIRELESS APPLICATION PROTOCOL

Teaching Hours: 7

Hrs.

Introduction–Protocol Architecture–Wireless Markup Language (WML)–WML Script– Applications–Wireless Telephony Application (WTA) – Wireless Telephony Application Architecture.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Mobile Communications”, Jochen Schiller –PHI/Pearson Education, Second Edition, 2003.
2. “ Mobile Computing”, Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal –Tata McGraw Hill Publications, Second edition, 2010.

Reference Books:

1. “Principles of Wireless Networks”, KavehPahalavan, PrasanthKrishnamoorthy, PHI/Pearson Education, 2003.
2. “Fundamentals of Mobile and Pervasive Computing”, Frank Adelstein, ,SandeepK.S.Gupta, Golden G.Richard III, Loren Schwiebert –Tata McGraw Hill Publications, 2005.
3. “Wireless Communications and Networks”, Williams Stallings–Pearson Education, Second Edition, 2009.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	M	M	S
CO2	S	S	M	M	S	M	S	M	S	S
CO3	S	M	M	S	M	S	M	M	S	S
CO4	S	M	S	S	M	S	M	S	S	S
CO5	S	M	M	M	M	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**(BCA) – 2022-2023 onwards****Semester: VI Paper type: Skill Based Subject IV Paper - 4****Paper code: Name of the Paper: OBJECT ORIENTED ANALYSIS AND DESIGN Credit: 2****Total Hours per Week: 3 Lecture Hours: 39. Tutorial Hours: Practical Hours:****Course Objectives**

1. Learn the UML analysis and design diagrams.
2. Apply appropriate object model and design patterns.
3. Create object code from design Patterns
4. Learn to map design to code, Compare and contrast various testing techniques.
5. At the end of the course, the student should be able to Design and implement projects using OO concepts.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand UML analysis and design diagrams.
2. After studied unit-2, the student will be able to Apply appropriate object model and design patterns.
3. After studied unit-3, the student will be able to ccreate object code from design Patterns
4. After studied unit-4, the student will be able to design to code, Compare and contrast various testing techniques.
4. After studied unit-5, the student will be able to Design and implement projects using OO concepts.
- 5.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

**Unit-1: UML DIAGRAMS
Hrs.**

Teaching Hours: 8

Introduction to OOAD – Role of Analysis and Design in Software Development – Meaning of Object Orientation – Overview of Various OOAD Methodologies – Unified Process – UML diagrams Goals of UML – Use Case – Actors and Use Cases – Use Case Relationships – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.

Unit-2:OBJECT MODEL AND DESIGN PATTERNS

Teaching Hours: 8

The Object Model – The Evolution of the Object Model – Foundations of the Object Model – Elements of the Object Model – Applying the Object Model. GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller – Design Patterns – creational – factory method – structural – Bridge – Adapter – behavioural – Strategy – observer.

**Unit-3: APPLYING DESIGN PATTERNS
Hrs.**

Teaching Hours: 7

The Nature of an Object – Relationships among Objects – The Nature of a Class – Relationships among Classes – The Interplay of Classes and Objects – On Building Quality Classes and Objects –System sequence diagrams – Relationship between sequence diagrams and use cases diagrams –Notations: The Unified Modelling Language – Package Diagrams – Component Diagrams – Deployment Diagrams – Activity Diagrams – Logical architecture refinement – UML class diagrams – UML interaction diagrams – Applying GoF design patterns.

Unit-4: CLASSIFICATION, CODING AND TESTING

Teaching Hours: 9 Hrs.

Classification: The importance of proper classification – Identifying classes and objects – Key abstractions and Mechanisms – Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing.

Unit-5:CASE STUDY

Teaching Hours: 7 Hrs.

Case study – the Next Gen POS system, Inception –Use case Modelling – Relating Use cases – include, extend and generalization – Elaboration – Domain Models – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.
- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self-discussion, self-learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Text book:

- 1. Craig Larman, "Applying UML and Patterns: An Introduction to Object–Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.
- 2. Mahesh P. Matha, "Object – Oriented Analysis and Design Using UML", PHI Learning Private Limited, New Delhi, 2008.
- 3. Grady Booch Robert A. Maksimchuk Michael W. Engle Bobbi J. Young, Ph.D. Jim Conallen Kelli A. Houston "Object–Oriented Analysis and Design with Applications" Third Edition, Pearson Education, Inc., April 2007.

Reference Book:

- 1. Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object–Oriented Software", Addison–Wesley, 1995.
- 2. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", Third edition, Addison Wesley, 2003.
- 3. Paul C. Jorgensen, "Software Testing:– A Craftsman's Approach", Third Edition, Auerbach Publications, Taylor and Francis Group, 2008.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	M	M	S
CO2	S	S	M	M	S	M	S	M	S	S
CO3	S	M	M	S	M	S	M	M	S	S
CO4	S	M	S	S	M	S	M	S	S	S
CO5	S	M	M	M	M	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

(With effect from 2022-2023)

The Course of Study and the Scheme of Examination

Sl. No.	Study Components		ins. hrs / week	Credit	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
SEMESTER I								
1.	Core	Paper- 1	6	4	Advanced Financial Management	25	75	100
2.		Paper- 2	6	4	Accounting for Managerial Decision	25	75	100
3.		Paper- 3	6	4	Marketing Management	25	75	100
4.		Paper- 4	6	4	Advanced Business Statistics	25	75	100
Internal Elective for same major students								
5.	Core Elective	Paper-1	3	3	(To choose one out of 3) A. Business Environment B. Computer Application in Business C. Managerial Economics	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
6.	Open Elective	Paper-1	3	3	(To choose one out of 3) A. Principles of Marketing B. Elements of Insurance C. Corporate Social Responsibility	25	75	100
			30	22		150	450	600
SEMESTER II						CIA	Uni. Exam	Total
7.	Core	Paper- 5	6	4	Corporate Laws	25	75	100
8.		Paper- 6	6	4	Human Resource Management	25	75	100
9.		Paper- 7	6	4	Advanced Corporate Accounting	25	75	100
Internal Elective for same major students								
10.	Core Elective	Paper-2	5	3	(To choose one out of 3) A. Export and Import Management B. Global Marketing C. E-Commerce	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								
11.	Open Elective	Paper-2	5	3	(To choose one out of 3) A. Principles of Management B. Elements of Accounting C. Elements of Business Law	25	75	100
12.	Field Study		-	2		100	-	100
13.	Compulsory Paper		2	2	Human Rights	25	75	100
			30	22		250	450	700
SEMESTER III						CIA	Uni. Exam	Total
14.	Core	Paper- 8	5	4	Goods & Services Tax (GST)	25	75	100
15.		Paper- 9	5	4	Organisational Behaviour	25	75	100
16.		Paper- 10	6	4	Advanced Cost Accounting	25	75	100
17.		Paper-11	6	4	Research Methodology	25	75	100
Internal Elective for same major students								
18.	Core Elective	Paper -3	4	3	(To choose one out of 3) A. Agri Business Management B. Services Marketing C. Business Analytics	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								

19.	Open Elective	Paper -3	4	3	(To choose one out of 3) A. Small Business Management B. Banking Theory C. Stress Management	25	75	100
20.	MOOC Course		-	2		-	-	100
			30	24		150	450	700
SEMESTER IV								
						<i>CIA</i>	<i>Uni. Exam</i>	<i>Total</i>
21.	Core	Paper- 12	6	4	Direct Taxes	25	75	100
22.		Paper- 13	6	4	Investment & Portfolio Management	25	75	100
23.		Paper- 14	5	5	Project Development	25	75	100
24.	Core	Project	5	5	Project With Viva voce	100 (75 Project +25 viva)		100
Internal Elective for same major students								
25.	Core Elective	Paper 4	5	3	(To choose one out of 3) A. Financial Services B. Information Technology in Business C. Entrepreneurial Development	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								
26.	Open Elective	Paper 4	3	3	(To choose one out of 3) A. Office Management B. Business Organisation C. Principles of Auditing	25	75	100
			30	24		150	450	600
				92				2600

ANNEXURE-I

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(Name of the Programme: - M. Com) – 2022-2023 onwards

The following details should be given before syllabus of each Programme (UG & PG Degree)

Programme Objectives (POs) (5 Points Compulsory)

1. To attain mastery over the Courses related to Commerce.
2. To gain advanced Knowledge on the concepts, principles, and theories relating to Financial Management, Accounting for Managerial Decisions, Marketing Management, Business Statistics, Corporate Accounting, and Cost Accounting.
3. To acquaint the students about Business Environment, Corporate Laws, Elements of Insurance, Managerial Economics, Corporate Social Responsibility etc.,
4. To make the students to utilize Computers, Internet, ICT tools, and Software to maximize resource utilization and to increase efficiency in their Professional Life.
5. To motivate students to attain leadership qualities by taking independent task or teamwork and accomplish the task within time frame.

Programme Educational Outcomes (PEOs)(5 Points Compulsory)

1. To develop further knowledge of students on the Subjects relating to Commerce such as Financial Management, Accounting for Managerial Decision, Marketing Management, Corporate Accounting, Cost Accounting etc.
2. To appraise the students about the Business Environment, Corporate Social Responsibility, Corporate Laws, Global Marketing, Human Resource Management etc.,
3. To make the students analyse the issues and problems faced by Corporates through Research Methodology, Business Analytics, Stress Management, Auditing etc.,
4. To assess the student`s enterprising ability through Business Organisation, Entrepreneurial Development, Project Development, and Project Vivo-Voce.
5. To make students evaluate Goods and Services Tax, Direct Tax, Investment &Portfolio Management, Financial Services etc.,

Programme Specific Outcome (PSOs) (10 Points compulsory)

1. Demonstrate knowledge on the Concepts, Theories, Techniques related to various Business Subjects.
2. Conduct research to identify problems and suggest solutions that will help in Business Decision Making process.
3. Extend acquired knowledge to manage, organise, and develop the efficient, successful Business Organisations.
4. Categorize the Business Environment, understand the various aspects and functions of Business.

5. Exhibit Business Ethics and Human Rights in Personal, Professional and Social Life, leading to a better, improved and sustained Corporate World.
6. Impart advanced knowledge on Financial Management, Accounting for Management Decisions, Marketing Management and Other Business-related Subjects.
7. Appraise the students about Corporate Social Responsibility, Global Aspects of Marketing, Export and Import procedure, and enabling them to apply in their Professional Life
8. Adopt the Computer applications in Business through Software, Information and Communication Technology tools, E-Commerce to increase efficiency and optimum utilization of resources.
9. Highlight the need and importance of Human Rights, Stress Management and its coping mechanism.
10. Motivate the students towards life-long learning through Online Platforms such as MOOC, NPTEL etc.

Programme Outcome (POs) (10 Points compulsory)

1. Synthesize the acquired knowledge and skill to establish and organise a Business Organisation efficiently and effectively.
2. Highlight the importance of Human Rights, Ethics and Management of Human Resources.
3. Analyse the Business Environment, Global Marketing, Export and Import Management and Services Marketing.
4. Contrast and compare the Elements of Insurance, Business Laws, Corporate Laws, and Auditing of Business Organisation.
5. Appraise Banking Theory, Stress Management, Small Business Management, and Office Management.
6. Apply Cost Accounts, Corporate Accounts, Management Accounts, Accounting for Managerial Decisions and Financial Management to measure the financial viability of Business.
7. Demonstrate the Ethics and Human Values in Business through Business Ethics, Human Rights.
8. Develop new Business ideas, prepare detailed Project Report and Present the Project through Viva voce to instil entrepreneurship qualities among students
9. Utilize Computers, Internet, ICT and other Software to maximize resource utilization and to bring efficiency in day-to-day Business Operations.
10. Develop the students for self and continuous learning through Massive Open Online Courses (MOOC), like SWAYAM, NPTEL, and other such Portals.

ANNEXURE-II

Each course/Paper should be given in the following structure

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(Name of the Programme: - M. Com) – 2022-2023 onwards

Semester: I,

Paper type: Core paper

Paper code.....

Name of the Paper: ADVANCED FINANCIAL MANAGEMENT

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objectives

1. To have the understanding of the functions of Finance Management.
2. To expand the awareness of Long-term Sources of Funds.
3. To facilitate the students to the understanding of Capital Structure and Leverage
4. To bring subject knowledge about capital investment decision among the students.
5. To let students to be acquainted with the subject of working capital management.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied Unit-1, the student will be able to understand the functions of finance Management.
2. After studied Unit-2, the student will be able to know about the long-term sources of funds and environment of working capital.
3. After studied Unit-3, the student will be able to gain information about capital structure and leverage
4. After studied Unit-4, the student will be able to gain knowledge about capital investment decision
4. After studied Unit-5, the student will be able to be acquainted with on the subject of working capital Management.

Matching Table (Put Yes / No in the appropriate box)

UNIT	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1.	Yes	Yes	Yes	Yes	No	No
2.	Yes	Yes	Yes	Yes	Yes	No
3.	Yes	Yes	Yes	Yes	No	No
4.	Yes	Yes	Yes	Yes	Yes	No
5.	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: - Financial Management**Teaching Hours: 18 Hrs.**

Financial Management - Functions - Goals of Financial Management - Maximization Vs. optimizations - Risk-return trade off.

UNIT-2: - Management of Funds**Teaching Hours: 18 Hrs.**

Management of funds – Long-term sources - Shares and Debentures - Convertible Securities and Term Loans - Working Capital financing - Sources and approaches- Bank Credit-Basic principles and Methods of assessment- Other sources of short-term finance Operating environment of working capital

UNIT-3: - Capital Structure of Planning**Teaching Hours: 18 Hrs.**

Capital structure planning: Concepts of cost of capital - cost of equity, debt, retained earning - Weighted average cost of capital - Capital structure theories - Net income, Net operating income, MM and Traditional Theories - Leverage - Types and significance. Dividend policy and practices - Dividend policies - Factors affecting dividend decision - Dividend theories - Graham, Gordon, Walter and MM Theories.

UNIT-4: - Management of Fixed Assets**Teaching Hours: 18 Hrs.**

Management of fixed assets - Evaluation of capital investment decision: Payback period - ARR - IRR - NPV - CAPM.

UNIT-5: - Working Capital Management**Teaching Hours: 18 Hrs.**

Working capital management-working capital cycle-forecasting of working capital requirements-Factors influencing working capital-Management of inventory, cash and accounts receivables-payables management-credit and collection policies.

Text Books

1. I M Pandey, Financial Management, Vikas Publishing House Pvt Ltd.
2. John H Hampton, Financial Decision Making, Prentice Hall of India Ltd.
3. Rustagi, R. P. Galgotia, Financial Management:Theory, Concepts & Problems
4. Inamdar, Financial Management, S.M. Everest
5. A.Murthy, Financial Management, Margham Publications

Reference Books

1. Prasanna Chandra, Financial Management, Tata McGraw Hill Publishing Company Limited.
2. M.Y.Khan and P.K.Jain, Financial Management, Tata McGraw Hill Publishing Company Limited.
3. P.V.Ratnam, Financial Management Theory, Problems and Solutions, Kitab Mahal.
4. Eugene F. Brigham and Michael C. Ehrhardt, Financial Management: Theory & Practice,
5. Kishore R.M, Financial Management, Taxman Allied Service

Course Material:website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	S	M	M	S	M
CO2	S	M	S	S	S	M	M	S	S	S
CO3	S	S	S	S	M	S	M	S	M	S
CO4	S	S	S	S	M	M	S	S	M	M
CO5	S	S	S	S	M	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Core paper

Paper code.....

Name of the Paper: ACCOUNTING FOR MANAGERIAL DECISION

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

.....

Course Objectives

1. To enhance the understanding of the Accounting for Decision making
2. To extend the knowledge of Ratio Analysis.
3. To facilitate the students to have the deep understanding financial statements
4. To bring about the awareness of Cost Management.
5. To let students to know about financial decisions and capital structure

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied Unit-1, the student will be able to understand the concept of Accounting for Decision making
2. After studied Unit-2, the student will be able to understand the Ratio Analysis Leverage Analysis-Budgeting and budgetary control
3. After studied Unit-3, the student will be able to understand the analysis of Fund flow and cash flow statements
4. After studied Unit-4, the student will be aware of the Marginal Costing, Applications and its technique
5. After studied Unit-5, the student will be able to know financial decisions Making

Matching Table (Put Yes / No in the appropriate box)

UNIT	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1.	Yes	Yes	Yes	Yes	No	No
2.	Yes	Yes	Yes	Yes	Yes	No
3.	Yes	Yes	Yes	Yes	No	No
4.	Yes	Yes	Yes	Yes	Yes	No
5.	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: - Accounting for Decision Making

Teaching Hours: 18 Hrs.

Accounting for Decision making - Scope and Importance - Decision Accounting vs. Financial Accounting and Cost Accounting.

UNIT-2: - Financial & Investment Analysis of Funds

Teaching Hours: 18 Hrs.

Financial and Investment analysis - Analysis and Interpretation - Ratio Analysis Leverage Analysis-Budgeting and budgetary control - Functional Budgets- Master Budget - Flexible budgeting - Zero Base Budgeting.

UNIT-3: - Understanding Financial Statements

Teaching Hours: 18 Hrs.

Understanding Financial Statements-Construction and analysis of profit and loss account and balance sheet-Construction and analysis of Fund flow and cash flow statements.

UNIT-4: - Cost Management**Teaching Hours: 18 Hrs.**

Cost Management- Absorption and Marginal Costing - Cost - volume-profit analysis Applications and techniques.

UNIT-5: - Financial Decisions**Teaching Hours: 18 Hrs.**

Financial decisions-capital structure-dividend decisions (only simple problems).

Note: **80% of the total marks be allotted for problems and 20% for theory**

Text Books

1. Management Accounting and Financial Control - S.N.Maheswari, Sultan Chand & sons, New Delhi
2. Advanced Cost & Management Accounting- Saxena and Vashist. C., Sultan Chand & Sons
3. Management Accounting- Rao, A.P., Everest Publishing ||House
4. Management Accounting –M.Y.Khan&Jain.P.K, Tata Mc graw Hill
5. Cost and Management Accounting – T.S Reddy and Hari Prasad Reddy, Margham |Publications

Reference Books

1. Management Accounting - Man Mohan and Goyal.
2. Management Accounting - Hingorani and Ramanathan.
3. Management Accounting - Charles Horngren.
4. Management Accounting - J.Batty
5. Management Accounting – Dr. E.B. Khedkar, Dr. D.B. Bharati and Dr. A. B. Kharapas

Course Material:

website links, e-Books and e-journals Mapping with Programme Outcomes.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	M	S	S
CO2	S	S	S	M	M	S	M	S	M	S
CO3	S	M	M	S	S	S	S	M	S	M
CO4	S	M	S	M	S	S	S	M	S	M
CO5	S	S	M	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Core paper

Paper code.....

Name of the Paper: MARKETING MANAGEMENT

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

.....
Course Objectives

1. To enhance the understanding of Core Marketing and Marketing segments and targets.
2. To extend the knowledge of marketing mix and brand equity.
3. To facilitate the students to have the deep understanding of Marketing Channels and Value networks and Market Logistics.
4. To bring about the awareness of marketing promotion and role of marketing communication in advertisement.
5. To let students to know about recent trends in modern marketing

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied Unit-1, the students will able to know the core market and their functions.
2. After studied Unit-2, the students will able to know the various kinds of Pricing and various stages in product life cycle, new product development.
3. After studied Unit-3, the students will gain knowledge about the marketing channel and distribution.
4. After studied Unit-4, the students will learn about the kinds of advertisement and qualities of good salesman.
5. After studied Unit-5, the students will know about the recent trend in modern marketing and digital marketing.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-1: - Introduction

Teaching Hours: 18 Hrs.

Marketing: Definition, importance and scope – Core marketing concepts – Functions of Marketing. Consumer Buying Motives - Customer Value, Customer Relationship Management Significance - Identifying Market Segments and targets.

UNIT-2: - Marketing Mix – Product & Pricing**Teaching Hours: 18 Hrs.**

Marketing Mix - Product – Definition - characteristics and classifications - New Product Development – Product Life Cycle Management – Product Vs Services. Packaging and Labelling - Brand Equity – Measuring Brand Equity. Pricing - Objectives - Pricing Strategies -Factors affecting price of a product- Ethical issues in pricing decisions.

UNIT-3: - Marketing Mix – Physical Distribution**Teaching Hours: 18 Hrs.**

Physical distribution: Marketing Channels and Value Networks – Role of Marketing Channels – Channel design decisions – Middlemen in Distribution – Functions of Wholesalers – Retailers. Elimination of Middlemen - Modern Retailing Practices – Classifications. Market Logistics – Objectives.

UNIT 4: - Marketing Mix- Promotion**Teaching Hours: 18 Hrs.**

Promotion: Role of Marketing Communication - Communication Mix – Advertising – Kinds of Media – Planning an Advertising Campaign, Personal Selling - Qualities of a Good Salesman, Sales Promotion – Strategies, Public relations – Functions and Types .

UNIT 5: - Recent Trends in Modern Marketing**Teaching Hours: 18 Hrs.**

Direct Marketing – Features – Benefits- Types. Impact of Digital Marketing on Businesses. Building Word-of-Mouth Marketing Strategy - Importance of Socially Responsible Marketing. Elements of Green Marketing. Cyber Marketing – Nature – Limitations

Text Books

1. Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithileswar Jha. 2017. Marketing Management. [Thirteenth Edition]. Pearson Education, New Delhi. Reference Books:
2. Ramaswamy, V.S and Namakumari S, 2009. Marketing Management. [Third Edition]. Macmillan India Ltd, New Delhi.
3. Rajan Saxena. 2009. Marketing Management. [Fourth Edition]. Tata-McGraw Hill, New Delhi.
4. Prachi Gupta, Marketing Management: Indian Cases, Pearson
5. Arun Kumar, Marketing Management, Atlantic Publishers

Reference Books

1. Roger Best, Market-Based Management: Strategies for Growing Customer Value and Profitability, 4th Ed. Pearson, 2005.
2. McCarthy, E.J., Basic Marketing: A managerial approach, Irwin, New York
3. Stanton, Etzel, Walker, Fundamentals of Marketing, Tata-McGraw Hill, New Delhi.
4. Dr.K. Karunakaran, Marketing Management, Himalaya Publishing House
5. Philip Kotler and Kevin Keller, Marketing Management

Course Material: website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Core paper

Paper code.....

Name of the Paper: ADVANCED BUSINESS STATISTICS

Credit: 4

Total Hours per Week: 6Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

.....

Course Objectives

1. To enhance the understanding of multiple correlation and multiple regression
2. To extend the knowledge of technique of probability.
3. To facilitate the students to have the deep knowledge on Sampling methods, proportions-large and small samples- Z test and T test
4. To bring about students to get information about chi square test.
5. To let students to know about F-Test and ANOVA.

Course Outcomes

1. After Studied Unit-1, The Student Will Be Able to Know Partial and Multiple Correlations.
2. After Studied Unit-2, The Student Will Be Able to Know Probability and Binomial Distribution.
3. After Studied Unit-3, The Students will know the Issues Surrounding Sampling, Hypothesis, Z Test and T Test.
4. After Studied Unit-4, The Student Will Be Able to Have the Awareness About Application of Chi- Square Distribution.
5. After Studied Unit-5, The Student Will Be Able to Know About Analysis of Variance and F Test.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analysing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: -Correlation & Regression Analysis

Teaching Hours: 18Hrs

Partial correlation-Partial correlation coefficient-Partial correlation in case of four variables-Multiple correlation -Multiple regression.

Unit-2: - Probability Distribution**Teaching Hours: 18Hrs**

Theory of probability-probability rules-Bayes Theorem-Probability Distribution- Characteristics and application of Binomial, Poisson and Normal Distribution.

Unit-3: - Sampling and Hypothesis Testing**Teaching Hours: 18Hrs**

Sampling- sampling methods- sampling error and standard error- relationship between sample size and standard error. Testing hypothesis- testing of means and proportions-large and small samples- Z test and T test.

Unit-4: - Chi- Square Distribution**Teaching Hours: 18Hrs**

Chi square distribution- Characteristics and application- test of goodness of fit and test of independence- Test of Homogeneity.

Unit-5: - F- Test & ANOVA**Teaching Hours: 18Hrs**

F distribution- testing equality of population variances- Analysis of variance- one way and two-way classification.

Note: The proportion between theory and problems shall be 20:80

Text Books:

1. S P Gupta, Statistical methods, Sultan chand& Sons 2000, New Delhi
2. D C Samcheri and V K Kapoor, Business statistics, Sultan Chand and sons, New Delhi
3. G C Beri – Business Statistics, 3rd ed, TATA McGrawHill.
4. Chandrasekaran &Umaparvathi-Statistics for Managers, 1st edition, PHI Learning
5. Ken Black – Business Statistics, 5th ed., Wiley India

Reference Books

1. J.K.Sharma, Business Statistics- Pearson Education
2. Richard I Levin and David S. Rubit, Statistics for management, 7th Edition, Pearson education, New Delhi, 2002
3. Business statistics and operations research, Dr D Joseph Anbarasu, Lintech press Trichy

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Core Elective paper

Paper code.....

Name of the Paper: A. BUSINESS ENVIRONMENT

Credit: 3

Total Hours per Week: 3 Hrs, Lecture Hours: 3hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To understand the concepts of Business Environment.
2. To identify the Social Responsibility of Business to different stakeholders
3. To understand How Economic Environment in Industrial Development Policies - Industrial policy, Fiscal policy, Monetary policy, Economic Reforms in India
4. To understand the Socio-Cultural Environment.
5. To familiarize with the Technological Environment and Modernisation of Technology.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied Unit-1, the students will able to learn Theoretical Framework of Business Environment.
2. After studied Unit-2, The students will able to make the student knowledge about business Economic Environment of Business.
3. After studied Unit-3, The students will able to Familiarize Current Political and Legal Environment.
4. After studied Unit-4, The students will able to understand the Socio-Cultural Environment and Ethics.
5. After studied Unit-5, The students will able to learn the Latest Technology Environment for Business.

Matching Table (Put Yes / No in the appropriate box)

UNIT	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1.	Yes	Yes	Yes	Yes	No	No
2.	Yes	Yes	Yes	Yes	Yes	No
3.	Yes	Yes	Yes	Yes	No	No
4.	Yes	Yes	Yes	Yes	Yes	No
5.	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: - Theoretical Framework of Business Environment
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Teaching Hours: 9 Hrs.

Business Environment: Concept, significance and nature of business environment; Elements of environment – internal and external; Changing dimensions of business environment; Techniques of environmental scanning and monitoring. PEST and SWOT analysis

UNIT- 2: - Economic Environment of Business**Teaching Hours: 9 Hrs.**

Economic Environment: Significance and Elements of Economic Environment; Economic systems and business environment; Economic Planning in India; Industrial Development Policies - Industrial policy, Fiscal policy, Monetary policy. Economic Reforms in India - Liberalisation and impact of Globalisation. Impact of Rupee Devaluation and Demonetization

UNIT-3: - Political and Legal Environment**Teaching Hours: 9 Hrs.**

Political and Legal Environment: Elements of political environment; Government and Business; Changing Dimensions of Legal Environment in India – Classification of Laws Influencing Business, Competition Act, Consumerism in India - Consumer Protection Act. - Objectives of GST. Significance of Corporate Governance – Need of Environmental Protection.

UNIT- 4: - Socio-Cultural Environment**Teaching Hours: 9 Hrs.**

Business and Society – Objective of Business. Components of Socio-cultural environment; Social institutions and systems; Elements of Culture - Social Values and Attitudes; Social Responsibility of Business – Guidelines. Ethical Principles in Business. Code of Ethics.

UNIT-5: - Technological Environment**Teaching Hours: 9 Hrs.**

Technological Environment: Factors governing Technological Environment-Impact. Innovation - Technology Transfer – Modernisation -Factors to be Considered for Appropriate Technology. Incentives and Concessions for Technological Research - Productivity in Indian Industry - Intellectual Property Rights.

Text Books

1. Francis Cherunila: Business Environment Himalaya Publishing House, Bombay.
2. C.B.Gupta: Business Environment, Sultan Chand and Sons, New Delhi
3. V. Neelamegam, Business Environment, Latest Edition, Vrinda Publications, Delhi.
4. V.K. Puri & S.K. Misra, Economic Environment of Business, Latest Edition, Himalaya Publishing House, New Delhi.
5. Amit Kumar, Business Environment, Sahitya Bhawan Publications, Agra

Reference Books

1. Adhikary, M: Economic Environment of Business, Sultan Chand & Sons, New Delhi.
2. Aswathappa, Legal Environment of Business, Himalaya Publication, New Delhi.
3. Chakravarty, S: Development Planning, Oxford University Press, Delhi.
4. Paul Justin, Business Environment, Latest Edition, McGraw Hill Education, New Delhi.
5. A.C. Fernando, Business Environment, Latest Edition, Pearson Publication, New Delhi.

Course Material:

website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcome

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I, **Paper type: Core Elective paper** **Paper code.....**

Name of the Paper:**B. COMPUTER APPLICATION IN BUSINESS** **Credit: 3**

Total Hours per Week: 3 Hrs, Lecture Hours: 3hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To make the students to understand the basic concepts of Computers and Computer hardware.
2. To expand the understanding of information Technology
3. To facilitate the students to have insights on words processing
4. To know how to present the business documents using Excel Sheet
5. To let to know students to Power Point presentation using various Transitions.

Course Outcomes:

1. After studied Unit-1, the student will be able to understand the various components of a computer system: Storage Devices, Input Devices & Output devices
2. After studied Unit-2, the student will be able to develop an idea about World Wide Web and Internet browsing
3. After studied Unit-3, the student will be able to know about the Preparation and presentation of business documents using Word Document
4. After studied Unit-4, the student will be able to will gain knowledge of about Preparation and presentation of the business documents using Excel Sheet,
5. After studied Unit-5, the student will be able to acquire the knowledge about how to Prepare PPT- Power Point presentation using various Transitions, Animations and other layouts.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-1: - Computer Hardware	Teaching Hours: 9Hrs
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CPU, Input devices, Output Devices, Communication devices, storage devices Types of computer system.

UNIT-2: - Information Technology	Teaching Hours: 9Hrs
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Basic idea of LAN (Local Area Network), and WAN (Wide Area Network) E-mail: Internet Technologies, Access Devices, Concept of World Wide Web and Internet browsing.

UNIT-3: - Word Processing**Teaching Hours: 9Hrs**

Introducing and working with MS Word in MS-Office - Word Basic Commands, formatting - Text and documents, Sorting and Tables, Working with graphics, introduction to Mail merge.

UNIT-4: - Spread Sheet**Teaching Hours: 9Hrs**

Working with EXCEL - Formatting functions, chart features, working with graphics in EXCEL using worksheets as database in accounting, Marketing, finance and personnel areas.

UNIT-5: - Presentation with Power Point**Teaching Hours: 9Hrs**

Power Point, basics creating Presentation of easy way: working with graphics in Power Point show time, sound effect and animation effects.

Text Books

1. Mansfield, Ron: The Compact Guide to Microsoft Office BPB Publication, New Delhi.
2. O.Brian...A: Management information System, Tala Mc Graw Hill, Delhi.
3. Ullman, J.O: Principles of Data base System, Galgoia publication, New Delhi
4. Nasib Singh Gill – Handbook of Computer Fundamentals, Khanna Publishing House, Delhi
5. Shrivastava-Fundamental of Computer& Information Systems (Wiley Dreamtech)

Reference Books:

1. Date, C.J: An Introduction to Data base systems, Addison Wesley, Massachusetts.
2. Dienes, Sheih.S: Microsoft Office, Professional for Windows 95: Instant Reference: BPB Publication, New Delhi
3. Leon A and Leon M - Introduction to Computers (Vikas, 1st Edition).
4. ITL ESL – Introduction to Information Technology (Pearson, 2nd Edition).
5. Introduction to Computers, Norton P. (TATA McGraw Hill)

Course Material:

website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Core Elective paper

Paper code.....

Name of the Paper: C. MANAGERIAL ECONOMICS

Credit: 3

Total Hours per Week: 3 Hrs, Lecture Hours: 3hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To make the students to understand the theories of managerial economics and factors.
2. To expand the awareness of Demand analysis and Forecasting
3. To facilitate the students to understand the law of variable proportions, product function and cost function
4. To bring subject knowledge on Economics of size and capacity Utilization and market structure pricing.
5. To let students to be acquainted with the subject of Business cycle and Policies.

Course Outcomes:

1. After studied Unit-1, the student will be able understand the theories of managerial economics and factors.
2. After studied Unit-2, the student will be able to develop an idea about Demand analysis and Forecasting.
3. After studied Unit-3, the student will be able to provide an idea regarding law of variable proportions, product function and cost function.
4. After studied Unit-4, the student will be able to make them aware about the Economics of size and capacity Utilization and market structure pricing.
5. After studied Unit-5, the student will be able to acquire the knowledge about be Business cycle and Policies

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-1: - Introduction of Managerial Economics

Teaching Hours: 9Hrs

Definition and scope of the subject-fundamental concepts and Methods-firm's objectives and the role of managerial economist.

UNIT- 2: - Demand Analysis and Forecasting**Teaching Hours: 9Hrs**

Demand analysis and forecasting for consumer goods and capital goods-use of business indicators- type of elasticity.

UNIT-3: - Cost Concepts and Production Functions**Teaching Hours:****9Hrs**

Concept and resources allocation- Cost Analysis- Short run and long run Cost functions production functions- cost price- Output relations.

UNIT-4: - Economics Size & Market Structure**Teaching Hours:****9Hrs**

Economics of size and capacity Utilization - Input-Output analysis- Market Structure Pricing and output general equilibrium.

UNIT-5: - Pricing and Theory of Profit**Teaching Hours: 9Hrs**

Pricing Objectives- pricing methods and approaches-price discrimination, Product line pricing-profit planning and Cost control- Business cycle and Policies.

Text Books:

1. Peterson, managerial economics, 4th edition - Pearson education - New Delhi.
2. Sampat Mokherjee, Business and Managerial Economics, New Central Book Agency, Calcutta.
3. R.L. Varshney & K.L. Maheshwari, Managerial Economics-Sultan Chand & Sons, New Delhi.
4. Gupta G.S (2010), Managerial Economics, Tata McGraw-Hill, New Delhi 5. Mehta, P.L (2014), Managerial Economics, Sultan Chand, New Delhi
5. Moyer & Harris (2005), Managerial Economics, Cengage Learning, New Delhi,

Reference Books:

1. Spencer M.H. Managerial Economics Text, Problems and short cases, Richard D. Irwin INC.
2. Sankaran.S, Managerial Economics Margham Publications, Chennai.
3. Dwivedi D.N , Managerial Economics, Vikas-New Delhi
4. Mankar & Denkar, Business Economics, Himalaya publishing House, Bombay
5. Joel Dean, Managerial Economics, Prentice Hall of India - New Delhi.

Course Material:

website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Open Elective paper

Paper code.....

Name of the Paper: A.PRINCIPLES OF MARKETING

Credit: 3Total

Hours per Week: 3 Hrs, Lecture Hours: 3hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the evolution of Marketing
2. To extend the knowledge on Bases of Market Segmentation and factors influencing Consumer Behaviour
3. To facilitate the students to understand the various Elements of Marketing Mix and Product Life Cycle.
4. To bring subject knowledge on kinds of Pricing and types of Channels of Distribution.
5. To let students to know on the subject of Recent trends in Marketing.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied Unit-1, the student will be able to understand the evolution of Marketing across ages through varying views on Marketing concept
2. After studied Unit-2, the student will be able to know the Bases of Market Segmentation and factors determining consumer behaviour
3. After studied Unit-3, the student will be able to know the Significance of Elements of Marketing Mix and Factors affecting price decision
4. After studied Unit-4, the student will be able to know about kinds of Pricing and types of Channels of Distribution
5. After studied Unit-5, the student will be able to know the recent trends in Marketing.

Matching Table (Put Yes / No in the appropriate box)

UNIT	i. Remembering	ii. Understanding	iii. Applying	iv. Analysing	v. Evaluating	vi. Creating
1.	Yes	Yes	Yes	Yes	No	No
2.	Yes	Yes	Yes	Yes	Yes	No
3.	Yes	Yes	Yes	Yes	No	No
4.	Yes	Yes	Yes	Yes	Yes	No
5.	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- 1: - Introduction

Teaching Hours: 9 Hrs.

Meaning of market – classification of markets- meaning and definition of marketing features of marketing – importance of marketing – difference between marketing and selling – Evolution of marketing concepts - functions of marketing.

UNIT- 2: -Market Segmentation & Consumer Behaviour	Teaching Hours: 9 Hrs.
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Meaning and definition of market segmentation – different patterns of market segmentation –
Definition of consumer behaviour - factors determining consumer behaviour.

UNIT- 3: - Marketing Mix	Teaching Hours: 9 Hrs.
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Four Ps of marketing mix - definition of product - classification of products - stages in new product development - product life cycle.

UNIT- 4: - Pricing Policy & Channel of Distribution	Teaching Hours: 9 Hrs.
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Factors affecting price decision – Types of pricing strategies - definition of channel of distribution – types of Channels of distribution - factors determining Channel of distribution.

UNIT- 5: - Recent Trends in Marketing	Teaching Hours: 9 Hrs.
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Social marketing – Demarketing – Remarketing – Over marketing – Meta marketing – E-Marketing – online retailing – shopping malls.

Text Books

1. Rajan Nair, Marketing, Sultan Chand & Sons, New Delhi
2. Varshney, Marketing Management, Sultan Chand & Sons, New Delhi.
3. Rajan Saxena, Marketing management, Tata Mc Graw Hill
4. M. Govindarajan, Marketing management, PHI learning India PVT Ltd.,

Reference Books

1. Jaisankar, Marketing, Margham Publications, Chennai
2. L. Natarajan, Marketing, Margham Publications, Chennai
3. Dr. K. Sundar, Essentials of Marketing, Vijay Nicole Imprints Private Ltd., Chennai
4. Kurtz / Boone, Principles of Marketing, Cengage learning – Chennai
5. Adrich Palmer: Introduction to Marketing (Oxford)

Course Material:

website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Open Elective paper

Paper code.....

Name of the Paper: B. ELEMENTS OF INSURANCE

Credit: 3

Total Hours per Week: 3 Hrs, Lecture Hours: 3hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To impart understanding about the functions, nature and principles of insurance
2. To bring understanding on the basics of Life Insurance
3. To facilitate knowledge on the principles and kinds of Marine Insurance
4. To provide knowledge to the students about computation of claims in respect of Fire Insurance
5. To know about Miscellaneous Insurance and Key players in Indian Insurance Industry

Course Outcomes

1. After Studied Unit-1, Students will be able to gain knowledge on functions, nature and principles of insurance
2. After Studied Unit-2, Students will be able understand the existence of Life Insurance and learn its benefits
3. After studied unit-3, Students will be able to gear up the principles and kinds of Marine Insurance
4. After Studied Unit-4, Students will be able to know the usefulness of Fire Insurance to the stakeholders.
5. After Studied Unit-5, the student will be able to know the Miscellaneous Insurance policies and Key players in Indian Insurance Industry

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit - I: - Introduction

Teaching Hours: 9Hrs

Insurance -Meaning, functions, nature and principles of insurance, importance of insurance to Individuals and business - Elements of the insurance contract - Types of insurance contract – Insurance as a tool to manage risk.

Unit - 2: -Life Insurance

Teaching Hours: 9Hrs

Life Insurance - Features of a life insurance contract - Advantages of Life Assurance - Types of Life Insurance Plans – Claims in Life Insurance - Health Insurance Policies – benefits

Unit - 3: - General Insurance - Marine Insurance**Teaching Hours: 9 Hrs**

Marine Insurance - Types of Marine Losses - Contract of marine insurance – Elements of marine insurance – classes of policies – policy conditions – clause in a marine insurance policy.

Unit -4: - General Insurance - Fire Insurance**Teaching Hours: 9Hrs**

Fire Insurance - features of a fire insurance – kinds of policies – policy conditions – payment of claims – reinsurance.

Unit - 5: - General Insurance – Miscellaneous Insurance**Teaching Hours: 9Hrs**

Miscellaneous Insurance – Motor insurance – Burglary – Personal accident insurance.

Key players in Indian Insurance Industry

Text Books:

1. M. N. Mishra, Insurance Principles And Practice, S. Chand & Co, New Delhi, 2000
2. M.N. Mishra, Modern concepts of Insurance, S. Chand & Co
3. P.S. Palandi, Insurance in India, Response Books – Sagar Publications
4. Taxmann, Insurance Laws Manual, Taxman Publications Pvt Ltd, Chennai
5. Anuj Gupta Neeti Gupta Abha Chopra Risk Management and Insurance, Kalyani Publishers

Reference Books

1. Gupta. P.K, Insurance and Risk Management, Himalaya Publishing House.
2. Dinsdale, W.A., Elements of Insurance, Pitaman.
3. Crane, F., Insurance Principles and Practices, John Wiley and Sons, New York.
4. Vaughan, E. J. and T. Vaughan, Fundamentals of Risk and Insurance, Wiley & Sons
5. Hansell, D.S., Elements of Insurance, Macdonald & Evans Ltd.

Course Material:

website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	M	S	S	S
CO2	S	M	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: I,

Paper type: Open Elective paper

Paper code.....

Name of the Paper: C. CORPORATE SOCIAL RESPONSIBILITY

Credit: 3

Total Hours per Week: 3 Hrs, Lecture Hours: 3hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the corporate Social responsibility of Business
2. To extend the knowledge of factors influencing CSR policy
3. To facilitate the students to have the understanding about benefits of CSR to the company
4. To students to know about institutional investors in corporate governance
5. To let students to know about corporate governance board and its power.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied Unit-1, the student will be able to acquire the knowledge Corporate Social responsibility of Business
2. After studied Unit-2, the student will be able to know the Identify the factors influencing CSR policy and Global Organisation CSR
3. After studied Unit-3, the student will be able to have to understanding of benefits of CSR to the company
4. After studied Unit-4, the student will be able to know the institutional investors in corporate governance
5. After studied Unit-5, the student will be able to know about corporate governance board and its power.

Matching Table (Put Yes / No in the appropriate box)

UNIT	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1.	Yes	Yes	Yes	Yes	No	No
2.	Yes	Yes	Yes	Yes	Yes	No
3.	Yes	Yes	Yes	Yes	No	No
4.	Yes	Yes	Yes	Yes	Yes	No
5.	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: - Corporate Social Responsibility

Teaching Hours: 9 Hrs.

Corporate social responsibility – Meaning – Definition – scope of CSR– a rational argument of CSR – Economic argument for CSR – strategies of CSR – challenges and implementation of CSR in Indian – relation between CSR and corporate governance – major code of CSR initiative in India – barriers to social responsibility – social responsibility of business.

UNIT-2: - Designing A CSR Policy

Teaching Hours: 9 Hrs.

Designing a CSR policy – factors influencing CSR policy – managing CSR in an organization role of the human resource professional in CSR– global reorganization of CSR –

ISO 14000 – SA8000 – AA1000 – codes – formulated by an Global compact – UNDP – global reporting Initiative.

UNIT – 3: - CSR Reporting Trend	Teaching Hours: 9 Hrs.
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CSR reporting trend in developing countries – timing and mode of release of CSR reports – CSR policy of a multi-product, multi-location Indian MNC's – constitutions of corporate social responsibility – dimensions of CSR – benefits of CSR to the company.

UNIT – 4: - Corporate Governance	Teaching Hours: 9 Hrs.
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Corporate governance – concept, structure, process, origin – scope and present scenario – role of institutional investors in corporate governance – structure and development of board – role of capital marketing governance, governance rating future of governance – innovation practices – case studies with lesson learned.

UNIT – 5: - Corporate Governance Board	Teaching Hours: 9 Hrs.
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Corporate governance board and its power – responsibility – disqualification, board committee and their functions – remuneration committee – nomination committee, compliance committee – share holder grievance committee – investor relation committee – investment committee – risk management committee – and audit committee – regulatory framework of corporate governance in India; SEBI guidelines and clause 49; reforms in the company act 2013 – corporate governance in PSU; and banks.

Text Books

1. Tandon Bb Vashishi, Ak,Kesho Prasad Arya PP, Corporate Governance Deep and Deep Publication ,New Delhi. 1st Edition.
2. S.A.Sherlekar Ethics in Management, Himalaya Publishing House – 2009.
3. Fernando, A.C, Business Ethics and corporate governance. Pearson Education
4. Gosh, B. N, Business Ethics and Corporate Governance. Tata McGraw Hill.
5. Keith Davis, Business and Society Mc Graw Hill

Reference Books

1. Corporate Social Responsibility In India – Sanjay K.Agarwal Sage Publication Ltd – UK 2008.
2. William B.Werther and David Chandler, Strategic Corporate Social Responsibility, Sage Publication In 2001.
3. Mallin Christine A, Corporate Governance (Indian Edition) Oxford University Press, New Delhi.
4. Blowfield, Michal and Alan Murray, Corporate Responsibility Oxford University Press, New Delhi.
5. .Velasquez, M. G. (2011). Business Ethics: Concepts and Cases.. PHI Learning

Course Material:

website links, e-Books and e-journals Mapping with Programme Outcomes

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Core Paper

Paper code.....

Name of the Paper: CORPORATE LAWS

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. This course is aimed at teaching students various Acts that impact Indian Corporations like Corporate Governance that is essential in today's Business World.
2. This course also deals with provisions of Competition Act, 2000 related to Companies.
3. To educate students with regard to SEBI the listing procedures.
4. To Impart Knowledge about provisions of FEMA Act help Companies that deal in International Trade.
5. Provisions related to Companies in the Insolvency and Bankruptcy Code, 2016 will help the students to understand the process of Insolvency Resolution and Liquidation.

Course Outcomes

1. Define Corporate Personality, Corporate Governance, E-Governance and describe the Corporate Governance Code in Companies Act.
2. Discuss the prohibitions of certain Agreements, Abuse of Dominant Position and Regulation of Combinations under The Competition Act.
3. Enumerate the Powers and Functions of SEBI.
4. Describe the provisions related to listing of Securities, Public Offerings and discuss the prohibition of Insider Trading in various regulations of SEBI
5. Discuss the provisions related to Regulation and Management of Foreign Exchange, Related Offences, Penalties and Appeals Procedure under FEMA, 1999.
6. Elucidate the Corporate Insolvency Resolution Process and Liquidation Process under Insolvency and Bankruptcy Code, 2016.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNITT – 1: - Introduction

Teaching Hours: 18Hrs

Corporate Laws – Corporate Personality – Corporate Governance – Concept – Corporate Governance Practices and Codes: Provisions under The Companies Act. – E-Governance

UNITT – 2: - Competition ACT	Teaching Hours:
18Hrs	

Competition Act, 2000 – Introduction – Objectives – Important Definitions – Prohibition of Anti-Competitive Agreements – Prohibition of Abuse of Dominant position – Regulation of Combinations – Competition Commission of India – Composition – Duties, Powers and Functions – Penalties – Appellate Tribunal – Procedures & Powers – Powers of the Central Government.

UNITT – 3: - SEBI Act 1992	Teaching Hours: 18Hrs
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The Securities and Exchange Board of India Act, 1992 – Introduction – Objectives – Important Definitions – Definitions under Securities Contracts (Regulations) Act, 1956 - Powers and Functions of SEBI – Registration – Penalties – Adjudication – Appellate Tribunal – Appeals – Procedure and Powers of The Securities Appellate Tribunal – Power to make Rules and Regulations – SEBI Issue of Capital and Disclosure Requirements Regulations, 2018 – General conditions for Public Issues and Rights Issues – Conditions for Initial Public Offer – Conditions for Further Public Offer – Pricing - Promoters Contribution – Listing of Securities – Conditions for Listing – Types of Listing – Procedure for Listing Requirements – Benefits of Listing – Defects of listing - The SEBI (Prohibition of Insider Trading) Regulations, 2015

UNITT – 4: - Foreign Exchange Management Act 1999	Teaching Hours: 18Hrs
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The Foreign Exchange Management Act, 1999 – Introduction – Objective – Differences and Similarities between FERA and FEMA - Important Definitions under the Act – Provisions related to Regulation and Management of Foreign Exchange – Authorised Person – Offences – Contraventions & Penalties – Adjudication & Appeals – Appellate Tribunal – Directorate of Enforcement

UNIT – 5: - Insolvency and Bankruptcy code	Teaching Hours: 18Hrs
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Insolvency and Bankruptcy Code, 2016 – Introduction – Objectives – Applicability of the Code – Important Definitions – Relationship between Bankruptcy, Insolvency and Liquidation - Corporate Insolvency Resolution Process – Liquidation Process – Fast Track Insolvency Process for Corporate Persons – Voluntary Liquidation – Adjudicating Authority – Offences and Penalties – Insolvency and Bankruptcy Board of India – Insolvency Professional Agencies – Insolvency Professionals – Information Utilities – Powers of Central Government

Text Books:

1. J. Jayasankar, Corporate Laws, Margham Publications, Chennai
2. Bharat Bhushan, N.D. Kapoor, Dr. Rajni Abbi & Rajiv Kapoor, N.D. Kapoor's Elements of Mercantile Law, Sultan Chand & Sons Pvt. Ltd., New Delhi

3. Gogna P.P.S., Business and Industrial Laws, S. Chand, New Delhi, 2010.
4. Saravanavel, P. and S. Sumathi, Legal aspects of Business, Himalaya Publishing House, Mumbai, 2012.
5. Kuchhal, M. C., Mercantile Law, Vikas, January 2018
6. Pandit and Pandit, Business Law, Himalaya, 2010

Reference Books:

1. K. Aswathappa & G. Sudarsana Reddy, Business Regulations, Himalaya Publishing House, Mumbai
2. Dr. MR Sreenivasan, Business Law (Commercial Law), Margham Publications, Chennai
3. Gulshan, S.S. A Hand book of Corporate Laws, S. Chand & Co, New Delhi

E-Resources:

1. The Institute of Chartered Accountants of India's Study Material for Competition Act, 2002: <https://resource.cdn.icai.org/47565bosfinal-p6d-cp2.pdf>
2. The Institute of Chartered Accountants of India's Study Material for The Foreign Exchange Management Act, 1999: <https://resource.cdn.icai.org/47681bosfinal-p6d-cp6.pdf>
3. The Institute of Chartered Accountants of India's Study Material for The Insolvency and Bankruptcy Code, 2016: <https://resource.cdn.icai.org/47588bosfinal-p6d-cp4.pdf>
4. The Institute of Cost Accountants of India's Study Notes for Corporate Laws: <https://icmai.in/upload/Students/Syllabus2016/Final/Paper-13-Revised-Aug.pdf>
5. The Competition Act, 2002 Bare Act at India Code - Digital Repository: https://indiacode.nic.in/handle/123456789/2010?view_type=browse
6. The Securities and Exchange Board of India Act, 1992 Bare Act at India Code - Digital Repository: https://indiacode.nic.in/handle/123456789/1890?view_type=search&sam_handle=123456789/1362
7. The Securities and Exchange Board of India Act, 1992 Bare Act at SEBI's Website: <https://www.sebi.gov.in/legal/acts/jan-1992/securities-and-exchange-board-of-india-act-1992-as-amended-by-the-finance-no-2-act-2019-3.html>
8. Securities Contracts (Regulation) Act, 1956 at SEBI's Website: <https://www.sebi.gov.in/acts/contractact.pdf>
9. The Foreign Exchange Management Act, 1999 Bare Act at India Code - Digital Repository: https://indiacode.nic.in/handle/123456789/1988?view_type=search&sam_handle=123456789/1362

10. The Insolvency and Bankruptcy Code, 2016 at India Code - Digital Repository:

https://indiacode.nic.in/handle/123456789/2154?view_type=browse&sam_handle=123456789/1362

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	M	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Core Paper

Paper code.....

Name of the Paper: HUMAN RESOURCE MANAGEMENT

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To make students to understand the basic concepts of Human Resource Management.
2. To expand the understanding of the Recruitment and Selection Procedure
3. To facilitate the students to be thoughtful about the Grievances procedure
4. To express to students the methods of Performance Appraisal
5. To let to know students about the Techniques of Training.

Course Outcomes:

1. After studied Unit-1, the student will be able to understand the concepts of Human Resource Management
2. After studied Unit-2, the student will be able to understand Recruitment and Selection Procedure
3. After studied Unit-3, the student will be able to know the various ways of solving the employee grievances procedure.
4. After studied Unit-4, the student will be able to know the evaluation the methods of Performance Appraisal
5. After studied Unit-5, the student will be able to evaluate the Different Techniques of Training.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT- 1: - Introduction

Teaching Hours: 18Hrs

HRM- Nature and Scope – Functions of HRM – Functions of HR Manager - development of the human potential - Link between organization planning and HR planning.

UNIT- 2: - Recruitment and Selection Teaching Hours: 18Hrs

Acquisitions and Maintenance of Personnel - Recruitment and Selection - Purposes and methods of Recruitment and Selection - Maintenance of Personnel - Motivation for increased productivity - QWL.

UNIT- 3: -Reward, Incentives and Grievances Teaching Hours: 18Hrs

Rewards and incentives - financial and non-financial incentives - Grievance procedure - conflict - process - stress vs. challenge - sources - resolution.

UNIT- 4: -Performance Appraisal Teaching Hours: 18Hrs

Performance appraisal - Ranking, rating scales, critical incident method - MBO as a method of appraisal - Removing subjectivity from evaluation - Criteria for promotions and job enrichment.

UNIT- 5: - Human Development and Organization Change Teaching Hours: 18Hrs

Human development - training - need and importance - methods of training - designing training program - Evaluation of training program - Executive development. - Organization change - change agents - resistance to change - managing the resistance.

Text Books

1. Aswathappa, Human Resource and Personnel Management, TataMcGraw Hill, NewDelhi, 2002.
2. A.M. Sheikh, Human Resource Development and Management, S. Chand & Co, New Delh
3. Subba Rao, P., Essentials of HRM and Industrial Relation, Himalaya Publishing House Pvt. Ltd.; 5/e edition (2013)
4. Biswajeet Pattanayak, Human Resource Management, PHI Learning, 2018.
5. Dressler- Human Resource management, 8th Ed. Pearson Education, 2002

Reference Books:

1. De Cenzo and Robbins, Personnel/Human Resource Management, Prentice Hall of India, 1998.
2. S.K.Chakraborty, Values and Ethics for Organization, Oxford University Press 1999.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Core Paper

Paper code.....

Name of the Paper: ADVANCED CORPORATE ACCOUNTING

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the accounts of banking companies and final accounts.
2. To have the knowledge about IRDA Regulations Regarding the Preparation of Financial
3. Statements.
4. To facilitate the students to have the deep understanding of holding company account, Consolidation of Balance sheets and Profit and Loss Accounts.
5. To know about Inflation Accounting.
6. To let students to know about Human Resource Accounting.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to make them aware about the Accounts of Banking Companies
2. After studied unit-2, the student will gain knowledge on preparation of accounts of insurance companies.
3. After studied unit-3, the student will be able to know develop knowledge of holding company concept & preparation of consolidated balance sheet.
4. After studied unit-4, the student will be able to know about Inflation accounting and CPP method.
5. After studied unit-5, the student will be able to know about Human Resource Accounting in India.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analysing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – 1: - Introduction

Teaching Hours: 18Hrs

Accounts of Banking Companies – Legal Provisions – Capital Adequacy Norms – Rebate on Bills Discounted – Asset Classification and Provisioning – Preparation of Final Accounts.

UNITT – 2: - Insurance Company Account	Teaching Hours: 18Hrs
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Insurance Company Accounts – Nature of Insurance Business – Distinction between Life and Non-Life Insurance – Accounts of Life Insurance Business – Accounts of General Insurance Business – IRDA Regulations Regarding Preparation of Financial Statements.

UNITT – 3: - Accounts of Holding Companies	Teaching Hours: 18Hrs
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Holding Company Accounts – Consolidated Financial Statements – Consolidation of balance Sheets and Profit and Loss Accounts.

UNITT – 4: -Inflation Accounting	Teaching Hours: 18Hrs
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Inflation Accounting – Need – Objections – Adjustments for General Price Changes – Current Purchasing Power Accounting (CPP) – CPP method of preparing financial statements.

UNIT – 5: - Recent Developments in Accounting	Teaching Hours: 18Hrs
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Human Resource Accounting – Need and Development – Importance of Human Resource Accounting – Objections against Human Resource Accounting – Human Resource Accounting in India. Corporate Social Reporting – Concept and Objectives.

Text book:

1. M.Y. Khan, Indian Financial System, Tata McGraw Hill, 2001
2. H.R. Machiraju, Indian Financial System, Vikas Publishing House, 1999.
3. B.S. Bhatia & G.S. Bhatre, Management of Capital Markets, Financial Services and Institutions, Deep and Deep Publishers, 2000.

Reference Book:

1. Dr. V. Balu, Merchant Banking & Finance Services, Sri Venkateswara Publication, Chennai.
2. Dr. N. Permavathy, Financial Services and Stock Exchange, Sri Vishnu Publications, Chennai.
3. Dr. S. Gurusamy, Financial Services and Systems, Vijay Nicholes Imprint Pvt. Ltd., 2001 Chennai.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	M	S	M	S	S	M	M	S
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	M	S	S	S	S	M
CO5	S	M	S	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Paper code.....

Credit: 3

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1. To enhance the understanding of the International Trade and Foreign Trade Policy.
2. To extend the knowledge of Balance of Payments and FEMA.
3. To facilitate the students to have the deep understanding of Export Procedure and Export Documents.
4. To bring about the awareness regarding the Guidelines of Import Procedure.
5. To let students to know about Export Pricing, Financing and EXIM Bank.

1. After studying Unit-1 students will be able to understand International Trade, Differences between International Trade, Domestic Trade and Advantages against International Trade.
2. After studying Unit-1 students will be able to differentiate Free Trade, Protection, Advantages of Free Trade and Protection, Tariffs - Non -Tariff barriers, Quota and Foreign Trade Policy
3. After studying Unit-2 student will be able to know the Balance of Payments and FEMA.
4. After studying Unit-2 students will have an exposure to the dealings in foreign exchange, Capital Account Transactions and Exports of Goods and Services.
5. After studied Unit-3, the student will be able to understand the Export Procedure and Export Documents.
6. After studying Unit-3 students will know the aspects of Letter of Credit (LC), Bill of Exchange, Trade Receipts, Letter of hypothecation, EPCG, Clearing and Forwarding Agents, Logistic Management and Supply Chain.
7. After studying Unit- 4 students will be aware of the Duties at the time of import, Duty Calculation, Changes in import Procedure and Import under Export Promotion Schemes
8. After studying Unit-4 students will be able to understand Duty payment through EXIM, EOU'S and SEZ, Special Additional Duty of Customs (SAD), Imports Tax Credit (ITC), Custom Clearance, Refund on Exports and Duty-free Import.
9. After studied Unit-5, the student will be able to know Export Pricing, Pricing objectives - Factors affecting pricing decisions, Steps involved in pricing, Pricing methods, Dumping and Marketing methods.

10. After studying Unit-1 students will be able to understand Trade Fairs, Export Incentives, Financing for Export and Import- Pre-shipment & Post –Shipment finance, Letter of Credit, Discounting of Foreign bills, (ECGC) Financial Institutions for International Trade, EXIM Bank and Risk Management.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit- 1: - Introduction to International Trade.

Teaching Hours: 15 Hrs

Features of International Trade - Differences between International Trade and Domestic Trade - Advantages against International Trade - Free Trade and Protection - Advantages of Free Trade and Protection - Tariffs- Non -Tariff barriers - Quota - Foreign Trade Policy – Incoterms.

Unit- 2: - Balance of Payments and FEMA. Teaching Hours: 15 Hrs

Definitions of Balance of Payments - uses of Balance of Payments- Differences between balance of trade and balance of payments - Objectives of the FEMA- Administration of the Act - Dealings in foreign exchange - Capital Account Transactions - Exports of Goods and Services.

Unit- 3: - Export Procedure and Export DocumentsTeaching Hours: 15 Hrs

Step-by-Step procedure for export - Documents required for Export - Bill of Lading - Airway Bill - Shipping Bill - Documents related to payment - Letter of Credit (LC) - Bill of Exchange - Trade Receipts - Letter of hypothecation - EPCG - Clearing and Forwarding Agents - Logistic Management - Supply Chain

Unit-4: - Guidelines and Import ProcedureTeaching Hours: 15 Hrs.

Introduction - Procedure for Import - Duties at the time of import - Duty Calculation - Changes in import Procedure - Import under Export Promotion Schemes and Duty payment through EXIM - EOU'S and SEZ, Special Additional Duty of Customs (SAD) - Imports Tax Credit (ITC) -Custom Clearance -Refund on Exports - Duty free Import.

Unit- 5: - Export Pricing and FinancingTeaching Hours:15 Hrs.
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Export Pricing, Pricing objectives - Factors affecting pricing decisions - Steps involved in pricing - Pricing methods - Dumping - Marketing methods- Trade Fairs - Export Incentives – Financing for Export and Import- Pre-shipment & Post –Shipment finance - Letter of Credit – Discounting of Foreign bills -(ECGC) Financial Institutions for International Trade – EXIM Bank- Risk Management.

Text books:

1. Natarajan. L Export Import Procedures, Margham Publications, Chennai.
2. Parul Gupta, Export Import Management, Mc Graw Hill Education (India) Pvt. Limited, 2018, Chennai.
3. Chaudhari Shiva CA, Practical Guide on How to Start Export-Import Business, Educreation Publishing, Delhi.
4. Sankaran. S, International Trade, Margham Publications, Chennai.
5. Kulwinder Singh, Foreign Trade of India, New Century Publications, 2014, New Delhi.

Reference Books:

1. Justin Paul & Rajiv Serkar, Export Import Management, Oxford University Press, 2013, Noida
2. Kenneth D, Building an Import / Export Business, John Wiley & Sons. Inc. 2007, New Jersey
3. Belay Seyoum, Export-Import Theory, Practices and Procedures, Routledge Publishers, 2009, New York.
4. Paliwal Manisha, Import Export Procedure, Nirali Prakashan, Educational Publishers, Pune.
5. [Sudhir Kochhar](#), Export Procedures and Documentation, Gullybaba Publishing House (P) Ltd, New Delhi

Journals:

1. Import, Export and Economic Growth. [www. researchgate.net](http://www.researchgate.net)
2. International Journal of Export Import Marketing. [www. econpapers.repec.org](http://www.econpapers.repec.org)
3. The relationship between Import and Export. [www. onlinejournal.in](http://www.onlinejournal.in)
4. International Journal of Export Marketing. www.inderscience.com
5. Export summary Journal Entries. [www. Knowledgecentre. Zuora.com](http://www.Knowledgecentre.Zuora.com)

E-Material:

1. How to Start an Import/Export Business. www.entrepreneur.com
2. EXIM Financing and Documentation, [www. Pondiuni.eu.in](http://www.Pondiuni.eu.in)
3. Importing & Exporting, www.patsula.com
4. India's export – Import Procedure and documentation, [www. research publish.com](http://www.research.publish.com)
5. Importing & Exporting in India – Leading Edge Alliance. [www. leaglb.com](http://www.leaglb.com)

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	M	S	M	S	S	S	M	S	S	S
CO4	S	M	S	M	S	M	S	S	M	S
CO5	S	S	S	S	M	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Core Elective Paper

Paper code.....

Name of the Paper: B. GLOBAL MARKETING

Credit: 3

Total Hours per Week: 5 Hrs, Lecture Hours: 5hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the Global Marketing Environment.
2. To extent the knowledge of global market entry strategies.
3. To facilitate the student's global product policy and price.
4. To bring knowledge about the global marketing channels.
5. To understand the international marketing promotional strategies.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to understand the concepts of Global marketing and Marketing information system.
2. After studied unit-2, the student will be able get full information about global market entry strategies and direct investment.
3. After studied unit-3, the student will be able to understand the global product policy and pricing for international market.
4. After studied unit-4, the student will be able to learn important Global Marketing Channels and Physical Distribution.
5. After studied unit-5, the student will be able to know about international marketing promotional strategies and International Marketing Communication.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – 1: - Global MarketingTeaching Hours: 15Hrs
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A Global Marketing-Scope-Importance-Global Vs. National Marketing – Global Marketing Environment-Social-Cultural-Political-Legal and Regulatory Environments-International Marketing Research Process, Market Surveys, Marketing Information System.

UNITT – 2: - Global Market Entry StrategiesTeaching Hours:15Hrs
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Identifying Foreign Markets-Global Market Entry Strategies-Joint Ventures, Strategic Alliances, Direct Investment, Manufacturing and Franchising, E-Marketing.

UNITT – 3: - Global Product Policy and Pricing**Teaching Hours: 15Hrs**

Global Customers-Segmentation-Targeting-Global Product Life Cycle-Innovative Products and Adaptation-Global Product Positioning. Branding-Country of Origin Effect and Global Brands. Pricing for International Markets-Objectives Transfer Pricing Strategy-Dumping-Incoterms 2020.

UNITT – 4: - Global Marketing Channels**Teaching Hours: 15Hrs**

Global Marketing Channels and Physical Distribution-Channel Objectives and Constraints. Channel Structures-Home Country Middlemen-Foreign Country Middlemen. Factors Involved in Distribution Systems, Modes of Transportation, International Packaging-Objectives of Logistics and Supply Chain Management.

UNIT – 5: - International Marketing Promotional Strategies**Teaching Hours: 15Hrs**

Promotional Strategies-International Marketing Communications-Generic Promotions in International Marketing. Nature of International Advertising-Diversified Advertising Strategy-Personal Selling, Trade Fairs and Exhibitions-Role of Export Promotion Organizations.

Text book:

1. Varshney, R.L. and Bhattacharya BL International Marketing Management, Sultan Chand & Sons, New Delhi.
2. Duby V.K.:Export Marketing, Common Wealth Publishers, New Delhi
3. Philip R Cateora, Mary C. Gilly, John L Graham-International Marketing, The McGraw-Hill Companies, Inc.

Reference Book:

1. Warnen J. Keegan: Global Marketing Management, Prentice Hall of India, New Delhi.
2. Cherian and Jacob: Export Marketing, Himalaya Publishing House, Mumbai.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	M	S	M	S	S	M	M	S
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	M	S	S	S	S	M
CO5	S	M	S	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Core Elective Paper

Paper code.....

Name of the Paper: C. E - COMMERCE

Credit: 3

Total Hours per Week: 5 Hrs, Lecture Hours: 5hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of basic concepts, theories and business models underlying E-Commerce.
2. To improve familiarity with current challenges and issues in E-Commerce.
3. To Know the concept of Electronic Data Interchange.
4. To enable the students to understand the data and message security.
5. To know about the Electronic Payment Schemes and Digital Payment.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to understand the Applications of E Commerce in business.
2. After studied unit-2, the student will be able to understand the Network Infrastructure of E Commerce.
3. After studied unit-3, the student will be able understand the Internet Protocols in E Commerce.
4. After studied unit-4, the student will be able to understand the Network Security in E Commerce.
5. After studied unit-5, the student will be able to understand the Types of Digital Documents in E Commerce.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – 1: - Electronic CommerceTeaching Hours: 15Hrs

Meaning -Traditional Commerce-E Commerce and its applications in Business. Basic Blocks of E Commerce, E Commerce Consumer-Anatomy of E Commerce.

Unit-2: Network Infrastructure

Teaching Hours15Hrs

Global Information Distribution Networks-Components of the 1-way-policy issues-Internet terminology-Internet Governance- An Overview of Internet Applications/.

Unit-3: Network Layers**Teaching Hours:15 Hrs**

Internet Protocol (IP)-Transmission Control Protocol (TCP)-Multimedia Concepts-Advantages of Internet. Electronic Data Interchange (EDI)-EDI and E Commerce-EDI application in Business.

Unit-4: Network Security**Teaching Hours:15 Hrs**

Client Server Network Security-Firewalls and Network Security-Data and message security-encrypted documents and Electronic Mail. Video Conferencing.

Unit-5: Digital Documents**Teaching Hours:15Hrs**

Documents Library-Types of Digital Documents-Corporate Data Warehouse-Electronic Payment Scheme-Intra-organizational Electronic Commerce.

Text book:

1. David Kosiur, understanding Electronic Commerce, Addison Wesley, 1996.
2. Soka, From EDI to Electronic Commerce, Tata McGraw-hill, 1995.

Reference Book:

1. Saily Chan, Electronic Commerce Management, John Wiley,1998.
2. Neil Randall, The Internet in a Wee, 2ndEdn. Prentice Hall of India, New Delhi..
3. Kamalesh, K. Balaji and Debjani Nag, “E-Commerce”, the cutting eduge of business, Tata McGraw-Hill, 2000
4. Marilyn Greenstein and Todd M. Fein Mann, Electronic Commerce, security, Risk Management, Irwin McGraw Hill, 2000.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	M	S	M	S	S	M	M	S
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	M	S	S	S	S	M
CO5	S	M	S	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Open Elective Paper

Paper code.....

Name of the Paper: A. PRINCIPAL OF MANAGEMENT

Credit: 3

Total Hours per Week: 5 Hrs, Lecture Hours: 5hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the Principles of Management.
2. To extent the knowledge of steps involved in the process of Planning and decision making.
3. To impact knowledge in Principles of Organization.
4. To provide the students the knowledge about the Authority to delegation.
5. To extend the knowledge on Need of Co-ordination and Control Process.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to understand the Principles & Functions of Management.
2. After studied unit-2, the student will be able to understand the Planning and its importance.
3. After studied unit-3, the student will be able to understand the Organization and its importance.
4. After studied unit-4, the student will be able to understand the Authority, Responsibility & Delegation.
5. After studied unit-5, the student will be able to understand the Need for Co-ordination and importance of Control.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: - Introduction

Teaching Hours: 15 Hrs

Management. Definition-Importance-Principles of Management-Functions of a Manager-Role of a Manager-Skills of a Manager.

Unit-2: -Planning and Decision-Making

Teaching Hours:15 Hrs

Planning Meaning-Nature-Objective-Steps in Planning-Limitation of Planning-Decision Making-Process of decision making-Types of decisions.

Unit-3:- Organisation**Teaching Hours:15 Hrs**

Organisation Meaning-Nature-Importance-Informal Organization-Principles of Organization.

Unit-4: - Authority and Reasonability**Teaching Hours:15 Hrs**

Authority Meaning-Responsibility-Difference between Authority & Responsibility Accountability. Delegation: Meaning-Advantages-Reasons of non-delegation-How to make Delegation effective.

Unit-5: - Co-Ordination and Controlling**Teaching Hours:15 Hrs**

Co-Ordination: Need of Co-ordination-Types-Techniques-Controlling-Meaning and Importance of Controlling-Control Process.

Text book:

1. P.C. Tripathi & P.N. Reddy-Principles of Management – Tata McGraw-Hill.
2. Gupta C.B. Business Management.

Reference Book:

1. Hanagan-Management Concepts & Practices-McMillan India Ltd.
2. Dr. N. Prema- Business Management.
3. Massie-Essentials of Management-Prentice-Hall of India.
4. J. Jayasankar-Principles of Management-Margham Publications.
5. R.N. Gupta-Principles of Management-S. Chand Publications

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	M	S	M	S	S	M	M	S
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	M	S	S	S	S	M
CO5	S	M	S	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Open Elective Paper

Paper code.....

Name of the Paper: B. ELEMENTS OF ACCOUNTING

Credit: 3

Total Hours per Week: 5 Hrs, Lecture Hours: 5hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of basic concepts of accounting.
2. To explain students about the Preparation of Ledger Accounts.
3. To facilitate the students in the Preparation of Trial Balance.
4. To express to students to about various classification of Error.
5. To let to know students to know the Balance Sheet with simple Adjustments.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to understand the basic account concept and double entry system
2. After studied unit-2, the student will be able to Pass Journal Entries, Prepare Ledger Accounts.
3. After studied unit-3, the student will be able to know the Preparation Trial Balance.
4. After studied unit-4, the student will be able to know the Rectification after the preparation of final account is excluded.
5. After studied unit-5, the student will be able to know the Preparation Trading a/c, Profit & Loss a/c and Balance Sheet..

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: - Introduction of Accounting

Teaching Hours:15 Hrs

Accounting-Meaning-Definition-Objectives-Double Entry System-Meaning of Debit and Credit - Advantages- Limitations-Types of Accounts - Accounting Rules - Accounting Terminology -Accounting Concepts and Conventions.

Unit-2: - Preparation of Journal and Ledger Account

Teaching Hours:15 Hrs

Journal -Meaning-Preparation of Journal-Ledger Accounts-Meaning-Preparation of Ledger Accounts-Advantages over Journal-Ledger Accounts.

Unit-3: - Preparation of Trail Balance and Subsidiary Book Teaching Hours:15 Hrs

Trial Balance-Meaning-Advantages-Preparation of Trial Balance-Subsidiary Books-Meaning-Types.

Unit-4: - Error and Rectification Teaching Hours:15 Hrs

Errors-Classification-Rectification (Rectification after the preparation of final account is excluded) – Suspense Account-Meaning and Need.

Unit-5: - Final Accounting Teaching Hours: 15 Hrs

Preparation of Final Accounts-Trading Account-Profit and Loss Account-Balance Sheet with simple Adjustments.

Text book:

1. Jain, S.P. & Narang, N.L. Advanced Accounting, Kalyani Publications.
2. Jaya Charulatha and Baskar, Introduction to Accountancy, Vijay Nicholes Imprint Pvt. Ltd. Chennai.

Reference Book:

1. Gupta, R.L & Radhaswamy, M. Advanced Accounts, Sulthan Chand, New Delhi.
2. Shukla & Grewal & Gupta, Advanced Accounting S. Chand & Co, New Delhi.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	M	S	M	S	S	M	M	S
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	M	S	S	S	S	M
CO5	S	M	S	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course outcomes – Strong, M – Medium, L – Low (may be avoided)

Semester: II,

Paper type: Open Elective Paper

Paper code.....

Name of the Paper: C. ELEMENTS OF BUSINESS LAW

Credit: 3

Total Hours per Week: 5 Hrs, Lecture Hours: 5hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the contract and agreement.
2. To extent the knowledge of devaluation joint Rights and Liabilities and Discharge of
1. contract.
2. To facilitate the students to have the understanding about Indemnity and Guarantee.
3. To know about Bailment and Pledge.
4. To let students to know about Contract of Agency and Termination Agency.

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to acquire the basic knowledge and understand the types of contracts and agreement.
2. After studied unit-2, the student will be able to know the essential elements of contract and rules as to offer.
3. After studied unit-3, the student will be able to have the understanding of law relating to indemnity and gurantee.
4. After studied unit-4, the student will be able to know the duties and rights of the Bailor and Bailee and Agent and Principal.
5. After studied unit-5, the student will be able to know about law of Agency.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: - Introduction of Contract

Teaching Hours:15 Hrs

Contract-Formation and Essential Element of Contract-Types of Contract and Agreement-Rules as to offer-Acceptance and Consideration -Capacity to Contract.

Unit-2: - Performance and Discharge of Contact

Teaching Hours:15 Hrs

Performance of Contract-Devolution of Joint Rights and Liabilities-Discharge of contract.

Unit-3: - Indemnity and Guarantee

Teaching Hours:15 Hrs

Indemnity and Guarantee-Features and Distinctions-Extent of Surety's Liability-Rights and Discharge of surety.

Unit-4: - Bailment and Pledge**Teaching Hours:15 Hrs**

bailment Definition-Features-Rights and duties of Bailor and Bailee, Pledge, Definition-Features-Rights and duties of pawnor and pawnee-Difference between Bailment and Pledge.

Unit-5: - Contract of Agency**Teaching Hours:15 Hrs**

Contract of Agency-Definition and meaning-creation-Rectification and Requisites-Rights of Principal and Agent-personal liability of Agent-Termination Agency.

Text book:

1. P.C. Tusian, Business Laws, Tata McGraw Hill, New Delhi.
2. Dr. N. Premavathy, Business Law, Sri Vishnu Publication, Chennai.

Reference Book:

1. N.D. Kapoor, Business Laws, Sultan Chand & Sons, New Delhi.
2. R.S.N. Pillai & Bagavathi, Business Laws, S. Chand & Co., New Delhi.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	S	S	M	S	M	S	S	M	M	S
CO3	M	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	M	S	S	S	S	M
CO5	S	M	S	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: II, Paper type: Compulsory Paper Paper code.....

Name of the Paper: HUMAN RIGHTS Credit: 3

Total Hours per Week: 5 Hrs, Lecture Hours: 5hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

Course Out Comes (five outcomes for each unit should be mentioned)

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: Introduction to Human Rights

Teaching Hours: 15 Hrs.

Definition of Human Rights - Nature, Content, Legitimacy and Priority - Theories on Human Rights - Historical Development of Human Rights.

Unit-2: International Human Rights

Teaching Hours: 15 Hrs.

International Human Rights - Prescription and Enforcement upto World War II - Human Rights and the U.N.O. - Universal Declaration of Human Rights - International Covenant on Civil and Political Rights - International Covenant on Economic, Social and Cultural Rights and Optional Protocol.

Unit-3: Human Rights Declarations

Teaching Hours: 15 Hrs.

Human Rights Declarations - U.N. Human Rights Declarations - U.N. Human Commissioner.

Unit-4:Amnesty International

Teaching Hours: 15 Hrs.

Amnesty International - Human Rights and Helsinki Process - Regional Developments - European Human Rights System - African Human Rights System - International Human Rights in Domestic courts.

Unit- 5 Contemporary Issues on Human Rights

Teaching Hours: 15 Hrs.

Contemporary Issues on Human Rights: Children's Rights - Women's Rights -Dalit's Rights - Bonded Labour and Wages - Refugees - Capital Punishment. Fundamental Rights in the Indian constitution - Directive Principles of State Policy - Fundamental Duties - National Human Rights Commission.

Books for Reference:

International Bill of Human Rights, Amnesty International Publication, 1988.
Human Rights, Questions and Answers, UNESCO, 1982

Mausice Cranston- What is Human Rights

Desai, A.R. - ` Violation of Democratic Rights in India

Pandey - Constitutional Law.

Timm. R.W. - Working for Justice and Human Rights.

Human Rights, A Selected Bibliography, USIS.

J.C.Johari - Violation of Democratic Rights in India

G.S. Bajwa - Human Rights in India.

Amnesty International, Human Rights in India.

P.C.Sinha - International Encyclopaedia of Peace, Security

K. Cheous (Ed) - Social Justice and Human Rights (Vols 1-7).

Devasia, V.V. - Human Rights and Victimology.

Magazines:

The Lawyer, Bombay

International Instruments of Human Rights, UN Publication

International Instruments of Human Rights, UN Publication

Human Rights Quarterly, John Hopkins University, U.S.A.

Semester: III,

Paper type: Core Paper

Paper code.....

Name of the Paper: GOODS & SERVICES TAX (GST)

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To gain expert knowledge on the principles and law relating to Indirect Taxation and GST in India.
2. To expose the students with the latest development in GST.
3. To impart skill in applying and analysing the provisions of Goods and Service Tax Act.
4. To know about the basic Administration of GST.
5. To Familiarize the Provisions to appeal in the court.

Course Outcomes

1. The students will able to know and familiarize with the fundamentals of Taxation.
2. The students will able to know GST and its history of GST and their types.
3. The students will able to know the exempted goods and Services under GST Act.
4. The students will able to know the Administration of GST and Authority.
5. The students will able to know how to avail the Appeal and Revision under GST

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – 1: - Introduction

Teaching Hours: 18Hrs

Meaning and Definition of Indirect Taxes-Nature-Scope Constitutional Provisions-Advantages-Disadvantages-Difference between Direct and Indirect Taxes- Types-Milestones in the history of Indirect Taxation in India - Goods & Services Tax (GST) Act 2016-Introduction - Meaning- Definition-Major Indirect Taxes merged in to Goods and Service Tax.

UNIT – 2: - Basic Provisions of GST

Teaching Hours: 18Hrs

Introduction--Historical backdrop of Goods and Service Tax-objectives & features - Strengths, Weaknesses, Opportunities and Challenges (SWOC) Analysis of GST in India. –

Advantages & Limitations of GST-Economy, Industry and trade, tax payers-Types of GST - CGST-IGST-SGST- UTGST Schedules-Rate of GST- Tamil Nadu GST Provisions.

UNITT – 3: - Main Provisions of GST	Teaching Hours: 18Hrs
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Provisions Compensation (GST) Law-Definitions of important terms-Levy of Tax- Collection-relating to Place, Time and Value of Supply-Different meaning of supply- Composite Supply Mixed supply- Scope of Supply- Taxable Supply- E-Commerce-SupplyChain, GST Exemption limit-Tax Invoice-Credit and Debit Notes-Valuation Rules- Computation Tax Input tax Credit (ITC)-Registration-procedures-Deemed Registration- Cancellation of Registration. Accounts and Records- Period of Retention of Records- Presumption as to Documents>Returns- Annual-Final-Payment of Tax-Information Technology in GST Audit- Special Audit-Assessment-Refund-Consumer welfare Fund-GST Per actioners - TDS/TCS

UNITT – 4: - Administration of GST	Teaching Hours: 18Hrs
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GST Council-Authorities-Inspection-search seizure-Arrest-Demand-Recovery-Liability to pay tax in certain cases-Advance Ruling- Authority and Appellate Authority - GSTN- Information infrastructure for GST.

UNIT – 5: - Appeals& Revisions under GST	Teaching Hours: 18Hrs
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Appeals-Appeal to High Court Appeal to Supreme Court- Revisions-Offences- Compounding of Offences-Penalty Transitional provisions-IGST Provisions- Inter-state Supply- Intra-state supply- Zero rated Supply- Imported Supply- Transfer of ITC-Compensation Rules- Base year Revenue-Projected Revenue-Miscellaneous Provisions-Interest-Job Work Procedure Deemed Export.

Text Books:

1. Goods and Services Tax, Dr. H.C. Mehrotra and V.P. Agarwal, Sahitya Bhawan Publications, Agra.
2. GST- A Brief Introduction, L.V.R. Prasad and G.J. Kiran Kumar, PK Publishers.
3. Indirect Taxes- Dr.H.CMehrotra& Prof. Agarwal, SahityaBhavanPublishers,Agra.
4. GST Law & Procedure, Anandaday Misra, Taxman
5. Hand Book of GST in India Concepts and Procedures(2017Edition) RakeshGarg&SandeepGarg - Bloomsbury India Publications

Reference Book

1. GST in India-RakeshGarg&SandeepGarg, Bloomsbury IndiaPublications
2. All about GST-V.S Datey-Taxman Publications.
3. GST Law, Concept & Impact Analysis-Dr.SanjivAgarwal
4. GST Law & Analysis with Conceptual Procedure-Bimal Jain &IshaBensalYoungGlobal.

5. GST Bare Acts, Rules, Notifications &Circulars

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: III,

Paper type: Core Paper

Paper code.....

Name of the Paper: ORGANISATIONAL BEHAVIOUR

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objectives

1. To understand the basic concepts of organizational behaviour.
2. To bring an understanding on different types of motivational theories
3. To facilitate the students to know the stress management
4. To let to know students to organisational structure and organisational Effectiveness

Course Outcome

1. After studying studied Unit-1 students will be able to understand the basic concept of organisational behaviour and foundations of individual behaviour.
2. After studying Unit -1 students will be able to have a idea about Personality, Stages of personality, perception, learning, attitudes, values and emotions.
3. After studying Unit-2 student will be able to develop an idea about different motivational theories and evaluate motivational strategies used in a variety of organizational settings.
4. After studying Unit-2 students will be able to understand motivation, morale, organisational citizenship behaviour.
5. After studying Unit-3 student will be able to understand the foundation of group dynamics.
6. After studying Unit-3 student will be able to understand work stress, stress management and coping strategies of stress.
7. After studying Unit-4, the student will be able to evaluate the appropriateness of various leadership styles and how to deal with organisational conflict.
8. After studying Unit-4, the student will be able to remember the concepts of organisational conflicts, stages, sources, types and conflict management.
9. After studying Unit-5, the student will be able to understand different types of organizational structures and importance of organizational effectiveness.
10. After studying Unit-5, the student will be able to understand organisational effectiveness & performance and organisational ethics

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit 1: -Introduction**Teaching Hours: 15 Hrs**

Organisational Behaviour – Concepts - Nature & Scope – Organisational Behaviour Models - Foundations of Individual Behaviour – Personality – Stages of Personality - Perception – Learning – Attitudes – Values – Emotions.

Unit 2: -Motivation**Teaching Hours: 15 Hrs**

Motivation – Theories by Maslow, Herzberg, McGregor, McClelland & Vroom – Motivational Tools in Organisation – Effects on Work Behaviour - Motivation and Morale - Organisational Citizenship Behaviour

Unit 3: - Group Dynamics and Stress Management**Teaching Hours: 15 Hrs**

Group Dynamics – Formal and Informal Group - Group Norms - Group Cohesiveness - Group Behaviour - Group Decision Making – Work Stress - Stress Management – Coping Strategies of Stress.

Unit 4: -Leadership and Organisational Conflicts**Teaching Hours: 15 Hrs.**

Leadership – Traits - Styles – Theories of Leadership - Power and Politics - Organisational Conflicts - Stages - Sources - Types - Conflict Management

Unit 5: - Organisational Structure and Organisational Effectiveness Teaching Hours:15 Hrs.

Organisational Structure – Foundation and Types - Organisational Culture and Climate – Organisational Development – Organisational Effectiveness & Performance – Organisational Ethics

Text Books

1. Khanka, S.S. Organisational Behaviour, S.Chand& Co. Ltd., New Delhi.
2. Aswathapa, K. Organisational Behaviour, Himalaya Publishing House.
3. Schermerhorn and Osborn,Organizational Behaviour,Wiley India Pvt. Ltd, Noida
4. David Buchanan and Andrzej Huczynski, Organizational Behaviour: an introductory
5. text, Financial Times/ Prentice Hall, New Delhi
6. Gupta C.B. A Textbook of Organisational Behaviour, S Chand & Company, New Delhi.

Reference Books:.

1. Stephen P. Robbins, Organizational Behavior, Pearson Education, New Delhi.
2. Prasad, L.M. Organisational Behaviour, Sultan Chand and Sons, New Delhi.
3. Margie Parikh and Rajen Gupta, Organisational Behaviour, Tata McGraw Hill Education, New Delhi

4. Gregory Moorhead, Organizational Behaviour, Dreamtech Press India Pvt. Ltd, New Delhi
5. Inder Jeet, and Suman Solanki. Organisational-Behaviour, Taxmann. Pune

Course Material: website links, e-Books and e-journals

1. Organizational Behavior eBooks - Barnes & Noble <https://www.barnesandnoble.com>
2. An Introduction to Organizational Behavior - 2012 Book Archive <https://2012books.lardbucket.org>
3. Download Organisational Behaviour eBooks for Free - PDF ... <https://www.pdfdrive.com>
4. Organizational behaviour (eBook, 2017) [WorldCat.org] <https://www.worldcat.org>
5. Organizational Behavior Interactive eBook - SAGE ... <https://uk.sagepub.com>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	M	S	M	S	S	S	M	S	S	S
CO4	S	M	S	S	S	M	S	S	M	S
CO5	S	S	S	S	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: III,

Paper type: Core Paper

Paper code.....

Name of the Paper: ADVANCED COST ACCOUNTING

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the basic concepts in Cost Accounting.
2. To extend the knowledge of Methods of Costing Process costing.
3. To facilitate the students to have the deep understanding of Standard Costing and Variance analysis
4. To bring about the awareness of Methods of cost reduction.
5. To let the students to know about Benefits from adoption of ABC-Just in Time Costing (JIT).

Course Outcomes

1. After studied Unit-1, the student will be able to understand the basic concepts in Cost Accounting and also familiarizing with the preparation of Cost Sheets, Tenders and Quotations.
2. After studied Unit-2, the student will be able to understand Preparation of Process Costing.
3. After studied Unit-3, the student will be able to Know the Standard Costing and Variance Analysis
4. After studied Unit-4, the student will be aware of the Cost control and Cost Reduction.
5. After studied Unit-5, the student will be able to develop the knowledge about Activity based costing.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNITT – 1: - Introduction**Teaching Hours: 18Hrs**

Nature and significance of cost accounts-Definition of Costing, Scope, Objectives, Functions and limitations of cost accounting-Installation of costing system-Elements of Cost- Cost centre and profit centre-Preparation of Cost sheet, tender of quotations.

UNITT – 2: - Process Costing Teaching Hours: 18Hrs

Methods of Costing-Process costing, Treatment of equivalent production- Inter process profit-Joint and by product Costing-Preparation of contract account, Cost plus contract and escalation clause.

UNITT – 3: - Standard Costing and Variance Costing**Teaching Hours: 18Hrs**

Standard Costing and Variance Analysis-Material, Labour and Overheads -reporting of variances.

UNITT – 4: - Cost Control**Teaching Hours: 18Hrs**

Cost control and Cost Reduction-Control over wastages, Scrap, Spoilage and defectives- Methods of cost reduction.

UNIT – 5: - ABC Analysis**Teaching Hours: 18Hrs**

Activity based costing-Meaning and concept-Characteristics of ABC-Benefits from adoption of ABC-Just in Time Costing (JIT)

Note: The proportion between theory oriented and problem-oriented questions in the university examination shall be 20:80

Text Book

1. T.S.Reddy and Y.H. Reddy- Cost and Management Accounting-Margam Publications, Chennai.
2. S.P. Jain and K.L. Narang-Cost accounting-Kalyani Publishers-New Delhi.
3. Ravi M Kishore Advanced Management Accounting - Taxman's-New Delhi.
4. Management Accounting - J.Batty.
4. B.K. Bhar- Cost Accounting-Academic publishers, Calcutta.
5. Jawaharlal - Cost Accounting-Tata Mc. Graw Hill

Reference books

1. C.T.Horangren-Cost Accounting - A Managerial Emphasis- Pearson education-New Delhi.
2. Robert S. Kaplan-Anthony A. Atkinson- Advanced Management Accounting - Prentice Hall of India-New Delhi 8.
3. Weldon's Cost Accounting and Cost Methods - Mc. Donald and Evens Limited.
4. .M N Arora and Priyanka Katyal Cost Accounting- Vikas Publicationms.
5. .M.L. Agarwal &Dr. K.L. Gupta Advanced Cost Accounting –Sahitya Bhawan Publications Agra.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	M	S	S	M
CO2	M	M	M	S	M	S	S	S	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	S	S	S	S	S	S	M
CO5	S	M	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: III,

Paper type: Core Paper

Paper code.....

Name of the Paper: RESEARCH METHODOLOGY

Credit: 4

Total Hours per Week: 6 Hrs, Lecture Hours: 6hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the basics of Research Methodology
2. To extend the knowledge of Data Collection and Sampling.
3. To facilitate the students to have the deep understanding of Processing of Data
4. To bring about the awareness of data Analysis through Statistical Tools.
5. To let students to know about Research Report

Course Out Comes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to know the various concept relating to Research.
2. After studied unit-2, the student will be able to demonstrate the different types of sampling techniques and classify the data.
3. After studied unit-3, the student will be able to collect the data from various sources, analyse and interpret it.
4. After studied unit-4, the student will be able to apply various statistical tools for Research.
5. After studied unit-5, the student will be able to prepare research report.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Introduction

Teaching Hours: 18 Hrs

Research – definition, characteristics, nature and scope. Various types of research - Formulation of research problem - Major steps in Research – Hypothesis – Research Design - Uses of social research.

Unit-2: Sampling and Data Collection

Teaching Hours: 18 Hrs

Sampling: Meaning, definition, need and types - Merits and demerits of sampling. Data collection: Sources of data; Primary and Secondary data. Procedure for data collection, Tool of data collection - Questionnaire – Interview-Schedule.

Unit-3: Data Processing and Analysis**Teaching Hours: 18 Hrs**

Processing of data: editing, coding and Tabulation - Problems - use of computer in social research. Analysis of data: Statistical analysis; diagrammatic and graphic representation. Interpretation of results.

Unit-4: Statistical Applications**Teaching Hours: 18 Hrs.**

Statistical Tools used in Research – F test – t- Test, Analysis of Variance (ANOVA) – Chi-Square Analysis.

Unit-5: Research Reports**Teaching Hours: 18 Hrs.**

Structure and components - Types of Research Report, Good Research Report. Pictures and Graphs. Introduction to SPSS Package.

Text book:

1. Kothari. C.R. Research Methodology - Methods & Technology, New Age International Publisher, New Delhi.
2. Panneerselvam. R. Research Methodology, Prentice Hall of India, New Delhi, 2004. New Delhi, 1994.
3. Gupta, C.B., An introduction to Statistics Methods, Vikas Publishing House, 1998, New Delhi
4. Dr. RK Jain Research Methodology: Methods and Techniques, Vayu Education of India, New Delhi
5. [H.V. Deshpande](#), Research in Literature and Language: Philosophy, Areas and Methodology, Notion Press; 1st edition, Chennai

Reference Book:

1. Wilkinson. T.S. & Bhandarkar. P.L. Methodology and Techniques of Social Research, Himalaya Publishing House, 2000, Mumbai.
2. Young, P.V., Scientific Social Survey and Research, Prentice Hall, 1949. New York.
3. Gupta, S.P. Statistical Methods, Sultan Chand and sons, 1999, New Delhi
4. [Dr Kirti Gupta](#), Research Methodology, Nirali Prakashan, Pune.
5. Veena Tucker, Research Methodology, Pearson Education; First edition, London.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	S	S	M
CO2	S	M	M	S	M	S	S	S	S	M
CO3	S	S	M	S	S	S	M	M	M	S
CO4	S	M	S	S	S	S	S	S	S	M
CO5	S	M	S	S	M	M	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: III,

Paper type: Core Paper

Paper code.....

Name of the Paper: A. AGRI BUSINESS MANAGEMENT

Credit: 3

Total Hours per Week: 4 Hrs, Lecture Hours: 4hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the Management Concept and Agripreneurs
2. To extend the knowledge of Agribusiness and Commodities Market.
3. To facilitate the students to have the deep understanding of Agricultural Market and Products.
4. To bring about the awareness of Small-Scale Industry and MSME.
5. To let students to know about financial schemes for Agribusiness.

Course Outcome

1. After studied Unit-1, the student will be able to understanding of the Management Concept and Agripreneurs.
2. After studied Unit-2, the student will be able to know the Agribusiness and Commodities Market.
3. After studied Unit-3, the student will be able to have the deep understanding of Agricultural Market and Products.
4. After studied Unit-4, the student will be able to have the awareness of Small Scale Industry and MSME.
5. After studied Unit-5, the student will be able to know about financial scheme for Agribusiness.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: Management Concepts and Agripreneurs.	Teaching Hours: 12 Hrs
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Management Concepts & Principle - Basic Concepts of Management - Managerial Environment - Management Functions - Leading and Leadership - Forms of Business organization - Entrepreneurial Competencies - Agripreneurs.

Unit-2: Agri Business and Commodities Markets.**Teaching Hours: 12 Hrs**

Management principles to Agribusiness -Nature and Characteristics of Agribusiness -Agro-based Industries in India -Agricultural Supply Chain Management - Strategic Management in Agribusiness - Risk Management in Agribusiness - Contract Farming - Commodity Markets - Recent Innovations in Commodities Markets - Warehousing

Unit-3: Production and Marketing of Agricultural Products.**Teaching Hours: 12 Hrs**

Production, Consumption, Processing and Marketing of Agricultural Products – Consumption of Agricultural Products – Agricultural Marketing – Agricultural Marketing Functions – Classification of Markets- Cooperative Agricultural Marketing – Pricing – Marketing cost-margins-price spreads – Rural Marketing

Unit-4: Small Scale Industry – MSME Teaching Hours: 12 Hrs.

Small Scale Industrial Undertaking -Ancillary Industrial Undertaking - Tiny Enterprises - Export Oriented Units -Small Scale (Industrial related) Service and Business Enterprises (SSSBE) -Women Enterprises - Village and Small-Scale Industries –MSME- Khadi Village Cottage Industries

Unit-5: Financing Agri Business.**Teaching Hours:12 Hrs.**

Financing Agribusiness – NABARD - Financial Assistance from Banks - Micro Credit Firms – Cooperative Banks - Types of Agricultural loans - Risk Management – Export Opportunities – Quality Management - TQM.

Text Books

1. Unit-1: Girdhari Lal Meena, Fundamentals of Agribusiness Management,Agrotech Publishing Academy, 2017, Udaipur
2. Unit-2: Vedamurthy K.B, Agribusiness Management and Trade, Anand Agricultural University, Anand.
3. Unit-3: TNAU, Tamil Nadu, AECO 341 - Fundamentals of Agri Business Management.
4. Unit-4: Girdhari Lal Meena, Fundamentals of Agribusiness Management,Agrotech Publishing Academy, 2017, Udaipur.
5. Unit-5: Subba Reddy S, Raghu Ram P, Agricultural Finance & Management, Oxford & Ibh Publishing Co. Pvt. Ltd. New Delhi

Reference Items: books.

1. Freddie L. Barnard, Jay T. Akridge, Agribusiness Management, Routledge Publishers. 2012, Canada.

2. Acharya S.S, Agricultural Marketing in India, Oxford & Ibh Publishing Co. Pvt. Ltd. 2019 New Delhi.
3. Sharma, Entrepreneurship in Livestock & Agriculture, CBS Publication, 2010 New Delhi,
4. Dr. Smita Diwase, Indian Agriculture and Agribusiness Management, Krish Management Network, 2017, New Delhi

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	S	M	S	S	S	M	S	S	S
CO4	S	M	S	M	S	M	S	S	M	S
CO5	S	S	S	S	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: III,

Paper type: Core Elective

Paper code:.....

Name of the Paper: B. SERVICES MARKETING

Credit: 3

Total Hours per Week: 4 Hrs. Lecture Hours: 4 hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To be aware of the Essential Elements of marketing mix in Service marketing.
2. To expand the understanding of marketing strategies for various services of marketing-mix
3. To help the students in understanding Product support services and problems of Service quality management
4. To enhance knowledge on Marketing of financial services.
5. To let the students to know CRM, and identify the Customer needs.

Course Outcomes:

1. After studied Unit-1, the student will be able to understand the essential elements of marketing mix in Service marketing
2. After studied Unit-2, the student will be able to develop an idea about marketing strategies for various services marketing-mix.
3. After studied Unit-3, the student will be able to know and learn about Product support services and identify the problems of Service quality management
4. After studied Unit-4, the student will be able to learn the Marketing of financial services.
5. After studied Unit-5, the student will be able to acquire the knowledge about CRM.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: - Introduction

Teaching Hours: 12 Hrs

Growth of the Service Sector - Nature and Concept of Service - classification of services - Characteristics of Services and their marketing implications - Essential Elements of marketing mix in Service marketing.

Unit-2: - Marketing Strategy**Teaching Hours: 12 Hrs.**

Marketing strategies for service firms with special reference to information, communication, consultancy, advertising, professional services, after sales service, recruitment training and tourism.

Unit-3: - Product Support Services**Teaching Hours: 12 Hrs.**

Difference between service marketing and product marketing - Product support services – pricing of services - Service quality- problems of Service quality management - Customer Expectations - innovation in services.

Unit-4: - Marketing of Financial Services**Teaching Hours: 12 Hrs.**

Marketing of financial services - nature - types - marketing of insurance - mutual fund - marketing for non - profit firms - Growth of financial services in India.

Unit-5: - Customer Relationship Management**Teaching Hours: 12 Hrs.**

CRM - Identifying and Satisfying Customer needs - Relationship marketing - Customer Satisfaction - Managing Service Brands.

Text Books:

1. Christopher Lovelock, Services Marketing, Pearson Education.
2. E.G. - Bateson, Managing Service marketing - Text and Readings, Dryden press, Hidsdale.
3. Philip Kotler and Paul N.Bloom, Marketing professional Services, Prentice hall, New Jersey.
4. Mathur, S. P. Mathur & Nishu, Service Marketing, New Age International (P) Ltd. Publishers.
5. Valarie A. Zeitham, Mary Jo Bitner, Services Marketing, Mc Graw Hill Education

Reference Books:

1. Payne, The Essence of Service Marketing, New Delhi, Prentice Hall.
2. Helen Wood Ruffe, Services Marketing, Macmillan India, New Delhi.
3. Mary Ann pezzallo, Marketing Financial Services, Macmillan.
4. Dr.S.Gurusamy, Financial and Markets Vijay Nicole imprints private limited, Chennai.
5. Dr.B.Balaji, Services Marketing and Management, S.Chand& Company Ltd., New Delhi.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	M
CO2	S	S	M	S	S	M	S	M	S	S
CO3	S	S	S	M	M	S	S	S	M	S
CO4	S	S	M	S	S	M	M	M	S	M
CO5	M	S	S	S	M	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: III,

Paper type: Core Elective

Paper code:.....

Name of the Paper: C. BUSINESS ANALYTICS

Credit: 3

Total Hours per Week: 4 Hrs. Lecture Hours: 4 hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To have the basic knowledge about Business Analytics.
2. To make the understanding about levels of Business Analytics.
3. To enable to students to know about types of Business Analytics
4. To bring knowledge about the Decision Making.
5. To enable the students to know about the approaches in Decision Making.

Course Outcomes:

1. After studied Unit-1, the student will be able to understand the concept of Business Analytic
2. After studied Unit-2, the student will be able to understand the Categories of Business Analytical methods and models
3. After studied Unit-3, the student will be able to understand the Role and Significance of Decision Making.
4. After studied Unit-4, the student will be aware of the Modern Approaches in Decision Making and Common Problems in Decision Making
5. After studied Unit-5, the student will be able to know Value of Analytics in Decision Making.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: - Business Analytics – Introduction

Teaching Hours: 12 Hrs

Definition of Business Analytics – Characteristics of Business Analytics and Business Intelligence. The basic rule of Business and Business Analysis - Evolving role of the Business Analyst.

Unit-2: - levels of Business Analytics

Teaching Hours: 12 Hrs.

Different levels of Business Analytics - Categories of Business Analytical methods and models. Business Analytic Process -. Classical Requirements and Tasks performed by Business Analysts

Unit-3: - Decision Making**Teaching Hours: 12 Hrs.**

Decision Making - Objectives - Role and Significance of Decision Making- Decision Making Process - Rationality in Decision Making - Programmed and Non-Programmed Decision Making- Decision Making under Uncertainty and Risk

Unit-4: - Approaches in Decision Making**Teaching Hours: 12 Hrs.**

Modern Approaches in Decision Making – Decision Support Systems - Heuristic Techniques- Participative Decision Making - Simulation – Brainstorming – Delphi Technique – Common Problems in Decision Making

Unit-5: - Value of Analytics**Teaching Hours: 12 Hrs.**

Value of Analytics in Decision Making - Types of analytics – Descriptive, Predictive and Prescriptive analytics

Text book

1. C.B.Gupta, Business Management, Sultan Chand and Sons, New Delhi
2. Harold Koontz, Heinz Weihrich, 'Essential of Management', Tata Mcgraw Hill
3. RN.Prasad, Seema, Achrya –Fundamentals of Business Analysis, Willy Publishers
4. Camm, Cochran, Fry, Ohlmann, Anderson, Sweeney, Williams- Essentials of Business Analytics, Cengage Learning.
5. Albright Winston, Business Analytics- Data Analysis-Data Analysis and Decision Making, Cengage Learning, Reprint 2016.

Reference book:

- 1.R.N. Prasad & Seema Acharya Fundamentals of Business Analytics Wiley India Publications.
- 2.James R.Evans Business Analytics By Pearson Publications.
3. Balram Krishan Business Analytics by Khanna Publishing House.
- 4.Purba Halady Rao Business Analytics an Application Focus. PHI Publications www.phindia.com.
5. Ramesh Sharda Business Intelligence and Analytics. Pearson Publications.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	M	S
CO2	M	S	S	S	M	S	S	S	S	M
CO3	M	S	M	S	M	M	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	M	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: III

Paper Type: Open Elective

Paper code.....

Name of the Paper: A. SMALL BUSINESS MANAGEMENT Credit: 3

Total Hours per Week: 4 Hrs. Lecture Hours: 4 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To enhance the understanding of the concept of Small Business and MSME.
2. To extend the knowledge of Starting a Small Industry.
3. To facilitate the students to have the deep understanding of the Type of the Organizations
4. To bring about the awareness of Sources of Finance for Small Business.
5. To let students to know about the Incentives and Subsidies given the Government.

Course Outcome

1. After studying Unit-1 students will be able to understand the concept of Small Business and MSME.
2. After studying Unit-1 students will be able to know the importance of MSMEs, Advantages, Problems and Measures of the Government to Develop Small Industries.
3. After studying Unit-2 students will be able to know how to start a Small Industry step by step.
4. After studying Unit-2 students will have an idea about the Total Quality Management (TQM) and its importance.
5. After studying Unit-3 students will be able to understand the Type of the Organizations.
6. After studying Unit-3 students can understand the factors influencing the choice of Organization.
7. After studying Unit-4 students will be aware of the Sources of Finance for Small Business.
8. After studying Unit-4 students will have an exposure of Institutions Assisting Small Enterprises – District Industries Centre (DICs), Industrial Estates, SIDO, NSIC, SIDCO, SISI, TIIC and SIPCOT.
9. After studying Unit-5 students will be able to know Incentives and Subsidies given the Government.
10. After studying Unit-5 students will know the schemes of incentives for MSME & SSI Units –Export Opportunities

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-1: Small Business Introduction**Teaching Hours: 12 Hrs**

Meaning of Small-Scale Enterprises – Objectives of Micro, Small and Medium Enterprises Act of 2006 (MSME) – Importance of MSMEs – Advantages – Problems – Measures of the Government to Develop Small Industries

UNIT-2: Steps for Starting A Small Industry Teaching Hours: 12 Hrs

Steps for Starting a Small Industry – Search for Business Idea, Sources of Ideas – Project Formulation and Design, Introduction to Total Quality Management (TQM) and its importance

UNIT-3: Type of the Organizations**Teaching Hours: 12 Hrs**

Selection of the Type of Organization – Sole Proprietorship - Partnership – Joint Stock Company – Factors Influencing the Choice of Organization.

UNIT-4: Sources of Finance**Teaching Hours: 12 Hrs.**

Sources of Project Finance – Short Term, Medium Term and Long-Term Finance – Role of Banks – Institutions Assisting Small Enterprises – District Industries Centre (DICs), Industrial Estates, SIDO, NSIC, SIDCO, SISI, TIIC and SIPCOT.

UNIT-5: - Incentives and Subsidies**Teaching Hours:12 Hrs.**

Incentives and Subsidies – Meaning – Need and Problems – Schemes of Incentives for MSME & SSI Units –Export Opportunities

Text books

1. Vijayshree P.T&Dr.Alagammal. M. Entrepreneurship and Small Business Management, Margham Publications, Chennai
2. Gupta C.B & Srinivasan N.P. Entrepreneurship Development in India, Sultan Chand & Sons, 1999, New Delhi
3. Saravanavel P. Entrepreneurship Development, ESS PEE KAY Publishers, Chennai.
4. Gupta C.B. & Srinivasan N.P. Entrepreneurship Development in India, Sultan Chand & Sons, 1999, New Delhi
5. Satish Taneja & Gupta S.L, Entrepreneur Development, Galgotia Publishing Company 2002, New Delhi.

Reference Books:

1. Jayshree Suresh, Entrepreneurial Development, Margham Publications, 2015 Chennai
2. Gordon.E& Natarajan, Entrepreneurship Development, Himalaya Publishing House, 2009 Mumbai.
3. Poornima M. Charantimath, Entrepreneurship Development and Small Business Enterprises,
4. Pearson Publishers, 2013, Chennai.
5. 4. [Anil Kumar](#). S, Small Business and Entrepreneurship, I. K. International Pvt Ltd, 2008, New Delhi
6. [Besterfield Dale H](#). Total Quality Management (TQM) Pearson Publishers, 2018, Chennai.

Journals:

1. The_Journal_of_Entrepreneurship. www.ediindia.org
2. Journal of Small Business and Entrepreneurship Development. www.jsbednet.com
3. International Journal of Small Business and Entrepreneurship Development. www.researchgate.net
4. Journal of Small Business and Enterprise Development. www.emerald.com
5. International Journal of Entrepreneurship and Innovation. www.sagepub.com

E-Materials:

1. [Poornima M Charantimath](#), Entrepreneurship Development and Small Business Enterprise, www.goodreads.com
2. Kevin McQueen, Small Business Development Strategies. www.bwbsolutions.com
3. Darren Dahl, How to Develop a Business Growth Strategy, www.inc.com
4. Tamil Nadu Manufacturing Business Incubation Infrastructure Development Project, Entrepreneurship Development and Innovation Institute, www.startup-tn.in
5. Dr. Jayakumar. V, Total Quality Management. www.easyengineering.net

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	S	M	S	S	S	M	S	S	S
CO4	S	M	S	M	S	M	S	S	M	S
CO5	S	S	S	S	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: III,

Paper Type: Open Elective

Paper code.....

Name of the Paper: C. BANKING THEROTY

Credit: 3

Total Hours per Week: 4 Hrs. Lecture Hours: 4Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objectives

1. To enhance the understanding of Developments in Banking Sector
2. To extend the knowledge of Functions of Commercial Banks.
3. To facilitate the students to have the knowledge on the Factors influencing Bank lending
4. To bring about students to familiar with the Functions of Central Banks
5. To let students to know about Recent Trends in Banking Sector.

Course Outcomes

1. After Studied Unit-1, The Student will be able to know classification of banks, ownership, function and banking structure in India.
2. After Studied Unit-2, The student will be able to familiar with the Types and Functions of Commercial Banks.
3. After Studied Unit-3, The Students will able to analyse the Relationship between Banker and Customer.
4. After Studied Unit-4, The Student will be able to know the Functions of Central Banks
5. After Studied Unit-5, The Student will be able to Analyse Recent Trends in Banking Sector.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- 1: Introduction to Banking

Teaching Hours: 12 Hrs

Introduction – Definition of Banking – Classification of Banks – Components of Indian Banking System – Banking Structure in India.

UNIT- 2: - Commercial Banking

Teaching Hours: 12 Hrs

Introduction – Definition – Features of a Commercial Banks – Origin of Commercial Banking in India – Function of Commercial Bank – Credit Creation.

UNIT- 3: - Function of Banking**Teaching Hours: 12 Hrs**

Introduction – Opening of Accounts – Types of Accounts – Relationship with customers – KYC – Norms – Banking lending – Types of lending – Factors influencing Bank lending CIBIL.

UNIT- 4: - Central Banking**Teaching Hours: 12 Hrs.**

Introduction – Definition – Characteristics – Role and objectives – Functions – Difference between Central bank and Commercial banks – Credit control.

UNIT- 5: - Recent trend of Banking**Teaching Hours:12 Hrs.**

Electronic Fund Transfer – Benefits of Electronic Banking – RTGS – NEFT – ATM – Credit and Debit Card – Core Banking Solutions (CBS).

Text Books:

1. P.N. Varshney., - Banking Law and Practice – Sultan Chand & Sons New Delhi- 24th Edition
2. B. Santhanam, Banking and Financial System, Margham Publication, Chennai.
3. S.N. Mahaeswari, Banking Law and Practice, Kalyani Publications, Chennai.
4. Natarajan S. and Parameswaran R. – Indian Banking – S. Chand and Co. Ltd., New Delhi (Latest Ed).
5. Vasudevan S.V. – Theory of Banking – S. Chand and Co. Ltd., New Delhi (Latest Ed).

Reference Books:

1. S.N. Maheswari, Banking Law and Practice, Kalyani Publications, Chennai
2. B. Santhanam Banking Theory Law and Practice- Margham publications
3. K C Shekhar Lakshmy Shekhar - Banking Theory and Practice- Vikas Publications.
4. S. Gurusamy Banking Theory Law and Practice-Vijay Nicole Publications.
5. Indian Institute of Banking & Finance – Principles & Practices of Banking – Macmillan Publication

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: III,

Paper Type: Open Elective

Paper code.....

Name of the Paper: C. STRESS MANAGEMENT Credit: 3

Total Hours per Week: 4 Hrs. Lecture Hours: 4 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objectives

1. To enhance the understanding of the meaning of Stress, Types and Causes of Stress.
2. To extend the knowledge of Personality its Types and Perception.
3. To facilitate the students to have the deep understanding of Emotional Intelligence - EQ
4. To bring about the awareness of Stress at Work Place.
5. To let students to know about Stress Management and Counselling.

Course Outcomes:

1. After studying Unit-1 students will be able to understand the concept of Stress, Types and Causes of Stress
2. After studying Unit-1 students will be able to know Consequences of Stress, Psychological Symptoms and Behavioural Symptoms.
3. After studying Unit-2 students will be able to understand the Personality its Types and Perception.
4. After studying Unit-2 students Similarities of Individuals - Individuals Difference - Dimensions of Personality - Perception - Attention and Selection
5. After studying Unit-3 students will be knowing the concepts of Emotion, Types of Emotions, Positive and Negative emotions, Feelings, Sensations and Moods
6. After studying Unit-3 students will be aware of Emotional Intelligence - EQ- Behaviour Theory - Cognitive Theory – Emotions and well-being
7. After studying Unit-4 students will be aware Stress and Job Performance – Role conflict – Organisational culture
8. After studying Unit-4 students will have an exposure of Stress of the working women - Time Management
9. After studied Unit-5, the student will be able to know Stress Management and Counselling - Prevention of Stress - Escaping Stress - Coping with Stress
10. After studied Unit-5, the student will be able to know Counselling - Characteristics of Counselling - Importance of Counselling- Functions of Counselling - Types of Counselling.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT- I: Stress, Types – Causes**Teaching Hours: 12 Hrs**

Stress - Meaning of Stress- Types - Causes of Stress - Personal Factors - Environmental Factors Organisational Factors - Consequences of Stress - Psychological Symptoms - Behavioural Symptoms.

UNIT- 2: Personality and Perception**Teaching Hours: 12 Hrs**

Personality -Types Personality - Determinants of Personality - Personality Theories - Trait Theories - Similarities of Individuals - Individuals Difference - Dimensions of Personality - Perception - Attention and Selection

UNIT- 3: Emotional Intelligent**Teaching Hours: 12 Hrs**

Emotion - Types of Emotions - Positive and Negative emotions - Feelings – Sensations - Moods - Emotional Intelligence - EQ- Behaviour Theory - Cognitive Theory – Emotions and well-being

UNIT- 4: Stress at Work Place**Teaching Hours: 12 Hrs.**

Stress and Job Performance – Role conflict – Organisational culture – Work Stress – effects of works on individual and organization - Stress of the working women - Time Management

UNIT- 5: Stress Management and Counselling**Teaching Hours:12 Hrs.**

Stress Management and Counselling - Prevention of Stress - Escaping Stress - Coping with Stress -Counselling - Characteristics of Counselling - Importance of Counselling- Functions of Counselling - Types of Counselling.

Text book

1. Stress Management an Integrated Approach, Dr. Viswanathan Gopalan, GenNext Publication, 2016, New Delhi.
2. Introduction to Psychology, Clifford Morgan and Richard King ,McGraw Hill Education, 2017 Chennai
3. Emotional Intelligence, Dainel Goleman, Penguin Random House, 2006, Noida
4. Human Resource Management, Jayasankar. J, Margham Publications, 2002, Chennai.

5. Richard Nelson Jones, Basic Counselling Skills: A Helper's Manual, Sage Publications, 2012, New Delhi

Reference - Books:

1. Stress Management, Chakravarty Ajanta, Rupa Publications, 2012, Chennai.
2. Organizational Behaviour, University of Minnesota Libraries Publishing, 2017. USA
3. John Romas, Practical Stress Management, Academic Press, 2017, Cambridge.
4. Dale Carnegie, How to Stop Worrying and Start Living, Rupa Publication, 2016, Kolkata
5. Dr. Bimal Chhajjer A complete guide to Managing Stress, New Ages Books, 2006, Chennai
6. Shashi Jain, Introduction to Psychology, Kalyani Publishers, 2006, Bengaluru,
7. Mangal S. K. Emotional Intelligence, PHI Learning Pvt. Ltd. 2015, New Delhi

Journal:

1. International Journal of Stress Management. www.aapb.org
2. The American Journal of Psychology on JSTOR. www.jstor.org
3. International Journal of Stress Management. www.apa.org
4. International Journal of Psychology. www.onlinelibrary.wiley.com

E-Materials Error! Hyperlink reference not valid. Stress Management. www.helpguide.org

2. A Study of Learning Stress and Stress Management Strategies. www.sciencedirect.com

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Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	S	M
CO3	S	S	M	S	S	S	M	S	S	S
CO4	S	M	S	M	S	M	S	S	M	S
CO5	M	S	S	S	M	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low

Semester: IV,

Paper Type: Core Paper

Paper code.....

Name of the Paper: DIRECT TAX

Credit: 4

Total Hours per Week: 6 Hrs. Lecture Hours: 6Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objective

1. To Learn the Students about History of Income Tax in India.
2. To Facilitate the Practical Knowledge on Calculation of Income from House Property.
3. To Impart Practical knowledge on Income from Business & Professional and Capital Gain.
4. To Make understand the Computation of Total Income of Individuals.
5. To know about the Assessment Procedure, e-filing of Return and Tax Planning.

Course Outcomes

1. The students we able to Contrast the Different Basic Concepts in Income Tax
2. The students we able to understand and Compute Salary Income and Income from House Property.
3. The students we able to understand and Construct the Statements for Business. Income, Professional Income and Capital Gain.
4. The students we able to understand and Compute Income from Other Sources and Total Income of Individual.
5. The students we able to understand and Trace Assessment Procedure and Familiarizing Tax Planning.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: - Introduction

Teaching Hours: 18 Hrs

History of Income Tax in India - Basic Concepts – Income – Persons – Previous Year – Assessment Year – Assessee – Gross Total Income – Total Income – Determination of Residential Status – Scope of Total Income and Incidence of Tax – Incomes Exempt from Tax u/s 10.\

UNIT-2: - Income from Salary & House Property**Teaching Hours: 18 Hrs**

Computation of Income from Salary – Allowances – Perquisites – Deductions including Standard Deduction – Income from House Property – Annual Value – Self-Occupied House - Let-Out House – Deemed to be Let-Out House – Partly Self-Occupied and Partly Let Out – Deductions.

UNIT-3: - Income from Business & Profession and Capital Gains Teaching Hours: 18Hrs

Profits and Gains of Business and Profession – Admissible Deductions – Expenses Expressly Disallowed – Deemed Incomes – Depreciation – Block of Assets – Normal Depreciation – Additional Depreciation – Capital Gains – Short-term and Long-term Capital Gains – Exemptions.

UNIT-4: - Income from Other Sources and Computation of Total Income Teaching Hours: 18 Hrs

Income from Other Sources – Aggregation of Income – Set-Off and Carry Forward of Losses – Deductions available from Gross Total Income – Computation of Total Income of Individuals.

UNIT-5: - Assessment Procedure, e-filing of Return and Tax Planning Teaching Hours: 18 Hrs

Assessment Procedure – Methods – Assessment of Individuals – e-filing of Tax Return – Tax Planning – Meaning, Need and Limitations – Tax Evasion and Tax Avoidance.

Note: Weightage of marks: Theory 40% Problems 60%

Text Books:

1. Gaur and Narang, Income Tax Law & Practice, Kalyani Publishers, New Delhi.
2. T.S. Reddy and Y. Hari Prasad Reddy, Income Tax Law & Practice, Margham Publications, Chennai.
3. Girish Ahuja & Ravi Gupta, Practical Approach to Income Tax, Wolters Kluwer India Pvt. Ltd., Mohali, Chandigarh.
4. Anita Raman, Income Tax Theory, Law & Practice, Mc Graw Hill, New Delhi.
5. Bomi F. Daruwala – Direct Taxes- Bharat Publications 2022.

Reference Books:

1. Vinod K Singhania and Monica Singhania, Students' Guide to Income Tax including GST, Taxmann, New Delhi.
2. H.C. Mehrothra, Income Tax including Tax Planning & Management, Sahithya Bhavan, Agra.

3. R N Lakhotia and Subhash Lakhotia, How to Save Income Tax through Tax Planning, Vision Books, New Delhi
4. Master Guide to Income Tax Rules, Taxmann, New Delhi.
5. Income Computation & Disclosure Standards, Taxmann, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV,

Paper Type: Core Paper

Paper code.....

Name of the Paper: **INVESTMENT & PORTFOLIO MANAGEMENT**

Credit: 4

Total Hours per Week: 6 Hrs. Lecture Hours: 6 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objective

1. To infuse basic knowledge in proposed investors as to select the better investment proposal.
2. To create awareness among the investors about unscrupulous trade practices happening in the security market thereby protecting their interests.
3. To Impart the students about basic Fundamental Analysis, Economic Analysis and Technical Analysis.
4. To facilitate the students about Valuation of Securities, ABM, YBM,FVM.
5. To Let students to know about Efficient Market Hypothesis, Random Walk Theory, Markowitz Theory.

Course Outcomes

1. Making the students being well aware of types of financial markets
2. Testing the knowledge of students about measurement of risk and return.
3. Asses the performance of students in relation to Fundamental Analysis, Economic Analysis, Industry Analysis and Company Analysis.
4. Evaluate student's knowledge on valuation of equity shares, preference shares, debentures and bonds
5. Getting the students to familiarize Efficient Market Hypothesis

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: - Introduction	Teaching Hours: 18 Hrs
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Properties of financial assets - Financial Markets - Investments - Types - Characteristics - Objectives - Types of Investors - Investment Vs. Gambling, Speculation, Speculation Vs. Gambling.

UNIT-2: - Security Analysis**Teaching Hours: 18 Hrs**

Nature and Scope of Security Analysis - Concept of Risk and Return - Sources of Risk - Types of Risk - Risk Aversion and Risk Premium - Measurement of Risk: Standard Deviation as a measure of Risk, β as a measure of Risk) - Measurement of Return from Historical data.

UNIT-3: - Fundamental & Technical Analysis**Teaching Hours: 18Hrs**

Fundamental Analysis - Economic Analysis, Industry Analysis and Company Analysis - Technical Analysis - Trend Indications - Indices and Moving applied in Technical Analysis.

UNIT-4: - Valuation of Security**Teaching Hours: 18 Hrs**

Valuation of Securities - Equity Shares: Assets Backing Method, Yield Basis Method, Fair Value Method, Return on Capital Employed and Price Earning Method. Preference Shares: Dividend Discount Model, Yield on Preference Shares. Debentures and Bonds: Market Discount Rate, Spot and Forward rate, Binominal Interest Rate Free, Maturity Pricing.

UNIT-5: - Model theory of Security**Teaching Hours: 18 Hrs**

Efficient Market Hypothesis - Random Walk Theory - Markowitz Theory - Sharpe's Optimisation Solution - Down Theory - CAPM model - SML, CML.

Text Book

1. Dr. Bhalla V.K. Investment Management, S. Chand and Company, New Delhi.
2. Rustagi R.P. Investment Analysis and Portfolio Management, Sultan Chand & Sons, New Delhi.

References

1. Dr.Ranganatham m & Madhumathi R. Investment Analysis 7 Portfolio Management. Pearson Education, New Delhi.
2. Fisher & Jordan, Security Analysis and Portfolio Management, Prentice Hall of India, New Delhi.
3. Sharpe, William and Gordon, Investment-Prentice Hall of India, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV,

Paper Type: Core Paper

Paper code.....

Name of the Paper: **PROJECT DEVELOPMENT**

Credit: 5

Total Hours per Week: 5 Hrs. Lecture Hours: 5Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objective

1. To study Project development cycle, Project Appraisal, Project Financing and Selection and Risk Management.
2. To Enhance the knowledge about the types of Appraisals.
3. To facilitate the students to the understanding Project cost and social cost.
4. To enable the students, Learn Selection of Project and Programming.
5. To Impart Knowledge on Project control and budgetary control.

Course Outcomes

1. The students will be able to understand the Project and its development:
2. The students will be able to understand the Capital expenditure decisions of projects.
3. The students will be able to understand the Economic Viability of the project.
4. The students will be able to understand the Sources of Project Finance.
5. The students will be able to understand the Project schedule and control mechanism.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: - Project	Teaching Hours: 15 Hrs
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Meaning and overview – Project Development Cycle – Capital Expenditure Decisions – Importance and Difficulties.

UNIT-2: -Project Appraisal	Teaching Hours: 15 Hrs
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Aspects of Appraisal – Market Appraisal – Technical Appraisal – Financial Appraisal – Economic Appraisal, Project formulation, and Feasibility Report.

UNIT-3: -Project Cost and Means of Finance**Teaching Hours: 15Hrs**

Project cost – Social Cost and Social Benefit. Terms Loans – Loans from Development banks – Assistance from Indian Finance Corporations and International Finance Corporations. External commercial borrowing.

UNIT-4: - Project Selection**Teaching Hours: 15 Hrs**

V Selection of a suitable project – Programming – Scheduling and Controlling Mechanism.

UNIT-5: - Project Control**Teaching Hours: 15 Hrs**

Time and cost control – Budgetary control – corrective and preventive actions. Risk Management function.

TEXT BOOKS:

1. Prasanna Chandra, Projects – Preparation Appraisal, Budgeting and Implementation, 3rd ed. Tata McGraw- Hill Publishing Company Limited, New Delhi.
2. Dr. Gupta, C.B. & Dr. Srinivasan, N.P. Entrepreneurial Development, Sultan Chand & sons, New Delhi.

REFERENCE BOOKS

1. Bryce, M.D. Industrial Development: A Guide for Accelerating Economic Growth, McGraw- Hill, 1960 New York.
2. Varma, M.L. Foreign Trade Management in India, Vikas Publishing House, 1993, New Delhi.
3. Jeevanandam, C. Foreign Exchange, Sultan Chand & sons, 1994, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV, Paper Type: Core Paper

Paper code.....

Name of the Paper: **A. FINANCIAL SERVICES**

Credit: 3

Total Hours per Week: 5 Hrs. Lecture Hours: 5 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objective

1. To enhance the understanding of the Financial Institutions and Financial Services Sector.
2. To extend the knowledge of Legal aspects of Factoring and Venture Capital.
3. To facilitate the students to have the deep understanding of Capital Market and stock market in India
4. To bring about the awareness of SEBI Guidelines.
5. To let students to know about Credit rating agencies

Course Outcomes

1. After studied Unit-1, achieve the target of students having better understanding of Financial Services in India.
2. After studied Unit-2, the student will be able to know the Collect the data from the students pertaining to venture capital
3. After studied Unit-3, Let the students know about Capital Market, Money Market Strategies and present position of stock market in India,
4. After studied Unit-4, the student will be able to have the awareness of SEBI Guidelines and Structure and performance evaluation
5. After studied Unit-5, the student will be able to know about Investor Services & Credit rating agencies.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: -Introduction to Financial Services	Teaching Hours: 15 Hrs.
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Financial Services – meaning – Financial Services and economic environment - Legal and Regulatory Framework – Financial Institutions and other participants in the Financial Services Sector.

Unit-2: -Factoring and Venture Capital**Teaching Hours: 15 Hrs.**

Factoring – Types and Features of Factoring agreement - Legal aspects of Factoring – Factoring in India – Steps involved in Future – **Seed Capital – Bridge capital** -Venture Capital – meaning and characteristics –Criteria for assistance – Schemes and guidelines.

Unit-3: -Financial Market**Teaching Hours: 15 Hrs.**

Financial market - meaning – Features – Capital Market – primary market – secondary market – present position of stock market in India – money market – characteristics of **Developed** money market – Importance – Problems faced by Indian money market – Difference between capital market and money market.

Unit-4: - Mutual Funds**Teaching Hours: 15 Hrs.**

Mutual Funds – SEBI Guidelines – Features and types – management – structure and performance evaluation – Growth and recent trends.

Unit-5: - Credit Rating Agencies**Teaching Hours: 15 Hrs.**

Investor Services – Credit rating agencies – CRISIL, CARE, ICRA – Services – Criteria for rating – symbols

Text Books:

1. M.Y.Khan, Indian Financial System, Tata McGraw Hill, 2001.
2. H.R.Machiraju, Indian Financial System, Vikas Publishing House, 1999
3. B.S. Bhatia &G.S.Bhatre, Management of Capital Markets, Financial Services and Insititutions, Deep and Deep Publishers, 2000.

Reference Books:

1. Dr. V. Balu, Merchant Banking & Finance Services, Sri Venkateswara Publication, Chennai
2. Dr. N. Permavathy, Financial Services and Stock Exchange, Sri Vishnu Publications, Chennai.
3. Dr.S.Gurusamy, Financial Services and Systems, Vijay Nicholes Imprint Pvt. Ltd., 2004 Chennai.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	M
CO2	S	S	M	S	S	M	S	M	S	S
CO3	S	S	S	M	M	S	S	S	M	S
CO4	S	S	M	S	S	M	M	M	S	M
CO5	M	S	S	S	M	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV,

Paper Type: Core Paper

Paper code.....

Name of the Paper: **B. INFORMATION TECHNOLOGY IN BUSINESS** Credit: 3

Total Hours per Week: 5 Hrs. Lecture Hours: 5 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objective

1. To Develop skills to practice information systems in Business.
2. To bring understanding about the Accounting and Financial Information Systems
3. To facilitate the students to know about – preparing to online business
4. To provide the students information about Security Issues in E-Commerce
5. To extend the knowledge of Growth of internet

Course Outcomes

1. After Studied Unit-1, Students will be able to develop skills to practice information systems in Business.
2. After Studied Unit-2, Students will be able understand the Accounting and Financial Information Systems.
3. After studied unit-3, Students will be able to develop to skill by preparing to online business
4. After Studied Unit-4, Students will be able to know the Security Issues in E-Commerce and Risk management approach to e-commerce security.
5. After Studied Unit-5, the student will be able to understand the relevant information technology, growth of internet and Usage of Internet to society.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Information Technology	Teaching Hours: 15 Hrs.
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Meaning - Definition - Types of Information System - Changing decision-making scenario;
Quality of information - Role of Information Technology in information generation and value addition.

Unit-2: -Application of It in Business:**Teaching Hours: 15 Hrs.**

Accounting and Financial Information Systems- Manual System Vs Computer based Accounting System. Marketing Information Systems - Components. Operational and Production Systems – Material Resource Planning. Human Resource Information Systems – Advantages.

Unit-3: Electronic Business**Teaching Hours: 15 Hrs.**

Computers - Internet business - Definition - Online Business - Business Categories – preparing to online business - Ethics of information technology. E. Business Applications - Business to Business (B2B) - Business to Customers (B2C) - Electronic Shopping.

Unit-4: - Security Issues in E-Commerce**Teaching Hours: 15 Hrs.**

Security Issues in E-Commerce: Risks of e-commerce –Types and sources of threats, Protecting electronic commerce assets and intellectual property; Risk management approach to e-commerce security.

Unit-5: - Internet**Teaching Hours: 15 Hrs.**

Meaning of Internet; Growth of internet, Owner of Internet, Anatomy of Internet, Net Etiquette; World Wide Web; Internet Protocols, Usage of Internet to society, Search Engines. Features of Industry 4.0.

Text Books:

1. Deepak Bharihoka, Fundaments of Information Technology, Excel Book, New Delhi
2. Leon a. and Leon M., (2002) Fundamental of Information Technology, Vikas Software Manuals.
3. Comer, Douglas E. (2007), the Internet Book, New Delhi: PHI Learning Private Limited).
4. Morley, Deborah and Charles S. parker (2007) Fundamentals of Computers (New Delhi: Learning India Pvt. Ltd.)
5. . Laudon, Kenneth C. and Jane P. Laudon, (2003), Management Information Systems (New Delhi: Prentice Hall of India.

Reference Books:

1. O.P.Wali- Information Technology for Management- Wiley Publications.
2. Dr.madhulikajainsatish information Technology Concepts- BPB Publications.
3. V.Rajaraman- Introduction to Information Technology- PHI Publications.
4. Pandey- E-Commerce and Applications – S.K. Kataria & Sons
5. Henry Chan -E-Commerce-Wiley Publications.

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	S	M
CO2	S	M	S	S	M	S	S	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	S	M	S	M	S	S	M	S	S	M
CO5	S	S	S	S	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper Type: Core Elective

Paper code.....

Name of the Paper: C.ENTREPRENEURIAL DEVELOPMENT

Credit: 3

Total Hours per Week: 5 Hrs. Lecture Hours: 5 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objectives

1. To enhance the deep understanding of the Entrepreneur and Entrepreneurship Qualities.
2. To extend the knowledge of devaluations of Joint Rights, liabilities and Discharge of contract.
3. To facilitate the students to have the understanding about Indemnity and Guarantee
4. To enable the students to know about Bailment and pledge
5. To let students to know about Contract of Agency and Termination agency.

Course Outcomes:

1. After studying Unit-1 students will be able to acquire the basic knowledge and understand the Concept of Entrepreneur and Entrepreneurship and Major Entrepreneurial.
2. After studying Unit-1 students will be able to know Types of Entrepreneur and knowledge & skills required for an Entrepreneur.
3. After studying Unit-2 students will be able to identify the Entrepreneurial Environment and Economic and Non-Economic Factors.
4. After studying Unit-2 students will be able to understand the Entrepreneurial Motivation and the need for EDPS.
5. After studying Unit-3 students will be able to know how to select the Sources of Business/Product ideas and Market Research.
6. After studying Unit-3 students will be able to find out the Selection of a project – Project Report Preparation and Evaluation Criteria..
7. After studying Unit-4 students will be able to understand the Institutional Finance, Term Lending Institutions and Commercial Banks.
8. After studying Unit-4 students will be able to identify the various funding agencies like SISI DIC – SIDCO – SIPCOT and ITCOT – Microfinance and Self Help Groups.
9. After studying Unit-5 students will be able to understand the how to Launch and Develop Small Business, Institutional Support to Small Business and Growth Strategies.
10. After studying Unit-5 students will be able to know the monitoring and evaluation of small business, industrial sickness, causes and consequences and prevent of industrial sickness

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit 1: - Concept of Entrepreneur**Teaching Hours: 15 Hrs**

Concept of Entrepreneur and Entrepreneurship – Major Entrepreneurial Competencies – Qualities of Successful Entrepreneur – Types of Entrepreneurs – Knowledge and Skills Required for an Entrepreneur.

Unit 2: - Entrepreneurial Environment Teaching Hours: 15 Hrs

Entrepreneurial Environment – Economic and Non-Economic Factors – Entrepreneurial Motivation – Need for EDPS.

Unit 3: - Selection of a Business Project Teaching Hours: 15 Hrs

Sources of Business / Product ideas – Market Research – Pre-feasibility study - Criteria for Selection of a project – Project Report Preparation and Evaluation Criteria.

Unit 4: -Small Business Finance**Teaching Hours: 15 Hrs.**

Institutional Finance – Term Lending Institutions – Commercial Banks – State Finance Corporations – Small Industries Development Bank of India (SIDBI) – Small Industries Service Institute (SISI) – District Industries Centre (DIC) – SIDCO – SIPCOT and ITCOT – Microfinance and Self-Help Groups.

Unit 5: - Small Business Launching Teaching Hours: 15 Hrs.

Launching and Development of Small Business – Institutional Support to Small Business – Growth Strategies – Product Launching – Monitoring and Evaluation of Small Business – Industrial Sickness – Causes and Consequences – Prevent in Sickness.

Text Book:

1. Jayshree Suresh, Entrepreneurial Development, Margham Publications, Chennai.
2. Khanka, S.S. Entrepreneurial Development S. Chand & Co., New Delhi
3. Ramachandran, Entrepreneurship Development McGraw-Hill Education (India) Pvt Limited, Noida
4. Dr. Nitin Zaware Dr. Shilpa, Entrepreneurship Development, Publisher: Thakur Publication Pvt. Ltd. Lucknow
5. Anil Kumar, Entrepreneurship Development, New Age International, New Delhi

Reference Books

1. N.D. Kapoor, Business Laws, Sultan Chand & Sons, New Delhi.
2. R.S.N. Pillai & Bagavathi, Business Laws, S. Chand & Co., New Delhi.
3. Hitesh Jhanji, Entrepreneurship and Small Business Management, Excel Books Private Limited, New Delhi
4. Dr. Mintu Gogoi, Anil Tanti & Gautam Hazarika, Entrepreneurship Development, Mahaveer Publications, Assam
5. Dr. O. P. Gupta, Dr. Vijay Gupta, Fundamentals of Entrepreneurship, SBPD Publishing House, Agra

Course Material: website links, e-Books and e-journals

1. Entrepreneurship Development - Himalaya Publishing House
<https://www.himpub.com>
2. Entrepreneurship Development | Journals | Books and Articles
<https://iupindia.in> › Entrepreneurship_Development
3. Entrepreneurship Development - A. Nirjar - Google Books
<https://books.google.com>
4. Entrepreneurship Development by Abha Mathur for CBCS ...
<https://www.taxmann.com>
5. Free Entrepreneurship - Study Online and for Free
<https://www.alison.com>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	S	S	M	S	S
CO2	M	S	S	S	M	S	S	S	S	M
CO3	S	S	M	S	S	S	M	S	S	S
CO4	S	M	S	S	S	M	S	S	M	S
CO5	S	S	S	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper Type: Core Elective

Paper code:.....

Name of the Paper: A. OFFICE MANAGEMENT

Credit: 3

Total Hours per Week: 3 Hrs. Lecture Hours: 3 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

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Course Objectives

1. To impart knowledge in office management and its functions and make them to apply in company in practical manner.
2. To understand how to organize their office and maintain filing system.
3. To inspire the students to apply the knowledge gained in Office forms and records.
4. To provide the students the avenues of studies in Office Machines and equipment.
5. To teach the recent developments in the different ways of Measurement of Office Work.

Course Outcomes

1. After Studied Unit-1, Students will be able to support management in office administration.
2. After Studied Unit-2, Students will be able to prepare business documents and records.
3. After studied unit-3, Students will be able to manage records and files. Students will also able to demonstrate business communication skills
4. After Studied Unit-4, Students will be able to utilize appropriate office technology. Students will also able to execute the duties of an office administrator.
5. After Studied Unit-5, the student will be able to know about to role of management in the workplace, levels and functions of management

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Office Management: Introduction

Teaching Hours: 9 Hrs.

Office and office Management –meaning of office, function of office, primary and administrative functions, importance of office. Relation of office with other departments of business Organization. Concept of paperless office, virtual office, back and front office, open and private office. Definition and elements of office management, duties of an Office Manager.

Unit-2: Filing System**Teaching Hours: 9 Hrs.**

Filing and Indexing –Meaning and importance of filing, essential of good filing system. Centralized and decentralized filing system. Digital filing-Meaning-Types and importance. Meaning, need and types of indexing used in the business organization.

Unit-3: Office Forms**Teaching Hours: 9 Hrs.**

Office forms–Meaning and types of forms used in business organization, advantages, forms controls, objectives, form designing, principles of forms designing and specimens of forms used in office. Office Record Management –Meaning, importance of record keeping management, principles of record management and types of records kept in a business organization.

Unit-4: Office Machines and Equipment**Teaching Hours: 9 Hrs.**

Office Machines and equipment –Importance, objectives of office machines. Office Safety and Security –Meaning, importance of office Safety, safety hazards and steps to improve office safety. Security hazards and steps to improve office security.

Unit- 5: Measurement of Office Work**Teaching Hours: 9 Hrs.**

Measurement of Office Work –Importance, purpose, difficulty in measuring office work. Different ways of measurement, setting of work standards, benefits of work standards. Techniques of setting standards. Office Manuals –Meaning, need, types of office manuals and steps in preparing of office manuals.

Text Books:

1. S.P.Arrora -Office organization and management- Vikas publishing house, 2009.
2. Chopra-Office management-Vikas publishing house 2nd revised edition, 2015.
3. Balachandran & Ravichandiran, Office Management, McGraw Hill Publications, New Delhi.
4. Ranjan Nangia -Office management- - Neha Publishers, Crescent publishing corporation, 2012
5. R.S.N. Pillai & Bagavathi, Office Management, S. Chand Publications, New Delhi.

Reference Books:

1. M.E. Thukaram Rao-Office management and organization-atlantic publishers and distributors, 2000
2. Dr. R. K. Chopra & Priyanka Gauri-Office management-Himalaya publishing house 17th revised and updated edition, 2020.
3. R.S.N. Pillai & Bagavathi, Modern Office Management, S. Chand Publications, New Delhi.

Course Material: website links, e-Books and e-journals

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	S	M
CO2	S	S	S	S	S	S	M	S	M	S
CO3	S	S	S	S	M	M	S	M	S	M
CO4	S	S	M	M	S	S	S	M	S	S
CO5	M	S	M	S	S	S	M	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper Type: Core Elective

Paper code.....

Name of the Paper: **B. BUSINESS ORGANISATION**

Credit: 3

Total Hours per Week: 3 Hrs. Lecture Hours: 3 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objectives

1. To make students to understand the concept of business and Business ethics
2. To expand the awareness of forms of business organization
3. To facilitate the students to the understanding on size of industry
4. To bring the subject knowledge about functions of Stock Exchanges
5. To let students to be acquainted with on the subject of Trade Association & Chamber of commerce.

Course Outcomes:

1. After studied Unit-1, the student will be able to know about Basics of Business Organization
2. After studied Unit-2, the student will be able to aware about different forms of business organization
3. After studied Unit-3, the student will be able to gain knowledge on Industry location & operations
4. After studied Unit-4, the student will be able to Facilitate to get exposure on Functioning of Stock Exchange.
5. After studied Unit-5, the student will be able to get full information on Trade Association & Chamber of commerce.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Introduction to Business Organisation

Teaching Hours: 9 Hrs.

Business and Business Organisation- meaning and types – profession – importance of business Organization- Social Responsibilities of Business- Business Ethics.

Unit-2: Forms of Business organization

Teaching Hours: 9 Hrs.

Forms of Business organization- sole trader- partnership- joint Hindu family- joint stock companies – co-operative societies – public utilities and public enterprises.

Unit-3: Organisation Process**Teaching Hours: 9 Hrs.**

Organization Process – Importance and Principles – Types of organization structure – Centralization and decentralization – Departmentation and Delegation of authority.

Unit-4: Location of Industry**Teaching Hours: 9 Hrs.**

Location of industry – factors influencing location – size of industry- optimum firm- advantages of large- scale operation – limitation of small-scale operation.

Unit-5 Trade Association**Teaching Hours: 9 Hrs.**

Trade association- Chamber of commerce- Functions- objectives – Trade Association - Working in India.

Text Books:

1. Y.K. Bhushan, Business organization, Sultan Chand, New Delhi.
2. R.N. Gupta, Business organization & Management, S. Chand & Co. New Delhi.
3. Dr. K. Sundar, Business Organization, Vijay Nicholes Imprint Pvt. Ltd., Chennai.
4. T.N. Chhabra, Business Organisation and Management, Sun India Publications, New Delhi.
5. 3. R. K. Sharma and Shashi K. Gupta, Business Organisation and Management, Kalyani Publishers, 2021.

Reference Books:

1. Prakash & Jagedesh, Business organization & Management.
2. Reddy & Gulshar, Principles of Business Organization & Management.
3. Vasudevan & Radhasivam, Business Organization.
4. Balaji & Prasad, Business Organisation, Margham Publications, Chennai.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	S	S
CO2	S	S	M	S	S	M	S	S	M	S
CO3	S	S	M	S	S	S	S	M	S	M
CO4	S	S	S	S	M	M	S	M	S	S
CO5	M	S	M	M	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Semester: IV

Paper Type: Core Elective

Paper code.....

Name of the Paper: C. Principle of Auditing

Credit: 3

Total Hours per Week: 3 Hrs. Lecture Hours: 3 Hrs. Tutorial Hours: Nil. Practical Hours: Nil

Course Objective:

1. To Facilitates the Students to know about Auditing and their nature.
2. To Impart the knowledge on Auditing programme Audit file and Audit note book.
3. To Enable the Students to know about Internal Check and Internal Audit.
4. To Make Aware the Students about Verification and Valuation of assets and liabilities.
5. To Learn Students about Qualification and Disqualification of Auditors, Rights, Powers and Liabilities.

Course Outcomes

1. The Students will able to understand the concept of Auditing and Classification.
2. The Students will able to gain knowledge about Audit Programme and importance.
3. The Students will able to get awareness about Internal check and Audit system.
4. The Students will able to understand the Valuation of assets and liabilities of the company.
5. The Students will gain knowledge on qualification and disqualification of Auditors.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	No	Yes	Yes

Unit-1: - Introduction To Auditing

Teaching Hours: 9 Hrs.

Auditing – **Origin** - Meaning and Definition – Nature and Scope of Auditing –Auditing and Investigation – Objectives of Auditing – Advantages and Limitations of Audit – Classification of Audit.

Unit-2: Audit Programme

Teaching Hours: 9 Hrs.

Meaning and Definition of Audit Programme – Advantages and Disadvantages – Audit File, Audit Note Book, Audit Working Papers – Purposes and Importance of Working Paper – Vouching and Voucher – Vouching of cash book – Vouching of trading transactions.

Unit-3: Internal Check and Audit**Teaching Hours: 9 Hrs.**

Internal Check – Meaning, object of Internal Check – Features of Good Internal Check System – Auditors duty with regards to Internal Check System – Internal Check and Internal Audit.

Unit-4: Verification and Valuation of assets and liabilities Teaching Hrs: 9 Hrs.

Verification and Valuation of assets and liabilities – Meaning and objects of verification – Vouching and verification – Verification and Valuation of different kinds of Assets and Liabilities.

Unit- Auditor**Teaching Hours: 9 Hrs.**

Qualification and Disqualification of Auditor – Status of an Auditor – Rights – Powers – Duties and Liability of an Auditor.

Text Books:

1. B.N. Tandon, Sultan Chand – A handbook of practical auditing
2. B.N. Tandon, Sudharsanam, Sundharabahu – S Chand – Practical auditing.
3. Sundar. K and Pari. K, Vijay Nicole Imprints Private Ltd., Chennai.
4. Dr. T. R. Sharma and Dr. I. M. Sahai, Auditing, Sahitya Bhawan Publications, Agra.
5. Arunkumar & Rachana Sharma, Auditing Theory and Practice, Atlantic Publications, www.atlanticbook.com

Reference Books:

1. Sharma, Sahitya Bhavan, Agra – Auditing
2. Dr.N.Premavathy, Practical Auditing, Sri Vishnu Publications, Chennai.
3. Pranav Jain, Audit of Financial Statements, Taxman Publications.

Course Material: website links, e-Books and e-journals**Mapping with Programme Outcomes**

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	S	M	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	M	S	M	M
CO4	S	M	S	S	M	S	S	S	M	S
CO5	M	S	M	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome, S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY
B.COM. (GENERAL)

SYLLABUS
THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.COM – GENERAL) – 2022-2023 onwards

The following details should be given before syllabus of each programme (UG & PG degree)

Programme Objectives: (5 Points Compulsory)

1. To enhance the knowledge of the students regarding finance, marketing and industries.
2. To encourage the students to acquire the knowledge and skills to become an entrepreneur.
3. The knowledge of different specializations in Accounting, costing, banking and finance with the practical exposure helps the students to stand in organization.
4. The programme aims to nurture the students in intellectual, personal, interpersonal and social skills with a focus on Holistic Education and development to make informed and ethical decisions and equips graduates with the skills required to lead management position..
5. This program could provide Industries, Banking Sectors, Insurance Companies, Financing companies, Transport Agencies, Warehousing etc., well trained professionals to meet the requirements.

Programme Educational Objectives: (5 Points Compulsory)

1. Discuss the concepts of Auditing and taxation and the other areas of Commerce.
2. Analyze financial statements to interpret organizational efficiency and apply critical thinking skills by identifying and analyzing accounting issues using the relevant accounting framework.
3. Analyze, interpret and apply concepts of Financial, Cost and Management Accounting and evaluate ethical problems that occur at all levels of business decision making
4. Execute the best practices of Accounting, taxation and Auditing and Work effectively and professionally in teams.
5. Exhibit the knowledge of entrepreneurial qualities and explore entrepreneurial opportunities.

Programme Specific Outcomes: (10 Points Compulsory)

1. Learners venture into Managerial positions, Accounting areas, Banking Sectors, Auditing, Company Secretaryship, Teaching Profession, Stock Agents, Government Employment etc.
2. Enables learners to prove themselves in different Professional examinations like CA, CS, CAT, GRE, CMA, MPSC, UPSC etc.
3. Enables learners to demonstrate Progressive learning of various tax issues and tax forms related to individuals and businessmen and setting up their own business start-up.
4. The vast syllabi cover various fields of commerce and accountancy which helps students grasp practical and theoretical knowledge.
5. Learners will gain thorough systematic and subject skills within various disciplines of commerce, business, accounting, economics, finance, auditing and marketing.
6. Learners will learn relevant financial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.
7. Learner's will acquire the skills like effective communication, decision making, problem solving in day-to-day business affairs
8. Learners will involve in various co-curricular activities to demonstrate relevancy of foundational and theoretical knowledge of their academic major and to gain practical exposure.
9. To imbibe knowledge and develop an understanding of learning and teaching.
10. Learners will be able to do higher education and advance research in the field of commerce and finance.

Programme Outcomes: (10 Points Compulsory)

1. To Enables learners to get theoretical and practical exposure in the commerce sector which includes Accounts, Commerce, Marketing, Management, Economics, Environment etc.
2. To Develops communication skills and build confidence to face the challenges of the corporate world.
3. To Enhances the capability of decision making at personal and professional levels.
4. To make the students industry ready and develop various managerial and accounting skills for better professional opportunities.
5. To Develops entrepreneurial skills amongst learners.
6. To strengthens their capacities in varied areas of commerce and industry aiming towards holistic development of learners.
7. To develop a thorough understanding of the fundamentals in Commerce and Finance.

8. To systematize experiences and strengthen the professional competencies of student teachers.
9. To Have critical thinking skills, which will enable them to understand, appreciate and critically.
10. Can evaluate real world developments in the field of commerce.

The Course of Study and the Scheme of Examinations

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-1	5	3	Financial Accounting -I	25	75	100
4.	III	Core Theory	Paper-2	5	3	Business Organization	25	75	100
5.	III	ALLIED -1	Paper-1	6	3	(to choose 1 out of 3) 1. Indian Economy I 2. Elements of Insurance 3. Consumerism	25	75	100
6.	III	PE	Paper-1	6	3	Professional English I	25	75	100
7.	IV	Environmental Studies		2	2	Environmental Studies	25	75	100
				36	22		175	525	700
SEMESTER II							CIA	Uni. Exam	Total
1.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-2	4	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-3	5	3	Financial Accounting –II	25	75	100
4.	III	Core Theory	Paper-4	5	3	Office management	25	75	100
5.	III	ALLIED-1	Paper-2	6	5	(to choose 1 out of 3) 1. Indian Economy II 2. Merchant banking 3. Business Mathematics	25	75	100
6.	III	PE	Paper-2	6	3	Professional English II	25	75	100
7.	IV	Value Education		2	2	Value Education	25	75	100
8.	IV	Soft Skill		2	1	Soft Skill	25	75	100
				36	25		200	600	800
S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER III							CIA	Uni. Exam	Total

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
1	III	Core Theory	Paper-5	6	5	Corporate Accounting I	25	75	100
2	III	Core Theory	Paper-6	5	4	Legal Aspects of Business	25	75	100
3	III	Core Theory	Paper-7	4	3	Business Correspondence	25	75	100
4	III	Core Theory	Paper-8	4	3	Business Statistics and Operation Research	25	75	100
5	III	ALLIED-2	Paper-3	6	3	Business Economics I	25	75	100
6	IV	Skill based Subject	Paper-1	3	2	Computer Applications in Business	25	75	100
7	IV	Non-major elective	Paper-1	2	2	General commercial Knowledge	25	75	100
				30	22		175	525	700
SEMESTER IV							CIA	Uni. Exam	Total
1	III	Core Theory	Paper-9	5	4	Corporate Accounting II	25	75	100
2	III	Core Theory	Paper-10	5	4	Business Management	25	75	100
3	III	Core Theory	Paper-11	5	3	Company Law	25	75	100
4	III	Core Theory	Paper-12	4	3	Modern banking	25	75	100
5	III	ALLIED-2	Paper-4	6	5	Business Economics II	25	75	100
6	IV	Skill based Subject	Paper-2	3	2	e- Commerce	25	75	100
7	IV	Non-major elective	Paper-2	2	2	Advertisement and Salesmanship	25	75	100
				30	23		175	525	700
SEMESTER V							CIA	Uni. Exam	Total
1	III	Core Theory	Paper-13	6	4	Cost accounting I	25	75	100
2	III	Core Theory	Paper-14	5	4	Practical Auditing	25	75	100
3	III	Core Theory	Paper-15	6	5	Management Accounting	25	75	100
4	III	Core Theory	Paper-16	6	4	Income Tax Law and Practice I	25	75	100
5	III	Elective	Paper-1	4	3	(to choose 1 out of 3) 1. Entrepreneurial Development 2. Business Environment 3. Management Information System	25	75	100
6	IV	Skill based Subject	Paper-3	3	2	Principles of marketing	25	75	100
				30	22		150	450	600

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER VI							CIA	Uni. Exam	Total
1	III	Core Theory	Paper-17	5	4	Cost accounting II	25	75	100
2	III	Core Theory	Paper-18	5	4	Income Tax law and practice II	25	75	100
3	III	Core Theory	Paper-19	4	4	Financial management	25	75	100
4	III	Compulsory Project	Paper-20	5	5	Individual / Group Project	25	75	100
5	III	Elective	Paper-2	4	3	(To choose one out of 3) 1. Innovation management 2. Logistics management 3. Service Marketing	25	75	100
6	III	Elective	Paper-3	4	3	(To choose one out of 3) 1. Customs and GST 2. Investment Management 3. Financial services	25	75	100
7	IV	Skill based Subject	Paper-4	3	2	Human resources management	25	75	100
8	V	Extension Activities		-	1		100	-	100
				30	26		275	525	800
TOTAL					140		1150	3150	4300

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	2	4	8	100	200
Part II	Communicative English	2	4	8	100	200
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Electives	3	3	9	100	300
	Core	19	(3-5)	70	100	1900
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual)	1	5	5	100	100

	Project)					
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	43		140		4300

THIRUVALLOVAR UNIVERSITY
B.COM. (GENERAL)

SYLLABUS
THIRUVALLOVAR UNIVERSITY, VELLORE – 632 115
(B.COM – GENERAL) – 2022-2023 onwards

Semester: I

Paper type: Core Paper-1

Paper code: CCM11

Name of the Paper: Financial Accounting I

Total Hours per Week: 5

Credit: 3

Lecture Hours: 75

OBJECTIVES

1. To understand the basic Principles and practical Applications of Accounting
2. To have practical knowledge in the preparation of Single/Double Entry System
3. To draft the Final Accounts as per the Accounting standards
4. To acquire knowledge about Depreciation accounting
5. To gain knowledge about importance of Tally

COURSE OUT COMES

- Unit 1 After studied unit-1, the student will be able to understand the basic fundamental of Double entry system Accounting.
- Unit 2 After studied unit-2, the student will be able to prepare the Final Accounts
- Unit 3 After studied unit-3, the student will be able to understand the depreciation accounting
- Unit 4 After studied unit-4, the student will be able to prepare the accounts in Single Entry System
- Unit 5 After studied unit-5, the student will be able to understand the importance of Tally Accounting

Matching Table (Put Yes / No in the appropriate box)

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: Introduction:**15 Hours**

Meaning of accounting – objectives– advantages -limitations - Accounting concepts and conventions - Methods of accounting - Journal - Ledger– Trial Balance - Rectification of Errors with and without suspense a/c.

UNIT-II: Final accounts:**15 Hours**

Meaning of final accounts – adjustments in preparation of final accounts – preparation of trading, profit & loss account and balance sheet of sole proprietorship concern.

UNIT-III: Depreciation:**15 Hours**

Meaning of depreciation – causes– need– Methods of calculating depreciation: straight line method and written down value method (change in method of depreciation is excluded) – Methods of recording depreciation: by charging depreciation to assets account or by creating provision for depreciation account.

UNIT-IV: Single entry system:**15 Hours**

Meaning of single entry system-features and limitations of single entry system – Distinction between single entry system and double entry system - Methods of calculation of profit: Statement of affairs method and Conversion method –Distinction between statement of affairs and balance sheet.

UNIT-V: Introduction to Tally:**15 Hours**

Accounts Basics- Accounts Basics - Understanding the Components of Computer, Classification of Software's - Challenges associated with accounting on computers and solutions there on - Software training to enhance employability - Growth of Tally.

Note: Questions in Sec .A, B & C shall be in the proportion of 20:80 between Theory and Problems.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1	T.S. Reddy & Dr. A.Murthy	Financial Accounting	Margham Publications Chennai.
2.	Jain &Narang,	Financial Accounting	Kalyani Publishers
3	S.N. Maheshwari	Financial Accounting	S.Chand Publications

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Hanif and Mukherjee	Financial Accounting	McGraw-Hill Publications
2.	Murugadoss, Jaya, Charulatha and Baskar	Financial Accounting	Vijay Nicholes Imprint Pvt. Ltd., Publications
3.	Shukla & Grewal	Advanced Accounting	S.Chand& Co. Publications
4.	Parthasarathy.S. &Jaffarulla,	Financial Accounting	Kalyani Publishers, NewDelhi
5.	Gupta, R.L & Gupta V.K,	Advanced Accounting	Sulthanchand and sons Publications
6.	Ashok Sehgal &Deepak Sehgal	Fundamental of Financial Accounting	Taxman Publications

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

Semester: I

Paper type: Core Paper-2

Paper code: CCM12

Name of the Paper: Business Organisation

Total Hours per Week: 5

Credit: 3

Lecture Hours: 75

OBJECTIVES:

1. To enable the students to understand the basic concepts of Business Organization.
2. To make the students to know the functioning of MNC's in India.
3. To earn adequate Profits.
4. Growth and expansion of Business Operation
5. Making use of available Resources in the best possible manner

COURSE OUT COMES

Units	CO Statement
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Unit1	After studied unit-1, the student will be able to gain Knowledge about business and profession.
Unit2	After studied unit-2, the student will be able to understand the different forms of business Organization.
Unit3	After studied unit-3, the student will be able to explore the theories of plant location and characteristics of lay out.
Unit 5	After studied unit-5, the student will be able understand the basic concepts of MNC's

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – 1

10 Hours

Introduction

Business – Meaning – Characteristics - Objectives - Criteria for Success in Modern Business – Classification of Business-Profession - Meaning-Distinction between Business and Profession - Social Responsibility of Business.

UNIT – 2

15 Hours

Forms of Business Organisation

Sole Trader, Partnership Firm, Limited Liability Partnership, Cooperative Societies and Joint Stock Company: Definition – Meaning – Characteristics – Advantages – Limitations - One Man Company- Virtual Organization- Private and Public Limited Company – Government Companies – Public Utilities.

UNIT – 3

20 Hours

Location of Industry

Plant Location: Meaning - Theories of Location - Factors Influencing Location - Plant Layout: Definition - Meaning – Objectives - Characteristics of Good Layout - Size of Firm: Meaning - Concept of Size - Measures of Size.

UNIT-4

15 Hours

Business Combination

Definition - Meaning – Advantages and Limitations – Types of Combination – Chamber of Commerce: Meaning – Advantages and functions – Trade Associations: Features and functions.

UNIT-5

15 Hours

Multinational Corporations (MNC's)

Definition - Distinction among IC, MNC, GC and TNC - Characteristics of MNC's-cultural impact of MNC's. Factors contributed for the growth of MNC's – Advantages and Disadvantages of MNC's – Control over MNC's – Organization Design and Structure of MNC, s – Relationship between Headquarters and Subsidiaries – MNC's in India.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	DinkarPagare	Business Organization & Management	Sultan Chand & Sons, New Delhi.
2.	C.B. Gupta	Business Organization & Management	Sultan Chand & Sons, New Delhi.

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	P.N. Reddy & S.S. Gulshan	Business Organization	Eurasia Publishing House (Pvt.) Ltd, New Delhi.
2.	Prof. C.D. Balaji& Dr. G. Prasad	Business Organization	Margham Publications, Chennai.
3.	Kathiresan& Dr. Radha	Business Organization	Prasana Publishers, Chennai.
4.	Y.K. Bhushan	Fundamentals of Business Organization & Management	Sultan Chand & Sons, New Delhi.
5.	Dr. P. Subba Rao	International Business – Text and Cases	Himalaya Publishing house, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: I

Paper type: Allied -1 Paper -1

Paper code: CACM15A

Name of the Paper: ELEMENTS OF INSURANCE

Total Hours per Week: 6

Credit: 3

Lecture Hours: 90

OBJECTIVES

1. To aims to educate students about the significance and purpose of insurance
2. To acquire skills about the Life Insurance and its types
3. To know about the Fundamental principles of fire insurance.
4. To know about the Fundamental principles of marine insurance.
5. To gain insights in E insurance.

COURSE OUTCOMES

UNITS CO STATEMENT

Unit1	After studied unit-1, the student will be able to understand the basic fundamentals of insurance
Unit2	After studied unit-2, the student will be able to apply the fundamentals of life insurance
Unit3	After studied unit-3, the student will be able to understand the fundamentals of life insurance.
Unit4	after studied unit-4, the student will be able to apply the fundamentals of marine insurance
Unit 5	after studied unit-5, the student will be able to understand the procedure of e-insurance

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: Introduction**15 Hours**

Insurance- purpose and Need - Benefits of Insurance - Functions of Insurance -Importance of Insurance - Principles of Insurance - Nature of Insurance Contract -Types of Insurance Contract - Fundamentals of Insurability - Classification of Insurance.

UNIT-2: Life Insurance**20 Hours**

Life Insurance - Definitions of Life Insurance, Advantages of Life Insurance -Fundamental principles of life Insurance - Procedure of taking Life Policy - Meaning of Whole life policy and Endowment policy - Policy conditions, procedure for the settlement of claims - Nomination and assignment - Annuity- Medical policy & Accident Insurance Policy.

UNIT 3: Marine insurance**20 Hours**

Marine Insurance - Definition of Marine Insurance contract- Procedure of taking marine policy - Fundamental principles of marine insurance - Warranties in marine insurance - Types of warranties- Types of marine policies, Marine policy conditions.

UNIT 4: Fire Insurance**15 Hours**

Fire Insurance- Definition of Fire Insurance contract - Procedure of taking fire policy - Fundamental principles of fire insurance - Types of fire insurance policies - Policy conditions - Implied express conditions.

UNIT 5: E-insurance in India**20 Hours**

The Insurance Regulatory and Development Authority (IRDA) – Benefits of e- insurance- challenges of e- insurance- Problems with e-insurance policies and how to deal with them- Companies are providing e-insurance programs - IRDA guidelines for e-insurance policies.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr. A.Murthy	Element of Insurance	MarghamPublisation
2.	E.Gordon and P.K.Gupta	Banking and Insurance	Himalaya Publishing house
3.	P.K.Gupta,	Legal Aspects of Insurance	Himalaya Publishing house
4.	Dr.Sunilkumar	Banking and insurance	Calcotia Publishing Company
5.	https://business.mapsofindia.com/articles/e-insurance-in-india-policy-and-procedures.html		

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	M.N.Mishra and S.B.Mishra	Insurance principles and practice,	S.Chand
2.	GauravVarshney	Insurance Law	Lexis Nexis.
3.	Neelam C. Gulati	Banking and Insurance Practices	Excel Books
4.	Dr.Biswa Mohana Jena	Principles of Banking and Insurance	Shree Vinayak Publication.
5.	O.P.Agarwal	Banking and Insurance	Himalaya Publishing House

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: I

Paper type: Allied -1 Paper -1

Paper code: CACM15B

Name of the Paper: Consumerism

Total Hours per Week: 6

Credit: 3

Lecture Hours: 90

OBJECTIVES

1. To make students to acquire knowledge of consumerism.
2. To understand the fundamentals of Consumerism.
3. To know the Consumer Protection Act, 1986.
4. To acquire the Consumer Protection Act 2006 (Amendments.)
5. To gain knowledge Consumer Protection Council.

COURSE OUTCOMES

UNITS CO STATEMENT

Unit1: After studied unit-1, the student will be able to understand the basic fundamentals of consumerism

Unit2: After studied unit-2, the student will be able to apply the fundamentals consumer protection act

Unit3: After studied unit-3, the student will be able to understand the Amendments of consumer Protection act.

Unit4: After studied unit-4, the student will be able to apply the fundamentals consumer protection council.

Unit 5: After studied unit-5, the student will be able to understand the procedure of consumer Redressal

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I: Introduction

15 Hours

Consumerism- Concept - Need and Scope of Consumerism- Origin of Consumer Movement – Consumer movement in India- Consumerism in India - Consumer of goods and services - Professional services - Medical, legal, educational and welfare services- Rights and Responsibilities of Consumerism- Unfair Trade Practices

UNIT – II: Consumer Protection Act, 1986

20 Hours

Consumer Protection Act, 1986 – Objectives – Definition of Terms – complainant, consumer dispute, defect, deficiency in service, service, unfair trade practices, restrictive trade practices - UN guidelines for Consumer Protection. Emergence of new Consumer Movements: Green Consumerism.

UNIT – III: Consumer Protection Act 2006

20 Hours

Consumer Protection Act 2006 (Amendments) – Salient features - Objectives -Definitions of the term: - Consumer – Types of Consumer Appropriate authority – Complainant – Consumer dispute – Restrictive Trade Practice. The various Consumer Rights: - Right to Safety, Right to Information, Right to Choose, Right to be heard – Right against exploitation – Right to Consumer Education

UNIT – IV: Consumer Protection Council

15 Hours

Consumer action groups, consumer resistance, consumer boycotts, lobbying, consumer guidance - Nature and Functions - Role and working of Consumer Voluntary Organisations in Grievance Settlement-Composition and Powers of National Commission, State Commission and District Consumer Forum.

UNIT – V: Consumer redressal

20 Hours

Redressal of consumer grievances-Goods & Services covered under Consumer Protection Act- Procedure for filing of complaints with District Forum, State Commission , National Commission.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr. Rega Surya Rao	Lecture on Torts and Consumer Protection Laws	Asia Law House, Hyderabad.
2.	Prof. Rakesh Khanna	Consumer Protection Laws	Central – Law Agency.
3.		Consumer Protection (Amendment) Act, 2002.	S. Chand & Sons.2012.

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr. V.K. Agarwal	Consumer Protection (Law & Practice)	Bharat Law House Pvt. Ltd.
2.	H.D. Pithawalla, c. Jamnadas& co	The Consumer Protection Act 2019	
3.	Avtar Singh	Consumer Protection (Law & Practice)	Eastern Book Co.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: II

Paper type: Core -3 Paper -3

Paper code: CCM21

Name of the Paper: Financial Accounting II

Total Hours per Week: 5

Credit: 3

Lecture Hours: 75

OBJECTIVES

1. To gain knowledge about the different systems of Accounting
2. To understand the branch accounts and its types
3. To have practical knowledge in the preparation departmental accounting
4. To draft the Hire purchase and Installment purchase systems
5. To acquire practical knowledge in Partnership accounts

COURSE OUTCOMES

UNITS CO STATEMENT

Unit1	After studied unit-1, the student will be able to understand the basic fundamentals of branch accounting
Unit2	After studied unit-2, the student will be able to Understand the basic fundamentals of departmental accounting
Unit3	After studied unit-3, the student will be able to Understand the hire purchase and installment system of accounting
Unit4	After studied unit-4, the student will be able to Prepare the accounts partnership
Unit 5	After studied unit-5, the student will be able to Understand the basics of tally accounting

Mapping with Programme Outcomes

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I Branch accounts:**20 Hours**

Meaning – objects of branch accounts – accounting in respect of dependent branches: debtors system; stock and debtors system; wholesale branch system and final accounts system - Independent branches – incorporation of branch trial balance in head office books

UNIT – II: Departmental Accounting:**10 Hours**

Meaning of departments and departmental accounting – Distinction between departments and branches- need for departmental accounting – advantages of departmental accounting - Apportionment of indirect expenses – Inter departmental transfers at cost and selling price - preparation of departmental trading, profit & loss account and balance sheet.

UNIT - III: Hire purchase and Installment purchase systems: 20 Hours

Meaning and features of hire purchase system - calculation of interest – books of hire purchaser and books of hire vendor - default and repossession (Hire purchase trading account excluded) Meaning of instalment system -distinction between hire purchase system and instalment system - calculation of interest – books of buyer and books of seller.

UNIT - IV: Partnership accounts**15 Hours**

Introduction- Admission of a partner – Retirement of a partner – Death of a partner – treatment of goodwill as per AS 10- Dissolution of a firm – insolvency of a partner (Garner Vs Murray rule) – Insolvency of all the partners

UNIT - V: Basics of Tally:**10 Hours**

ERP - Introduction to ERP 9 Advantages and Salient Features of Tally.ERP 9 - Company Creation Ledger Creation with predefined Primary Groups, Predefined Sub Groups and New Sub Groups

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	T.S. Reddy & Dr. A.Murthy,	Financial Accounting	MarghamPublications, Chennai.
2.	Jain &Narang,	Financial Accounting	Kalyani Publishers
3.	S.N. Maheshwari	Financial Accounting	S.Chand

REFERENCES BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Hanif and Mukherjee	Financial Accounting	McGrawhill.
2.	Murugadoss, Jaya, Charulatha and Baskar	Financial Accounting	Vijay Nicholes Imprint Pvt. Ltd.,
3.	Shukla & Grewal	Advanced Accounting	S.Chand& Co.
4.	Parthasarathy.S. &Jaffarulla	FinancialAccounting	KalyaniPublishers, NewDelhi
5.	Gupta, R.L & Gupta V.K	Advanced Accounting	Sulthanchand and sons
6.	AshokSehgal&Deepak Sehgal	Fundamental of Financial Accounting	Taxman Publication
7.	Tulsian	Financial Accounting	Pearson

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: II

Paper type: Core

Paper -4

Paper code: CCM22

Name of the Paper: OFFICE MANAGEMENT

Total Hours per Week: 5

Credit: 3

Lecture Hours: 75

OBJECTIVE

Understand the range of responsibilities and skills required by the office manager

1. Apply various approaches when dealing with the management of tasks, teams and individuals
2. Apply techniques to plan and manage workload effectively and achieve objectives
3. Create and apply a checklist of systems and procedures to aid the smooth running of the office
4. Apply assertive communication and problem-solving skills.
5. Planning to find the right technology.

COURSE OUTCOMES

UNITS

CO STATEMENT

Unit1	After studied unit-1, the student will be able to gain knowledge about nature and scope of organization.
Unit2	After studied unit-2, the student will be able to gain effective knowledge about administrative arrangements and physical conditions
Unit3	After studied unit-3, the student will be able to gain a knowledge of office equipments and office system
Unit4	After studied unit-4, the student will be able to know about office correspondence
Unit 5	After studied unit 5,the student will be able to know the role of successful supervisor.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	NO
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I

15 Hours

Meaning and Scope -Function and Qualifications of Office Manager -Poor and Good Organization Departments -Flow of Work -Organization Charts and manual.

UNIT-II

15 Hours

Administrative arrangements and physical conditions - Centralization and Decentralization of Office services - Office Accommodation and Layout -Office Furniture - Meaning of Various terms - Basic pattern of work -Sub-division - Standardization and Standards - Work Measurement and control

UNIT-III

15 Hours

Office equipments - Reproduction equipments - Typewriter - Duplicators - Photo Copier - Franking Machine - Communication Equipments - Dictaphone - Intercom - Telephone - Telex – Tele printers - PABX - PBX - STD - Storage equipment - Filing Cabinets - Time Clocks - Use of Computers in Office Management

Office System - Procedure - Routine - And methods - Paper work in office Filing functions - essentials of good filing systems - Central vs. Departmental Filing classification - Methods of filing Old and Modern - Micro filing - Indexing Types.

UNIT-IV

15 Hour

Mail service and communication - Office Correspondence - Central vs. Departmental Correspondence - Handling Mail - Postal Services - Postbag and Post Box Numbers - Registered and Insured Posts - VPP Communications - Oral written - Internal and external communication - Records Management Types - Forms Controls - Principles - Foremost - Continuous stationery

UNIT-V

15 Hours

Office Supervisor - Meaning and characteristics of Supervisor - Status - Place and Role of Supervisor - Effective Supervisor - Qualification - Knowledge and skill of Supervisor.

Note: Questions in Sec. A, B & C - 100 % Theory.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1	R.S.N.Pillai&Bha gwathi. V	Office Management	S.Chand, New Delhi.
2.	Arora S.P	Office Management	Vikas Publications Pvt. Ltd., Chennai.

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Balachandiran.V& Chandrasekaran	Office Management	Vijay Nicole imprints Private Limited, Chennai

REFERENCE JOURNALS

1. Journal of Accounting & Marketing
2. Journal of Business & Financial Affairs
3. Journal of Defense Studies and Resource Management
4. Journal of Entrepreneurship & Organization Management

E- MATERIALS

1. Office management
2. Elements Of Office Management
3. office management skills
4. Business organization and office management

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: II

Paper type: Allied Paper -2

Paper code: CACM23B

Name of the Paper: MERCHANT BANKING

Total Hours per Week: 6

Credit: 5

Lecture Hours: 90

OBJECTIVE

1. To enable the students to understand Merchant banking and its services to corporate sector.
2. To familiarize the students with the concepts of Financial Management
3. Managing investment in primary market and secondary market
4. To acquaint the students in respect to the investment decisions related to Derivative market.
5. Establishing appropriate investment objectives, developing optimal portfolio strategies, estimating risk-return tradeoffs, evaluating investment performance and portfolio revision technique.

COURSE OUTCOMES

UNITS CO STATEMENT

- Unit1 After studied unit-1, the student will be able to gain knowledge about merchant banking .
- Unit2 After studied unit-2, the student will be able to impart effective knowledge about public issue management.
- Unit3 After studied unit-3, the student will be able to learn about post issue management.
- Unit4 After studied unit-4, the student will be able to gain knowledge about capital market instruments.
- Unit 5 After studied unit-5, the student will be able to learn about port folio management.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I**20 Hours**

Merchant Banking – Definitions and Functions – Regulatory Framework – Registration of Merchant Bankers – Procedure Capital Adequacy Requirement – Lead Merchant Banker Appointment, Restrictions and Responsibilities.

UNIT-II**15 Hours**

Public Issue Management – Functions and Mechanism – Categories of Issue – Issue Manager – Category and Restrictions Activities Involved in Public Issue Management – Marketing of New Issues – Methods – Pricing of Rights and Other Public Issues.

UNIT-III**15Hours**

Post Issue Management – Allotment / Dispatch of Shares / Refunds – Basis of Allotment – Procedure – Listing Requirements of Stock Exchanges – Advantages – Listing Requirements of OTCEI.

UNIT-IV**20 Hours**

Capital Market Instruments – Meaning and Types – Commercial Paper – Issue of Commercial Paper – Usance – E-nomination – Ceiling – Mode of Issue – Credit Syndication – For Long Term and Working Capital.

UNIT-V**20 Hours**

Port Folio Management – Functions – Registration of Port-folio Managers – Obligation – Investment of Client Funds – Maintenance of Book and Accounts – Reports to be Furnished – Code of Conduct.

Note: Questions in Sec. A, B & C - 100 % Theory.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1	Dr.S.Gurusamy	Merchant Banking	Vijay Nicholes Imprint Pvt. Ltd., Chennai
2.	Dr.V.Balu	Merchant Banking & Finance Services	Sri Venkateswara Publication, Chennai

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	H.R. Machiraju	Merchant Banking	New Age International, New Delhi
2.	Dr.J.C.Verma	A Manual of Merchant Banking	Baharat Law House, New Delhi.

JOURNALS

1. Merchant banking India: Recent development in merchant banking (2016),ISSN-2455-6602.
2. Performance evaluation of merchant banking in India-A study of SBI capital market limited (2015), ISSN-2347-9671.
3. Recent development in merchant banking and challenges ahead in India,(2016), E-ISSN:2455-295X.
4. A literature review of merchant banking in india (2019), ISSN-2349-5162.
5. <https://www.businessmanagementideas.com/financial-management/merchantbanking/top-7-developments-in-merchant-banking-establishment-in-india/4174>

E-MATERIALS

1. "Business Finance and Financial Management". UpFina. Retrieved 2015-11-04.
2. "Capital Structure Definition | Investopedia". Investopedia. Retrieved 2015-11-04.
3. 'Nobanee, Haitham; Abraham, Jaya (2015). "Current assets management of small enterprises". Journal of Economic Studie.
4. "What are fixed assets? | The e-conomic Accounting Glossary". www.e-conomic.co.uk. Retrieved 2015-11-04.
5. "Current Asset Definition - AccountingTools". www.accountingtools.com. Retrieved 2015-11-04.
6. "The Top 4 Cash Flow Forecasting Mistakes". Entrepreneur. Retrieved 2015-11-04.

Mapping with ProgrammeOutcomes :

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: III

Paper type: Core

Paper-5

Paper code: CCM31

Name of the Paper: Corporate Accounting I

Total Hours per Week: 6

Credit: 5

Lecture Hours: 90

Objectives:

1. To help the students to understand the basic concepts relating to issue of shares
2. To get familiarized about redemption of shares.
3. To understand accounting treatment on acquisition of business.
4. To learn about profit prior to incorporation.
5. To enable the students to prepare company final accounts.

Course Out Comes

Units	CO Statement
Unit – I After studied unit-1, the student will be able to	Understand the basic concepts relating to issue of shares and make accounting entries.
Unit - II After studied unit-2, the student will be able to	Make accounting entries for and redemption of preference shares.
Unit - III After studied unit-3, the student will be able to	Be acquainted with accounting treatment for acquisition of business.
Unit - IV After studied unit-4, the student will be able to	Understand the accounting procedures related to Profits Prior to Incorporation
Unit - V After studied unit-5, the student will be able to	Prepare Company Final Accounts & Company Balance Sheet.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

ISSUE OF SHARES:

20 Hours

Issue of Shares - Introduction -Meaning and types of shares- Features and Kinds of Companies- Under Subscription and Over Subscription-Issue of shares at par ,premium and at discount-Calls-in-arrears-Calls-in-advance-Forfeiture of Shares - Reissue of Forfeited shares-Balance Sheet (Revised Schedule VI).

UNIT - II

REDEMPTION OF PREFERENCE SHARES:

20 Hours

Introduction - Meaning - Provision of the Companies Act Section 80 and 80A -Steps Involved in Redemption of Preference Shares - Balance Sheet (Revised Schedule VI).

UNIT- III

ACQUISITION OF BUSINESS:

15 Hours

Introduction-Meaning- Accounting treatment for acquisition of business in the books of vendor and purchaser -When new set of books are opened- Debtors and Creditors taken over on behalf of vendors-When same set of books are continued-When Debtors and Creditors are not taken over.

UNIT - IV

PROFITS PRIOR TO INCORPORATION:

20 Hours

Introduction - Meaning-Methods of Ascertaining profit or loss prior to incorporation-Basis of Apportionment of Expenses.

UNIT - V

FINAL ACCOUNTS OF COMPANIES:

15 Hours

Introduction -Preparation of statement of profit and loss (Part II of Revised Schedule VI) - Preparation of Balance Sheet (Part I of Revised Schedule VI)-Managerial Remuneration.

TEXTBOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	R.L.Gupta and M.Radhaswamy	Advanced Accountancy (Volume I)	Sultan Chand & Sons- New Delhi.
2.	Shukla MC, Grewal TS & Gupta SC	Advanced Accounts, Vol. II,	S. Chand & Company Ltd, New Delhi

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	S.P.Jain and K.L.Narang,	Corporate Accounting (Volume I)	Kalyani Publishers- Ludhiana.
2.	T.S.Reddy and A.Murthy	Corporate Accounting (Volume I)	Margham Publications- Chennai.
3.	S.P.Iyengar	Advanced Accountancy (Volume I),	Sultan Chand & Sons- New Delhi.
4.	Dr .R. Rangarajan and Dr. V. Chandrasekaran, S.Viswanathan	Corporate Accounting	(Printers and Publishers) Pvt. Ltd.,-Chennai.

E-Material

1. www.universityofcalicut.info > syl > bcomiisem197

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	S	S	M	S
CO2	S	M	S	M	M	M	S	S	M	S
CO3	S	M	S	M	M	M	S	S	M	S
CO4	S	M	S	M	M	M	S	S	M	S
CO5	S	M	S	M	M	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: III

Paper type: Core Paper-6

Paper code: CCM32

Name of the Paper: Legal Aspects of Business

Total Hours per Week: 5

Credit: 4

Lecture Hours: 75

Objectives

1. To make the students to gain the Basic Knowledge in legal aspect of business.
2. To enable the students to understand and deal with various contracts in his day-to-day life, be it for his business or profession.
3. To get familiarized about special contracts
4. To make the students to gain knowledge about sale of goods Act
5. To create awareness among the students regarding Consumer Protection Act 1986.

Course Out Comes:

Units	CO Statement
Unit - I After studied unit-1, the student will be able to	Know the framework of Indian Contract Act 1872.
Unit - II After studied unit-2, the student will be able to	Understand the other essential elements of Indian Contract 1872.
Unit - III After studied unit-3, the student will be able to	Aware the provisions of Special Contracts and Modes of Discharge.
Unit - IV After studied unit-4, the student will be able to	Acquire Knowledge of Sale of Goods Act 1930.
Unit - V After studied unit-5, the student will be able to	Consciousness on Consumer Protection Act 1986 .

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I**15 Hours****INDIAN CONTRACT ACT 1872(INTRODUCTION AND ESSENTIAL ELEMENTS)**

Law - Meaning - Objectives - Need for the Knowledge of Law. Law of Contract - Contract-Definition - Agreement and its Enforceability - Consensus Ad Idem - Essential Elements of a Valid Contract - Classification of Contracts. Offer and Acceptance - Legal Rules as to Offer and Acceptance - Communication of Offer, Acceptance and Revocation.

UNIT – II**15 Hours****INDIAN CONTRACT ACT 1872(OTHER ESSENTIAL ELEMENTS)**

Consideration - Definition - Meaning - Legal Rules as to Consideration - Valid Contracts without Consideration. Capacity to Contract - Agreements with Minor - Minor's Liability for Necessaries Free Consent - Coercion - Undue Influence - Fraud - Misrepresentation - Mistake. Agreements Opposed to Public Policy.

UNIT - III**15 Hours****INDIAN CONTRACT ACT 1872 (SPECIAL CONTRACTS)**

Contingent Contract-Modes of Discharge of Contract -Remedies for Breach of Contract - Quasi Contract Special Contracts: Bailment and Pledge - Indemnity and Guarantee-

UNIT – IV**15 Hours****SALE OF GOODS ACT 1930**

Goods-Classification of Goods-Contract of Sale-Sales and Agreement to Sell-Conditions and Warranties -Performance of Contract of Sale-Doctrine of Caveat Emptor” - Rights of Unpaid Seller

UNIT – V**15 Hours****CONSUMER PROTECTION ACT, 1986**

Introduction- Objectives of the Act-Definitions-Deficiency in services-Role of Central and State Consumer Protection Council - Consumer Disputes Redressal Agencies: District Forum, State Commission and National Commission: Jurisdiction - Composition - Appeal.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	N.D.kapoor	Business Law	Sultan Chand, New Delhi.
2.	R.S.N. Pillai and Bagavathi	Business Law	Chand & co, New Delhi.

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	P.C. Tulsian	Business Law	Tata McGraw Hill, New Delhi.
2.	P. Saravanel& S. Sumathi	Legal Aspects of Business	Himalaya publication, New Delhi.
3.	M.R. Sreenivasan	Business Law	Margham publication, Chennai.
4.	AkhilashwarePathek	Legal Aspects of Business	Tata MCGraw Hill, , New Delhi.
5.	M.C. Kuchal	Business Law	Vikas Publication, , New Delhi.

E-Material

1. https://www.icaai.org/post.html?post_id=13821 - e material
2. https://www.dphu.org/uploads/attachements/books/books_3498_0.pdf- e material
3. <https://www.youtube.com/watch?v=8zaTVt0Qf9c>- Indian Contract Act, 1872 by CA Shivangi Agrawal- e content
6. <https://www.youtube.com/watch?v=HluidzdIIInM>-sale of goods act 1930 full lecture

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	S	M	M	S
CO2	S	M	S	M	M	M	S	M	M	S
CO3	S	M	M	M	M	M	S	M	M	S
CO4	S	M	S	M	M	M	S	M	M	S
CO5	S	M	S	M	M	M	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Semester: III

Paper type: Core Paper-7

Paper code: CCM33

Name of the Paper: Business Correspondence

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

Objectives

1. To acquire knowledge about basic concepts of business Correspondence
2. To understand the structure and layout of the business letter
3. To acquire the knowledge about types of business letter
4. To gain knowledge about the Letters of Application with CV, Resume.
5. To enable the business report and its types.

Course Out Comes

Units

CO Statement

Unit - I	After studied unit-1, the student will be able to	The student will be able to understand the basic concepts of business correspondence.
Unit - II	After studied unit-2, the student will be able to	The students will be able to prepare the business letter and letter style.
Unit - III	After studied unit-3, the student will be able to	The students will be able to know the different types of business letter's, offers, orders and complaints.
Unit - IV	After studied unit-4, the student will be able to	The students will be able to acquire the knowledge of preparing letters of application with cv, resume etc.
Unit - V	After studied unit-5, the student will be able to	The students will be able to understand the types and characteristics of business report.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

INTRODUCTION:

15 Hours

Features of business communication - Importance of effective communication in business - classification of communication - characteristics and Guidelines of effective business communication.

UNIT - II

10 Hours

BUSINESS LETTERS - (LAY OUT)

Preparation of business letters - Basic principles in drafting - Appearance, structure and layout - letter style.

UNIT - III

12 Hours

TYPES OF BUSINESS LETTERS

Various Types of Business Letters - Letters of Enquiry - Offers, Quotations, orders, and complaints.

UNIT - IV

13 Hours

Letters of Application

Letters of application - Essential Qualities - Letters of Application with CV, Resume - Application in response to an advertisement.

UNIT - V

10 Hours

BUSINESS REPORT

Business Reports - Importance - Characteristics - Types - Reports by individuals and committees

Text Books:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Ramesh and Pattanchetti.R	Business Communication	Chand&Co
2.	Rajendra Pal and J.S.Korlahall	Essentials of Business communication	
3.	Dr.K.Sundar and Dr.A.Kumara raj	Business Communication	Vijay Nicoles Imprints Pvt., Ltd.,
4.	Herta Murphy	Effective business Communication	Mc Graw Hill Education
5.	Madhukant Jha	Business Communication	Gyan books.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	S	S	S
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	S	S	S	M	M	S	S	S	S
CO4	S	S	S	S	M	M	S	S	S	S
CO5	S	S	S	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: III

Paper type: Core

Paper-8

Paper code: CCM34

Name of the Paper: Business Statics and Operational Research

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

Course Objectives

1. To develop skills in analysis and interpretation of data.
2. How to measures Central Tendency and their application in business.
3. To measure the degree and direction of relationship between the variables in business.
4. Index Numbers and Time series are the most important widely used statistical device, students get familiarize
5. To solve challenging problems by using appropriate statistical tools.

Course Out Comes

Units	CO Statement
Unit-I	After studied unit-1, the student will be able to Acquired skills in analysis and interpretation of data.
Unit-II	After studied unit-2, the student will be able to Gained knowledge on measures of Central Tendency and their application in business
Unit-III	After studied unit-3, the student will be able to Learned about Correlation and Regression
Unit-IV	After studied unit-4, the student will be able to Get familiarized about Index Numbers and Time series
Unit-V	After studied unit-5, the student will be able to Solved challenging problems by using appropriate statistical tools.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I**13 Hours**

Statistics -Definitions -Scope and Limitations -Collection of Data -Primary and Secondary Data - Questionnaire -Classification and Tabulation -Diagrammatic and graphical representation of data- Measures of Central tendency -Mean -Median -Mode - Combined Mean

UNIT – II**13 Hours**

Measures of Dispersion -Range -Quartile deviation -Mean Deviation -Standard Deviation - Coefficient of Variation-Lorenz Curve - Measures of Skewness -Karl Pearson's and Bowley's Coefficient of Skewness- Kurtosis -Characteristics of Kurtosis -Measures -Calculation.

UNIT – III**10 Hours**

Correlation -Definition - Karl Pearson's Coefficient of Correlation - Rank Correlation - Regression Analysis - Simple regression- Regression equations.

UNIT – IV**12 Hours**

Index Number -Definition -Uses -Weighted Index -Laspeyre'sPaasche, Dorbish Bowley's - Marshall Edge worth, Fisher Ideal Index -Time and Factor Reversal Test -Cost of Living Index - Time Series -Definition and Uses -Components -Semi Average, Moving Average -Method of Least Square -Seasonal Variation -Simple Average Method.

UNIT – V**12 Hours**

Linear programming- Formation of LPP- Graphical method - Simplex method- Maximization Function- Minimization Function (Simple Problems only)- Transportation problems- North West Corner Method - Least Cost Method- Vogel's Approximation Method - Assignment problem- Balanced Hungarian Assignment Method.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr. S.P. Gupta	Business Statistics & Operation Research	Sultan Chand.
2.	PA. Navanitham	Business Statistics & Operation Research	Jai Publications, Trichy.
3.	S.P. Rajagopalan& R. Sattanathan	Business Statistics & Operation Research 3 rd Edition	Vijay Nicole Publications, Chennai.

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr. S.P. Gupta	Statistical Methods	Sultan Chand.
2.	R.S.N. Pillai&Bhagavathi	Statistics.	
3.	J.K. Sharma	Business Statistics	Pearson Education.
4.	B. Agarwal	Basic Statistics	Wiley Eastern.

E MATERIALS

www.southampton.ac.uk

www.quora.com

www.pondiuni.edu.in

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	M	M	S	M
CO2	S	M	M	M	M	M	M	M	S	M
CO3	S	M	M	M	M	M	M	M	S	M
CO4	S	M	M	M	M	M	M	M	S	M
CO5	S	M	M	M	M	M	M	M	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: III

Paper type: Skill Based

Paper-1

Paper code: CSCM36

Name of the Paper: Computer Applications in Business

Total Hours per Week: 3

Credit: 2

Lecture Hours: 45

Course Objectives

1. Identify computer concepts terminology and concepts, basic operating system functionality and terminology
2. To apply basics and advanced formatting techniques, skills to produce word processing documents
3. Demonstrate basic skills involving working with MS excel sheet functions, create formulas, charts and graphs, manipulate data and generate reports
4. Develop a database; create and format tables, queries and reports; enter and modify table data.
5. Develop and deliver business presentations using presentation

Course Out Comes

Units	CO Statement
Unit - I	After studied unit-1, the student will be able to Gained basic knowledge about computer concept and terminology
Unit - II	After studied unit-2, the student will be able to Acquired skills to produce word processing documents
Unit - III	After studied unit-3, the student will be able to Demonstrated basic skills involving MS excel sheet
Unit - IV	After studied unit-4, the student will be able to Acquired skills on data base
Unit - V	After studied unit-5, the student will be able to Enhanced knowledge on business presentation by using presentation software.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I**9 Hours**

Introduction to computer- characteristics of computer- history of computer- computer generation - hardware - software- system software and application software.

UNIT – II**8 Hours**

MS - word processing: starting MS word- ms word environment - working with word documents.

UNIT – III**10 Hours**

Ms excel - ms excel sheet-ms excel environment - working with excel workbook - worksheet-formulas and functions - inserting charts - printing in excel - free worksheet (ms excel)- ms power point - startingms power point - ms power point environment- working with power point - working with different views - designing , presentation & printing in power point.

UNIT – IV**10 Hours**

Programming under a DBMS environment - the concept of the data base management system; data field, records, and files, sorting and indexing data; searching records. Designing queries, and reports; linking of data files ; understanding programming environment in DMBS ; developing menu drive applications in query languages(MS- Access).

UNIT – V**8 Hours**

Electronic commerce - types -advantages and disadvantages - electronic data interchange (EDI) working of EDI- EDI benefits & limitation - future of EDI - FEDI- smart card - smart card application.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Anathishehasaayee	Computer Application in Business and Management	Margam Publication.
2.	leon& Leon	Computer Applications in Business	VjayNicholes imprint pvt.ltd - Chennai.

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	R.K.Taxali,	Pc Software for Windows Made Simple	Tata Mcgraw Hill publications - India 2010
2.	Hebert Schildt	Windows 2000 Programming from the ground up	Tata Mc Graw Edition 2000
3.		ComadexComputer Course Kit, Training Kit For Windows 98/me , word , excel, access 2000 and internet dream tech press.	

E- MATERIALS

www.ggu.ac.in

www.ddegjust.ac.in

www.scribd.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	M	M	M	M	M	M	M
CO2	M	M	M	M	M	M	M	M	M	M
CO3	M	M	M	M	M	M	M	M	M	M
CO4	M	M	M	M	M	M	M	M	M	M
CO5	M	M	M	M	M	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: III

Paper type: Non Major Elective

Paper-1

Paper code: CNCM37

Name of the Paper: General Commercial Knowledge

Total Hours per Week: 2

Credit: 2

Lecture Hours: 30

Course Objective

1. To enable the students to gain basic knowledge of Trade, Commerce and Industry.
2. To learn about different forms of Business Organization.
3. To acquire knowledge about company.
4. To understand basic knowledge about stock exchange.
5. To make the students to know about Trade Association and Chamber of Commerce.

Course Out Comes

Units	CO Statement
Unit - I After studied unit-1, the student will be able to	To gain knowledge about Commerce, Trade, Industry.
Unit - II After studied unit-2, the student will be able to	To learn about Forms of Business organization.
Unit - III After studied unit-3, the student will be able to	To acquire knowledge about Company.
Unit - IV After studied unit-4, the student will be able to	To know about Stock Exchange
Unit - V After studied unit-5, the student will be able to	To impart effective knowledge about Trade association and Chamber of commerce

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I**6 Hours**

Business - Commerce -Industry- Trade - Profession - Meaning-Scope - Importance-Kinds-Economic Basis of Commerce.

UNIT - II**6 Hours**

Forms of Business organization - Sole Trade- Partnership Firm-Features-Merits-Demerits - Co-Operative Societies -Features-Types-Advantages.

UNIT – III**6 Hours**

Joint stock Company-Features-Memorandum and Articles-Contents-Prospectus.

UNIT – IV**6 Hours**

Stock Exchange - Function - Types - Regulation of Stock Exchanges in India.

UNIT-V**6 Hours**

Trade association - Chamber of commerce - Functions - Objectives - Working in India.

Note: Questions in Sec. A, B & C - 100 % Theory.

Text Books:

S.no	Authors	Title	Publishers
1	Ghosh and Bhushan	General Commercial Knowledge	Sultan Chand & Sons, New Delhi.
2.	R.N. Gupta	Business organization & Management	S. Chand & Co. New Delhi.

Reference Books:

S.No	Authors	Title	Publishers
1.	P.N.Reddy&S.S.Gulshan	Commerce - Principles & Practice	S. Chand & Co. New Delhi.
2.	C.D.Balaji&Dr.G.Prasad	Business organization	Margham Publications, Chennai.

Reference journals:

1. Arabian Journal of Business and Management Review,
2. International Public Management Journal,
3. International Small Business Journal,
4. Journal of Business and Psychology,
5. journal of International Management,

E-Materials:

1. E-book Business organization by H. E Morgan
6. Business Organisation - sbpd publication

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	S	S	S	M	S
CO2	S	M	M	S	S	S	S	S	M	S
CO3	S	M	M	S	S	S	S	S	M	S
CO4	S	M	M	S	S	S	S	S	M	S
CO5	S	M	M	S	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper type: Core

Paper-9

Paper code: CCM41

Name of the Paper: Corporate Accounting II

Total Hours per Week: 5

Credit: 4

Lecture Hours: 75

Objectives:

1. To enable the students to acquire knowledge in valuation of shares and goodwill.
2. To enable the students to understand the Liquidation, accounting procedure and various business combinations.
3. To make the students to understand about Mergers and Acquisitions of the company.
4. To learn about accounts of Holding and subsidiary companies.
5. To know about the accounting procedures related to preparation of bank accounts.

Course Out Comes

Units	CO Statement
Unit - I After studied unit-1, the student will be able to	Impart the knowledge of valuing shares and goodwill of the company.
Unit - II After studied unit-2, the student will be able to	Understand the accounting procedures related to Alteration of share capital and Internal Reconstruction.
Unit - III After studied unit-3, the student will be able to	Be acquainted with accounting procedures for Mergers and acquisitions.
Unit - IV After studied unit-4, the student will be able to	Prepare consolidated financial statements of Holding company and its subsidiary companies.
Unit - V After studied unit-5, the student will be able to	Know the accounting procedures related to preparation of bank accounts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I

15 Hours

VALUATION OF GOODWILL AND SHARES

Goodwill-Introduction-Meaning-Definition-Need-Factors Affecting Value of Goodwill-Methods- Average profit method-Weighted Average-Super profit method-Annuity method-Capitalization Method. Shares-Introduction-Meaning-Definition-Need-Factors affecting valuation of shares-Methods-Net asset method-Yield method-Fair value method.

UNIT – II

15 Hours

ALTERATION OF SHARE CAPITAL AND INTERNAL RECONSTRUCTION

Introduction-Meaning-Different kinds of alteration of share capital-Capital reduction-Procedure for reduction of share capital.

UNIT – III

18 Hours

AMALGAMATION, ABSORPTION AND EXTERNAL RECONSTRUCTION:

Amalgamation-Introduction-Meaning (Accounting Standard 14)-Types of amalgamation-Amalgamation in the nature of Merger-In the nature of Purchase-Computation of Purchase Consideration- Entries in the books of the transferor and transferee-Absorption-Meaning-Accounting treatment-External Reconstruction- -Meaning-Accounting treatment (Intercompany holding excluded).

UNIT - IV

HOLDING COMPANIES:

15 Hours

Meaning and definition of Holding and Subsidiary - Capital Profit-Revenue profit-Minority Interest-Goodwill/Capital reserve-- Elimination Of Common Transactions - Unrealised profit - Revaluation of Assets and Liabilities - Bonus Shares -Preparation of consolidated balance sheet (As per Revised Schedule VI).

UNIT - V

BANKING COMPANY ACCOUNTS:

12 Hours

Accounts of Banking Companies - Rebate on bill discounted-Non - Performing assets and their treatment - Provision for doubtful debts- Preparation of profit and loss accounts (Form 'B' of Schedule III) and Balance Sheet (Form 'A' of Schedule III).

TEXTBOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	R.L.Gupta and M.Radhaswamy	Advanced Accountancy	Sultan Chand & Sons- New Delhi.
2.	Shukla MC, Grewal TS & Gupta SC	Advanced Accounts, Vol. II	S. Chand & Company Ltd, New Delhi

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	S.P.Jain and K.L.Narang	Corporate Accounting (Volume II)	Kalyani Publishers- Ludhiana.
2.	T.S.Reddy and A.Murthy	Corporate Accounting (Volume II)	Margham Publications- Chennai.
3.	S.P.Iyengar	Advanced Accountancy (Volume I),	Sultan Chand & Sons- New Delhi.
4.	Dr .R. Rangarajan and Dr. V. Chandrasekaran, S.Viswanathan	Corporate Accounting	(Printers and Publishers) Pvt. Ltd.,-Chennai.

E-Material

1. www.universityofcalicut.info › syl › bcomiisem197

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	M	M	M	M
CO2	S	M	M	S	M	M	M	M	M	M
CO3	S	M	M	S	M	M	M	M	M	M
CO4	S	M	M	S	M	M	M	M	M	M
CO5	S	M	M	S	M	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper type: Core Paper-10

Paper code: CCM42

Name of the Paper: Business Management

Total Hours per Week: 5

Credit: 4

Lecture Hours: 75

Objectives:

1. To familiarize the students with the concepts and principles of management.
2. To provide opportunities to apply the general functions of management in day.
3. To understand the students about organizing and staffing.
4. To acquire knowledge about motivation.
5. To make the students to understand the techniques of control and coordination.

Course Out Comes

Units	CO Statement
Unit - I After studied unit-1, the student will be able to	Knowledge pertaining to Fundamentals of management
Unit - II After studied unit-2, the student will be able to	Knowledge pertaining to develop planning
Unit - III After studied unit-3, the student will be able to	Understand organising and staffing.
Unit - IV After studied unit-4, the student will be able to	Knowledge pertaining to motivation structures.
Unit - V After studied unit-5, the student will be able to	Advanced Programming techniques using control and coordination

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

INTRODUCTION TO MANAGEMENT:

15 Hours

Meaning, Definition, Importance, Nature, Management and administration, Functions of Management. Levels of management, roles of manager, Management as a Science or Art, Contribution to management by F.W. Taylor, Henry Fayol, Elton Mayo, Peter F. Drucker and C. K. Prahalad.

UNIT - II

PLANNING:

15 Hours

Planning - Meaning, Definition, importance, process, types, methods (Objectives- Policies- Procedures - Strategies & Programmes). Obstacles to effective planning. Decision making - Steps, Types, Decision Tree.

UNIT - III

ORGANISING AND STAFFING :

20 Hours

Organization - Importance - Principles of Organisation. Delegation & Decentralization - Departmentation - Span of Management. Organizational structure: line & staff and functional - organizational charts and manual-making organizing effective-Staffing-recruitment -selection-Training, promotion and appraisal.

UNIT - IV

DIRECTING AND MOTIVATING:

15 Hours

Function of directing - Motivation - Theories of motivation (Maslow, Herzberg and Vroom's theories) Motivation techniques. Communication - Function - Process - Barriers to effective communication. Leadership-Definition-Theories and approach to leadership-styles of leadership-Types.

UNIT - V

CO-ORDINATION AND CONTROL:

10 Hours

Meaning, Definition, Nature - Problems of effective coordination. Control - Nature - Basic control process - control techniques (traditional and non-traditional)-Use of Computers in managing information - Concepts of keizen - six sigma.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	C. B Gupta	Business Management	Sultan Chand & Sons, New Delhi.
2.	Dinkarpagare	Principles of management,	Sultan Chand and sons, New Delhi.

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Koontz, O'Donnell, Weirich	Essentials of Management	Tata McGraw Hill Publishing Company Ltd., New Delhi.
2.	Sherlekar&Sherlekar	Principles of Business Management	Himalaya Publishing House, New Delhi.
3.	L.M.Prasad	Principles and Practices of Management	Sultan Chand and sons, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper type: Core Paper-11

Paper code: CCM43

Name of the Paper: Company Law

Total Hours per Week: 5

Credit: 3

Lecture Hours: 75

Course Objective

1. To enlighten the students on the Provisions governing the Company Law.
2. To make the students aware on the recent amendments to Companies Act.
3. To caliburize the students regarding prospectus of the company.
4. To gain knowledge about members of the company.
5. To learn about winding up of company.

Course Out Comes

Units	CO Statement	
Unit - I	After studied unit-1, the student will be able to	To learn about Nature, Scope and Kinds of Company
Unit - II	After studied unit-2, the student will be able to	To gain effective knowledge about Formation of a Company
Unit - III	After studied unit-3, the student will be able to	To effectively impart knowledge about Prospectus of company
Unit - IV	After studied unit-4, the student will be able to	To know about Members of Company
Unit - V	After studied unit-5, the student will be able to	To learn about Directors of Company and Winding up of Company

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	No	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I**15 Hours**

Introduction - Meaning and Definition of a Company - Characteristics of a Company - Advantages - Limitations - Types of Companies - Distinction between a Private Ltd. Company and a Public Ltd. Company.

UNIT - II**15 Hours**

Formation of a Company - Memorandum of Association - Meaning - Contents - Purpose - Articles of Association - Meaning - Contents - Distinction between Memorandum and Articles.

UNIT – III**15 Hours**

Prospectus - Meaning - Requirements of a Prospectus - Objects of Issuing a Prospectus - Contents - Civil and Criminal Liability for mis-statement of prospectus -Statement in Lieu of Prospectus.

UNIT – IV**15 Hours**

Members of a Company - Meaning and Definition - Who can become a Member? - Rights of the Members - Liabilities of the Members - Termination of Membership.

UNIT – V**15 Hours**

Directors of a Company - Definition - Eligibility to become a Director - Number of Directorships - Appointment of Directors - First Directors - Subsequent Directors -Removal of Directors - Powers, Duties and Liabilities of Directors - Winding up of a Company - Meaning - Methods of Winding up.

Note: Questions in Sec. A, B & C - 100 % Theory.

Text Books:

S.no	Authors	Title	Publishers
1	N.D.Kapoor	Company Law	Sultan & Chand, New Delhi.
2.	P.P.S.Gogna	Company Law	S. Chand, New Delhi

Reference Books:

S.No	Authors	Title	Publishers
1.	Dr.N. Premavathy	Company Law	Sri Vishnu Publications, Chennai
2.	Gaffoor and Thothadri	Company Law, 2nd Edition	Vijay Nicholes Imprint Pvt. Ltd., Chennai.
3.	Kathiresan and Radha	Company law	Prasanna Publishers, Chennai.

Related Journals:

1. Intellectual Property Rights,
2. Political Sciences & Public Affairs,
3. Sociology and Criminology,
4. Journal of Corporate Law Studies,
5. Australian Journal of Corporate Law,
6. India Business Law Journal,
7. Corporate and Commercial Law Journals,
8. Journal of Business Law

E-Materials:

1. [ndkapoor company law free download](#)
2. [company law icsi 2019](#)
3. [company law pdf 2017](#)
4. [general principles of company law](#)
5. [company law lpu](#)
6. [mc kuchhal corporate law](#)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	S	M	M
CO2	S	M	M	M	S	M	M	S	M	M
CO3	S	M	M	M	S	M	M	S	M	M
CO4	S	M	M	M	S	M	M	S	M	M
CO5	S	M	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper type: Core Paper-12

Paper code: CCM44

Name of the Paper: Modern Banking

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

Course Objectives

1. To understand the basic Concepts banking
2. To have knowledge about Central Banking
3. To known the SBI
4. To acquire knowledge in development Bank.
5. To acquire the recent trend in e-banking

Course Out Comes

Units	CO Statement
Unit - I After studied unit-1, the student will be able to	The students will be able to acquire the knowledge of different types of banking.
Unit - II After studied unit-2, the student will be able to	The students will be able to know the measures and methods of credit control in central bank.
Unit - III After studied unit-3, the student will be able to	The students will be able to understand the concept of SBI.
Unit - IV After studied unit-4, the student will be able to	The students will be able to study the different types of development banking in India.
Unit - V After studied unit-5, the student will be able to	The students will be able to acquire the new concepts of E-Banking.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

INTRODUCTION:

12 Hours

Brief history of banking - Unit banking - branch banking - structure of Indian financial system - Mixed banking - functions and importance of commercial banks - credit creation of commercial banks.

UNIT - II

CENTRAL BANKING:

10 Hours

Central banking (special reference to India) - functions - measures / methods of credit control - Quantitative and Qualitative credit control measures

UNIT - III

STATE BANK OF INDIA:

10 Hours

State bank of India - Organization - functions - management - Regional Rural Banks (RRBS)

UNIT - IV

DEVELOPMENT BANKING:

12 Hours

Development Banking - Industrial Finance Corporation of India (IFC) - Industrial Credit and Investment Corporation of India (ICICI) - Industrial Development of Bank of India (IDBI)

UNIT - V

E-Banking:

16 Hours

Electronic Banking: Traditional Banking Vs E-Banking-Facets of E-Banking -E-Banking transactions -Automatic Teller Machine (ATM) at home -Electronic Fund Transfer(EFT)-uses - computerization in clearing houses- Tele banking- Banking on home computers -Electronic Money Transfer -uses of EMT.

Text Books

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr.S.Gurusamy	Banking Theory Law and Practice	Vijay Nicole Imprints Pvt's Ltd.,
2.	Dr.V.Balu	Banking and Financial System,	Sri Venkateswara Publications,
3.	B.Santhanam	Banking and Financial System	Sri Margham Publications.
4.	K.P.M.Sundaram and E.N.Sundaram	Modern Banking	Sultan Chand and Sons.
5.	Dr.Gupta	Banking Law and Practice in India	Sahitya Bhawan Publication.

Reference Items:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	O.P.Agarwal,	Modern Banking	Himalaya Publishing house
2.	K.C.Shekher	Banking Theory and Practice,	Vikas Publishing.
3.	A.Gajendran	Banking Law and practice	Vrinda Publications (P) Ltd
4.	D.Muraleedharan	Modern Banking Theory and Practice,	Prentice hall India Learning Private Limited.
5.	S.Natarajan and R.Parameswaran	Indian Banking	S.Chand.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	S	S	M
CO2	S	S	S	M	M	M	M	S	S	M
CO3	S	S	S	M	M	M	M	S	S	M
CO4	S	S	S	M	M	M	M	S	S	M
CO5	S	S	S	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper type: Skill based Subject Paper-2

Paper code: CSCM46

Name of the Paper: E-Commerce

Total Hours per Week: 3

Credit: 2

Lecture Hours: 45

Objectives:

- To impart the students with knowledge of web technology and their role in doing business.
- To gain knowledge on E-Marketing.
- To gain knowledge on E-Payments.
- To caliburize the students regarding Electronic Data Interchanges.
- To help the students to Gain an understanding of the legal frame work of E-commerce.

Course Out Comes

Units	CO Statement
Unit - I After studied unit-1, the student will be able to	To understand the knowledge of E-Commerce.
Unit - II After studied unit-2, the student will be able to	Gaining knowledge on E-Marketing.
Unit - III After studied unit-3, the student will be able to	Know the E-Payment systems.
Unit - IV After studied unit-4, the student will be able to	Knowledge on Electronic Data Interchanges (EDI)
Unit - V After studied unit-5, the student will be able to	Conceive an idea of legal framework for E-Commerce.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

E-COMMERCE – INTRODUCTION:

10 Hours

Introduction to E-Commerce - E-Trade - E-Business -E-Market -Advantages and Disadvantages of E-Commerce - E-Business Models - Introduction to Mobile Commerce.

UNIT - II

E-MARKETING :

9 Hours

E- Marketing -Meaning - Channels- E-Marketing Mix - Web Salesmanship - online shopping avenues- Advertising on Network.

UNIT - III

E-PAYMENT SYSTEM:

10 Hours

E-Payment System- Types- Business Issues and Economic implications - Components of an effective E-Payment System.

UNIT - IV

ELECTRONIC DATA INTERCHANGE:

8 Hours

EDI - Definition - Objectives- Standards -Applicability - Approving authority- Cross Index and related documents.

UNIT - V

LEGAL FRAMEWORK:

8 Hours

Legal Framework for E-Commerce - Net Threats - Cyber Laws - Aims and Salient Features of Cyber Laws in India- Cyber Crimes.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	L.T.Joseph	E-Commerce A managerial perspective	Printice Hall Publications, 2004.

- | | | | |
|----|----------------|-------------------------|-----------------------------|
| 2. | Addison Wesley | Frontiers of E-Commerce | Pearson Publications, 2004. |
|----|----------------|-------------------------|-----------------------------|

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	David Whitley	E-Commerce Strategy, Technology and Application	Tata McGraw Hill Publications, 2004.
2.	Dennis P.Curtin	E-Commerce Principles and Introduction Technology	Tata McGraw Hill Publication, 2004
3.	Greenstein, Feinman	E-Commerce	Tata McGraw Hill Publications, 2001

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	S	M	M
CO2	S	S	M	M	M	M	M	S	M	M
CO3	S	S	M	M	M	M	M	S	M	M
CO4	S	S	M	M	M	M	M	S	M	M
CO5	S	S	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

Semester: IV

Paper type: Non- Major Elective Paper-2

Paper code: CNCM47

Name of the Paper: Advertisement and Salesmanship

Total Hours per Week: 2

Credit: 2

Lecture Hours: 30

Course Objectives

1. To understand the concept of advertising
2. To enable the students to have practical knowledge about advertising agencies
3. To familiarize about recent trends in advertising
4. To have knowledge on fundamental concept of salesmanship
5. To understand the duties and responsibilities of salesmanship

Course Out Comes

Units	CO Statement	
Unit - I	After studied unit-1, the student will be able to	Impart knowledge on advertising
Unit - II	After studied unit-2, the student will be able to	Get familiarized about advertising agencies
Unit - III	After studied unit-3, the student will be able to	Get familiarized about recent trends in advertising
Unit - IV	After studied unit-4, the student will be able to	Acquired knowledge on fundamental concept of salesmanship
Unit - V	After studied unit-5, the student will be able to	Impart knowledge on duties & responsibilities of salesmanship

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I**6 Hours**

Definition of Advertising- Origin and Development of Advertising -Objectives -Nature-Scope of Advertising- -Functions -Types -Benefits.

UNIT – II**6 Hours**

Advertisement copy - Advertising media- Advertising Agencies.

UNIT - III**6 Hours**

Recent trends in advertising - Economic aspects of Advertising- Social and Ethical aspects of Advertising.

UNIT - IV**6 Hours**

Definition of Salesmanship -Features -Objectives- Recruitment of a salesman- Qualities of Good Salesman.

UNIT – V**6 Hours**

Advantages of Salesmanship- Distinction between Salesmanship and Advertising- Types of Salesmanship- Functions, Duties and Responsibilities of a Salesmanship.

Text Books:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	R.S.N. Pillai&Bagavathi	Modern Marketing (Principles and Practices)	S. Chand & Co. New Delhi
2.	S Rajkumar, V Rajagopalan	Sales and Advertisement Management	S. Chand & Company Pvt. Ltd.
3.	Sahu and Raut	Salesmanship and Sales Management	Vikas Publishing House, Chennai.
4.	CL Tyagi & Arun Kumar	Sales Management	Atlantic publishers.

Reference Books:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Chunawalla K.C. Sethia	Advertising (Principles and Practices)	Chunawalla K.C. Sethiax
2.	Dr. M.M. Varma, R. K. Agarwal	Advertising Management	Forward 300K Depot, New Delhi.
3.	Mahendra Mohan	Advertising Management	Tata Mcgraw-hill Publishing Company Limited, New Delhi, India.
4.	G.R. Basotia N. K Sharama	Advertising Marketing and Sales Management	Mangal Deep Jaipur.
5.	Dr. K. Sundar	Essentials of Marketing	Vijay Nicholes Imprint Pvt. Ltd., Chennai.

E- MATERIALS

www.slideshare.net

www.himpub.com

www.ves.ac.in

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	M	S	M	M
CO2	S	S	S	S	M	M	M	S	M	M
CO3	S	S	S	S	M	M	M	S	M	M
CO4	S	S	S	S	M	M	M	S	M	M
CO5	S	S	S	S	M	M	M	S	M	M

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Core Paper-13

Paper code: CCM51

Name of the Paper: COST ACCOUNTING-I

Total Hours per Week: 6

Credit: 4

Lecture Hours: 90

Course Objectives

1. To understand the basic concepts and methods of Cost Accounting.
2. To enable the students to learn the various methods of cost elements.
3. To understand the basic concepts and processes used to determine product costs.
4. To be able to interpret cost accounting statement.
5. To be able to analyze and evaluate information for cost ascertainment, planning, control and decision making.

Course Outcomes

1. After studied unit-1, the student will be able to understand the Nature and Scope of Cost Accounting, and Computation of Cost Sheet and Tenders.
2. After studied unit-2, the student will be able to learn the preparation of Material Purchase and Control.
3. After studied unit-3, the student will be able to impart knowledge about Methods of pricing of Material Issues.
4. After studied unit-4, the student will be able to study about preparation of Labour Cost Control.
5. After studied unit-5, the student will be able to gain knowledge about Distribution of Overheads.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes

3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I

10 Hours

NATURE AND SCOPE OF COST ACCOUNTING

Cost Accounting: Nature and Scope - Objectives, Advantages and Limitations - Financial Vs. Cost Accounting - Costing System - Types of Costing and Cost Classification - Cost Sheet and Tenders - Cost Unit - Cost Centre and Profit Centre.

UNIT-II

15 Hours

Material Purchase and Control

Purchase Department and its Objectives - Purchase Procedure - Classification and Codification of Materials, Material Control: Levels of Stock and EOQ - Perpetual Inventory System, ABC and VED Analysis - Accounting of Material Losses.

UNIT-III

20 Hours

Methods of pricing of Material Issues

Cost Price Methods: FIFO, LIFO, Average Price Methods: Simple and Weighted Average Price Methods, Notional Price Methods: Standards Price, and Market Price Methods

UNIT – IV

25 Hours

Labour Cost Control

Labour Turnover: Causes, Methods of Measurement and Reduction of Labour Turnover - Idle and Over Time - Remuneration and Incentive: Time and Piece Rate - Taylor's, Merricks and Gantt's Task - Premium Bonus System - Halsey, Rowan and Emerson's Plans - Calculation of Earnings of Workers.

UNIT-V

20 Hours

Overheads

Classification of Overhead Costs -Departmentalization of Overheads - Allocation Absorption and Apportionment of Overhead Costs - Primary and Secondary Distribution of Overheads - Computation of Machine Hour Rate and Labour Hour Rate.

Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.

TEXT BOOKS:

S.no	Authors	Title	Publishers
1	S.P.Jain and Narang	Cost Accounting	Kalyani Publishers, New Delhi
2.	T.S. Reddy & Hari Prasad Reddy	Cost Accounting	Margham Publications, Chennai.
3.	S.P. Iyengar	Cost Accounting	Sultan Chand & Sons, New Delhi.
4	Manosh Dutta	Cost Accounting	Dorling Kindersley (India) Pvt. Ltd, 2010
5	A. Murthy and S. Gurusamy,	Cost Accounting	Vijay Nicole Imprints Private Ltd., Chennai.
6	Khanna B.S.Pandey I.M., Ahuja G.K., and Arora M.N	Practical Costing	S. Chand & Sons
7	Arora M.N	Cost Accounting	S. Chand & Sons
8	R.S.N. Pillai & Bhagavati	Cost Accounting	S. Chand & Sons
9	Bhabatosh Banerjee	Cost Accounting – Theory & Practices	Sultan Chand & Sons
10	V.KSaxena ,C.D Vashist,	Cost Accounting problems and solutions	Sultan Chand & Sons

REFERENCE BOOKS:

S.No	Authors	Title	Publishers
1.	Tulsian	Cost Accounting	Tata McGraw Hills.
2.	S.N.Maheswari	Principles of Cost Accounting	Sultan Chand & sons, New Delhi
3.	ManashDutta,	Cost Accounting	Pearson Education (Singapore) Pvt. Ltd, Second Edition Print, 2005
4	M.C. Shukla, T.S. Grewal, Dr.M.P.Gupta,	Cost Accounting	S.Chand& Company Ltd, 2010.
5	Reddy and Murthy	Cost Accounting	Margham Publications
6	Inamdar, S. M. (Satish Inamdar)	Cost & Management Accounting	Everest Publishing House
7	Kishore, R. M.	Cost & Management Accounting	Taxman Allied Service
8	V.KSaxena ,C.D Vashist,	Advanced Cost & Management Accounting	Sultan Chand & Sons
9	Jawaharlal	Cost Accounting	MC Graw Hill
10	M.E. Thukaram Rao	Cost and Management Accounting	New Age International

Reference Journal

1. Business and Economics Journal,
2. Global Economics,
3. Accounting & Marketing,
4. Accounting Research Journal,
5. Asian Review of Accounting,
6. Asia-Pacific Journal of Accounting and Economics,
7. Journal of Accounting and Organizational Change,
8. Journal of Contemporary Accounting and Economics

E- Materials

1. www.icwai.org
2. www.nasbaregistry.org.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Core Paper-14

Paper code: CCM52

Name of the Paper: PRACTICAL AUDITING

Total Hours per Week: 5

Credit: 4

Lecture Hours: 75

Course Objectives

1. Understand the meaning, types of audit, and difference between auditing and book keeping.
2. Know the meaning of internal control, internal check and audit.
3. Identify different types of vouchers.
4. Understand qualification, Duties, Rights, and different types of auditors.
5. Identify Meaning, Features & Qualifications of Cost and Management auditor and audit reports.

Course Out Comes

1. After studied unit-1, the student will be able to acquire the basic concepts of auditing.
2. After studied unit-2, the student will be able to learn the meaning and importance of internal audit, internal check and control.
3. After studied unit-3, the student will be able to understand the verification of vouchers and vouching.
4. After studied unit-4, the student will be able to study the auditor's appointment, removal, qualification and disqualification.
5. After studied unit-5, the student will be able to identify the auditor's reports and its kinds.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	NO
5	Yes	Yes	Yes	Yes	Yes	NO

UNIT-I

15 Hours

INTRODUCTION

Meaning and Definition of Auditing - Nature and Scope of Auditing - Accountancy and auditing, Auditing and Investigation - Objectives of auditing - Limitations of audit - Advantages of audit - classification of audit.

UNIT-II

15 Hours

AUDIT PROGRAMME AND INTERNAL CONTROL

Meaning and definition of audit program - Advantage and disadvantage - audit file, audit note book, audit working papers - purposes and importance of working papers - Internal check - meaning, objectives of Internal check - features of good Internal check system - Internal Control - meaning, objectives and features of good Internal control.

UNIT-III

15 Hours

VOUCHING

Vouching - meaning of vouching - Importance - objects - Vouching of cash transactions - Verification of assets and liabilities - meaning of verification - objectives - Distinction between vouching and verification - distinction between Valuation and Verification.

UNIT-IV

15 Hours

COMPANY AUDITORS

Company auditors - Qualification and Disqualification of an auditor - Appointment and Removal of an auditor - Powers and Duties of auditors - Liabilities of an auditor

UNIT-V

15 Hours

AUDITOR'S REPORT

Auditor's Report - Importance of auditor's report - contents of audit report - Kinds of reports.

Text Books

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	B.N. Tandon	A hand book of practical Auditing.	S.Chand
2.	T.R.Sharma	Auditing	SahityaBhavan, Agra.
3.	B.N.TandonSudharsanam, Sundharababu	Practical Auditing	S.Chand,.
4.	Dr.K.Sundar and K.Parri	Practical Auditing	Vijay Nicole Imprints Pvt., Ltd.,
5.	S.K.Basu	Auditing and Principles and Techniques	Pearson
6	B.N. Tandon	Practical Auditing	S. Chand.
7	Dr.Premavathy	Auditing	Vishnu Publications
8	Dinkarpagare	Principles and practice of auditing	Sultan Chand & Sons
9	Raymond J.Noss	Practical auditing technichs	Iunivers
10	B.N Tandon	The handbook of practical auditing	S.chand

Reference Books:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr.L.Natarajan	Practical Auditing	Margham Publications
2.	Kamal Gupta and Ashok Arora	Fundamentals of Auditing	Tata Mc.,Graw Hill.
3.	R.G.Saxena.	Auditing	Himalaya Publishing House
4.	S.N.Maheshwari	Banking Theory , law and practice	Kalyani Publications.

5	S. Vengadaman	Practical Auditing	Margham Publication.
6	B.N .Tandon	Practical auditing for ug courses for madrassuniversity	S.chand
7	Dr.Natarajan	practical auditing	Margam
8	A.Jesentha Rani	Practical auditing	Charulatha
9	George Benton Renn	Practical auditing	Kessinger
10	Dr.R.NSengupta	Practical guide to auditing	New central book house

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Core Paper-15

Paper code: CCM53

Name of the Paper: MANAGEMENT ACCOUNTING

Total Hours per Week: 6

Credit: 5

Lecture Hours: 90

Course Objective

To introduce students to the various tools and techniques of management Accounting.

1. To enlighten students on Financial Statement Analysis with the emphasis on the preparation of fund flow and cash flow statement.
2. Is to impart knowledge of financial statements and their analysis and interpretations.
3. To emphasize on application of theoretical knowledge and help managers in decision making.
4. To familiarize the students with managerial financial decisions which are taking place in organizations.
5. To acquire the importance of financial information on decision making process.

Course Out Comes

1. After studied unit-1, the student will be able to learn the preparation of Financial Statement Analysis.
2. After studied unit-2, the student will be able to gain effective knowledge about Ratio Analysis
3. After studied unit-3, the student will be able to impart knowledge about Fund Flow and Cash Flow Analysis.
4. After studied unit-4, the student will be able to study about Marginal Costing techniques.
5. After studied unit-5, the student will be able to know about the preparation of Budget and Budgetary Control

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I

10 Hours

Management Accounting: Definition - objectives - Functions - Advantages and limitations - Financial Statement Analysis - Comparative and Common size statements - Trend Analysis.

UNIT-II

20 Hours

Ratio Analysis: Definition - Significance and Limitations - Classification - Liquidity, Solvency, Turnover and Profitability ratios - Computation of Ratios from Financial Statements - Preparation of Financial Statement from Ratios.

UNIT-III

20 Hours

Fund Flow and Cash Flow Analysis: Concept of Funds, Sources and Uses of Funds - Fund Flow Statement - Concept of Cash Flow - Cash Flow Statement as Per AS3.

UNIT-IV

20 Hours

Marginal Costing: Definition - Advantages and Limitation - Break Even Point - Margin of Safety - P/V Ratio - Key factor - Make or Buy Decision - Selection of Product Mix - Changes in Selling Price - Foreign Market Offer - Desired Level of Profit.

UNIT-V

20 Hours

Budget and Budgetary Control: Definition - Objectives - Essentials - Uses and Limitations - Preparation of Material Purchase, Production, Sales, Cash and Flexible Budget - Zero Base Budgeting.

Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1	S.N. Maheswari	Management Accounting	Sultan Chand & Sons, New Delhi.
2.	T.S. Reddy & Hari Prasad Reddy	Management Accounting	Margham Publications, Chennai.
3	M Y Khan, PK Jain	Management Accounting	Tata McGraw hill, Fourth Edition, 2003
4	I.M. Pandey,	Management Accounting	Vikas Publishing, third Edition, 2006
5	A.R. Ramanathan, N.L. Hingorani, T.S. Grewal	Management Accounting	Sultan Chand & sons, 5th Edition. 2003
6	M.E. Thukaram Rao	Management Accounting	New Age International
7	M.E. Thukaram Rao	Cost and Management Accounting	New Age International
8	A. Murthy & S. Gurusamy,	Management Accounting	Vijay Nicole Imprints Private Ltd., Chennai.
9	V.K. Saxena & C.D. Vashist	Advanced Cost & Management Accounting – Problems & Solutions	Prentice Hall of India (P) Ltd.
10	R.S.N. Pillai & Bhagavati	Management Accounting	S. Chand

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr.S.P.Gupta & Dr.K.L.Gupta	Management Accounting	Sathiya Bhavan Publications
2.	S.P.Gupta	Management Accounting	Sultan Chand & Sons, New Delhi.

3	T.S.reddy&Dr. Hariprasadreddy,	Y. Management Accounting	Margham Publications, Fifth revised Edition, 2014
4	Kulkarni, M. A.	Management Accounting	Career
5	Rao, A. P.	Management Accounting	Everest Publishing House
6	Drury, Colin	Management & Cost Accounting	Thompson Books
7	Hornngren, C. T/ Sundem, G. L/ Stratton, W. O	Introduction To Management Accounting	Pearson Education
8	Ghosh, T. P.	Financial Accounting For Managers	Taxman Allied Service
9	Kishore, R. M.	Cost & Management Accounting	Taxman Allied Service
10	Patankar, Sanjay	Text Book Of Management Accounting	NiraliPrakashan Pune

Reference Journal

1. The Chartered Accountant Monthly
2. Journal of Human Values Three time in Year
3. Indian Journal of Marketing Monthly
4. Abhigyan: Journal of Management Monthly
5. Smart Manager Quaterly
6. IUP Journal of Operation Management Quaterly
7. IUP Journal of Business Strategy Quaterly
8. IUP Journal of Management Research Quaterly
9. Prabandhan: Indian Journal of Management Monthly
10. Arthashastra: Indian Journal of Economics & Research Monthly
11. India Green File Monthly
12. Management and Change

E- Materials

1. Indian institute of materials management
2. association for healthcare resource & materials management (AHRMM)
3. management accounting
4. material management
5. introduction to management accounting
6. functions of material management

7. cost and management accounting
8. <https://www.freebookcentre.net/business-books-download/Management-Accounting.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Core Paper-16

Paper code: CCM54

Name of the Paper: INCOME TAX LAW AND PRACTICE I

Total Hours per Week: 6

Credit: 4

Lecture Hours: 90

Course Objectives

1. To acquire Knowledge of Different Income Tax Concepts
2. The Main Objective of Taxation is Economic Development
3. To Overcome the Scarcity of Capital, Taxes are regarded as effective means to Control Inflation
4. To Control Cyclic Fluctuations
5. Reduction of Balance of Payments Difficulties

Course Out Comes

1. After studied unit-1, the student will be able to understand the basic level of Income tax Act.
2. After studied unit-2, the student will be able to know the tax calculation on house property income
3. After studied unit-3, the student will be able to achieve knowledge on tax calculation of salaried people.
4. After studied unit-4, the student will be able to obtain knowledge on income tax of business/ professional income.
5. After studied unit-5, the student will be able to understand the administrative set up of income tax department and their powers

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I

15 Hours

INTRODUCTION

Income Tax Act 1961- Basic Concepts - Assessment Year - Previous Year - Person -Assessee- Income - Agricultural Income - Capital and Revenue Receipts - Capital and Revenue Expenditures - Exempted Incomes u/s 10.

Residential status of an individual- Residential status of a HUF - Residential status of a firm and association of persons - Residential status of a company - incidence of tax liability.

UNIT- II

15 Hours

INCOME FROM HOUSE PROPERTY

Annual value - Determination of annual value- Income from let out house property - Income from self-occupied house property - Deductions allowed from Income from house property u/s 24.

UNIT- III

30 Hours

SALARIES

Meaning and features of Salary - Allowances - Perquisites - Profits in lieu of Salary - Provident Fund and its types - payments exempted u/s 10: Leave travel concession; gratuity; pension; leave encashment; retrenchment compensation; VRS - Deductions from salary: EA and professional tax- deduction u/s 80C- taxable salary

UNIT – IV

20 Hours

PROFIT AND GAINS OF BUSINESS OR PROFESSION AND DEPRECIATION

Meaning of business and profession - deductions expressly allowed - expenses expressly disallowed - treatment/ admissibility of certain expenses and incomes - income from business- income from profession-Meaning of depreciation - conditions for depreciation - actual cost - written down value- computation of allowable depreciation.

UNIT- V

10 Hours

INCOME TAX AUTHORITIES

CBDT - powers - Director General of income tax - Chief commissioner of income tax - Assessing officer - appointment - Jurisdiction - powers relating to search and seizure.

Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Gaur &Narang	Income Tax Law & Practice	Kalyani Publishers
2.	Dr. A. Murthy	Income Tax Law & Practice	Vijay Nicole Imprints Pvt.Ltd. Chennai
3.	Reddy,T.S.&Haripr asadReddy,	Income Tax Theory, Law& Practice	Margham Publications, Chennai.
4.	V.B. Gaur &Narang	Income Tax Law And Practice	Kalayani Publishers,2001
5.	DrVinod K. Singhania	Income Tax Law And Practice	Taxmann Publications Pvt. Limited, 2005.
6.	T.N.Manoharan&H. R.Hari	Taxation	Ankit thakkar for snow white publication pvt ltd
7.	A.Murthy	Income Tax Law And Practice	Vijay Nicole
8.	N.Hariharan	Income Tax Law And Practice	Mc grew hill
9.	T .Srinivasan	Income Tax Law And Practice	Vijay Nicole
10.	Rajavelu	Income Tax Law And Practice	S.V.P publications

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Mehrotra	Income Tax Law & Accounts	Sahithiya Bhavan Publications
2.	Vinod, K. Singhania	Students Guide to Income Tax	Taxman Publications Pvt. Ltd
3.	Anita Raman	Income Tax Law & Practice	McGraw Hill
4	V. Bala Chandran, S. Thothadri,	Taxation Law and Practice	Published by Asoke K. Ghosh, PHI Learning Private Limited, Volume 1, 2003
5	V.P Gaur	Income tax law & practice	Kalyani
6	Dr. H. C. Mehrotra	Taxation law and practice	Sathiyabhawan
7	M. Jeevarathinam	Income tax law & practice	Winners wisdom
8	Expert Teacher	Taxation law and practice	Sathish and brothers
9	G.S. Mitra	Income tax law & practice	Mahaveer publication
10	Dr. R. K. Jain	Taxation law and practice	SPBD publication

Reference Journal

1. Indian Journal of Tax Law
2. Taxman.com/Journal
3. Vision Journal of Indian Taxation
4. Income Tax Reports, Company Law, Institute of India Pvt Ltd, Chennai

E- Materials

1. GST and Income Tax Fortnightly E Magazine
2. Capital Gain Clear Tax
3. India filing.com
4. Clear Tax.in
5. Income Tax Management.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Elective Paper-1

Paper code: CECM55A Name of the Paper: ENTREPRENEURIAL DEVELOPMENT

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

**INTERNAL ELECTIVE
(to choose one out of 3)
PAPER - 1**

Course Objectives

1. To make and create interest among the students to become an Entrepreneur.
2. To facilitates the students to avail the incentives and schemes available for MSMEs.
3. To Promote first generation Businessman and Industrialists
4. To promote self employment Tendencies
5. To provide knowledge about Government Plan and Programmes

Course Outcomes

1. After studied unit-1, the student will be able to understand the basic concepts and theories of entrepreneurship.
2. After studied unit-2, the student will be able to exemplify knowledge on course contents, curriculum and constraints of EDP.
3. After studied unit-3, the student will be able to conceive business ideas and convert them into business projects.
4. After studied unit-4, the student will be able to become familiar with institutions support various forms of assistances and subsidies.
5. After studied unit-5, the student will be able to learn the MSMEs schemes provided to budding entrepreneurs

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	NO
3	Yes	Yes	Yes	Yes	Yes	Yes

4	Yes	Yes	Yes	Yes	Yes	NO
5	Yes	Yes	Yes	Yes	Yes	NO

UNIT- I

15 Hours

INTRODUCTION

Entrepreneurship: Meaning- Nature-Importance-Theories- Entrepreneur: Meaning-Definition- Characteristics-Qualities-Types and Roles of an Entrepreneur-Entrepreneur vs Intrapreneur-Factors Promoting an Entrepreneur - Women Entrepreneur-Problems of Women Entrepreneurs - Role of entrepreneurs in India's Economic Development

UNIT- II

10 Hours

ENTREPRENEURSHIP DEVELOPMENT PROGRAMMES

Meaning-Needs-Objectives -Course Contents and Curriculum-Phases of EDP-Problems and Constraints of EDP- Organisations providing Entrepreneurship Development Programmes.

UNIT- III

13 Hours

NEW VENTURE

Meaning - Promoting New Venture -Sources of Business Ideas - Idea Generation Techniques- Project Identification-Project Selection.- Procedures to Start a New Venture- Project : Meaning- Types-formulation of Project report -Project Appraisal- Network Analysis.

UNIT- IV

12 Hours

INSTITUTIONAL SUPPORT AND SUBSIDIES

Sources of Raising Funds for an Entrepreneur- Need for Institutional Finance- Various Institutions supporting Entrepreneurial growth - Incentives and Subsidies: Meaning-Needs-Incentives and Subsidies available to Entrepreneurs0- DIC- Industrial Estates

UNIT- V

10 Hours

MICRO , SMALL AND MEDIUM ENTERPRISES (MSMES)

Introduction- Classification of Enterprises- Memorandum of MSMEs-Registration of MSMEs- MUDRA Scheme, Prime Minister's Employment Generation Programme (PMEGP), STAND-UP INDIA and START-UP INDIA: Objectives-Purpose-Loan facilities available-Applying Procedures.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr.S.S Khanka	Entrepreneurial Development	Sultan chand company Ltd.
2.	AbhaJaiswal	Micro Small & Medium Enterprises Development Act, (Law, Policies & Incentives),	Bharat Law House Pvt. Ltd
3.	C.S.V. Murthy	Entrepreneurial Development	Himalaya publishing house, 2015.
4	Dr.S.S. Khanka	Entrepreneurial Development	S. Chand & Company (pvt).Ltd, 2014
5	Sami Uddin	“Entrepreneurial development in India	Mittal Publications, First Edition, 1989.
6	Taneja	Entrepreneurial Development	Galgotia
7	Annie Stephan	Entrepreneurial Development	S.Chand
8	S.A kumar	Entrepreneurial Development	New Age International
9	S.S Kanka	Entrepreneurial Development	S.Chand
10	N.P.Srinivasan	Entrepreneurial Development	S.Chand

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Vasant Desai	Small-Scale Industries and Entrepreneurship	Himalaya Publishing House, 2017
2.	Prasanna Chandra	Project Preparation , Appraisal, Implementation	Tata McgrawHill, New Delhi.
3.	G.N.Pande	A Complete Guide To Successful Entrepreneurship-	VikasPublishingHouse,

			New Delhi
4.	C B Gupta &Srinivasan	Entrepreneurship Development in India	Sultan Chand.
5.	A Gupta	Indian Entrepreneurial Culture	New Age International.
6	H.Shaw	The Global Entrepreneurs	R Publication
7	Vandana Gupta	Entrepreneurship Development in India	Technical Publication
8	CharantimathiPoornima .M	Entrepreneurship Development in India	S.Chand
9	Ca.DrAbhamathur	Entrepreneurship Development in India	S.Chand
10	C.A.Gupta	Entrepreneurship	Pearson

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Elective Paper-1

Paper code: CECM55B

Name of the Paper: BUSINESS ENVIRONMENT

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

**INTERNAL ELECTIVE
PAPER - 2**

Course Objectives

1. The basic objective of the course is to develop understanding and provide knowledge about business environment to the commerce students.
2. To understand the fundamentals of Business Environment
3. To promote basic understanding on the Economic environment of business.
4. The provide knowledge about the political environment of business.
5. To know the Social Environment of business.

Course Outcomes

1. After studied unit-1, the student will be able to know the concept of external, micro macro of business environment.
2. After studied unit-2, the student will be able to study the economic policies and conditions in India.
3. After studied unit-3, the student will be able to understand the concept of natural and technological environment.
4. After studied unit-4, the student will be able to acquire the knowledge of social environment and consumer protection.
5. After studied unit-5, the student will be able to study the concept of globalization of Indian business.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	NO
3	Yes	Yes	Yes	Yes	Yes	NO
4	Yes	Yes	Yes	Yes	Yes	NO
5	Yes	Yes	Yes	Yes	Yes	NO

UNIT-I**15 Hours****INTRODUCTION**

An overview of Business environment- types -Internal and External, Micro and Macro - Environmental Analysis and strategies management -Techniques of environmental analysis - steps and approaches.

UNIT-II**10 Hours****ECONOMIC ENVIRONMENT OF BUSINESS**

Significance and elements of economic Environment, economic systems and business environment, Economic planning in India, Government policies - Industrial policy.

UNIT-III**13 Hours****POLITICAL AND LEGAL ENVIRONMENT OF BUSINESS**

Monopoly and Restrictive Trade Practices (MRTP) Act, Foreign Exchange Management Act (FEMA), Consumer Protection Act, Patent Laws.

UNIT-IV**12 Hours****SOCIO, CULTURAL & INTERNATIONAL ENVIRONMENT**

Social responsibility of business, Characteristics, Components, Scope, relationship between society and business, Socio-cultural business Environment, Social Groups, World Trade Organisation (WTO), International Monetary Fund (IMF), Foreign Investment in India

UNIT-V**10 Hours****TECHNOLOGICAL ENVIRONMENT**

Concept, Online Channels, Online Services, Advantage of Online services, E-commerce, Indian conditions of E-commerce and Franchise.

Text Books:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Francis Cherunilam	Business Environment	Himalaya Publishing House,
2.	K.Aswathappa	Business Environment	Himalaya Publishing House,
3.	Dr.S.Sankaran	Business Enironment	Margham Publication
4.	Sheik Saleem	Business Environment	Pearson Education.
5.	Dr.N.Premavathy	Business Environment	Sri Vishnu Publications
6	Suresh Bedi	Business Environment,	Pearson
7	Shaikh Saleem	Business Environment,	McGraw Hill International Books Co.,
8	Paul	Business Environment	McGraw Hill International Books Co.,
9	Justin Paul	Business Environment text and cases	McGraw Hill International Books C
10	Dr.Amit Kumar	Business Environment	Sahithyabhawan publications

References Books:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Keith Davis William, C.Frederik,	Business and Society,	McGraw Hill International Books Co.,
2.	Dr.M.Dhanabhakym and M.Kavitha	Business Environment	Vijay Nicole Imprints, Pvt., Ltd.,
3.	Pailwar.V.K	Business Environment	Prentice Hall India LearningPvt.,Ltd.,
4.	SarojUpadhyay	Business Environment,	Asian Books Pvt.,Ltd.,
5.	PankajMehra	Aspects of Business Environment	Omega Publication.

6	FRANCIES CHERUNITAM	Business Environment, Text and cases	Himalaya
7	DR.V.C SINHA	Business Environment,	Sanjay
8	MUKESH TREHAN	Business Environment,	EMINANCE IN EDUCATION
9	VEENA KESHAW PAILWAR	Business Environment,	PHI
10	ALOK GOYAL	Business Environment,	VK

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Elective Paper-1

Paper code: CECM55C Name of the Paper: MANAGEMENT INFORMATION SYSTEM

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

**INTERNAL ELECTIVE
PAPER - 3**

Course Objectives

1. To have knowledge on fundamental principles of management information system
2. Relate the basic concepts and technologies used in the field of management information system
3. Compare the process of developing and implementing information systems
4. To enable students to understand computer and information processing
5. Apply the understanding of how various information systems like DBMS work together to accomplish the information objectives of an organization

Course Out Comes

1. After studied unit-1, the student will be able to understand the fundamental principles of MIS
2. After studied unit-2, the student will be able to basic knowledge about Concepts and Technologies used in MIS
3. After studied unit-3, the student will be able to acquired knowledge on process of developing and implementing information system
4. After studied unit-4, the student will be able to impart knowledge on Information Processing
5. After studied unit-5, the student will be able to enhanced knowledge on DBMS.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I**13 Hours**

Definition- Management Information System - MIS Support for Planning, Organizing and Controlling - Structure of MIS- Information for Decision Making

UNIT - II**12 Hours**

Concept of System - Characteristics of System - System Classification - Categories of Information System - Strategic Information System and Competitive advantage.

UNIT - III**13 Hours**

System Analysis and Design -SDLC- Role of System - Analyst- Functional Information System - Personnel ,Production, Material, Marketing.

UNIT - IV**12 Hours**

Computer and Information Processing - Classification of Computer - Input Devices- Storage Devices - Batch and Online Processing- Hardware - Software - Database Management Systems.

UNIT -V**10 Hours**

Development - Maintenance of MIS- Operations of manual information system- Role of Computer In MIS - Data Base Concept - Expert System - System Audit.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Kenneth Claudo and June P Laudon	Management Information System	Prentice Hall of India
2.	M. Assam	Fundamentals of Management Information system	Fundamentals of Management Information system
3.	Jawadekar W.S	Management Information System	Tata McGraw Hill Publishing Company Ltd., 2002.

4	Mudrick& Ross	Management Information System	Prentice- Hall of India
5	Sadagopan	Management Information System	Prentice Hall of India
6	Murthy CSV	Management Inforation System	Himalaya Publishing House
7	Jayant Oke	Management Inforation System	Niraliprakaash
8	Jane P.LaudonKeneethC.Laudon	Management Inforation System	Pearsons
9	Ramesh Behl	Management Inforation System	Mc.Graw Educations
10	A.K. Gupta	Management Inforation System	Mc.Graw Educations

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Rahul De	Management Information System	Ocean Book House
2.	Jane Laudonkennelth	Management Information System	Pearson Education
3.	V.S Bagad	Management Information System	Technical Publication
4	P.C.Reddy	Management Information System	Vikas Publishing Pvt. Ltd.
5	NirmalaBagchi	Management Information System	Vikas Publishing Pvt. Ltd.
6	Ramesh Chandra	Management Information System	KalpazPublishng
7	Sahilraj	Management Information System	Pearson Education
8	My.Kamat	Information System Of Management	Pointer
9	AshimaBhatnagar	Information System Of Management	Jsr Publication
10	L.M Prasad	Information System Of Management	S.Chand

E-MATERIALS:

www.dbtra.com
www. itword.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: V

Paper type: Skill Based Subject Paper-3

Paper code: CSCM56

Name of the Paper: PRINCIPLES OF MARKETING

Total Hours per Week: 3

Credit: 2

Lecture Hours: 45

PAPER - 3

Objectives

1. To enable the students to understand the elements of Marketing Mix and bases for Market segmentation
2. To make him to appreciate the need for marketing science in the modern business world.
3. To identify the elements of a customer driven marketing strategy
4. To understand the behavioural concepts relevant to marketing
5. To fix the goals of marketing

Course Outcomes

1. After studied unit-1, the student will be able to know the basic principles and practices of marketing.
2. After studied unit-2, the student will be able to be aware of the importance of products, standards of branding, packing and quality management.
3. After studied unit-3, the student will be able to understand the pricing mechanism of marketing.
4. After studied unit-4, the student will be able to know the basic aspects of the channels of distribution and buyers' behaviours.
5. After studied unit-5, the student will be able to articulate sales Promotional techniques used in modern marketing.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	NO
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	yes
5	Yes	Yes	Yes	Yes	Yes	NO

UNIT – I

9 Hours

INTRODUCTION

Market- Meaning- Definition- Classification of markets. Marketing - Meaning - Definition- Evolution - Approaches - Modern marketing concepts - Marketing Mix with Extended 7Ps and 10 Ps- Meaning-Concepts - Role of Marketing in Economic Development-Market Segmentation- Definition -Requirements -Bases for Market Segmentation.

UNIT- II

9 Hours

PRODUCT

Meaning- Features-Classification of products- Product Mix- Product Innovation-New Product Development-Product Life Cycle- Branding- Meaning- Advantages and Limitations. Packaging - Meaning - Kinds - Labelling - Meaning- Advantages and Limitation.

UNIT – III

9 Hours

PRICING

Price - Meaning - Pricing- Importance - Objectives- Factors affecting pricing decisions Pricing Policies- Procedure for price determination- Kinds of Pricing.

UNIT- IV

9 Hours

DISTRIBUTION CHANNELS

Meaning-Importance-Marketing and Distribution- Middlemen in distribution -Function and Kinds of Middlemen - Agents and Merchant Middlemen-Wholesalers -Types - Services rendered by wholesalers - Retailers- Types - Requisites - Services rendered by retailers- Introduction to Supply Chain and Logistic Management - Introduction to Networking Marketing and Niche Marketing.

UNIT- V

9 Hours

PROMOTION

Sales Promotion - Personal Selling - Meaning - Purpose - Types - Advantages - Limitations - Factors to be considered on Personal Selling. Advertising- Meaning and definition- Medias - Advantages- Limitations -Advertising copy -Definition - Elements of an Advertisement copy - Introduction to Cinema Advertising, Social Media Advertising, Web Advertising, and Mobile Advertising.

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	R.S.N.Pillai&Bagavathi	Modern Marketing principles & practices	S. Chand & co ltd., New Delhi.
2.	Gary Armstrong & Philip Kotler	Marketing an Introduction	PearsonPrentice Hall, New Delhi.
3	Philip kotler ,GrayAmstrong	Principles of Marketing	Pearson Education
4	Pooja Jain,Dr.MehaSimbal	Principles of Marketing	Chengage Book House
5	Jim Blythe	Principles of Marketing	Sage Publisher
6	David Jobber	Principles of Marketing	Mc.Graw Educations
7	Amit Kumar	Principles of Marketing	SahityaPublication
8	Adrianpalmer	Principles of Marketing	Mc.Graw Educations
9	Maharajan	Principlesof Service Marketing	Vikas Publishing Pvt. Ltd.
10	Pride,Ferrell	Principles Of Marketing	Chengage Book House

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Stanton William CherlesFutrell	Fundamentals of Marketing	TataMc Grew Hill, New Delhi.
2.	Dr.Rajan Nair &SanjithR Nair	Marketing	S. Chand & co ltd, New Delhi.
3.	Edward W Cudiff	Fundamentals of Modern Marketing	Prentice Hall of India, New Delhi.
4.	Philip Kotler	Marketing Management	Prentice Hall of India, and New Delhi.

5.	Dr. N. Rajan Nair	Marketing an Introductory Text	Sultan Chand & Sons, New Delhi.
6	Dr. Neha srighal	Principles of Marketing	Chengage book house
7	T.N.Chhabra	An introduction to Principles of Marketing	Sun India's
8	Prof.KavithaSharma And Swati Aggarwal	Principles of Marketing	Taxman
9	H.DevendraDr.Mamishy Joshi	Principles of Marketing	Niraliprakashan
10	Dr.NanalKentidas	Principles of Marketing	Niraliprakashan

E-Material

1. Online Study Material for Commerce courses - LPU Distance

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Core Paper-17

Paper code: CCM61

Name of the Paper: COST ACCOUNTING II

Total Hours per Week: 5

Credit: 4

Lecture Hours: 75

Course Objectives

1. To make the students to understand the process of ascertaining, classification and controlling cost.
2. To enable the students for higher studies like CA, ICWA and ACS with ease and confidence.
3. To ascertain the profitability
4. To facilitate the preparation of financial and other statements
5. To fix the selling price

Course Out Comes

1. After studied unit-1, the student will be able to taught the Computation of Job, Batch, Contract Costing
2. After studied unit-2, the student will be able to learn the preparation of Process Costing.
3. After studied unit-3, the student will be able to impart knowledge about calculation of Operating Costing
4. After studied unit-4, the student will be able to study about preparation of Standard Costing.
5. After studied unit-5, the student will be able to gain knowledge about Reconciliation of Cost and Financial Accounts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I**15 Hours**

Job, Batch, Contract Costing: Job Costing - definition - Features - Procedure - WIP - Cost Accumulation, Batch Costing - EBQ, Contract Costing - Definition, Features, Work Certified and Uncertified - Incomplete Contract - Escalation Clause - Cost Plus Contract - Contract Account.

UNIT-II**15 Hours**

Process Costing: Definition - Features - Job Vs Process Costing - Process Account - Losses - By Products and Joint Products - WIP - Equivalent Units and its Calculation - Closing WIP with or without Process Loss.

UNIT-III**15 Hours**

Operating Costing (Transport Costing): Cost Unit - Cost Classification - Operating Cost sheet.

UNIT-IV**15 Hours**

Standard Costing - Variance Analysis - Material -Labour- Overheads - Fixed - Variable -Sales Variance.

UNIT-V**15 Hours**

Reconciliation of Cost and Financial Accounts.

Note: Questions in Sec. A, B & C shall be in the proportion of 20:80 between Theory and Problems.

Text Books:

S.no	Authors	Title	Publishers
1	S.P.Jain and Narang	Cost Accounting	Kalyani Publishers, New Delhi
2.	T.S. Reddy & Hari Prasad Reddy	Cost Accounting	Margham Publications, Chennai.

3.	S.P. Iyengar	Cost Accounting	Sultan Chand & Sons, New Delhi.
4	Manosh Dutta	Cost Accounting	Dorling Kindersley (India) Pvt. Ltd, 2010
5	A. Murthy and S. Gurusamy,	Cost Accounting	Vijay Nicole Imprints Private Ltd., Chennai.
6	Khanna B.S.Pandey I.M., Ahuja G.K., and Arora M.N	Practical Costing	S. Chand & Sons
7	Arora M.N	Cost Accounting	S. Chand & Sons
8	R.S.N. Pillai & Bhagavati	Cost Accounting	S. Chand & Sons
9	Bhabatosh Banerjee	Cost Accounting – Theory & Practices	Sultan Chand & Sons
10	V.KSaxena ,C.D Vashist,	Cost Accounting problems and solutions	Sultan Chand & Sons

Reference Books:

S.No	Authors	Title	Publishers
1.	Tulsian	Cost Accounting	Tata McGraw Hills.
2.	S.N.Maheswari	Principles of Cost Accounting	Sultan Chand & sons, New Delhi
3.	ManashDutta,	Cost Accounting	Pearson Education (Singapore) Pvt. Ltd, Second Edition Print, 2005
4	M.C. Shukla, T.S. Grewal, Dr.M.P.Gupta,	Cost Accounting	S.Chand& Company Ltd, 2010.
5	Reddy and Murthy	Cost Accounting	Margham Publications
6	Inamdar, S. M. (Satish Inamdar)	Cost & Management Accounting	Everest Publishing House
7	Kishore, R. M.	Cost & Management Accounting	Taxman Allied Service
8	V.KSaxena ,C.D Vashist,	Advanced Cost & Management Accounting	Sultan Chand & Sons

9	Jawaharlal	Cost Accounting	MC Graw Hill
10	M.E. Thukaram Rao	Cost and Management Accounting	New Age International

Reference Journal

1. Accounting Research Journal,
2. Asian Review of Accounting,
3. Asia-Pacific Journal of Accounting and Economics,
4. Journal of Accounting and Organizational Change,
5. Journal of Contemporary Accounting and Economics

E- Materials

1. www.icwai.org
2. www.nasbaregistry.org.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Core

Paper-18

Paper code: CCM62

Name of the Paper: INCOME TAX LAW AND PRACTICE II

Total Hours per Week: 5

Credit: 4

Lecture Hours: 75

Course Objectives

1. To acquire Knowledge of Different Income Tax Concepts
2. The Main Objective of Taxation is Economic Development
3. To Overcome the Scarcity of Capital, Taxes are regarded as effective means to Control Inflation
4. To Control Cyclic Fluctuations
5. Reduction of Balance of Payments Difficulties

Course Outcomes

1. After studied unit-1, the student will be able to know the calculation of taxes for gain on capital asset.
2. After studied unit-2, the student will be able to know the tax on other source and its calculation.
3. After studied unit-3, the student will be able to know the adjustment of carry forward Income/Expenditure.
4. After studied unit-4, the student will be able to expertise in preparation of total income of individual/ firm etc.
5. After studied unit-5, the student will be able to gain knowledge on filing of income tax returns.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- I

20 Hours

CAPITAL GAINS

What are capital assets? - What are not capital assets? - kinds of capital assets - transfer u/s 2 (47) - cost of acquisition - cost of improvement - computation of short term capital gain - computation of long term capital gain - exemptions from capital gains.

UNIT – II

17 Hours

INCOME FROM OTHER SOURCES

Specific incomes chargeable to tax - general incomes chargeable to tax - Interest on securities - Interest exempt from tax u/s 10 (15) - deductions allowed from Income from other sources - computation of income from other sources.

UNIT- III

16 Hours

CLUBBING OF INCOMES AND SET OFF AND CARRY FORWARD OF LOSSES

Income transfer without asset transfer - cross transfer -transfer for the benefit of son's wife - capital gain on an asset gifted before marriage - gifted money used for construction of house by spouse - income including losses - clubbing of business income - clubbing of minor's income - computation of total income. Provisions relating to set off of losses- Provisions relating to set off and carry forward of losses - unabsorbed depreciation - order of set off - computation of total income.

UNIT- IV

12 Hours

AGRICULTURAL INCOME AND DEDUCTIONS FROM GROSS TOTAL INCOME

Meaning of agricultural income - types of agricultural income - income from growing and manufacturing rubber - income from growing and manufacturing coffee - income from growing and manufacturing tea - income of a sugar mill growing its own sugarcane- computation of tax of an assessee having agricultural income. Permissible deductions from gross total income - section 80C, 80CCC, 80CCD, 80D, 80DD, 80DDB, 80E, 80G, 80GG, 80GGA, 80QQB, 80RRB, 80U.

UNIT – V

10 Hours

ASSESSMENT OF INDIVIDUALS AND ASSESSMENT PROCEDURES

Sources of income of an individual - computation of total income and tax liability of an individual. Filing of returns - permanent account number (PAN) -Usage of PAN - TDS - types of assessment - self assessment - Best judgement assessment - Income escaping assessment (reassessment) - Advance payment of tax

Note: Questions in Sec .A, B & C shall be in the proportion of 20:80 between Theory and Problems.

Text Books

S.No	Authors	Title	Publishers
1.	Gaur &Narang	Income Tax Law & Practice	Kalyani Publishers
2.	Dr. A. Murthy	Income Tax Law & Practice	Vijay Nicole Imprints Pvt.Ltd. Chennai
3.	Reddy,T.S.&HariprasadReddy,	Income Tax Theory, Law& Practice	Margham Publications, Chennai.
4.	V.B. Gaur &Narang	Income Tax Law And Practice	Kalayani Publishers,2001
5.	DrVinod K. Singhania	Income Tax Law And Practice	Taxmann Publications Pvt. Limited, 2005.
6.	T.N.Manoharan&H .R.Hari	Taxation	Ankit thakkar for snow white publication pvt ltd
7.	A.Murthy	Income Tax Law And Practice	Vijay Nicole
8.	N.Hariharan	Income Tax Law And Practice	Mc grew hill
9.	T .Srinivasan	Income Tax Law And Practice	Vijay Nicole
10.	Rajavelu	Income Tax Law And Practice	S.V.P publications

Reference Books

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Mehrotra	Income Tax Law & Accounts	SahithiyaBhavan Publications
2.	Vinod,K.Singhania	Students Guide to Income Tax	Taxman Publications Pvt. Ltd
3.	Anita Raman	Income Tax Law & Practice	McGraw Hill

4	V. BalaChandran, S. Thothadri,	Taxation Law and Practice	Published by Asoke K. Ghosh, PHI Learning Private Limited, Volume 1, 2003
5	V.P Gaur	Income tax law & practice	Kalyani
6	Dr.H.CMehrotra	Taxation law and practice	Sathiyabhawan
7	M.Jeevarathinam	Income tax law & practice	Winners wisdom
8	Expert Teacher	Taxation law and practice	Sathish and brothers
9	G.S.Mitra	Income tax law & practice	Mahaveer publication
10	Dr.R.K.Jain	Taxation law and practice	SPBD publication

Reference Journals

1. Indian Journal of Tax Law
2. Taxman.com/Journal
3. Vision Journal of Indian Taxation
4. Income Tax Reports,Chennai

E- Materials

1. GST and Income Tax Fortnightly E Magazine
2. Capital Gain Clear Tax
3. India filing.com
4. Clear Tax. in
5. Income Tax Management.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S

CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Core Paper-19

Paper code: CCM63

Name of the Paper: FINANCIAL MANAGEMENT

Total Hours per Week: 4

Credit: 4

Lecture Hours: 60

Course Objectives

1. To provide expert knowledge on setting financial objectives & goals.
2. To manage Financial Resource, financial risk management and through understanding of investment portfolios and financial instruments.
3. To Maximize the Cost of Capital by Developing a Sound and Economical combinations of Corporate Securities, Proper Estimation and Requirement for Expansion and Growth
4. To Ensure adequate return on Investment
5. To Maintain Proper Cash Flow Creating Reserves and Goodwill

Course Outcomes

1. After studied unit-1, the student will be able to understand the basic Principles and practices of Financial management.
2. After studied unit-2, the student will be able to determine the amount of Capital, Organization and Structure. Reduce cost of Capital and Operating Risks
3. After studied unit-3, the student will be able to have the knowledge and practice of arriving financial Decision makings
4. After studied unit-4, the student will be able to acquire practical knowledge on Calculation of working capital
5. After studied unit-5, the student will be able to gain knowledge on leverage and portfolio management

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes

5	Yes	Yes	Yes	Yes	Yes	Yes
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UNIT- I

10 Hours

Nature and Importance of Finance Functions - Organizing Finance Functions - Functions of Finance Manager - Objectives of Finance Function - Methods and Sources of Raising Finance - Critical Appraisal of the Various Sources of Finance.

UNIT- II

13 Hours

Goals of Finance Function - Financing Decisions - Financial Planning - Financial Forecasting - Capital Structure Decisions - Net Income Approach, NOI Approach and MM Approach- Capitalization - Cost of Capital - Computation of Cost of Capital-Dividend Policy-Factors Determining Dividend Policy.

UNIT- III

13 Hours

Investment Decisions - Estimation of Cash Flows - Evaluation of Alternative Investment Proposals like NPV, ARR, IRR Methods - Decision Making Under Risk and Uncertainty - Inflation and Investment Decisions

UNIT- IV

12 Hours

Working Capital - Meaning, Concept, Types and Significance-Gross and Net Working Capital - Determinants of Working Capital - Sources of WC - Credit and Collection Policies.

UNIT- V

12 Hours

Security Analysis and Portfolio Management - Leverages -Meaning, Types of Leverage.Degree of Operating and Financial Leverage - Financial Ratio Analysis.

TEXT BOOKS:

S.No	Authors	Title	Publishers
1.	Dr.S.N.Maheswari	Financial Management	Sultan Chand & Sons, New Delhi
2.	Dr.A.Murthy	Financial Management	MarghamPublications,Chennai.

3.	Dr. J. Srinivasan, Sridhar and Ramalingam	Financial Management	Vijay Nicole Imprints Pvt .Ltd. Chennai
4.	R.K.Sharma	Financial Management	Kalyani Publishers, New Delhi
5.	I.M. Pandey	Financial Management	Vikas Publishing House Pvt Ltd, 01-Nov-2009
6.	P.c. Kulkarni	Financial Management	B.G. Sathyaprasad, Himalaya Publications, 2004
7.	Dr..V.R.Palanivelu,	Financial Management	S.Chand Publication,2010
8.	I.M Panday	Financial Management	Pearson
9.	Berk	Financial Management	Pearson
10.	Prasana Chandra	Financial Managementtheory and practice	McGraw hill education Pvt. Ltd India

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	I.M.Pandey	Financial Management	VikasPublision house Pvt Ltd. Noida
2.	Prasanna Chandra	Financial Management 10ed.	McGraw hill education Pvt. Ltd India
3.	Subirkumar Banerjee	Financial Management	PHI Learning Pvt Ltd
4.	VyuptakeshSharan	Fundamentals of Financial Management	Pearson Education
5.	Dr .N. Premavathy	Financial Management	Sri Vishnu Publications, Chennai.
6.	S.C. Kuchhal	Financial Management	Chaitanya
7.	P.V. Kulkarni& B.G. Satyaprasad	Financial Management	HimalayaPublishingHouse
8	M.Y Khan P.K Jain	Financial management text problem and cases	McGraw hill education Pvt. Ltd India

9	Prasanna Chandra	Fundamentals of financial management	Taxmann
10	Dr.S.p. Gupta	Advanced Financial management	Sathiyabhavan

Reference: Journals

1. Indian Journal of Business Finance and Accounting
2. Journal of Financial Reporting and Accounting
3. Asian Academy Management Journal of Accounting and Finance
4. Review of Accounting and Finance

E- Materials

1. Economic Times.Com
2. Financial Express
3. Reserch gate.net
4. Entrepreneur.com
5. The Hindu business line

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Elective Paper-2

Paper code: CECM64A

Name of the Paper: INNOVATION MANAGEMENT

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

INTERNAL ELECTIVE
(To choose one out of 3)
Paper - 1

Objectives

1. To help students understand, describe and explain the phenomenon of Innovation.
2. To present students a toolkit to successfully navigate complex landscape that surrounds the innovation process.
3. To reap in the economic benefits of new technological inventions by commercializing them on time
4. To accomplish technology Transfer
5. To reduce new product development time

Course Outcomes:

1. After studied unit-1, the student will be able to perceive the basics of innovation
2. After studied unit-2, the student will be able to appreciate the value of creativity
3. After studied unit-3, the student will be able to gain exposure to various theories of innovation
4. After studied unit-4, the student will be able to apprehend the innovation process.
5. After studied unit-5, the student will be able to inculcate the shade of innovation for the success of business
6. **Matching Table (Put Yes / No in the appropriate box)**

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- I

12 Hours

INNOVATION AND COMPETITIVE ADVANTAGE

Innovation- Introduction, meaning, definition, concepts, nature, importance, early-stage of innovation -Identifying opportunities-Discovering new points of differentiation. Innovation drivers- State - Technology - Types of innovations; Descriptions of technological, marketing and organization.

UNIT- II

12 Hours

INNOVATION AND CREATIVITY

Creativity - meaning, definition, need for and importance of creativity - Factors influencing creativity. Individual - Self-evaluation of individual - SWOT Analysis - Team - Group dynamics - Meaning, **Characteristics, Stages, Types, Factors affecting group behaviour and team building**- Leadership - Meaning and nature - Creating Breakthroughs in innovation. Perception - meaning, Definition, Perceptual process, Factors affecting perception and techniques to improve perception.

UNIT- III

12 Hours

INNOVATION THEORIES

Major contemporary theories: Disruptive-Networked-Open; Alternative theories: Evolutionary-Uncontested- Adaptive - Green Initiatives.

UNIT- IV

12 Hours

INNOVATION PROCESS

New Product Development-Criticality of the Value Proposition, Differentiation - Paths to Market- Systems of Ideation, Experimentation and Prototyping - Innovation Labs.

UNIT- V

12 Hours

SUCCESS AND INNOVATION

Transformation of Business - Business processes - Recognition and Execution strategies- Designing a Winning Innovative Culture - Patents - Intellectual property - successful innovation case studies (any two).

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Tidd Joe, And Bessant John	Managing Innovation	John Wiley and Sons, Chichester, UK
2.	<u>J. Christopher Westland</u>	Global innovation Management, A strategic Approach	Palgrave Macmillan
3.	<u>J. Christopher Westland</u>	Global Innovation Management	Macmillan International Higher Education
4.	M Adithan	Management of Innovation and Creativity	Atlantic Publishers & Distributors Pvt Ltd
5.	<u>Dr. Leena Modi (Gandhi)</u>	Management Of Innovations And Sustainability	Nirali Publication
6.	M.Adithan	Innovation management and creativity	Atlantic Publication
7.	Michal Rabal Scott Swan	innovation and product management	Springer Puublication
8.	J.A Kulkarini	innovation and product management	Partiridge India
9.	Marcus T.Y	Innovation management Research Wave	Vernon press
10.	Jane HeneryDavid Walker	Management Of Innovations	Swage publications

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Moore, G.A	Dealing with Darwin: How Great Companies Innovate at Every Phase of their Evolution,Capstone.	Random House.

2.	Collins, J.	How the Mighty Fall: And Why Some Companies Never Give In	Random House.
3.	Prahalad C.K. and Krishna	The New Age of Innovation: Driving Concreted ValueThrough Global Networks	M.S. McGraw Hill.
4	Tom Burns And G.M Stalker	Innovation Managememt	Oxfor University
5	ShlomoMitakAnd D.V.K Seshadri	Innovation Managememt	Response Book
6	Jauhari	Innovation Managememt	Oxfor University
7	Dr.Glegary.C Mc Laughlin	Innovation Managememt	Crc Press
8	Sanjiva Shankar Dubey	Technology And Innovation Managememt	Phi
9	Ina Gollers	Crativity For Innovation Managememt	Routledge
10	Keith Goffin	Innovation Managememt Effective Stratergy And Innovation	

E-Material

1. Www.eui.upm.es › modulospdfBasic Concepts of Innovation and Innovation Management
2. [Https://www.coursehero.com](https://www.coursehero.com) › file Innovation_Management_404_v1.pdf - Innovation Management Developed By Prof
3. What is Innovation Management? What Does Innovation Management mean? Youtubeapp · The Audiopedia

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Elective Paper-2

Paper code: CECM64B

Name of the Paper: LOGISTIC MANAGEMENT

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

INTERNAL ELECTIVE
Paper - 2

Course Objectives

1. To enable students understand the importance and dynamics of a firm's physical distribution function and management of its supply chain.
2. To understand how warehouse functions in logistics fits into logistics & supply chain management.
3. To have better Inventory Management
4. To meet the efficient flow of operations
5. To provide customer satisfaction by having the right product in the right place at right time

Course Outcomes:

1. After studied unit-1, the student will be able to understand the basic concepts of logistic management
2. After studied unit-2, the student will be able to explore the supply chain intermediaries
3. After studied unit-3, the student will be able to explore the supply chain strategies
4. After studied unit-4, the student will be able to identify the warehousing strategies in logistic management

5. After studied unit-5, the student will be able to to perceive the legal frame work of logistic management.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- I

12 Hours

Logistics - meaning - definition- scope- importance - function- objectives- of logistics management- customer service and logistics.

UNIT- II

12 Hours

Supply chain intermediaries - Meaning, Importance, Objectives, Functions- Types of Intermediaries- Selection of Channel Member- Motivation, Training and Evaluation of Channel Members.

UNIT- III

12 Hours

Supply Chain Management- Meaning, Definition, Function, Need- Marketing Forces affecting Supply Chain Activities- Supply Chain Activities in India.

UNIT- IV

12 Hours

Meaning, Characteristics of Warehousing -Functions of Warehousing -Types of Warehousing- Selection of Transportation- Warehouse Locations-Packaging and Material Handling- Documents relating to warehousing- Warehousing in India.

UNIT - V

12 Hours

Government Policies And Regulations- Motor Vehicles Act - Carriage By Air, Sea Multi- modal Transportation - Documentation - Airways Bill, Mate Receipt, Railway Receipt, Lorry Receipt, Bill of Lading.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1	Sathish k. Kappor and purvakamal	Basis of Distribution Management Supply chain management strategic planning and operation	Printice Hall of India, New Delhi
2.	Sunil chopra	Logistics and supply chain management	Pearson Education Vijay Nicoles Imprint Pvt. Ltd
3	Nanthakumar .B	Operations Management Theory & Practice	Pearson Education, 2nd Edition, New Delhi
4	.Mahadevan B,	BarryProduction& Operations Management	Pearson Education, 2013 Margham Publications- Chennai, 2011.
5	Heizer Jay and Render	Production and operations management	
6	Saravanel&Sumathy		
7	Vinod V. Sople	Logistics Management	Pearson Education
8	Satis c, Ailawadi, Rakesh Singh	Logistics Management	Prentice Hall of India New Delhi
9	Taylor	supply chain manager's guide	Person Education
10	RonaLH.Ballou	Business Logistics /supply chain management	Pearson education prentice hall, New Delhi

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Sunil Chopra	Essentials of Supply Chain Management	Pearson Publications, New Delhi, Fifth Edition
2.	D K Agarwal	Text Book of Logistic Management	Trinity Publication
3.	V VSople	Logistic Management	Pearson Publication
4.	Anikita Bhatt Karan TajeevRandive	Logistic Management	NiraliPrakashan
5	Ganapathi And Nandhi	Logistic Management	Oxford Publication
6	Dr.L.Nadarajan	Logistic Supply Chain Management	Margam Publication
7	Dr.S.Ramachandran	Supply Chain And Logistic Management	Airwalk Publication
8	Saikumar V Purushothaman	Supply Chain And Logistic Management	Sulthan Chand
9	S.SudalimuthuAnd Anthony Raj	S. Logistic Managementfor International Business	PHI Publication
10	SatishcAilwadi	Logistic Management	PHI Publication

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Elective Paper-2

Paper code: CECM64C

Name of the Paper : SERVICE MARKETING

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

INTERNAL ELECTIVE

Paper - 3

Course Objectives

1. To enable students to acquire knowledge of service marketing
2. To understand the concepts relating to service quality, pricing and demand for services
3. To impart knowledge about insurance services in service marketing
4. To develop practical knowledge about service marketing.
5. To create new ideas in service marketing.

Course Outcomes

1. After studied unit-1, the student will be able to understand the concepts and evolution of service marketing.
2. After studied unit-2, the student will be able to Explore the 4 Ps of service marketing.
3. After studied unit-3, the student will be able to perceive the strategies in service marketing.
4. After studied unit-4, the student will be able to explore the quality issues of service marketing.
5. After studied unit-5, the student will be able to understand the different services organizations.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	NO
5	Yes	Yes	Yes	Yes	Yes	NO

UNIT - I

12 Hours

Marketing of Services - Introduction - Growth of the Service Sector - The Concept of Service - Characteristics of Services Classification of Services -Using Technology - Developing Human Resources.

UNIT - II

12 Hours

Marketing mix in services marketing - The seven Ps - Product Decisions - Pricing Strategies- Promotion of Services and Distribution Methods for Services - Additional Dimensions in Services Marketing- Internet as a service channel.

UNIT - III

12 Hours

Strategic Marketing Management for Services - Matching Demand and Supply through Capacity Planning and Segmentation - Internal Marketing of a Service - External versus Internal Orientation of Service Strategy.

UNIT - IV**12 Hours**

Delivering Quality Services - Causes of Service-Quality Gaps - The Customer Expectations versus Perceived Service Gap - Factors and Techniques to Resolve this Gaps in Service - Quality Standards, Factors and Solutions.

UNIT - V**12 Hours**

Marketing of Services with special reference to Health Services - Hospitality Services including Travel, Hotels, and Tourism.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1	Dr. L. Natarajan	Services Marketing	Margahm Publications, Chennai
2.	M. K. Rampal&S.L.Gupta	Services Marketing	Galgotta Publications
3	Geethabansal, AmandeepKaur&Bhavna	Services Marketing	Kalyani Publications
4	RamneetKaur, Parampalsingh	Services Marketing	Kalyani Publications
5	S.M. Jha	Services Marketing	Himalaya Publications
6	Dr. B. BaLy	Services Marketing	S. Chand and Co. Publications
7	VasanthiVenugopal& Raghu V.N	Services Marketing	Himalaya Publications
8	Valarie A. Zeithaml Marry Jo Bitner	Service marketing	Mc Graw Hilleducation Publication
9	S.P.Mathur ,Nishu	Service marketing	New Age International
10	Christopher Lovelock,	Service marketing	Pearson Publication

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	R.Srinivasan	Service marketing	PHI Publication
2.	Kisholoy Roy	Marketing service	Everest Publication House
3.	Dr.V.Muthu Ruben	Principlesof marketing service	IIP Publishing House
4.	Vinnie Jauharikirtidutta	Service marketing	OUP India Publisher
5	M.K Rambol,S.L Gupta	Service marketing	Galgotia Publication
6	Dr.Natarajan	Marketing service and management	Margam Publication
7	JochenWirtz	Service marketing	Pearson
8	K..Ramamohanarao	Service marketing	Pearson
9	Dr.ManitaMathru	Service marketing	Red shine
10	JochenWirtz	Essential of Service marketing	Pearson

E- Material

1. http://www.sasurieengg.com/e-course-material/MBA/II-YearSem3/BA7013%20SERVICE_MARKETING.pdf

2. http://www.pondiuni.edu.in/storage/dde/downloads/markiv_sm.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S

CO5	S	S	S	S	S	S	S	S	S	S
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PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Elective

Paper-3

Paper code: CECM65A

Name of the Paper: Customs and Goods and Service Tax

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

INTERNAL ELECTIVE

(To choose one out of 3)

PAPER - 1

Course Objectives

1. To protect the imports and exports of goods for achieving the policy objectives of the Government.
2. Enforcement of Customs legislation and other relevant laws.
3. To eliminate the cascading effect of taxes.
4. To promote competitive pricing and increase consumption.
5. To have an improved logistics and distribution system.

Course Outcomes

1. After studied unit-1, the student will be able to understand the basics of Customs and Excise duty.
2. After studied unit-2, the student will be able to know the fundamental concepts of Goods and Service Tax (GST).
3. After studied unit-3, the student will be able to understand the Goods and Service Tax Registration.
4. After studied unit-4, the student will be able to analyze the procedures of Levy and Collection of GST.
5. After studied unit-5, the student will be able to understand the Assessment Returns and Refund of Goods and Service Tax.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I

12 Hours

CUSTOMS AND EXCISE DUTY

Introduction-Customs act 1962- Objectives of Customs Act, Levy and collection of Customs duty , classification of goods , Goods Exempted from Customs duty, Searches ,seizures, confiscation and penalties. Central excise duty 1944- Nature of excise duty, levy and collection of excise duty - Type of excise duty, valuation of goods- clearance of goods- clearance of samples- registration and exemption from registration.

UNIT – II

12 Hours

INTRODUCTION TO GOODS AND SERVICE TAX

Goods and Service Tax - Meaning, History of Goods and Service Tax, Features, Objectives, Challenges, Types - SWOT (Strength, Weakness, Opportunities, and Threats of Goods and Service Tax), Scope of Goods and Service Tax - Difference between Indirect Tax and Goods and Service Tax - Advantages and Disadvantages of Goods and Service Tax - Dimension of Goods and Service Tax - Effects of Goods and Service Tax in Indian Economy - Impact of Goods and Service Tax and its Implication.

UNIT- III

12 Hours

GOODS AND SERVICE TAX REGISTRATION

Meaning, Importance, Types, Procedure for Resident and Non- Resident - Application Process and Enrolment process under Goods and Service Tax - Documents required - Penalties - Cancellation of Registration - Revocation of Cancellation of Registration.

UNIT- IV

12 Hours

LEVY AND COLLECTION OF GST

Supply - Meaning, Place of Supply, Time of Supply, Value of Supply, Methods of Valuation - Goods and Service Tax on Exports.

UNIT- V

12 Hours

ASSESSMENT RETURNS AND REFUND OF GOODS AND SERVICE TAX

Assessment - Meaning and types - Accounts and Other Records - Periods of Retention of Accounts. Returns - Types of returns and their due dates -Furnishings of details of Outward Supply - Claim of Input tax credit and Provisional Acceptance thereof - Matching and Reversal and Reclaim at Reduction in Output tax liability. Payments of Goods and Service Tax -TDS and TCS under Goods and Service Tax - Refund of Goods and Service Tax.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	CA HemantNarang	Goods and Service Tax Simplified, A Complete Guide to New Model GST Law	Computech Publications Limited , New Delhi.
2.	RakeshKumar	Goods and Service Tax	Diamond Pocket Books (P) Ltd., New Delhi.
3.	Dr.H.C.MehrotraProf.V.P. Agarwal	Goods and Service Tax	SahityaBhawan Publication New Delhi(2020).
4	T S Reddy and Hari Prasad Reddy	Business Taxation	Margham Publication.
5	Dr. Vinod and K. SinghaniamonicSinghaniamonic	Students Guide To goods and service Tax	Taxmann Publications, New Delhi.
6	Datey, V.S.	Indirect Tax Law and practice	Taxmann Publications Pvt. Ltd., Delhi,
7	Bansal K.M	Gst and Customs Law	Taxman
8	Dr,NitiBhasin,Dr.Sameer Lama	Gst and Customs Law	Taxman
9	SanjeetSharma , C.A Anoopmodi,C.A	Gst and Customs Law	VK Publication
10	Mahesh Gupta,C.A Nikhil Gupta	Gst and Customs Law	Rajeev Bansal

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	VS DateyDr.KrishnaSachdev	Principles of GST and customs law	Taxmann
2.	Dr.SonalBabber,RasleenKaur,Kritika	GST and customs law	Scholar tech press
3.	SonnalBabberRasleen Kaur	GST and customs law	Scholer tech press

4	Dr.K.M.Bansal	GST and customs law	Taxmann
5	Dr.RavimM.N	GST and customs law	Professional bros publication
6	Dr.VenodK.Singhanian	GST and customs Duty	Taxmann
7	VS Datey	GST	Taxmann
8	ShilpiSahi	GST and customs law	Cengage
9	Taxpal Classes	GST and customs law	A taxpal publication
10	Dr.H.C.MehrotraProf.V.P.Agarwal	Goods and Service Tax and Custom Duty	SahityaBhawanPublication (2021).

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Elective

Paper-3

Paper code: CECM65B

Name of the Paper: INVESTMENT MANAGEMENT

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

INTERNAL ELECTIVE

(to choose one out of 3)

PAPER - 2

Course Objectives

1. To enable the students to apply various tools and techniques of Investment and risk management.
2. To provide knowledge on various investment avenues that benefits the individual and nation.
3. To Keep Funds Safe & Secure.
4. To Earn a Steady & Additional Source of Income
5. To have good Retirement Planning

Course Outcomes

1. After studied unit-1, the student will be able to understand the Fundamentals of Investment
2. After studied unit-2, the student will be able to get knowledge pertaining to Security Investment.
3. After studied unit-3, the student will be able to gain knowledge about Non Security Investment.
4. After studied unit-4, the student will be able to know the scientific reasoning about Risk and Return.
5. After studied unit-5, the student will be able to get Reflective thinking through Fundamental and Technical Analysis.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT- I**12 Hours****INTRODUCTION TO INVESTMENT**

Investment Meaning- Investment Vs. Speculation- Investment Vs Gambling- Important factors favourable for investment program- stages in investment - investors classification

UNIT – II**12 Hours****SECURITY INVESTMENT**

Meaning- Bonds- Preference Shares- Equity shares- Derivatives- Options- Swaps- Futures- Mutual funds

UNIT – III**12 Hours****NON SECURITY INVESTMENT**

Meaning- Government Securities- Life Insurance- UTI- Commercial banks- Provident fund- Post office schemes- National Savings Schemes- Fixed Deposit Schemes.

UNIT – IV**12 Hours****RISK AND RETURN**

Meaning- Historical and Expected return- Types of risk- Measurement of risk

UNIT – V**12 Hours****FUNDAMENTAL AND TECHNICAL ANALYSIS**

Meaning- Economy, Industry and Company Specific analysis- Tools for technical analysis- Charts, Support and Resistant level analysis.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Preeti Singh	Investment Management	Himalaya Publishing House. New Delhi. 2014
2.	Prasanna Chandra	Investment Analysis and Portfolio Management,	Tata McGraw - Hill Publishing Company Limited, New Delhi.
3	Dr. Radha	Investment Management	Prasanna Publication, 2015
4	Dr.O.P Agarwal	Security Analysis And Investment Management	Himalaya Publication, 2007.

5	Dr.Prithisingh	Investment Management	“Himalaya Publication, 2015.
6	Natarajan L	Investment Management Security Analysis and Portfolio Management	Margham Publication, Chennai.
7	Avadhani VA	Investment and Securities Market in India	Himalaya Publishing House, Mumbai.
8	Bhalla VK	Investment Management, Security Analysis and Portfolio Management	S.Chand and Company Ltd, New Delhi
9	Dr. V.AAvadhani,	Investment Management	Himalaya Publication, 2004.
10	Preeti Singh	Investment management	Himalaya Publicating House

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr.L.Natarajan	Investment management	Margam Publication
2.	Prof.Y.P Singh	Fundamental of investment management	Galgotia Publication
3.	RustagiR.P	Investment management	Sultan Chand And Sons
4	PrasannaChanra	Investment management and portfolio management	Mc GrawHilleducation Publication
5	V.K. Bhalla	Investment management	Sultan Chand and Sons
6	Charles P. Jones	Investment analysis and management	Wiley India Pvt.Ltd
7	BhailaV.K	Fundamentals of investment Management	S.Chand
8	VandanaDargi	Investment management	Global Publication
9	Keith Brown	Investment analysis and portfolio management	Cengage Learning
10	Rustage	Investment analysis and portfolio management	S.Chand

E-Material

1. www.universityofcalicut.info › ...PDF Investment Management - University of Calicut
2. www.pondiuni.edu.in › PDFSecurity Analysis and Portfolio Management
3. <https://www.cfainstitute.org> › ...PDF the future of investment management - CFA Institute.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Elective Paper-3

Paper code: CECM65C

Name of the Paper: FINANCIAL SERVICES

Total Hours per Week: 4

Credit: 3

Lecture Hours: 60

**INTERNAL ELECTIVE
(to choose one out of 3)
PAPER - 3**

Course Objective

1. To enable the students to gain knowledge of business financial services.
2. Financial system of a country is closely related to the economic development.
3. There is drastic change in the functioning of financial system in this era of liberalization, privatization and globalization.
4. The purpose of including Indian Financial system as a subject is to give a clear understanding and knowledge of financial system in the present scenario.

Course Out Comes

1. After studied unit-1, the student will be able to gain knowledge about Financial Services, Capital and Money Markets
2. After studied unit-2, the student will be able to gain effective knowledge about leasing.
3. After studied unit-3, the student will be able to impart knowledge about Factoring.
4. After studied unit-4, the student will be able to know about Venture capital.
5. After studied unit-5, the student will be able to learn about Mutual funds.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes

4	Yes	Yes	Yes	Yes	Yes	NO
5	Yes	Yes	Yes	Yes	Yes	NO

UNIT-I

12 Hours

Financial services - meaning - Financial services and economic environment - legal and regulatory framework - financial institutions and other participants in the financial services sector - capital and money markets - Instruments - Government - Securities market - SWAP Analysis

UNIT-II

12 Hours

Introduction to leasing - legal and tax aspects - lease evaluation - Merits and Demerits - Accounting and Reporting for Lease - lease funding - Types of lease - Lease agreement - Hire purchase Vs lease - Legal aspects of Hire purchase - rights and duties of hire vendor and hire purchaser.

UNIT-III

12 Hours

Factoring - Types and feature of factoring agreement - Factoring Vs Bills discounting - Services of factor - Consumer Finance and credit card services - forfeiting.

UNIT-IV

12 Hours

Venture capital - meaning and characteristics - criteria for assistance - schemes and guidelines - infrastructure financing - assessment of risk - legal aspects.

UNIT-V

12 Hours

Mutual funds - SEBI Guidelines - Features and types - Management structure and performance evaluation - Growth and recent trends - Investor services - Credit rating agencies - CRISIL, CARE, ICRA - Services - Criteria for rating - Symbols.

Note: Questions in Sec. A, B & C - 100 % Theory.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1	Dr.S.Gurusamy	Financial Services	Vijay Nicholes Imprint Pvt. Ltd., Chennai
2.	Dr.V.Balu	Merchant Banking & Finance Services	Sri Venkateswara Publication, Chennai
3	M.Y. Khan,	Financial Services	Tata McGraw Hill, 2004.
4	K. Sasidharan, Alex Mathews	Financial Services	Tata McGraw Hill, 2010
5	B. S. Bhatia, G. S. Batra,	Management of Financial Services	Deep & Deep Publications Pvt Ltd., 2008.
6	Dr. N. Premavathy	Financial Services and Stock Exchange	Sri Vishnu Publications, Chennai.
7	Dr.S.Gurusamy	Financial Services and Systems	Vijay Nicholes Imprint Pvt. Ltd., Chennai
8	M.Y Khan	Financial Service	Mc GrawHilleducation Publication
9	B.Santhanam	Financial Service	Margam Publication
10	Dr.R.Shanmugam	Financial Service	Wiley India Pvt.Ltd

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	ThummuluriSiddaiah	Financial Service	Pearson Publication
2.	Dr.L.Natrajan	Financial Service And Marketing Reasearch	Margam Publication
3	Renuka Sharma And Keran Mehta	Financial Service	Chengage Book House
4	Christine Ennew, Nigel Waite , Roisin Waite	Financial Services Marketing: An International Guide to Principles and Practice	Routledge

5	Duke Fanelli	The Financial Services Marketing Financial Services Banking & Insurance	Wiley
9	C Satyadevi	Financial Services and System	S.Chand
6	K.Sasidharan And Alex. K Mathews	Financial Services	McGraw Hill
7	Prof. Rishikesh J. Malani, Mr. Nimbolkar Vishal Rajendra, Et Al.	Financial Services	Thakur Publication Pvt. Ltd.
8	Punithavathy Pandian	Financial Services And Markets	Vikas
9	Siddaiah	Financial Services Financial Markets, Institutions & Financial Services	Pearson Publication
10	Prof. BimalJaiswal, Dr.Bhuvana Venkatraman, Et Al.		SathiyaBhawanPublications

Related Journals:

1. Journal of Finance.
2. The Review of Financial Studies.
3. Journal of Financial Economics.
4. Journal of Accounting and Economics.
5. Journal of International Money and Finance.
6. Journal of Business Finance & Accounting.
7. Journal of International Financial Management and Accounting.
8. Journal of Financial Services Research

E-Materials:

1. "Financial Services: Getting the Goods". IMF. 28 March 2012. Retrieved 8 September2015.
2. "Access to a financial account or services". Our World in Data. Retrieved 15 February2020.

3. "Bill Summary & Status 106th Congress (1999 - 2000) S.900 CRS Summary - Thomas (Library of Congress)". Retrieved 2011-02-08.
4. Roberts, Richard (2008). The City: A Guide to London's Global Financial Centre. Economist. p. 2.
5. "Research and statistics FAQ". The City of London. Archived from the original on 26 September 2011. Retrieved 23 February 2012.
6. "Triennial Central Bank Survey - Foreign exchange and derivatives market activity in 2004"

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Semester: VI

Paper type: Skill Based Subject Paper-4

Paper code: CSCM66 Name of the Paper: HUMAN RESOURCES MANAGEMENT

Total Hours per Week: 3

Credit: 2

Lecture Hours: 45

PAPER - 4

Course Objectives

1. To enable the students to understand the Human resource management concepts and principles.
2. To create an awareness about the existing HR practices of the companies in India.
3. Defining Organizational Structure And Driving Productivity
4. Offering Employee Satisfaction.
5. Building Coordination Between Organizational Departments

Course Outcomes

1. After studied unit-1, the student will be able to understand the basics of Human Resource Management.
2. After studied unit-2, the student will be able to get the ability to plan Human resource.
3. After studied unit-3, the student will be able to attain knowledge about leadership qualities through Recruitment and Selection.
4. After studied unit-4, the student will be able to know Comprehension about Training and Development.
5. After studied unit-5, the student will be able to get awareness about Performance and Potential Appraisal.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	NO	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	NO
3	Yes	Yes	Yes	Yes	Yes	NO
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I

9 Hours

INTRODUCTION TO HUMAN RESOURCES MANAGEMENT

Definition- Meaning, Nature, Scope and Objectives, Functions, Importance. Qualities and Role of HR Manager -Problems and Challenges of HR Manager -Changing Environment of HRM, Changing role of HRM.

UNIT – II

9 Hours

HUMAN RESOURCE PLANNING

Definition, Need and Importance, HRP Process, Problems And Barriers To HRP, HRP Effectiveness. Job Analysis - meaning, process, Job Description and Job Specification. Job Design meaning and methods.

UNIT – III

9 Hours

RECRUITMENT AND SELECTION

Meaning and Definition, Objectives, Sources of Recruitment, Process, Methods and Recruitment Practices In India. Selection- Meaning and Definition, Objectives, Process and preparation of Curriculum Vitae.

UNIT – IV

9 Hours

TRAINING AND DEVELOPMENT, PERFORMANCE APPRAISAL

Meaning - Nature, Principles, Assessing The Needs Of Training, Inputs And Gaps In Training - Training And Development As Source Of Competitive Advantage - Methods Of Training, Evaluation Of Effectiveness Of Training Programme, Making The Training Effective-HR Culture In MNC's.

UNIT-V

9 Hours

Performance and Potential Appraisal - Meaning, Purpose-Process - Methods – Traditional and Modern Methods - Problems. Human Resource Accounting- Methods of valuation of Human resources, controlling costs of Human Resources.

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Dr.S.S. Khanka	Human Resource Management (Text & Cases)	S. Chand Publishing, New Delhi, 5 th edition (2013).
2.	L.M. Prasad	Human Resource Management (Text & Cases)	Sultan Chand and sons, New Delhi, 3 rd edition (2014).
3	K. A. Aswathappa	Human Resource Management	Himalaya Publishing House, 8 th edition.
4	C. B. Mamoria	Personnel Management	Himalaya Publishing House Pvt., Ltd, 13 th edition (2019).
5	P. C. Tripathi	Personnel Management and industrial relations	Sultan Chand and sons, New Delhi, 21 st edition (2013).
6	P.SubbaRao	Personnel and Human Resource Management	Himalaya Publishing House.
7	V.S.P Rao	Human Resource Management	Taxmann's
8	Gary DesslerBijuVerkkey	Human Resource Management	Pearson Education
9	C.B Gupta	Human Resource Management	Sultan Chand & Sons
10	Susan L. Verhust	Human Resource Management	Wiley India

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS
1.	Ramashankar Yadav	Human Resource Management	Wiley India
2.	T.N Chhabra	An Introduction to Human Resource Management	Sun India Publication
3.	K.A SwathappaSadhana Dash	Human Resource Management Text And	Mc Graw Hill

Cases

4.	Raymond A.Aboe John R.Hollenbeue	Fundamentals Of human Resource Management	Mc Grew Hill
5	PravinDurai	Human Resource Management	Pearson Education
6	Ashok khurana	Human Resource Management	Eminence Edition
7	Vinay karwasra	Human Resource Management	Kindle edition
8	Raman Preet	Future of Human Resource Management	wiley
9	Nishantuppal	Human Resource Management analytics	Pearson Education
10	David.ADecenzo,StephenP.Robbins	Human Resource Management	Wewyark john wiley&sons ,inc.,1999

E-Material

1. Online Study Material for Commerce courses - LPU Distance

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY
MASTER OF SCIENCE
M.Sc. CHEMISTRY
DEGREE COURSE
UNDER CBCS
With effect from 2022-2023

The Course of Study and the Scheme of Examinations

S. No.	Study Components		Ins. Hrs/ week	Credit	Title of the Paper	Maximum Marks		
	Course Title							
SEMESTTER I						CIA	Uni. Exam	Total
1.	Core Theory	Paper-1	4	4	Organic Chemistry- I	25	75	100
2.	Core Theory	Paper-2	4	3	Inorganic Chemistry- I	25	75	100
3.	Core Theory	Paper-3	4	3	Physical Chemistry- I	25	75	100
	Core Practical	Paper-1	4	0	Organic Chemistry Practical- I	-	-	-
	Core Practical	Paper-2	4	0	Inorganic Chemistry Practical- I	-	-	-
	Core Practical	Paper-3	4	0	Physical Chemistry Practical- I	-	-	-
Internal Elective for same major students								
4.	Core Elective	Paper-1	3	3	(to choose 1 out of 3) A. Advanced Polymer Chemistry B. Heterocyclic Chemistry C. Materials Chemistry	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
5.	Open Elective	Paper-I	3	3	(to choose 1 out of 3) A. Chemistry in Agriculture B. Food Chemistry C. Industrial chemistry-I	25	75	100
			30	16		125	375	500
SEMESTER II						CIA	Uni. Exam	Total
6.	Core Theory	Paper-4	3	3	Organic Chemistry- II	25	75	100
7.	Core Theory	Paper-5	3	4	Inorganic Chemistry- II	25	75	100
8.	Core Theory	Paper-6	3	3	Physical Chemistry- II	25	75	100
9.	Core Practical	Paper-1	5	3	Organic Chemistry Practical- I	25	75	100
10.	Core Practical	Paper-2	5	3	Inorganic Chemistry Practical- I	25	75	100
11.	Core Practical	Paper-3	5	3	Physical Chemistry Practical- I	25	75	100
12.	Compulsory paper		2	2	Human Rights	25	75	100
Internal Elective for same major students								
13.	Core	Paper-2	2	3	(to choose 1 out of 3)	25	75	100

	Elective				A. Green Chemistry B. Supramolecular and Nanochemistry C. Modern Separation Techniques			
External Elective for other major students (Inter/multi disciplinary papers)								
14.	Open Elective	Paper-II	2	3	(to choose 1 out of 3) A. Medicinal Chemistry B. Textile chemistry C. Dairy Chemistry	25	75	100
15.	Field Study		-	2		-	-	100
			30	29		225	675	1000
SEMESTER III								
						CIA	Uni. Exam	Total
16.	Core Theory	Paper-7	3	3	Organic Chemistry- III	25	75	100
17.	Core Theory	Paper-8	4	4	Inorganic Chemistry- III	25	75	100
18.	Core Theory	Paper-9	4	4	Physical Chemistry- III	25	75	100
	Core Practical	Paper-4	5	0	Organic Chemistry Practical- II	-	-	-
	Core Practical	Paper-5	5	0	Inorganic Chemistry Practical- II	-	-	-
	Core Practical	Paper-6	5	0	Physical Chemistry Practical- II	-	-	-
Internal Elective for same major students								
19.	Core Elective	Paper-3	2	3	(to choose 1 out of 3) A. Scientific Research Methodology B. Advanced Bioinorganic Chemistry C. Advanced analytical techniques	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
20.	Open Elective	Paper-3	2	3	(to choose 1 out of 3) A. Industrial Chemistry-II B. Science of Photography C. Energy Resources	25	75	100
21.	MOOC Courses		-	2		0	0	100
			30	19		125	375	600
SEMESTER IV								
						CIA	Uni. Exam	Total
22.	Core Theory	Pape-10	4	4	Organic Chemistry- IV	25	75	100
23.	Core Theory	Paper-11	4	4	Physical Chemistry- IV	25	75	100
24.	Core Practical	Paper-4	5	3	Organic Chemistry Practical- II	25	75	100
25.	Core Practical	Paper-5	5	3	Inorganic Chemistry Practical- II	25	75	100
26.	Core Practical	Paper-6	5	3	Physical Chemistry Practical- II	25	75	100
27.	Core	Project	5	5	Project with viva voce (Compulsory)	100 (75 Project +25 viva)		100

Internal Elective for same major students								
28.	Core Elective	Paper-4	2	3	(to choose 1 out of 3) A. Inorganic Chemistry-IV B. Environmental Chemistry C. Medicinal Chemistry and Drug Design	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
29.	Open Elective	Paper-4	2	3	(to choose 1 out of 3) A. Polymer and plastics B. Basics of Forensic science C. Health Science	25	75	100
				28		175	525	800
				92				2900

**SYLLABUS
UNDER CBCS
(with effect from 2022-2023)**

FIRST YEAR

**SEMESTER I
PAPER - 1
ORGANIC CHEMISTRY – I**

OBJECTIVES:

To make the students learn and understand the concept of stereochemistry, conformational analysis and their application in the determination of reaction mechanism. To understand the mechanism of nucleophilic and electrophilic substitution reactions. To learn the importance of kinetics in organic reactions.

OUTCOMES:

The student will be able to

- *Describe the concept of Stereochemistry*
- *Illustrate the importance of Conformation*
- *Analyze the mechanism of Aliphatic and Aromatic Substitution reactions*
- *Acquire knowledge on the various concepts of reaction kinetics and mechanism*

UNIT-I: STEREOCHEMISTRY

Optical activity and chirality, classification of chiral molecules as asymmetric and dissymmetric. Topicity – Homotopic, enantiotopic and diastereotopic ligands and faces. A brief study of dissymmetry of allenes, biphenyls, spiro compounds, trans-cyclooctene and molecules with helical structures. Absolute configuration - R, S notation of biphenyls and allenes. Fischer projection. Inter conversion of Sawhorse, Newman and Fischer projections. Erythro and threo nomenclature, E and Z nomenclature - Asymmetric synthesis - Cram's rule. Stereospecific and stereoselective reactions.

UNIT-II: CONFORMATIONAL ANALYSIS

Conformational analysis of disubstituted cyclohexane and their stereochemical features (geometrical and optical isomerism (if shown) by these derivatives). Conformation and reactivity of substituted cyclohexanol (oxidation and acylation), cyclohexanone (reduction) and cyclohexane carboxylic acid derivatives (esterification and hydrolysis). Conformation and stereochemistry of cis and trans-decalin and 9 - methyldecalin.

UNIT-III: ALIPHATIC SUBSTITUTION REACTIONS

Nucleophilic substitution reactions: SN1, SN2 and SNi mechanisms - Neighbouring group participation – Reactivity - structural and solvent effects - substitution in norbornyl and bridgehead systems - substitution at allylic and vinylic carbons - substitution by ambident nucleophiles - substitution at carbon doubly bonded to oxygen and nitrogen - alkylation and acylation of amines, halogen exchange, Von-Braun reaction, alkylation and acylation of active methylene carbon compounds, hydrolysis of esters, Claisen and Dieckmann condensation.

Electrophilic substitution reactions: SE1, SE2 and SEi mechanism, double bond shift - Reactivity. Migration of double bond, keto-enol interconversion, Stork- Enamine reaction, halogenation of aldehydes and ketones and decarboxylation of aliphatic acids.

UNIT-IV: AROMATIC SUBSTITUTION REACTIONS

Electrophilic substitution reactions: The arenium ion mechanism. Orientation and reactivity (ortho, meta and para directing groups). Typical reactions including Reimer - Tiemann reaction, Vilsmeier - Haack, Gattermann, Gattermann - Koch reaction and Kolbe reaction. Synthesis of di and tri substituted benzene (symmetrical tribromo benzene, 2-amino-5-methyl phenol, 3-nitro-4-bromobenzoic acid, 3, 4- dibromonitrobenzene and 1, 2, 3 - trimethylbenzene) starting from benzene or any monosubstituted benzene.

Nucleophilic substitution reactions: Mechanisms: S_NAr and Benzyne mechanisms. Methods for the generation of benzyne intermediate and reactions of aryl anion intermediate. Nucleophilic substitution involving diazonium ions. Aromatic nucleophilic substitution of activated halides, Ziegler alkylation and Chichibabin reaction.

UNIT – V QUANTITATIVE TREATMENT OF ORGANIC REACTIONS

Kinetic and Non-kinetic methods of determining reaction mechanisms. Isotope effects. Effect of structure on reactivity: Hammett and Taft equation. Partial rate factor. Significance of ρ and ρ^+ Simple problems

Recommended Books

1. Jerry March, Advanced organic chemistry, 4th edition, John Wiley and sons, New York, 1992.
2. S. H. Pine, Organic chemistry, 5th edition, McGraw Hill international edition chemistry series, New York, 1987.
3. Seyhan. N. Ege, Organic chemistry, structure and reactivity, 3rd edition, A.I.T.B.S., New Delhi, 1998.
4. P. S. Kalsi, Stereochemistry, Conformation analysis and Mechanism, II Edition,

- Wiley Eastern Limited, Chennai (1993).
5. Ernest Eliel, Stereochemistry of carbon compounds, McGraw Hill, New York (1962).
 6. Francis A. Carey and Richard J. Sundberg, Advanced Organic Chemistry, Part A and B, III Edition, Plenum Press (1990).
 7. B. Y. Paula Yurkanis Bruise, Organic Chemistry, 3rd edition, Pearson education, New Delhi 2002.
 8. J. Miller, Advanced Organic Chemistry, III Edition.
 9. J. Miller, Aromatic Nucleophilic Substitution
 10. Nasipuri, Stereochemistry, Alhed Publishers, 2003.
 11. Mc Murry, Organic Chemistry, V Edition, Asian Books Pvt Ltd (2000).
 12. Michael Smith, Organic Synthesis, McGraw Hill, 1996.
 13. Clayden, Greeves, Warren, Wothers, Organic Chemistry, Oxford Univ Press.
 14. Neil Isaacs, Physical Organic Chemistry, ELBS Publications (1987).
 15. P. Ramesh, Basic principles of Organic Stereochemistry, Madurai Kamaraj University.
 16. P. S. Kalsi, Stereochemistry and mechanism through solved problems, WileyEastern Ltd., (1994).
 17. R. K. Bansal, Organic Reaction Mechanism.
 18. R.O.C. Norman, J.M. Coxon, Principle of Organic Synthesis, ELBS Publications, 1994.
 19. S. M. Mukherji and S.P. Singh, Organic Reaction Mechanism, MacMillan India Ltd., Chennai (1990).
 20. T. L. Gilchrist and C.W. Rees, Carbenes, Nitrenes and Arynes, Thomas Nelson and Sons Ltd., London.
 21. Peter Sykes, A Guide book to mechanism in organic chemistry, Pearson Edition (2006).
 22. C. N. Pillai, Textbook of Organic Chemistry, University press (India) private Ltd (2009).

PAPER -2
INORGANIC CHEMISTRY I

OBJECTIVES:

To learn about the inorganic polymers. To study the concept of coordination chemistry, stability of the complexes and stereochemistry of complexes. To know about the structure and bonding of inorganic compounds.

Outcomes :

The student will be able to

- *Explain Isopolyacids and heteropolyacids of Vanadium, Chromium, Molybdenum and Tungsten.*
- *Describe the structure, properties, correlation and applications of some Inorganic polymers.*
- *Illustrates the chemistry of metal clusters.*
- *Discuss polyhedral boranes, carboranes and metallocarboranes.*
- *Explain the stability constant of co-ordination complexes.*
- *Apply the stereo chemistry for co-ordination complexes.*
- *Gain knowledge about the structure and bonding of Inorganic compounds.*

UNIT-I: STRUCTURE AND BONDING - I

Polyacids: Isopolyacids and heteropolyacids of vanadium, chromium, molybdenum and tungsten.

Inorganic Polymers: Silicates, structure - properties - correlation and applications - molecular sieves, polysulphur - nitrogen compounds and poly – organophosphazenes

UNIT-II: STRUCTURE AND BONDING - II

Boron hydrides: Polyhedral boranes, hydroboration, carboranes and metallocarboranes.

Metal clusters : Chemistry of low molecularity metal clusters (upto) trinuclear metal clusters, multiple metal-metal bonds. Cubane clusters and Zintl clusters.

UNIT-III: COORDINATION CHEMISTRY - I

Stability of complexes; thermodynamic aspects of complex formation; factors affecting stability, HSAB approach. Determination of stability constants by spectrophotometric, polarographic and potentiometric methods.

UNIT-IV: COORDINATION CHEMISTRY - II

Stereochemical aspects; stereoisomerism in inorganic complexes; isomerism arising out of ligand distribution and ligand conformation; chirality and nomenclature of chiral complexes; optical rotatory dispersion and circular dichroism. Macrocyclic ligands; types; porphyrins; corrins, Schiff bases; crown ethers and cryptates.

UNIT-V: COORDINATION CHEMISTRY - III

Evidences for metal-ligand orbital overlap, molecular orbital theory and energy level diagrams, concept of weak and strong field ligands, Jahn-Teller distortion, charge - transfer spectra. Term states for “d”- ions, energy diagrams, d-d transitions, Orgel and Tanabe - Sugano diagrams, spin orbit coupling, nephelauxetic effect, spectral and magnetic characteristics of transition metal complexes.

TEXT BOOKS

1. F. A. Cotton and G.W. Wilkinson, Advanced Inorganic Chemistry– A comprehensive Text, John Wiley and Sons (1988).
2. J. E. Huheey, Inorganic Chemistry, Harper and Collins, NY, IV Edition, (1993).
3. K. F. Purcell and J. C. Kotz, Inorganic Chemistry WB Saunders Co., USA, (1977).
4. M. C. Shriver, P.W Atkins, CH. Langford, Inorganic Chemistry, OUP, (1990).
5. N. N. Greenwood and Earnshaw, Chemistry of the Elements, Pergamon Press, New York (1984).
6. N. H Ray, Inorganic Polymers, Academic Press, (1978)
7. S. F. A. Kettle, Coordination Chemistry, ELBS, (1973).

Suggested References

8. A. B. P. Lever, Inorganic Electronic Spectroscopy, II Edn., Elsevier, New York, (1984).

9. B.E. Douglas, D.H. McDaniel's and Alexander, Concepts and Models of Inorganic Chemistry, Oxford IBH, (1983).
10. B.N. Figgis, Introduction to Ligand Fields, Interscience, (1966).
11. E.L. Muetterties, Polyhedral Boranes, Academic Press, New York (1975).
12. M.C. Day and J. Selbin, Theoretical Inorganic Chemistry, Van Nostrand Co., NY (1974).
13. W.U. Mallik, G.D. Tuli, R.D. Madan, Selected topics in Inorganic Chemistry, S. Chand and Co., New Delhi, (1992).
14. D. M.P. Mingos and D. J. Wales, Introduction to Cluster Chemistry, Prentice Hall, 1990.
15. R. Gopalan, Text book of Inorganic Chemistry, University press (India) private Ltd.

PAPER-3
PHYSICAL CHEMISTRY I

OBJECTIVE:

To study the partial molar property, fugacity and its significance. Theories and basic concepts of chemical kinetics - mechanism of acid, base and enzyme catalysis reaction. To acquire knowledge on phase equilibria of three component system. To study the basics of colloids.

OUTCOMES :

The student will be able to

- *Explain partial molar properties and the concept of fugacity.*
- *Describe the phase diagrams of three component systems involving solid-liquid and liquid-liquid equilibria.*
- *Gain the knowledge about micelles, surfactants, structure and stability of colloids.*

Illustrate the effect of pressure, dielectric constant and ionic strength of the solution on the rate of the reaction.

- *Describe acid base and enzyme catalysis.*

UNIT-I: THERMODYNAMICS

Partial molar properties -Partial molar free energy (chemical potential), Partial molar volume and Partial molar heat content - Their significance and determination of these quantities. Variation of chemical potential with temperature and pressure.

Definition of fugacity - determination of fugacity by graphical method - variation of fugacity with temperature and pressure - the concept of activity and activity coefficients – determination of activity and activity coefficient by emf method - determination of activity and activity coefficients for non-electrolytes - determination of standard free energies - choice of standard states.

UNIT-II: PHASE EQUILIBRIA

Physical equilibria involving phase transition: Two component system - Congruent system (phenol-aniline) and Incongruent system (sodium chloride- water) - Peritectic reactions. Three component system: Solid - Liquid equilibria - hydrate formation (sodium chloride - sodium sulphate - water); Liquid - Liquid equilibria - one pair of partially miscible liquids (acetic acid - chloroform - water and alcohol - benzene - water); two pairs of partially miscible liquids (water - ethyl alcohol - succinic nitrile).

UNIT-III: COLLOIDS

Surface phenomena - surfactants, micellization, critical micelle concentration (CMC), factors affecting CMC of surfactants, micro emulsions, reverse micelles and surface films (electro kinetic phenomena).

Structure and stability of colloids - Zeta potential (derivation), electro osmosis, protective colloids, gold number, sedimentation potential, streaming potential and Donnan membrane equilibrium.

UNIT-IV: CHEMICAL KINETICS

Absolute Reaction Rate Theory (ARRT) - Potential energy surfaces - partition function and activated complex- Eyring equation - estimation of free energy, enthalpy and entropy of activation and their significance.

Reactions in solutions - effect of pressure, dielectric constant and ionic strength on reactions in solutions - kinetic isotope effects - linear free energy relationships. Hammett and Taft equation.

UNIT-V: CATALYSIS

Acid - Base catalysis - mechanism of acid - base catalyzed reactions - Bronsted catalysis law. Catalysis by enzymes - Kinetics of enzyme catalyzed reaction - Michaelis - Menten equation and its interpretation. Effect of substrate concentration, pH and temperature on enzyme catalyzed reactions - inhibition of enzyme catalyzed reactions - Competitive, Non-competitive and Uncompetitive inhibition.

TEXT BOOKS

1. S. Glasstone, Thermodynamics for Chemists, Affiliated East West Press, New Delhi (1950).

2. J. Rajaram and J. C. Kuriacose, Thermodynamics for Students of Chemistry, Lal Nagin Chand, New Delhi (1986).
3. Samuel Glasstone, Textbook of Physical Chemistry, Macmillan India Limited, 2nd Edition
4. Terence Cosgrove – Colloid Science - Principles, methods and applications
5. Robert J. Hunter - Foundations of Colloid Science, 2nd Edition
6. J. Rajaram and J.C. Kuriacose, Kinetics and Mechanism of Chemical Transformations. Mac Millan India Ltd (1993).
7. K. J. Laidler, Chemical Kinetics, Harper and Row, New York (1987).

Suggested References

1. W. J. Moore, Physical Chemistry, Orient Longman, London (1972).
2. K. G. Denbiegh, Thermodynamics of Steady State, Methien and Co. Ltd, London (1951).
3. K. Nash, Elements of Chemical Thermodynamics, Addison Wesley (1962).
4. Alexander and Johnson- "Colloid science"- Oxford University Press
5. R. G. Frost and Pearson, Kinetics and Mechanism, Wisely, New York (1961).
6. Amdur and G. G. Hammes, Chemical Kinetics, Principles and Selected Topics, McGraw Hill, New York (1968).
7. M.V. Sangaranarayanan and V. Mahadevan, Text book of Physical Chemistry, University press (2011).

**ELECTIVE
PAPER-I
(To choose 1 out of 3)**

A. ADVANCED POLYMER CHEMISTRY

OBJECTIVE:

To gain the knowledge in the preparation, properties, characterization and applications of polymers.

OUTCOMES:

- *Have the knowledge on classification, nomenclature and properties of polymers.*
- *Adequate knowledge on kinetics and mechanism of polymerisation.*
- *Understanding on characterization of polymers.*
- *Understand the morphology and applications of polymers.*

UNIT- I: BASIC CONCEPTS

Classification - Nomenclature and isomerism - functionality - Molecular forces and chemical bonding in polymers - molecular weight – linear, branched and cross linked polymers. Thermoplastic and thermosetting polymers - Elastomers, fibers and resins. Techniques of polymerization - bulk solution, emulsion and suspension.

UNIT- II: KINETICS AND MECHANISM

Kinetics and mechanism of polymerization - free radical, cationic, anionic and co-ordination polymerization (Ziegler-Natta Catalyst). Copolymerization - kinetics (Detailed Study). General characterization-kinetic chain length-degree of polymerization, chain transfer - initiators - inhibitors - retarders.

UNIT-III: A. STRUCTURE AND PROPERTIES

Structure - property relationship - mechanical properties, thermal properties - glass transition temperature - factors affecting glass transition temperature - crystallinity and melting point - related to structure.

B. POLYMER CHARACTERIZATION AND ANALYSIS

Crystalline nature - X-Ray diffraction - Differential Scanning Calorimetry (DSC) - Thermo Gravimetric Analysis - molecular weight determination - Osmometry (membrane), viscosity, ultra centrifuge and gel permeation chromatography.

UNIT-IV: INDUSTRIAL AND NATURAL POLYMERS

Important industrial polymers - preparation and application of polyethylene, poly vinyl chloride, poly urethanes, polytetrafluoro ethylene (TEFLON), nafion and ion - exchange resins. Importance of natural polymers - application and structures of starch, cellulose and chitosan derivatives.

UNIT-V: ADVANCES IN POLYMERS

Biopolymers - biodegradable polymers - biomedical polymers - poly electrolytes - conducting polymers - high temperature and fire retardant polymers - polymer blend - polymer composites - polymer nanocomposites - IPN inter penetrating network polymers - electroluminescent polymers.

TEXT BOOKS:

1. F. W. Bill Meyer. Text book of polymer science, III Edition, John Wiley and sons, New York.
2. P. J. Flory. Principles of Polymer Chemistry, Cornell Press (recent edition).
3. V. R. Gowarikar, B. Viswanathan, J. Sridhar, Polymer Science - Wiley Eastern, 1986.
4. F. S. Misra - Introduction to Polymer Chemistry, Wiley Eastern Ltd.,
5. P. Bahadur, N. V. Sastry, Principles of Polymer Science, Narosa Publishing House.
6. G. Odian, Principles of Polymerization, McGraw Hill Book Company, New York, 1973.
7. Charles E. Carraher, Jr, Seymour/Carraher's polymer chemistry. -- 7th Edition

Suggested References

1. Rudin, The Elements of Polymer Science and Engineering. Academic Press, New

- York, 1973.
2. E. H. Brawn, The Chemistry of High Polymers, Butter worth & Co., London, 1948.
 3. G. S. Krishenbaum, Polymer Science Study Guide, Gordon Breach Science publishing, New York, 1973.
 4. E. A. Coolins, J. Bares and E. W. Billmeyer, Experiments in Polymer Science, Wiley Interscience, New York, 1973

PAPER-1

B. HETEROCYCLIC CHEMISTRY

OBJECTIVES:

To know the student about chemistry of heterocyclic compounds. To understand the strategies for designing the chemical synthesis. To make the students knowledgeable in higher heterocycles.

OUTCOMES:

- *Have the knowledge on nomenclature of heterocyclic compounds.*
- *Understanding the molecular geometry of non-aromatic heterocycles.*
- *Gain knowledge on reaction mechanism of small ring heterocyclic compounds.*
- *Have knowledge on reaction mechanism of mesoionic and higher heterocyclic compounds.*

UNIT I: NOMENCLATURE OF HETEROCYCLES

Introduction, nomenclature systems- systematic nomenclature system (Hantzsch – Widman system) and replacement nomenclature system for monocyclic, fused, spiro and bridged heterocycles. Aromatic heterocycles: Introduction, chemical behavior of aromatic heterocycles, classification (structural types). Criteria of aromaticity in heterocycles (bond lengths, dipole moments, empirical resonance energy, delocalization energy, Dewar resonance energy, chemical shifts and ¹H NMR spectra).

UNIT- II: NONAROMATIC HETEROCYCLES

Introduction, strain, bond angle strain, torsional strain and their consequences in small ring heterocycles, conformations of six membered heterocycles – molecular geometry, barriers to ring inversion, pyramidal inversion and 1,3 diaxial interactions. Stereoelectronic effect in saturated six membered heterocycles- anomeric effect, other related effects and attractive interactions through space.

UNIT III: SMALL RING HETEROCYCLES

Three membered and four membered heterocycles: Synthesis and reactions of aziridines, oxiranes, thiranes, azetidines, oxetanes and thietanes. Benzo- fused five membered heterocycles: Synthesis and reactions including medicinal applications of benzopyrroles, benzofurans and benzothiophenes.

UNIT- IV: MESO IONIC HETEROCYCLES

General classification, chemistry of some important meso-ionic heterocycles of type A and B and their applications. Six membered heterocycles with one heteroatom: Synthesis and reactions of pyrylium salts and pyrones and their comparisons with pyridinium and thiopyrylium salts and pyridones.

UNIT- V: HIGHER HETEROCYCLES

Six membered heterocycles with two or more heteroatom: Synthesis and reactions of diazines, triazines and tetrazines. Seven and large membered heterocycles: Synthesis and reactions of azepines, oxepines, thiepinines and diazepines. Synthesis of five and six membered heterocycles with P, As, Sb and Bi.

Text book:

1. Heterocyclic Chemistry, Vol. 1-3, R. R. Gupta, M. Kumar and V. Gupta, Springer Verlag.

Suggested references:

2. The Chemistry of Heterocycles, T. Eicher and S. Hauptmann, Thieme.
3. Heterocyclic Chemistry, J. A. Joule, K. Mills and G. F. Smith, Chapman and Hall.
4. Heterocyclic Chemistry, T. L. Gilchrist, Longman Scientific Technical.
5. Contemporary Heterocyclic Chemistry, G. R. Newkome and W.W. Paudler, Wiley-Interscience.
6. An Introduction to the Heterocyclic Compounds, R. M. Acheson, John Wiley.
7. Comprehensive Heterocyclic Chemistry, A. R. Katritzky and C.W. Rees, eds. Pergamon press.

PAPER-1

C. MATERIALS CHEMISTRY

OBJECTIVES:

*To learn about different types of materials. To understand the classifications of materials.
To learn the advancements of material chemistry.*

OUTCOMES:

- *Understanding on alloys, ceramics, composites and nano materials.*
- *Knowledge on liquid crystals, Ionic conductors, and pervoskites.*
- *Understanding on super conductors, NLO materials, second and third harmonic generation.*
- *Basic understanding on smart materials.*

UNIT-I: MULTIPHASE MATERIALS

Ferrous alloys: Fe-C phase transformation in ferrous alloys, stainless steels, non-ferrous alloys, properties of ferrous and non-ferrous alloys and their applications.

Glasses: Glassy state, glass formers, glass modifiers and applications.

Ceramics: Ceramic structures, mechanical properties, clay products, refractories-characterizations, properties and applications.

Composites: Microscopic composites- dispersion-strengthened and particle reinforces-fibre-reinforced composites and macroscopic composite.

Nanomaterials: Nanocrystalline phase- preparation- special properties and applications.

Thin films and Langmuir - Blodgett films: Preparation techniques; evaporation/sputtering and sol-gel methods. Photolithography, properties and application of thin films.

UNIT-II: LIQUID CRYSTALS

Mesomorphic behaviour, thermotropic liquid crystals, positional order, bond orientational order, nematic and smectic mesophases; smectic-nematic transition and clearing temperature-hornotropic, planar and schlieren textures, twisted nematics, chiral nematics, molecular arrangement in smectic A and smectic C phases, optical properties of liquid crystals. Dielectric susceptibility and dielectric constants.

UNIT-III: IONIC CONDUCTORS

Types of ionic conductors, mechanism of ionic conduction, interstitial jumps (Frenkel). Vacancy mechanism, diffusion super ionic conductors; phase transitions and mechanism of conduction in super ionic conductors, examples and applications of ionic conductors.

High T_c Materials: Defect perovskites, high T_c superconductivity in cuprates, preparation and characterization of 1-2-3 and 2-1-4 materials, anisotropy, normal state properties: temperature dependence of electrical resistance, optical phonon modes, super conducting state; heat capacity;

Coherence length, elastic constants, position lifetimes and microwave absorption - Applications of high T_c materials.

UNIT-IV: MATERIALS FOR SOLID STATE DEVICES

Rectifiers, transistors, capacitors- IV-V compounds, low dimensional quantum structures, optical properties.

Organic solids: Conducting organic solids, organic superconductors and magnetism in organic materials.

Fullerenes: doped fullerenes as superconductors.

Molecular devices: Molecular rectifiers and transistors, artificial photosynthetic devices, optical storage memory and switches-sensors.

Nonlinear optical materials: nonlinear optical effects. Second and third order - molecular hyper polarisability and second order electric susceptibility - materials for second and third harmonic generation.

UNIT-V: ADVANCED MATERIALS

Brief study of the following: Fiber reinforced plastics (FRP), fiber reinforced metals (FRM), metal matrix composites (MMC), surface acoustic wave (SAW) materials, ceramics and cermets, electrets and SMART materials.

BOOKS SUGGESTED:

1. Solid State Chemistry and its applications, Anthony R. West, (1998), John Wiley & Sons, New York.

2. Material Science and Engineering. An Introduction. W.D. Callister. Wiley.
3. Principles of the Solid State, H.V. Keer. Wiley Eastern.
4. Materials Science for Engineers: J. C. Anderson, K.D. Leaver, P. Leever and R.D. Rawlings, 5TH Edition, Nelson Thornes Ltd.
5. Thermotropic Liquid Crystals. Ed. G.W. Gray. John Wiley.
6. Handbook of Liquid Crystals. Kelker and Hafz. Chemie Verlag.
7. Materials science, M. Arumugam ,Anuradha publications (2012) , Chennai.
8. Materials Science, S. L. Kakani, Amit Kakani, (2006), New Age International (P) Limited, Publishers, Chennai.
9. Material Science and Engineering: A First Course, V. Raghavan, 5TH Edition (2007), Prentice-Hall of India (P) limited.
10. A.R. West, Solid State Chemistry and its Applications, (1984) John Wiley & Sons, Singapore.
11. C.N R. Rao and J. Gopalkrishnan, New Directions in Solid State Chemistry, (1997) Cambridge Univ. Press.
12. T. V. Ramakrishnan and C. N. R. Rao, Superconductivity Today, (1992) Wiley Eastern Ltd., New Delhi.
13. P. Ball, Designing the Molecular World: Chemistry at the Frontier, (1994) Princeton University Press.

OPEN ELECTIVE (NON MAJOR)
PAPER-I
(To choose 1 out of 3)

A. CHEMISTRY IN AGRICULTURE

OBJECTIVES:

- *To make the students learn the different types of fertilizers.*
- *To understand the classification of manures.*
- *To understand the usage of pesticides.*
- *To learn the importance of fungicide and herbicide.*
- *To make the students aware of different soils.*

OUTCOMES:

The student will be able to

- *Differentiate between different types of fertilizers.*
- *Acquire knowledge on the various types of manures.*
- *Appreciate the usage of different pesticides with caution*
- *Illustrate the importance of types of herbicides and preservation of seeds*
- *Analyze the characteristics of different soils.*

UNIT – I Fertilizers : Effect of Nitrogen, potassium and phosphorous on plant growth – commercial method of preparation of urea, triple superphosphate. Complex fertilizers and mixed fertilizers – their manufacture and composition. Secondary nutrients – micronutrients – their function in plants.

UNIT – II Manures : Bulky organic manures – Farm yard manure – handling and storage. Oil cakes. Blood meal – fish manures.

UNIT – III Pesticides and Insecticides : Pesticides – classification of Insecticides, fungicides, herbicides as organic and inorganic – general methods of application and toxicity. Safety measures when using pesticides. Insecticides : Plant products – Nicotine, pyrethrin – Inorganic pesticides – borates. Organic pesticides – D.D.T. and BHC.

UNIT – IV Fungicides and Herbicides : Fungicide : Sulphur compounds, Copper compounds, Bordeaux mixture. Herbicides : Acaricides – Rodenticides. Attractants – Repellants. Preservation of seeds.

UNIT – V

SOILS -Classification and properties of soils –soil water,soil temperature,soil minerals, soil acidity and soil testing.

PAPER-I
(To choose 1 out of 3)

B. FOOD CHEMISTRY

OBJECTIVE:

- *To understand the different sources of food*
- *To learn the concept of food poisoning.*
- *To understand the techniques of food preservation.*
- *To study the importance of vitamins and uses.*
- *To appreciate the different minerals needed for day to day life*

OUTCOMES:

The student will be able to

- *Appreciate the importance of various foods.*
- *Acquire knowledge of remedies for various ailments.*
- *Identify the causes for food spoilage.*
- *Reason out the deficiency of vitamins.*
- *Illustrate the importance of minerals.*

UNIT-I FOOD ADULTERATION Sources of foods, types, advantages and disadvantages, constituents of foods, carbohydrate, protein, fats and, oils, colours, flavours, natural toxicants.

UNIT-II FOOD POISONING Sources, causes and remedy- Causes and remedies for acidity, gastritis, indigestion and constipation

UNIT-III FOOD PRESERVATION AND PROCESSING Food spoilage, causes of food spoilage, types of Food spoilage, food preservation, preservation and processing by heating-sterilisation, pasteurization.

UNIT-IV VITAMINS Sources, requirement deficiency diseases of A, C, K, E1 and B6

UNIT-V MINERALS Mineral elements in food-Principal mineral elements-source. Function-Deficiency and daily requirements-Na, K, Mg, Fe, S and P

REFERENCE BOOKS: 1. Seema Yadav : —Food Chemistry, Anmol publishing (P) Ltd, New Delhi
2. Car H. Synder : — The Extraordinary Chemistry for ordinary things, John Wiley & sons inc., New York, 1992.
3. Sivasankar – Food Processing and Preservation PHI. (Eastern Economy Editions)

PAPER-I
(To choose 1 out of 3)
C. INDUSTRIAL CHEMISTRY-I

OBJECTIVES:

To make the students learn about fertilizers
To understand the importance of sugar Industries
To learn the importance of Chemical explosives
To study about the leather industries
To understand the importance of water industry

OUTCOMES:

The students will be able to
Acquire knowledge of fertilizers
Appreciate the importance of sugar industries in India
Acquire knowledge of Chemical explosives
Illustrate the importance of leather industries
Identify the importance of water industry

UNIT I Fertilizers : Fertilizer industries in India, Manufacture of ammonia, ammonium salts, urea, superphosphate, triple superphosphate and nitrate salts.

UNIT II Sugar : Cane sugar manufacture, recovery of sugar from molasses, sugar estimation- sugar industries in India.

UNIT III Chemical Explosives : Preparation and chemistry of lead azide, nitroglycerine, nitrocellulose, TNT, RDX, Dynamite, cordite, picric acid, gunpowder, introduction to rocket propellants.

UNIT IV Leather Industry : Curing, preservation and tanning of hides and skins, process of dehairing and dyeing. Treatment of tannery effluents.

UNIT V Water Industry: Pollution of water by fertilizers, detergents, pesticides and industrial wastes, BOD, COD, thermal pollution. Water Treatment – Ion exchange, electrodialysis, reverse osmosis, softening of hard water. 121

Reference : 1. B.N.Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing Co, New Delhi, 1981.

2. B.K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut.

3. P.P.Singh, T.M.Joesph, R.G.Dhavale, College Industrial Chemistry, Himalaya Publishing House, Bombay, 4th Ed., 1983 125

SEMESTER II
PAPER - 4
ORGANIC CHEMISTRY II

OBJECTIVES:

To understand the nature of carbon-hetero atom multiple bond additions and the mechanism of a chemical reactions. To appreciate the principles of addition and elimination reactions. To learn various synthetically important reactions with a view to appreciate their scope, limitations and use in synthetic sequences. To learn the chemistry of free radicals and their importance. To understand the concept of Aromaticity.

OUTCOMES:

The student will be able to

- *Elucidate the mechanism of addition and elimination reactions*
- *Appreciate the synthetic usage of various oxidizing and reducing reagents*
- *Illustrate the importance of free radicals*
- *Describe the concept of aromaticity*

UNIT-I: ADDITION TO CARBON - CARBON AND CARBON – HETERO MULTIPLE BONDS

Electrophilic, nucleophilic and neighbouring group participation mechanisms - addition of halogen and nitrosyl chloride to olefins. Hydration of olefins and acetylenes. Hydroboration, hydroxylation, Michael addition, 1, 3 - dipolar additions, Simon - Smith reaction. Mannich, Stobbe, Darzen, Wittig, Wittig - Horner and Benzoin reactions. Carbenes and nitrenes: Methods of generation, structure, addition reactions with alkenes and insertion reactions.

UNIT-II: ELIMINATION REACTIONS

E1, E2 and E1CB mechanism - E1, E2 and E1cB spectrum - Orientation of the double bond - Hofmann and Saytzeff rules - Competition between elimination and substitution. Typical elimination reactions- dehydration, dehydrohalogenation and dehalogenation. Stereochemistry of E2 eliminations in cyclohexane systems. Mechanism of pyrolytic eliminations. Chugaev and Cope eliminations.

UNIT-III: OXIDATION AND REDUCTION

Mechanism - study of the following oxidation reactions - oxidation of alcohols - use of DMSO in combination with DCC and acetic anhydride in oxidising alcohols - oxidation of methylene to carbonyl, oxidation of aryl methane - allylic oxidation of olefins - ozonolysis - oxidation of olefinic double bonds and unsaturated carbonyl compounds -

oxidative cleavage of C-C bond. Reduction: Selectivity in reduction of 4-t-butylcyclohexanone using selecterides. Hydride reductions - reduction with LiAlH_4 , NaBH_4 , sodium cyanoborohydride, trialkyl tin hydride and hydrazines.

UNIT-IV: FREE RADICALS

Long and short-lived free radicals - methods of generation of free radicals - detection of free radicals by ESR - Addition of free radicals to olefinic double bonds - aromatic radical substitutions reactions - decomposition of diazo compounds – phenol coupling - Sandmeyer reaction - Gomberg reaction - Pschorr reaction - Ulmann reaction and Hunsdiecker reaction.

UNIT-V: AROMATICITY

Aromaticity of benzenoid - non-benzenoid, and heterocyclic compounds - Huckel's rule - Aromatic systems with π electron numbers other than six - non-aromatic (cyclo octatetraene etc.) and anti aromatic system (cyclobutadiene etc.) - system with more than 10π electrons - Annulenes upto C_{18} (synthesis of all these compounds is not expected).

Recommended Books

1. Francis A. Carey and Richard J, Sundberg, Advanced Organic Chemistry - Part B, 3rd Edition (1990).
2. H. O. House, Modern Synthetic Reactions, Benjamin Cummings Publishing Company, London (1972).
3. W. Carruthers, Iain Coldham, Modern Methods of organic synthesis, IV Edition.
4. W. Carruthers, Some Modern Methods of Organic Synthesis, III Edition, Cambridge University Press, (1993).
5. J. March, Advanced organic reaction mechanism and structure, Tata McGraw Hill.
6. Mc Murry, Advanced organic chemistry, Thomas Pvt. Ltd.,
7. Michael B. Smith, Organic Synthesis, McGraw Hill, International Edition (1994).
8. L.F. Fieser and M. Fieser, Organic Chemistry, Asia Publishing House, Bombay, 2000.
9. Reinhard Brukner, Advanced Organic Chemistry, Academic Press, Elseiver, 2002.
10. C.K. Ingold, Structure and Mechanism in Organic Chemistry, Cornell Univ. Press .
11. Parmer and Chawla, Organic reaction mechanisms, S. Chand and Co.,
12. R. E. Ireland, Organic synthesis, Prentice Hall of India
13. R.O.C. Norman, Principles of organic synthesis, Chapman and Hall, London. 1980.
14. Raymond K. Mackie and David M. Smith, Guide book to Organic synthesis, ELBS Publication.
15. S. M. Mukherji and S.P. Singh, Organic Reaction Mechanism, MacMillan India Ltd., Chennai (1990).
16. C. N. Pillai, Textbook of Organic Chemistry, University press (India) private Ltd (2009).
17. R. T. Morrison and R. N. Boyd, Organic chemistry, 6th edition, Prentice Hall of India Limited., New Delhi, 1992

PAPER – 5

INORGANIC CHEMISTRY II

OBJECTIVES:

To make the students knowledgeable in solid state chemistry. To equip the students for their future career in nuclear industry. To learn the chemistry of lanthanides, to learn about nanotechnology and use of inorganic compounds in biological chemistry

OUTCOMES :

- Explain about the structure and properties of solids.
- Describe the types of Nuclear reactions.
- Explain about the stellar energy.
- Discuss the types of Nuclear reactors.
- Illustrate the radio analytical methods
- Describe the chemistry of lanthanides and actinides.
- Applying Nanotechnology to various metals.
- Illustrate the types of transport proteins.

UNIT-I: THE CHEMISTRY OF SOLID STATE

Structure of solids; Comparison of X-ray and Neutron Diffraction; structure of pyrochlore, cadmium iodide and nickel arsenide; spinels and antispinel, defects in solids, non-stoichiometric compounds. Electrical, magnetic and optical properties of solids, band theory. Semiconductors, superconductors, solid state electrolytes. Types of magnetic behaviour, dia, para, ferro, antiferro and ferrimagnetism, hysteresis.

Solid state lasers, inorganic phosphors and ferrites.

UNIT- II: NUCLEAR CHEMISTRY-I

Nuclear properties: Nuclear spin and moments, origin of nuclear forces, Nuclear models: liquid drop model and nuclear shell model. Modes of radioactive decay: Orbital electron capture, nuclear isomerism, internal conversion. Detection and determination of activity by cloud chamber, nuclear emulsion, bubble chamber, Geiger-Muller, scintillation and Cherenkov counters.

Nuclear reactions: Types, cross section, compound nucleus theory, high energy nuclear, direct nuclear, photonuclear and thermonuclear reactions.

UNIT- III: NUCLEAR CHEMISTRY-II

Stellar energy: synthesis of elements, hydrogen burning, carbon burning. Nuclear reactors: fast breeder reactors, particle accelerators, linear accelerators, cyclotron and synchrotron. Radio analytical methods: Isotope dilution analysis, radiometric titrations, radio immuno assay. Neutron activation analysis.

UNIT-IV: THE CHEMISTRY OF LANTHANIDES, ACTINIDES AND NANOTECHNOLOGY

The chemistry of solid state, lanthanides and actinides, oxidation state, spectral, magnetic characteristics, coordination numbers, stereochemistry, nuclear and non-nuclear applications.

Nanotechnology: Introduction - preparatory methods, characterization, application as sensors, biomedical applications, application in optics and electronics.

UNIT-V: BIOINORGANIC CHEMISTRY

Transport proteins: Oxygen carriers, metalloenzymes, carboxy peptidase, carbonic anhydrase, redox process, iron-sulphur proteins, chlorophyll, salient features of the photo synthetic process, vitamin-B₁₂, role of sodium, potassium, calcium, zinc and copper; fixation of nitrogen, nitrogen cycle.

Text Books

1. A. R. West, Basic solid state chemistry, John Wiley, (1991).
2. S. Glasstone, Source Book on Atomic Energy, Van Nostrand Co., (1969).
3. G. Frieland, J. W. Kennedy and J. M. Miller, Nuclear and Radiochemistry, John Wiley and Sons (1981).
4. Hari Jeevan Arnikaar , Essentials of nuclear chemistry, New Age International (P) Ltd., (2005).
5. Hari Jeevan Arnikaar, Nuclear Chemistry Through Problems, New Age International (P) Ltd., (2007).
6. G. T. Seaborg, Transuranium elements, Dowden Hitchinson and Ross, (1978).
7. Nishit Mathur, Nanochemistry, RBSA publishers (2010).

8. Patric Salomon, A hand book on Nano Chemistry, Dominant publishers and distributors (2008).
9. G. B. Sergeev, Nanochemistry, Elsevier Science and Technology (2007).
10. U. Saityanarayana, Essentials of Biochemistry, Books and Allied (P) Ltd.,
11. T. Pradeep, Nano: The essentials., McGraw Hill Education.(2007)

Suggested References

11. W. E. Addison, Structural principle in inorganic chemistry, Longman (1961).
12. D. M. Adams, Inorganic solids, John Wiley Sons (1974).
13. Azaroff, Solid State Chemistry, John Wiley.
14. B. E. Dogulas DH McDaniel's and Alexander, Concepts and Models of Inorganic Chemistry, Oxford IBH, (1983)
15. M. C. Day and J. Selbin, Theoretical Inorganic Chemistry, Van Nostrand Co., New York (1974).
16. J.E. Huheey, Inorganic Chemistry - Principles, Structure and Reactivity, Harper Collins, New York, IV Edition (1993).
17. N. Greenwood and A. Earnshaw, Chemistry of Elements, Pergamon, NY, (1984).
18. F.A. Cotton and G. Wilkinson Advanced Inorganic Chemistry - A Comprehensive Text, John Wiley and Sons, V Edition (1988).
19. K.F. Purcell and J.C. Kotz, Inorganic Chemistry - WB Saunders Co., USA (1977)
20. W. U. Mallik, G.D. Tuli, R.D. Madan, Selected topics in Inorganic Chemistry, S. Chand and Co., New Delhi, (1992).
21. M.N. Hughes, The Inorganic Chemistry of Biological processes, Wiley London, II Edition (1982).
22. Jonathan W. Stead, David R. Turner and Karl. J. Wallace., Core concepts in Supramolecular Chemistry and Nanochemistry, John Wiley sons Ltd (2007).
23. Beoffry A.Ozin, Andre Arsenault, Ludovico & Cademartiri. Nano chemistry - A chemical approach to nano materials, Royal Society of chemistry (2009).
24. Kenneth J. Klabunde, Nano scale materials in Chemistry A. John Wiley & Sons Publishers (2001).
25. L. Stryer, Biochemistry, V Edition, Freeman & Co., New York (2002) .
26. D. L. Nelson and M. M. Cox, Lehninger, Principles of Biochemistry, III edition, McMillan North Publication (2002).
27. W. Kaim and B. Schwederski, Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life, an Introduction and Guide, Wiley, New York (1995).
28. S. J. Lippard and J. M. Berg, Principles of Bioinorganic Chemistry, University Science Books (1994).
29. I. Bertini, H. B. Grey, S. J. Lippard and J. S. Valentine, Bioinorganic Chemistry, Viva Books Pvt. Ltd., New Delhi (1998).
30. R. Gopalan, Text book of Inorganic Chemistry, University press (India) private Ltd.

PAPER-6
PHYSICAL CHEMISTRY II

OBJECTIVES:

To understand the behavior of kinetic reactions and fast reaction. To understand the behavior of electrolytes in solution. To know the structure of the electrode surface. To differentiate electrode kinetics from other types of kinetic studies. To know the applications of electrode process. To study the concept and applications of group theory.

OUTCOMES :

- *Describe the rate expression for complex reactions and experimental study of fast reactions.*
- *Describe Debye-Huckel limiting law and Bronsted equation.*
- *Explain the structures of double layer and deriving Lippmann equation.*
- *Apply group theory and finding the symmetries and point group to construct character tables of C_{2v} and C_{3v}.*

UNIT-I: KINETICS OF COMPLEX REACTIONS & FAST REACTIONS

Kinetics of complex reactions, reversible reactions, consecutive reactions, parallel reactions, chain reactions, general treatment of chain reactions - chain length - Rice Herzfeld mechanism - explosion limits.

Study of fast reactions - relaxation methods - temperature and pressure jump methods - stopped flow and flash photolysis methods.

UNIT-II: ELECTROCHEMISTRY – I

Mean ionic activity and mean ionic activity coefficient - activity coefficient of strong electrolytes - determination of activity coefficient by electrochemical method.

Debye Huckel limiting law - qualitative and quantitative verification - limitation - Debye Huckel limiting law at appreciable concentrations of electrolytes - Debye - Huckel - Bronsted equation.

UNIT-III: ELECTROCHEMISTRY – II

Electrode - electrolyte interface - adsorption at electrified interface - electrical double layer - electro capillary phenomenon - Lippmann equation - Structure of double layers - Helmholtz - Perrin, Guoy - Chapman and Stern model of electrical double layers. Diffusion - Fick's law of diffusion - Effect of ionic association on conductance-electro kinetic phenomena -membrane potential.

UNIT-IV: GROUP THEORY – I

Definition of basic terms in group theory – Group – Abelian group, cyclic group, subgroup, group multiplication table - similarity transformation and class, symmetry elements and symmetry operations -Point groups (any examples limited to $n = 4$ of C_{nv} , C_{nh} , D_{nh} , D_{nd} , & T , T_d , O , O_h), Reducible and Irreducible representations - direct product representation. Character Table - explanation of various column and Mulliken Symbol.

UNIT-V: GROUP THEORY – II

Orthogonality theorem and its consequences - construction of character table for C_{2v} , C_{3v} , C_{2h} , and D_{2d} point groups - hybrid orbitals in nonlinear molecules (CH_4 , BF_3 , and NH_3). Determination of representations of vibrational modes in nonlinear molecules (H_2O , NH_3 , BF_3 and $[PtCl_4]^{2-}$). Symmetry selection rules of Infra-red and Raman spectra.

TEXT BOOKS

1. J. Rajaram and J. C. Kuriacose, Kinetics and Mechanism of Chemical Transformations. Mac Millan India Ltd (1993).
2. K. J. Laidler, Chemical Kinetics, Harper and Row, New York (1987).
3. K. L. Kapoor, A text book of Physical Chemistry, Mac Millan India Ltd., (2001).
4. S. Glasstone, Introduction to Electrochemistry, Affiliated East West Press, New Delhi (1960).
5. D. R. Crow, Principles and Applications to Electrochemistry, Chapman and Hall (1991).
6. K.V. Raman, Group Theory and its Applications to Chemistry, Tata Mc Graw Hill Publishing Co., (1990).
7. P. K. Bhattacharya, Group Theory and its Applications, Himalaya Publishers.
8. K.V. Ramakrishnan and M. S. Gopinath, Group Theory in Chemistry, Vishal Publications (1998).

SUGGESTED REFERENCES

1. R. G. Frost and Pearson, Kinetics and Mechanism, Wisely, New York (1961).
2. C. Capellos and B. H.J. Bielski, Kinetic Systems, Wisely Interscience, New York (1972).
3. Amdur and G.G. Hammes, Chemical Kinetics, Principles and Selected Topics, McGraw Hill, New York (1968).
4. G. M. Harris, Chemical Kinetics, D. C. Health and Co., (1966).
5. J. Robbins, Ions in Solution - An Introduction of Electrochemistry, Clarendon Press, Oxford (1972).
6. John O. M. Bockris, Amulya K.N. Reddy, Modern Electrochemistry 2B: Electrodics in Chemistry, Engineering, Biology and Environmental Science
7. F. A. Cotton, Chemical Applications of Group Theory, John Wiley and Sons inc., New York (1971).
8. N. Thinkham, Group Theory and Quantum Mechanics, McGraw Hill Book Company, New York (1964).
9. S. Schonland, Molecular Symmetry, Vannostrand, London (1965).
10. Alan Vincent, Molecular Symmetry and Group Theory-Programme Introduction to Chemical Application, Wiley, New York (1977).
11. S. Swarnalakshmi, T. Saroja and R. M. Ezhilarasi, A simple Approach to Group Theory in Chemistry, University press (India) private Ltd (2008).

MAIN
PRACTICAL PAPER – 1
ORGANIC CHEMISTRY PRACTICAL- I

- A) Identification of components in a two component mixture and preparation of their derivatives. Determination of b.p. / m.p. for components and m.p. for the derivatives.
- B) Any Six preparations from the following:
1. Preparation of o-benzoyl benzoic acid (Fridel Crafts Reaction)
 2. p-Nitrobenzoic acid from p-nitrotoluene (Oxidation)
 3. Anthroquinone from anthracene (Oxidation)
 4. Glucose pentaacetate from Glucose (Acetylation)
 5. m-Nitroaniline from m-dinitrobenzene (Reduction)
 6. Benzophenone oxime from benzophenone (Addition reaction)
 7. p-Chlorotoluene from p-toluidine (Sandmeyers' Reaction)
 8. 2,3 - Dimethylindole from phenyl hydrazine and 2 - butanone (Fisher Indole Synthesis)
 9. 1,2,3,4 - Tetrahydrocarbazole from cyclohexanone (Fisher Indole Synthesis)
 10. Methyl orange from sulphanilic acid (Diazo Reaction)

University Examination	Marks
Qualitative organic Analysis	40
Preparation	20
Viva voce	10
Record	05
Total	75

CONTINUOUS INTERNAL ASSESSMENT MARKS (CIA MARK)

MAX. MARKS = 25

Evaluation method for practical paper:

Distribution of Marks

Internal assessment	Marks
Two Tests	10
Results accuracy	10
Attendance/ Regularity	5
Total	25

References:

1. Arthur I. Vogel, "A Textbook of Practical Organic Chemistry", ELBS.
2. N.S. Gnanapragasam and B. Ramamoorthy, "Organic Chemistry Lab Manual" (2006), S. Visvanathan Printers & Publishers.

PRACTICAL PAPER – 2
INORGANIC CHEMISTRY PRACTICAL – I

A) Semimicro qualitative analysis of mixture containing two common and two rare cations. The following are the rare cations to be included. W, Ti, Te, Se, Ce, Th, Zr, V, U, Li, Mo and Be.

B) Complexometric Titrations (EDTA): Estimation of Ca, Mg and Zn.

C) Preparation of the followings:

1. Potassium tris (oxalate) aluminate (III) trihydrate
2. Tris (thiourea) copper (I) chloride
3. Potassium tris (oxalato) chromate (III) trihydrate
4. Sodium bis(thiosulphato) cuprate (I)
5. Tris (thiourea) copper (I) sulphate
6. Sodium hexanitrocobaltate (III)
7. Chloropentammine cobalt (III) chloride
8. Bis (acetylacetonato) copper (II)
9. Hexamminenickel (II) chloride
10. Bis (thiocyanato) pyridine manganese (II)

D). Separation of zinc and magnesium on an anion exchange.

Marks distribution:

University Examination	Marks
Qualitative Inorganic Analysis	25
EDTA Complexometric Titration	20
Preparation	15
Viva Voce	10
Record	05
Total	75

M. Sc. Chemistry: Syllabus (CBCS)

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CONTINUOUS INTERNAL ASSESSMENT MARKS (CIA MARK)

MAX. MARKS = 25

Evaluation method for practical paper:

Distribution of Marks

Internal assessment	Marks
Two Tests	10
Results accuracy	10
Attendance/ Regularity	5
Total	25

PRACTICAL PAPER-3
PHYSICAL CHEMISTRY PRACTICAL- I

Experiments in Thermodynamics, colligative properties, phase rule, chemical equilibrium and chemical kinetics.

Typical examples are given and a list of experiments is also provided from which suitable experiments can be selected as convenient.

1. Heat of solution from Solubility measurements
2. Determination of Molecular weight
3. Determination of activity and activity coefficient
4. Construction of Phase diagram involving two / three component systems
5. Determination of partial molar quantities
6. Verification of Freundlich Adsorption isotherm
7. Reaction rate and evaluation of other kinetic parameters using polarimetry
8. Determination of Reaction rate and Rate constant using Analytical techniques: Conductometry and Dilatometry
9. Verification of Beer Lambert law.

Detailed list of Experiments for Physical Chemistry Practical I

Typical list of possible experiments is given.

Experiments of similar nature and other experiments may also be given.

Any 15 experiments have to be performed in a year.

1. Determine the temperature coefficient and energy activation of hydrolysis of ethyl acetate.
2. Study the kinetics of the reaction between acetone and iodine in acidic medium by half-life method and determine the order with respect to iodine and acetone.
3. Study the effect of solvent (DSMO-water, acetone-water system) on the rate of acid catalysed hydrolysis of acetal by dilatometry.
4. Study the Saponification of ethyl acetate by sodium hydroxide conductometrically and determine the order of the reaction.
5. Determine the order with respect to Silver (I) in the oxidation and rate constant and for uncatalysed reaction.
6. Study the inversion of cane sugar in the presence of acid using Polarimeter.
7. Determine the rate constant and order of the reaction between potassium persulphate and potassium iodide and determine the temperature coefficient and energy of activation of the reaction.
8. Study the effect of ionic strength on the rate constant for the saponification of an ester.
9. Study the salt effect on the reaction between acetone and iodine.

10. Study the kinetics of the decomposition of sodium thiosulphate by mineral acid (0.5M HCl).
11. Study the primary salt effect on the kinetics of ionic reactions and test the Bronsted relationship (iodide ion is oxidized by persulphate ion).
12. Study the kinetics of enzyme catalysed reactions (Activity of tyrosinase upon tyrosine spectrophotometrically).
13. Study the salt effect, the solvent effect on the rate law of alkaline hydrolysis of crystal violet.
14. Study the reduction of aqueous solution of ferric chloride by stannous chloride.
15. Determine the molecular weight of benzoic acid in benzene and find the degree of association.
16. Determine the activity coefficient of an electrolyte by freezing point depression method.
17. Study the phase diagram form-toluidine and glycerine system.
18. Construct the phase diagram for a simple binary system naphthalene - phenanthrene and benzophenone-diphenyl amine.
19. Construct the boiling point composition diagram for a mixture having maximum boiling point and minimum boiling point.
20. Study the complex formation between copper sulphate and ammonia solution by partition method.
21. Study the simultaneous equilibria in benzoic acid - benzene - water system.
22. Determine the degree of hydrolysis and hydrolysis constant of aniline hydrochloride by partition method.
23. Determine the molecular weight of a polymer by viscosity method.
24. Determine the viscosities of mixtures of different compositions of liquids and find the composition of a given mixture.
25. Determine the partial molal volume of glycine / methanol and formic acid / sulphuric acid by graphical method and by determining the densities of the solutions of different compositions.
26. Study the temperature dependence of the solubility of a compound in two solvents having similar inter molecular interactions (benzoic acid in water and in DMSO water mixture) and calculate the partial molar heat of solution
27. Construct the phase diagram of the three component of partially immiscible liquid system (DMSO-water benzene; acetone-chloroform -water; chloroform-acetic acid-water)
28. Construct the phase diagram of a ternary aqueous system of glucose -potassium chloride and water
29. Study the surface tension - concentration relationship for solutions (Gibb's equation)
30. Study the absorption of acetic acid by charcoal (Freundlich isotherm).
31. Study the complex formation and find the formula of silver-ammonia complex by distribution method.
32. Determine the dissociation constant of picric acid using distribution law

Marks distribution:

University examination	Marks
Procedure	10
Manipulation	25
Result	25
Viva voce	10
Record	05
Total	75

CONTINUOUS INTERNAL ASSESSMENT MARKS (CIA MARK): MAX.
MARKS = 25

Evaluation method for practical paper:

Distribution of Marks

Internal assessment	Marks
Two Tests	10
Results accuracy	10
Attendance/ Regularity	5
Total	25

**ELECTIVE
PAPER-2
(to choose 1 out of 3)**

A. GREEN CHEMISTRY

OBJECTIVES:

To know the principle and importance of green chemistry. To understand the student green chemistry strategies for designing the chemical synthesis. To know the solvent free synthesis. To make the students knowledgeable ultrasound and microwave assisted green synthesis.

OUTCOMES:

Have the knowledge on 12 rules on green chemistry.

Apply the attractive techniques in green synthesis.

Use of ionic liquids, and polymer supported reagents in green synthesis.

Apply the phase transfer catalysis in green synthesis.

UNIT- I: BASIC PRINCIPLES OF GREEN CHEMISTRY

Basic principles, prevention of waste/by-products, maximum incorporation of the reactants (starting materials and reagents) into the final product, prevention or minimization of hazardous products, designing safer chemicals, energy requirements for synthesis, selection of appropriate solvent, selection of starting materials, use of protecting groups, use of catalyst and products designed should be biodegradable.

UNIT- II: ULTRASOUND AND MICROWAVE ASSISTED GREEN SYNTHESIS

Ultrasound: Introduction, instrumentation, the phenomenon of cavitation. Sonochemical esterification, substitution, addition, alkylation, oxidation, reduction and coupling reactions.

Microwaves: Introduction, concept, reaction vessel/ medium, specific effects, atom efficiency (% atom utilization), advantages and limitations. N-alkylation and alkylation of active methylene compounds and Diels –Alder reactions. Reactions in water and reaction in organic solvents. Solvent free reactions and deprotection of esters.

UNIT- III: IONIC-LIQUIDS AS GREEN SOLVENTS

Introduction, structure, synthesis and applications of some important ionic liquids in organic synthesis.

Polymer supported reagents in green synthesis: Introduction - properties and advantages of polymer supported reagents and choice of polymers.

Substrate covalently bound to the support: Synthesis of oligosaccharides, intramolecular cyclisation. Selective chemical reactions on one aldehyde group of symmetrical aldehydes - Asymmetric synthesis.

Reagent linked to a polymeric material: Preparation of sulfonazide polymer and application in diazotransfer reaction. Synthesis of polymer bound per acid and its applications, synthesis of polystyrene tin dichloride resin and its applications.

Polymer supported catalytic reactions: Preparation of polymer supported AlCl_3 and applications - polymer supported photo sensitizers.

UNIT- IV: PHASE TRANSFER CATALYSIS IN GREEN SYNTHESIS

Introduction, mechanism of phase transfer catalyst reaction, types and advantages of phase transfer catalyst, types and applications of phase transfer reaction: Nitriles from alkyl or acyl halides, alkyl fluorides, alcohols, azides from alkyl halides, generation of dichlorocarbenes, addition to olefins, elimination reaction, alkylation reactions, Williamson synthesis, Benzoin condensation, Darzen reaction, Michael reaction, Wittig reaction, oxidation under PTC condition and reduction.

UNIT-V: INDUSTRIAL CASE STUDIES

Methyl Methacrylate (MMA)-Greening of Acetic acid manufacture, Vitamin-C- Leather manufacture-Types of Leather- Difference between Hide and Skin- Tanning –Reverse tanning-Vegetable tanning-Chrome tanning- Fat liquoring- Dyeing- Application- Polyethylene-Ziegler Natta Catalysis, Metallocene Catalysis- Eco friendly Pesticides- Insecticides.

Text Books:

1. New Trends in Green Chemistry, V. K. Ahluwalia, M. Kidwai, II Edn., Anamaya publishers New Delhi(2007).
2. Green Chemistry and Introductory text, Mike Lancaster, II Edition

3. Organic synthesis: Special techniques, V. K. Ahluwalia and R. Aggarwal, Narosa, New Delhi, 2003.

References:

4. Green Chemistry environment friendly alternatives, R. Sanghi and M M Srivastava, Narosa, New Delhi, 2003.
5. Green Chemistry – an introduction text, Royal Society of Chemistry, UK, 2002
6. P. T. Anastas and J. C. Warner, Green Chemistry theory and Practice, Oxford University press. Oxford (1988).
7. Phase Transfer Catalysis in Organic Synthesis, W. B. Weber, G. W. Gokel, Springer, Berlin, 1977.
8. Phase Transfer Catalysis, E. V. Dehmlov, S. S. Dehmlov, 2nd Edn., Verlagchemie, Wienhein, 1983.
9. Polymers as aids in Organic Synthesis, N. K. Mathur, C. K. Narang and R. E. Williams, Academic Press, NY, 1980.

PAPER-2

B. SUPRAMOLECULAR AND NANOCHEMISTRY

OBJECTIVES:

To know the student the basis of suprmolecular chemistry, metal-organic framework solids, nano materials and their applications. To understand the various techniques available to characterize the advanced nano materials. To identify the applications of nanotechnology.

OUTCOMES:

Understand the basic concepts of interaction in supramolecular structures.

Adequate knowledge on supramolecular frame works and synthesis.

Gain knowledge on synthesis and preparation of nanomaterials.

Understand the nanomaterials characterization and applications.

UNIT-I: SUPRAMOLECULAR CHEMISTRY

Definition of supramolecular chemistry. Nature of binding interactions in supramolecular structures: ion-ion, ion-dipole, dipole-dipole, H-bonding, cation-p, anion-p, p-p, and vander Waals interactions. Supramolecular synthons.

Self-assembly molecules: Design, synthesis and properties of the molecules, self-assembling by H-bonding, metal-ligand interactions and other weak interactions, metallomacrocycles, catenanes, rotaxanes, helicates and knots.

UNIT-II: FRAMEWORK SOLIDS

Introduction-definition of porosity, pore size, pore volume, pore density-zeolites-synthesis and applications-metal organic frame work solids-definition-classifications-uses of different types of organic ligands- tuning of structure and properties - synthetic methods- advantage of MOF solids over zeolites- cracking of petroleum products

UNIT-III: SYNTHESIS OF SUPRAMOLECULES

Synthesis and structure of crown ethers, lariat ethers, podands, spherands, cyclophanes, cryptophanes, carcerands and hemicarcerands., Host-Guest interactions, lock and key analogy. Binding of cationic, anionic, ion pair and neutral guest molecules.

Molecular devices: molecular electronic devices, molecular wires, molecular rectifiers, molecular switches and molecular logic.

UNIT-IV: NANOCHEMISTRY

Introduction and definition of nanoparticles and nanomaterials, emergence of nanotechnology, challenges of nanotechnology. Synthesis of nanoparticles of ZnO₂, TiO₂, silver, gold, rhodium, palladium and platinum; carbon materials- fullerene- porous nano carbon (PNC).

Techniques of synthesis: Electroplating and electrophoretic deposition, conversion through chemical reactions and lithography; Thin films: Chemical vapor deposition and atomic layer deposition techniques; Carbon fullerenes and nanotubes.

UNIT-V: ANALYTICAL CHARACTERIZATION AND APPLICATIONS

X-rays, Infrared, UV-Vis, Laser Raman, Electron microscopic techniques (SEM and TEM) - Thermal analysis (TG/DTA/DSC) methods.

Application of nanotechnology: modern technology in electronic, biological, consumer and domestic applications. Energy related application: photo-voltaic cells, energy storage nanomaterial. Drug delivery, drug targeting. Sensors and biosensors.

Reference Books

1. C.N.R. Rao, A. Muller, A.K. Cheetam (Eds), The Chemistry of Nanomaterials, Vol.1, 2, Wiley – VCH, Weinheim, 2004
2. Nanochemistry, Kenneth J. Klabunde and G.B.Sergeev
3. G.Zhong Cao. Nanostructures and Nanomaterials: Synthesis, Properties and Applications, Imperial College Press (2004)
4. Metal-Organic Frameworks Applications from Catalysis to Gas Storage. Cejka, J, ed. (2011). Wiley-VCH. ISBN 978-3-527-32870-3
5. Zeolites and Catalysis: Synthesis, Reactions and Applications. Jiri Cejka; Avelino Corma; Stacey Zones (2010). John Wiley & Sons. ISBN 978-3-527-63030-1.
6. J.-M. Lehn; Supramolecular Chemistry-Concepts and Perspectives (Wiley-VCH, 1995)

7. P. D. Beer, P. A. Gale, D. K. Smith; Supramolecular Chemistry (Oxford University Press, 1999)
8. J. W. Steed and J. L. Atwood; Supramolecular Chemistry (Wiley, 2000).
9. C. P. Poole Jr, F. J. Owens, Introduction to nanotechnology, 2nd edition, Wiley-India, Delhi, 2008.
10. C. C. Kouch, Nanostructures materials: Processing, properties and applications, William Andrew publications, Newyork, 2002.
- 11.** T. Pradeep, Nano: The essentials., McGrew Hill Education.(2007)

PAPER-2

C. MODERN SEPARATION TECHNIQUES

OBJECTIVES:

To learn the basic concept of chromatography. To understand the different chromatographic techniques. To study the applications of chromatography. To know the separation and purification methods.

OUTCOMES:

Have knowledge on principles on chromatography.

Working knowledge on gas and HPCL chromatographic techniques.

Adequate knowledge on application of ion-exchange chromatography.

Understanding on solvent extraction and distillation techniques

UNIT-I: BASIC CONCEPTS OF CHROMATOGRAPHY

General description: Definitions, terms and parameters used in chromatography. Classification of chromatographic methods. Elution chromatography on columns. Migration rates of solutes, zone broadening, column efficiency and optimization of column performance.

UNIT-II GAS CHROMATOGRAPHY(GC)

Principles of gas-liquid chromatography, instrumentation, carrier gas, sample injection, column configuration and detection system (FID, TCD, ECD). Gas chromatographic columns (open tubular columns and packed columns) and stationary phases. Interfacing GC/MS.

UNIT-III: HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

Column efficiency. Instrumentation: pumping system, sample injection system. Liquid chromatographic columns - types of column packing. Detectors: Absorbance detector and electrochemical detectors. Partition chromatography.

UNIT-IV: ION-EXCHANGE CHROMATOGRAPHY (IEC)

Definition, requirements for ion exchange resin. Synthesis and types of ion-exchange resins. Principle and basic features of ion - exchange reactions. Exclusion

chromatography: Theory and principle of size exclusion chromatography. Experimental techniques of gel-filtration chromatography (GFC) and gel-permeation chromatography (GPC). Materials for packing-factors governing column efficiency. Methodology and applications.

M.Sc. Chemistry: Syllabus (CBCS)

UNIT-V: PURIFICATION AND EXTRACTION TECHNIQUES

Principle and techniques: Desiccants, precipitation: types of precipitation, factors affecting the precipitation. Distillation: fractional, steam, azeotropic, vacuum distillations. Recrystallization and sublimation.

Solvent extraction: Principle and techniques. Factors affecting the extraction efficiency: Ion association complexes, chelation, synergistic extraction and pH. Role of chelating ligands in solvent extraction. Introduction to solid phase extraction (SPE) and microwave assisted extraction (MAE) and applications.

REFERENCES

1. Fundamental of Analytical Chemistry, D.A. Skoog, D.M. West, Holler and Crouch, 8th Edition, 2005, Saunders College Publishing, New York.
2. Analytical Chemistry, G.D. Christian, 5th ed., 2001 John Wiley & Sons, Inc, India.
3. Quantitative Analysis, R.A. Day and A.L. Underwood, 6th edition, 1993, prentice Hall, Inc. New Delhi.
4. Vogel's Textbook of Quantitative Chemical Analysis, J. Mendham, R.C. Denney, J.D. Barnes and M.J.K. Thomas, 6th edition, Third Indian Reprint. 2003 Pearson Education Pvt. Ltd., New Delhi.
5. Analytical Chemistry Principles, John H. Kennedy, 2nd edition, Saunders College Publishing, California, 1990.
6. Introduction to Chromatography Theory and practice, V.K.Srivastava, K.K.Srivastava, Chand & Company Ltd, New Delhi
7. Principles of Instrumental Analysis, , D.A. Skoog,,F.James Holler, Timothy.A.Nieman ,Harcourt Asia (P) Ltd
8. Principles of Instrumental Analysis, D.A. Skoog, , Saunders College Pub. Co, III Edn., 1985
9. Text Book of Quantitative Organic Analysis A.I Vogel, , ELBS III Edn, 1987.
10. Fundamentals of Analytical Chemistry, D.A. Skoog and D. M. West, Holt Rinehart and Winston Publications, IV Edn, 2004.
11. Instrumental Methods of Analysis, Willard, Merit, Dean and Settle, , CBS

- Publishers and Distributors, IV Edn.,1989
12. G. D. Christian and J. E. O. Reilly, Instrumental Analysis, Allyn and Bacon Inc, II Edn., 1988.
 13. R. M. Upadhyay , Instrumental & Analytical Chemistry Principles & Procedure Kalyani Publishers(2002).

OPEN ELECTIVE (NON MAJOR)
PAPER-II
(To choose 1 out of 3)

A. MEDICINAL CHEMISTRY

OBJECTIVES:

To make the students learn the concept of medicinal chemistry
To understand the various sources and classification of drugs
To learn the importance of Chemotherapy
To study about the common body ailments
To understand about health promoting drugs

OUTCOMES:

The students will be able to
Appreciate the importance of medicinal chemistry
Acquire knowledge of classification of drugs
Identify the importance of Chemotherapy
Acquire knowledge of common body ailments
Illustrate the importance of health promoting drugs

UNIT I-INTRODUCTION Common diseases – infective diseases – insect – borne, air – borne and water-borne – hereditary diseases – Terminology – drug, pharmacology, antimetabolites, absorption of drugs – factors affecting absorption – therapeutic index (Basic concepts only)

UNIT II-DRUGS Various sources of drugs, pharmacologically active constituents in plants, Indian medicinal plants – tulsi, neem, keezhanelli – their importance – Classification of drugs – biological chemical (Structure not required) Drug receptors and biological responses – factors affecting metabolism of drugs. (Basic concepts only)

UNIT III-CHEMOTHERAPY Drugs based on physiological action, definition and two examples each of anesthetics- General and local – analgesics – narcotic and synthetic – Antipyretics and anti inflammatory agents – antibiotics – Penicillin, Streptomycin, Antivirals, AIDS – symptoms, prevention, treatment – Cancer (Structure not required)

UNIT IV-COMMON BODY AILMENTS

Diabetes – Causes, hyper and hypoglycemic drugs – Blood pressure – Systolic & Diastolic Hypertensive drugs – Cardiovascular drugs – depressants and stimulants – Lipid profile – HDL, LDL cholesterol lipid lowering drugs. (Structure not required)

UNIT V-HEALTH PROMOTING DRUGS Vitamins A, B, C, D, E and K micronutrients – Na, K, Ca, Cu, Zn and I, Medicinally important inorganic compounds of Al, P, As, Hg and Fe, Examples and applications, Agents for kidney function (Aminohippuric acid). Agents for liver function (Sulfo bromophthalein), antioxidants, treatment of ulcer and skin diseases. (Structure not required)

RECOMMENDED TEXT BOOKS:

1. S.Lakshmi Pharmaceutical Chemistry, S.Chand & Sons, New Delhi, 2004
2. V.K. Ahluwalia and Madhu Chopra, —Medicinal Chemistry, Ane Books, New Delhi, 2008
3. P.Parimoo, — A Text Book of Medicinal Chemistry, CBS publishers, New Delhi, 2006

RECOMMENDED REFERENCE BOOKS

1. Ashutosh Kar, —Medicinal Chemistry, Wiley Eastern Ltd., New Delhi, 1993,
2. David William and Thomas Lemke, Foyes Principles of Medicinal Chemistry, BI Publishers.
3. Romas Nogrady, Medicinal Chemistry, Oxford Univ. Press 129

PAPER-II
(To choose 1 out of 3)

B.TEXTILE CHEMISTRY

OBJECTIVES:

To make the students learn the concept of textile chemistry

To understand about synthetic fibres

To learn the importance of raw cotton

To study about the dyeing process

To understand about finishes given to fabrics

OUTCOMES:

Appreciate the importance of textile chemistry

Acquire knowledge of synthetic fibres

Identify the importance of raw cotton

Acquire knowledge of dyeing

Illustrate the importance of finishes given to fabrics

UNIT I : 1. General classification of fibres-chemical structure, production, properties and uses of the following natural fibres (a) natural cellulose fibres (cotton and jute) (b) natural protein fibre (wool and silk).

UNIT II : Chemical structure, production, properties and uses of the following synthetic fibres. (i) Man made cellulosic fibres (Rayon, modified cellulose fibres) (ii) Polyamide fibres (different types of nylons) (iii) Poly ester fibres.

UNIT III : Impurities in raw cotton and grey cloth, wool and silk- general principles of the removal – Scouring – bleaching – Desizing – Kierboiling- Chemicking.

UNIT IV : Dyeing - Dyeing of wool and silk –Fastness properties of dyed materials – dyeing of nylon, terylene and other synthetic fibres.

UNIT V : Finishing- Finishes given to fabrics- Mechanical finishes on cotton, wool and silk, method used in process of mercerizing –Anti-crease and Anti-shrink finishes –Water proofing.

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Reference

1. Chemical Technology of fibrous Materials – F.sadov, M.Horchagin and A.Matetshy, Mir Publishers.
2. The Identification of Textile Fibres – Bruno Nuntak.
3. Introduction to Textile Science -3rd edition, Maryory L.Joseph.
4. Textile Chemistry –Vol.II R.H.Peters, Elsevier, Amsterdam.
5. Dyeing and chemical Technology of Textile fibres-5th Edition, E.R.Trotman, Charles Griffin & Co Ltd
6. Chemistry of dyes & Principles of Dyeing -V.A.Shenai, Sevak Publications.
7. Scouring and Bleaching E.R.Trotman, Charles Griffin & Co Ltd.

PAPER-II
(To choose 1 out of 3)

C.DAIRY CHEMISTRY

OBJECTIVES:

To make the students learn about dairy chemistry
To understand the importance of milk-lipids, proteins, carbohydrates and vitamins
To learn the importance of creams
To understand the importance of dairy detergents
To study about the milk powder and ice-cream

OUTCOMES:

The students will be able to
Identify the importance of dairy chemistry
Acquire knowledge of milk-lipids, proteins, carbohydrates and vitamins
Appreciate the importance of creams
Acquire knowledge of milk powder and ice-creams
Illustrate the importance of dairy detergents

UNIT I : Milk: General composition of milk factors affecting the gross composition of milk, physico-Chemical change taking place in milk due to processing parameters-boiling pasteurization- sterilization and homogenization.

UNIT II : 1. Milk lipids-terminology and definitions 2. Milk proteins:. Physical properties of milk proteins-Electrical properties and hydration, solubility. Reaction of milk proteins with formaldehyde and ninhydrin. 3. Milk carbohydrate-Lactose- Estimation of lactose in milk. 4. Milk vitamins-water and soluble vitamins, effect of heat and light on vitamins. 5. Ash and mineral matters in milk.

UNIT III : 1. Creams : Definition-composition-chemistry of creaming process- gravitational and centrifugal methods of separation of cream-Factors influencing cream separation (Mention the factors only)-Cream neutralization. Estimation of fat in cream. 2. Butter : Definition-% composition-manufacture-Estimation of fat, acidity, salt and moisture content-Desi butter. 113

UNIT IV : 1. Milk powder : Definition-need for making powder-drying process- spraying, drum drying, jet drying and foam drying-principles involved in each. Manufacture of whole milk powder by spray drying process-keeping quality of milk powder. 2. Ice cream : Definition-percentage composition-types- ingredients needed -manufacture of ice-cream stabilizers-emulsifiers and their role.

UNIT V : Dairy Detergents : Definition-characteristics-classification-washing procedure (modern method) sterilization-chloramin-T and hypochlorite solution.

Reference Books 1. Outlines of Dairy Technology-Sukumar De
2. Principles of Dairy Chemistry-Robert Jenness & S.Patton.
3. Indian Dairy products-K.S. Rangappa and K.T. Achaya.

**SECOND YEAR
SEMESTER III
PAPER - 7
ORGANIC CHEMISTRY III**

OBJECTIVE:

To understand the concepts of spectral techniques and to apply these techniques for the quantitative and structural analysis of organic compounds. To understand the concept of Photochemical and Pericyclic Reactions. To study the synthesis of heterocycles, vitamins and steroids.

OUTCOMES:

The student will be able to

- *Visualize the importance of UV-Visible and IR spectroscopy.*
- *Acquire knowledge of vibrational transition and identify various functional groups*
- *Apply the concept of Mass spectroscopy to different compounds*
- *Elucidate the structure of organic compounds using NMR*
- *Solve photochemical and pericyclic problems*
- *Illustrate the synthesis of heterocycles*

UNIT-I: UV AND IR SPECTROSCOPY AND THEIR APPLICATIONS

Ultraviolet-Visible spectroscopy: Types of electronic transitions - chromophores and auxochromes - factors influencing the positions and intensity of absorption bands - absorption spectra of dienes, polyenes and unsaturated carbonyl compounds - Woodward - Fieser rules and its applications.

Infra Red Spectroscopy: Vibrational frequencies and factors affecting them - identification of functional groups - intra and inter molecular hydrogen bonding – functional group region- finger print region.

UNIT-II: NMR SPECTRA AND ITS APPLICATIONS

Nuclear spin - magnetic moment of a nucleus - nuclear energy levels in the presence of magnetic field - basic principles of NMR experiments - CW and FT NMR - ^1H NMR - Chemical shift and coupling constant - factors influencing proton chemical shift and vicinal proton - proton coupling constant- ^1H NMR spectra of simple organic molecules such as $\text{CH}_3\text{CH}_2\text{Cl}$ and CH_3CHO . AX and AB spin system - nuclear overhauser effect-chemical exchange.

^{13}C NMR - proton decoupling and Off resonance decoupling spectra - factors affecting ^{13}C NMR chemical shift - ^{13}C NMR spectra of simple organic molecules.

UNIT-III: PHYSICAL METHODS OF STRUCTURAL DETERMINATION

Mass spectroscopy - Principles - measurement techniques - (EI, CI, FD, FAB, SIMS) - presentation of spectral data - molecular ions - isotope ions - fragment ions of odd and even electron types - factors affecting cleavage patterns - simple and multicentre fragmentation – Mc Lafferty rearrangement - Mass spectra of hydrocarbons, alcohols, phenols, aldehydes and ketones. ORD and its applications - Octant rule - Cotton effect - Axial halo ketone rule - Problem solving (for molecules with a maximum number of C10).

UNIT-IV: PHOTOCHEMISTRY AND PERICYCLIC REACTIONS

Photochemical excitation - fate of the excited molecules - Jablonskii diagram - study of photochemical reactions of ketone - photo reduction - photo cycloaddition - Paterno - Buchi reaction - di pi-methane rearrangement - Pericyclic analysis of electrocyclic - cyclo addition and sigmatropic reactions - correlation diagrams for butadiene - cyclobutene system - hexatriene to cyclohexadiene systems - structure of Bullvalene - fluxional molecule - Cope and Claisen rearrangement.

UNIT-V: HETEROCYCLES, VITAMINS AND STEROIDS

Synthesis of imidazole, oxazole, thiazole, flavones, isoflavones, anthocyanins, pyrimidines (cytosine, uracil only) and purines (adenine, guanine only). Synthesis of Vitamin-A1 using Wittig method. Conversion of cholesterol to progesterone, estrone and testosterone.

RECOMMENDED BOOKS

1. Francis A. Carey and Richard J. Sundberg, Advanced organic chemistry, III Edition (1990). G.A Swan, Introduction to alkaloids
2. I.L. Finar, Organic chemistry, Vol. II, 5th edition ELBS publication.
3. J. Dyer, Application of absorption spectroscopy of organic compounds, Prentice and Hall of India, Pvt., New Delhi.
4. J. March, Advanced organic reaction mechanism and structure, Tata McGraw Hill.
5. Neil S. Issac, Physical organic chemistry, ELBS publication 1987.
6. O.P. Agarwal, Chemistry of organic Natural Products, Goel Publishing House, Meerut.
7. P.S. Kalsi, Spectroscopy of organic compounds, Wiley Eastern Ltd., Chennai.
8. R.M. Silverstein, G.d. Bassler and Monsu, Spectrometric identification of organic compounds, John Wiley and Sons, New York.
9. S.M. Mukherji and S.P. Singh, Organic Reaction Mechanism, MacMillan India Ltd., Chennai (1990).
10. Schliemann, Introduction to the spectroscopic methods for the identification organic compounds, 2 volumes, Pergamon Press.
11. W. Kemp, Spectroscopy, Macmillan Ltd.,
12. Y.R. Sharma, Structural identification of organic compounds, S. Chand & Co.

13. R.O.C. Norman, J.M. Coxon, Principle of Organic Synthesis, ELBS Publications, 1994.
14. R. T. Morrison and R. N. Boyd, Organic chemistry, 6th edition, Prentice Hall of India Limited., New Delhi, 1992
15. Heterocyclic Chemistry, Vol. 1-3, R. R. Gupta, M. Kumar and V. Gupta, Springer Verlag.
16. The Chemistry of Heterocycles, T. Eicher and S. Hauptmann, Thieme.
17. Heterocyclic Chemistry, J. A. Joule, K. Mills and G. F. Smith, Chapman and Hall.
18. Heterocyclic Chemistry, T. L. Gilchrist, Longman Scientific Technical.
19. Charles H. Depey and Orville, Molecular Reaction and Photochemistry, L. Chapman, Prentice Hall of India Pvt., Ltd., New Delhi.

PAPER- 8

INORGANIC CHEMISTRY III

OBJECTIVE:

To study about the Coordination complexes, Substitution in Coordination complexes and Inorganic Photochemistry.

OUTCOMES:

The student will be able to

- *Explain about carbon donors*
- *Describe the structure and bonding of metallocenes (ferrocenes)*
- *Illustrate the different types of reaction of organo metallic compounds.*
- *Discuss the various catalysis processes in organo metallic chemistry.*
- *Explain the Electron transfer reactions of co-ordination compounds.*
- *Describe the various substitution reactions of coordination compounds.*
- *Analyse various types of photochemical reactions.*

UNIT-I: ORGANO METALLIC CHEMISTRY - I

Carbon donors: Alkyls and aryls metallation, bonding in carbonyls and nitrosyls, chain and cyclic donors, olefins, acetylene and allyl system. Synthesis, structure and bonding of metallocenes (ferrocene only).

Reactions: Association, substitution, addition and elimination reactions, ligand protonation, electrophilic and nucleophilic attack on ligands. Carbonylation, decarboxylation, oxidative addition and fluxionality.

UNIT-II: ORGANO METALLIC CHEMISTRY - II

Catalysis: Hydrogenation of olefins (Wilkinson's catalyst), hydroformylation of olefins using cobalt or rhodium catalysts (Oxo process), oxidation of olefins to aldehydes and ketones (Wacker process), polymerization (Ziegler - Natta Catalyst); cyclo oligomerisation of acetylene using nickel catalyst (Reppe's catalyst); polymer-bound catalysts.

UNIT-III: COORDINATION CHEMISTRY - IV

Electron transfer reactions, outer and inner sphere processes; atom transfer reaction, formation and rearrangement of precursor complexes, the bridging ligand, precursor and successor complexes. Marcus theory. Complementary, non-complementary and two electron transfer reactions.

UNIT-IV: COORDINATION CHEMISTRY - V

Substitution Reactions: Substitution in square planar complexes, reactivity of platinum complexes, influences of entering, leaving and other groups, the Trans effect.

UNIT-V: COORDINATION CHEMISTRY - VI

Substitution of octahedral complexes of cobalt and chromium, replacement of coordinated water, solvolytic (acids and bases) reaction applications in synthesis (platinum and cobalt complexes only).

Inorganic Photochemistry: Photo-substitution, Photoredox and isomerisation process, application of metal complexes in solar energy conversion.

Text books

1. R.C. Mehrotra, A. Singh, Organo Metallic Chemistry, Wiley Eastern Co., (1992).
2. F. Basolo and R.G. Pearson, Mechanism of Inorganic Reaction, Wiley NY (1967).
3. J. Huheey, Inorganic Chemistry, Harper and Collins, NY IV Edition, (1993).
4. K.F. Purcell and J.C. Kotz, Inorganic Chemistry, W. Saunders Co., (1977).
5. S. FA Kettle, Coordination Chemistry, ELBS, (1973).
6. F.A. Cotton and G. Wilkinson, Advanced Inorganic Chemistry, John Wiley and Sons, V Edition (1988).
7. D.F. Shrivvers, Pw. Atkins and C.H. Langford, Inorganic Chemistry, OUP (1990).
8. Guillermo J. Ferraudi, Elements of inorganic photochemistry, Wiley (1988).
9. Arthur W. Adamson, Paul D. Fleischauer, Concepts of inorganic photochemistry, Wiley(1975).

Suggested References

1. G. Coates M.I. Green and K. Wade. Principles of Organometallic chemistry, Methven Co., London (1988).
2. P. Powell, Principles of Organometallic chemistry, Chappman and Hall. (1998).
3. G.S. Manku, Theoretical Principles of Inorganic Chemistry, McGraw-Hill Education, (1984).
4. M.C. Day and J. Selbin, Theoretical Inorganic Chemistry, Van Nostrand Co., New York (1974).
5. R.B. Heslop and K. Jones, Inorganic Chemistry, Elsevier Scientific Publ., (1976).
6. F. Basolo and R.G. Pearson, Mechanism of Inorganic Reaction, Wiley NY (1967).
7. M.C. Day and J. Selbin, Theoretical Inorganic Chemistry, Van Nostrand Co., New York (1974).

8. B.E. Douglas DH McDaniel's and Alexander, Concepts and Models of Inorganic Chemistry, Oxford IBH (1983).
9. WU. Mallik, G.D. Tuli, R.D. Madan, Selected topics in Inorganic Chemistry, S. Chand and Co., New Delhi (1992).

PAPER-9

PHYSICAL CHEMISTRY III

OBJECTIVES:

To study the electrochemical kinetics, over potential, corrosions and fuel cells. To know the solid state and its properties. To Study the principles and applications of spectroscopy. To study statistical thermodynamics,

OUTCOMES:

The student will be able to

- *Derive Butler-Volmer equation and explain Pourbaix and Evan's diagram of corrosion.*
- *Explain electrical and magnetic properties of solids.*
- *Describe the basic principles and applications of microwave, vibrational, Raman, NMR and electronic spectroscopy.*
- *Compare Maxwell-Boltzmann and Fermi-Dirac and Bose-Einstein statistics.*

UNIT-1: ELECTROCHEMISTRY- III

Mechanism of electrode reactions - polarization and over potential - the Butler-Volmer equation for one step and multistep electron transfer reactions - significance of electron exchange current density and symmetry factors - transfer coefficient and its significance - mechanism of the hydrogen and oxygen evolution reactions.

Corrosion and passivation of metals - Pourbaix diagram - Evan's diagram - fuel cells - electrodeposition - principle and applications.

UNIT-II: SOLID STATE

Classification of solids - Imperfection in solids - point, line and plane defect - Electrons and holes - Non-stoichiometry - Imperfection and physical properties of solids (brief study). **Electrical properties** - electrical conductivity - Hall effect - dielectric properties - piezo electricity, Ferro electricity and conductivity; **Optical properties** - Photo conductivity -luminescence - color center - lasers - refraction - birefringence;

Magnetic properties - diamagnetism - paramagnetism - ferro - antiferro and ferrimagnetisms. Calculation of magnetic moments. Mechanical and thermal properties.

UNIT-III: SPECTROSCOPY - I

Microwave spectroscopy – Rotational spectroscopy of rigid rotator - non rigid rotator - diatomic and polyatomic molecules.

Vibrational spectroscopy - Harmonic oscillator - anharmonicity - vibrational spectra of polyatomic molecules - vibrational frequencies - group frequencies - vibrational coupling- overtones - Fermi resonance.

Raman Spectroscopy- Raman effect, Stoke's and Anti-stoke's lines, rotational and vibrational Raman spectra.

Electronic spectroscopy - Progressions and sequences, selection rules, Franck - Condon principle, types of electronic transitions - solvent effects.

UNIT-IV: SPECTROSCOPY- II

Resonance spectroscopy - Zeeman effect - equation of motion of spin in magnetic fields - chemical shift - spin-spin coupling - NMR of simple AX and AMX type molecules - calculation of coupling constants - ^{13}C , ^{19}F , ^{31}P NMR spectra - applications - a brief discussion of Fourier Transformation Resonance Spectroscopy.

UNIT-V: STATISTICAL THERMODYNAMICS- I

Objectives of statistical thermodynamics - concept of thermodynamic and mathematical probabilities - permutations and combinations, distribution of distinguishable and non-distinguishable particles. Stirling approximation, Maxwell - Boltzmann distribution law - Fermi - Dirac and Bose - Einstein statistics - comparison with Maxwell -Boltzmann distribution law and their applications - radiation law - electron gas in metals.

Partition function - evolution of translational, vibrational and rotational partition functions for mono and diatomic ideal gases.

Text Books

S.Glasstone, Introduction to Electrochemistry, Affiliated East West Press, New Delhi (1960).

D.R. Crow, Principles and Applications to Electrochemistry, Chapman and Hall (1991).

S. Glasstone, Introduction to Electrochemistry, Affiliated East West Press, New Delhi (1960).

P.H.Rieger, Electrochemistry, Chapman and Hall, New York (1994).

R.Crow, Principles and Applications to Electrochemistry, Chapman and Hall (1991).

Lesley E.Smart, Elaine A.Moore, Solid State Chemistry - An Introduction
 Charles Kittel - Introduction to Solid State Physics
 Anthony R. West - Solid State Chemistry and its Applications
 C.N. Banwell and E.M. McCash, Fundamentals of Molecular spectroscopy, IV - Edition,
 Tata McGraw Hill (2005).
 N. Sathyanarayana, Vibrational Spectroscopy, New Age International Publishers (2004).
 Carington and Ad. Mclachlan, Introduction to Magnetic Resonance, Harper and Row,
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 M. C.Gupta, Statistical thermodynamics, Wiley Easter, New Delhi (1990).
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J.O.M. Bokris and A. K. N. Reddy, Electrochemistry, Vol. 1 and 2, Plenum, New York
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 H.Reiger, Electrochemistry, Chapman and Hall, New York (1994).
 W.J. Moore, Physical Chemistry, Orient Longman, London (1972).
 J.M. Murrell, S.F.A. Kettle and J.M. Tedder, The Chemical Bond, Wiley (1985).
 R.C. Ropp, Solid State Chemistry
 C N. Banwell, Fundamentals of Molecular Spectroscopy, Mc Graw Hill (1966).
 Raymond Chang, Basic Principles of Spectroscopy, McGraw Hill Ltd., New York
 (1971).
 G M. Barrow, Introduction to Molecular Spectroscopy, Mc Graw Hill, New York (1962).
 W. Kemp, NMR in Chemistry, Mc Millan Ltd., (1986).
 D. Mclauchlan, Magnetic Resonance, Oxford Chemistry Series, Oxford (1970).
 P. Staughan and S. Walker, Spectroscopy, Vol. I, II & III, Chapman and Hall (1976).
 J.K. Sanders and B.K. Hunter, Modern NMR Spectroscopy, A Guide for Chemists,
 Oxford University Press, Oxford (1987).
 Jk.M. Sanders, E.C. Constable and B.K. Hunter, Modern NMR Spectroscopy - a Work
 Book of Chemical Problems, Oxford (1989).
 Francis W Sears and Gerhard L Salinger, Thermodynamics, kinetic theory, and statistical
 thermodynamics.
 P. Dalahay, Electrode Kinetics and Structure of Double Layer, Inter Science, New York
 (1965).

**CORE ELECTIVE
PAPER-3
(to choose 1 out of 3)**

A. Scientific Research Methodology

OBJECTIVES:

To study about the importance of research, literature survey, error analysis, statistical treatment. To study about the conventions of writing thesis.

OUTCOMES:

Understanding the importance of research and literature sources.

Knowledge on isolation and purification techniques.

Adequate knowledge on assessing the quality of analytical data.

Working knowledge on report writing.

UNIT-I: INTRODUCTION

Nature and importance of research - aims, objective, principles and problems - selection of research problem - survey of scientific literature - primary and secondary sources - citation index for scientific papers and journals - patents.

UNIT-II: CONDUCT OF RESEARCH WORK

Physical properties useful in analysis and methods of separation prior to analysis - Isolation techniques - extraction - Soxhlet extraction, crystallization, sublimation - methods for vacuum sublimation and distillation under reduced pressure.

Chemistry of working with hazardous materials - acid / base / water sensitive, corrosive, toxic, explosive and radioactive materials.

UNIT-III: EVALUATION OF ANALYTICAL DATA

Precision and accuracy - Reliability - determinate and random errors - distribution of random errors - normal distribution curve.

UNIT-IV: STATISTICAL TREATMENT OF ANALYTICAL DATA

Statistical treatment of finite samples - the students test and F test - criteria for rejection of an observation - the Q test, significant figures and computation rules - data plotting - least square analysis.

UNIT-V: THESIS AND ASSIGNMENT WRITING

Conventions of writing - the general format - page and chapter format - use of quotations and footnotes - preparation of tables and figures - referencing - appendices - revising editing and evaluating the final product - proof reading - meanings and examples of commonly used abbreviations.

REFERENCES

1. Douglas A. Skoog and Donald, M. West, Fundamental of analytical chemistry, Halt Saundersons International Edition.
2. J. Anderson, H.M. Durston and M.Poole, Thesis and assignment writing - Wiley Eastern Ltd., (1970).
3. J. March, Advanced organic chemistry - reactions, Mechanism & Structure. McGraw Hill Student Edition.
4. Vogel's Textbook of quantitative chemical analysis, ELBS edition.
5. Rajammal P. Devados, Research Methodolgy.

**CORE ELECTIVE
PAPER-3
B. ADVANCED BIOINORGANIC CHEMISTRY**

OBJECTIVES:

- 1. To learn the importance of Bioinorganic Chemistry*
- 2. To learn the role of metal ions in the biologically important complexes*
- 3. To learn mechanism of photosynthesis*

OUTCOMES:

*Understand the principles of bioinorganic chemistry.
Knowledge on metalloporphyrins and metalloenzymes.
Understand the role of metals in medicine.
Have knowledge on nitrogenfixation and photosynthesis.*

UNIT - I: SCOPE OF BIOINORGANIC CHEMISTRY

Introduction: Trace elements, complex formation, hard and soft acids and bases (HSAB), inert and labile complexes. Amino acids and proteins - structure of proteins, peptide bond - enzymes - nucleic acid - carbohydrates - blood - plasma.

Concepts of essentiality - evolution of essential trace elements - future essential trace elements- role of minerals - working of essential trace elements - essential ultra trace elements - essential ultra trace nonmetals.

UNIT - II: METALLOPORPHYRINS

Respiratory proteins: Hemoglobin and Myoglobin - structure and functions - oxygenation reactions - structure and functions relationship - structural models for dioxygen binding - synthetic models for oxygen binding - models for Hemoproteins – Hemerythrin - Hemocyanin. Non-redox metalloenzymes: Peroxidase, Catalase and Alcohol Dehydrogenase (Structure, mechanism of action and model compound)

UNIT - III: METALLOENZYMES

Copper enzymes: Superoxide dismutase, cytochrome oxidase and ceruloplasmin - Molybdenum enzymes: Pyridoxal oxidase and xanthine oxidase. Zinc enzymes:

Carbonic anhydrase and carboxy peptidase. Cobalt enzyme: Vitamin B₁₂.
Biom mineralization – Siderophores - Ferritin and Transferrin,

UNIT - IV: METALS IN MEDICINE

Metal deficiency and disease - toxicity of mercury, cadmium, lead, beryllium, selenium and arsenic - biological defence mechanism - meaning and example of chelation therapy - Metals used for diagnosis (Tc, Fe and Co) - Metals in medicine: platinum complexes as anticancer drugs, Pt-DNA binding, complexes of gold, copper, zinc, mercury, arsenic and antimony as drugs.

UNIT - V: NITROGEN FIXATION AND PHOTOSYNTHESIS

Nitrogenase enzyme: Reactivity, reduction involving nitride / diazene intermediate, dinitrogen complexes and their reactivity in vitro nitrogen fixation. Photosynthesis: Structure of chlorophyll in green plants (Z- Scheme) - ATP synthesis - Role of manganese complex in oxygen evolution - dark reaction (Calvin cycle).

TEXT BOOKS

1. K. Hussain Reddy, Bioinorganic Chemistry, New Age international publishers (2007)
2. S. J. Lippard & J. M. Berg. Principles of Bioorganic Chemistry, Panima Publ. Corp. (2005).
3. E. I. Ochiai. Bioinorganic Chemistry – An Introduction, Allyn and Bacon Inc. (1977).
4. M.N. Hughes, Inorganic Chemistry of Biological Processes, John Wiley & Sons, 2nd Edition, 1985
5. R.P. Hanzlik. Inorganic Aspects of Biological and Organic Chemistry, Academic Press (1976)

REFERENCE BOOKS

1. H. Kraatz & N. Metzler-Nolte (Eds.). Concepts and Models in Bioinorganic Chemistry, Wiley (2006).
2. I. Bertini, H. B. Gray, S. J. Dippard & J. S. Valentine, Bioinorganic Chemistry, Viva Books Pvt. Ltd. (2004).
3. A.W. Addison, W.R. Cullen, D. Dolphin & B.R. James (eds.). Biological Aspects of Inorganic Chemistry, John Wiley (1977).
4. R.J.P. Williams & J.R.R.F. Dasilva. New Trends in Bioinorganic Chemistry, Academic Press (1978).

5. A. E. Martell. Inorganic Chemistry in Biology and Medicine, ACS Symp. Series, ACS (1980).
6. S. J. Lippard. Progress in Inorganic Chemistry: Bioinorganic Chemistry, Vol. 38, John Wiley (1990).
7. N. Kaim & B. Schwederski. Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life, John Wiley (1994).
8. Advanced Inorganic Chemistry, F.A. Cotton and G. W. Wilkinson. John Wiley & Sons, 5th Ed. 1988.
9. Inorganic Chemistry, Principles of Structure and Reactivity, J. E. Huheey, E.A. Keiter 4th Ed. Harper Collins, 1993.
10. Bioinorganic chemistry, R. W. Hay, Halsted Press, 1984.
11. Principles of Bioinorganic Chemistry, S. J. Lippard and J.M. Berg, Panima Publishing Corporation, 2nd Ed., 1995.

CORE ELECTIVE

PAPER-3

C. ADVANCED ANALYTICAL TECHNIQUES

OBJECTIVES:

On the completion the course the students will have the knowledge of various instrumental techniques. The students should have learnt data analysis and electroanalytical techniques.

OUTCOMES:

Have knowledge on electro analytical techniques.

Understand the use of non-destructive method of chemical analysis.

Knowledge on basic and advanced microscopic techniques.

Adequate knowledge on thermal and radiochemical analytical methods.

UNIT-1: ELECTROANALYTICAL TECHNIQUES:

Voltametry - coulometry - amperometry – potentiometry – polarography - electrolytic conductivity - impedance spectroscopy.

UNIT-1I: CHEMICAL ANALYSIS:

Non-destructive techniques: Wavelength and energy dispersive X-ray fluorescence spectroscopy (WDS and EDS) - X-ray absorption spectroscopy (XANES and EXAFS) - secondary ion mass spectrometry (SIMS) - temperature programmed desorption (TPD) - thermal desorption spectroscopy (TDS).

Destructive techniques: Atomic absorption spectroscopy (AAS) - inductively coupled plasma-atomic emission spectroscopy (ICP-AES).

UNIT-1II: IMAGING AND DEPTH PROFILING:

Basic concepts in surface imaging - secondary electron microscopy (SEM) - secondary Auger microscopy (SAM) - scanning probe microscopy (SPM) - scanning tunneling microscopy (STM) - transmission electron microscopy (TEM) - surface imaging - depth profiling. Associated techniques of microscopy and spectroscopy.

UNIT- IV: THERMAL ANALYSIS:

Thermo gravimetric and differential thermal analysis - thermometric titrations - differential scanning colourimetry - basic instrumentation and applications.

UNIT-V: RADIOCHEMICAL METHODS

Hot atom chemistry – the Szilard – chalmers process, chemistry of recoil atoms, chemical effects on radioactive decay, solvated electron. Uses of radiations in the study of matter, neutron activation analysis, dilution analysis, dosimetry, synthesis of organic and inorganic compounds by irradiation. Radiometric analysis and radiography.

TEXT BOOKS:

1. R. Wiesendanger, *Scanning Probe Microscopy and Spectroscopy*, Cambridge University Press, 1994.
2. Frank A. Settle, *Handbook of instrumental techniques for analytical chemistry*, Prince Hall, New Jersey, 1997.
3. K. W. Kolasinski, *Surface science: Foundations of catalysis and nanoscience*, John Wiley and Sons, West Susses, 2002.
4. D. A. Skoog, D. M. West, F. J. Holler and S. R. Couch, *Fundamentals of analytical chemistry*. Brooks/ColeCengage learning, New Delhi, 2004.
5. P. Atkins and J. de Paula, *Atkins' physical chemistry*, 8th Ed., Oxford University Press, New Delhi, 2008.
6. T. Pradeep, *Nano: The essentials*, McGraw-Hill Education, New Delhi, 2010.
7. F. Scholz, *Electroanalytical Methods*, Springer, 2nd Ed., 2010.
8. Allen J. Bard and Larry R. Faulkner, *Electrochemical Methods: Fundamentals and Applications*, 2nd edition 2001, John Wiley & Sons
9. Allen J. Bard (Ed), *Electroanalytical Chemistry*, Vol.13, Plenum Press 1983
10. Joseph Wang, *Analytical Electrochemistry*, 3rd edition 2006, John Wiley & Sons
11. D.A .Skoog, 1985, *Principles of Instrumental Methods of analysis*, III Edition, Saunders College Publ.
12. Willard Merri, Dean and Settle, 1986, *Instrumental methods of analysis*, VI Edition, CBS Publ.
13. D.A. Skoog and D.M. West, 1982, *Fundamentals of Analytical Chemistry*, IV Edition, old Reinhold & Winston, Publication

SUGGESTED REFERENCE BOOKS:

1. G.D.Christian & J.E.O. Reily, 1986, *Instrumental Analysis*, II Edition, Allegen Recon.
2. H.A. Strobel, 1976, *Chemical Instrumentation*, Addition- Wesley Publ Co.

3. Kolthoff and Elwing (All Series) - Treatise on Analytical Chemistry.
4. Willson Series - Comprehensive Analytical Chemistry.
5. Willard, Merit, Dean and Settle, Instrumental Methods of Analysis, CBS Publishers and Distributors, IV Edn. 1986
6. Schoog, Holler, Nieman, Principles of Instrumental Analysis, Thomson Asia Pte Ltd., Singapore, 2004.

**OPEN ELECTIVE
PAPER-3
(To choose 1 out of 3)**

A.INDUSTRIAL CHEMISTRY-II

OBJECTIVES:

*To make the students learn about electrochemical industries
To understand the importance of agrochemical industries
To learn the importance of petroleum and fuel gases
To study about the paints and varnishes
To understand the importance of Cement, Ceramic and Glass*

OUTCOMES:

*The students will be able to
Identify the importance of electrochemical industries
Acquire knowledge of agrochemical industries
Appreciate the importance of petroleum and fuel gases
Acquire knowledge of paints and varnishes
Illustrate the importance of Cement, Ceramic and Glass*

UNIT I Electrochemical Industries: Production of materials like chlorine, caustic soda ,sodium chlorate, perchlorates, Batteries – primary and secondary cells, solar cells, fuel cells.

UNIT II Agrochemical industries: Important categories of insecticides, fungicides, herbicides, rodenticide, Mode of action and synthesis of common pesticides like gammexane, DDT, aldrin, Parathion, Malathion, Baygon,

UNIT III Petroleum : Origin, refining, Cracking, reforming ,knocking and octane number, LPG, synthetic gas, synthetic petrol. **Fuel Gases:** Large scale production, storage, hazards and uses of coal gas, water gas, producer gas, and oil gas.

UNIT IV Paints & Varnishes: Primary constituents of paints, Dispersion medium (solvent), binder Pigments, formulation of paints and varnishes. Requirements of a good paint.

Cleansing Agents: Preparation of toilet and washing soaps, synthetic detergents-alkyl aryl sulphonates, ethanalamines, nonionic detergents, builders, additives, corrosion inhibitors. 124

UNIT V Cement : Manufacture – Wet Process and Dry process, types, analysis of major constituents, setting of cement, reinforced concrete. Cement industries in India. **Ceramics:** Important clays and feldspar, glazing and vitrification. **Glass:** Composition and manufacture of glass .Types of glasses- optical glass, coloured glasses and lead glass.

Reference : 1. B.N.Chakrabarty, Industrial Chemistry, Oxford & IBH Publishing Co, New Delhi, 1981.

2. B.K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut.

3. P.P.Singh, T.M.Joesph, R.G.Dhavale, College Industrial Chemistry, Himalaya Publishing House, Bombay, 4th Ed., 1983 125

OPEN ELECTIVE PAPER-3

B. SCIENCE OF PHOTOGRAPHY

OBJECTIVES:

To make the student understand the principles of photography.

To make the student understand concepts of image formation.

To make the student understand the concept motion image and film.

To allow the student to have a deep knowledge of photography and photographic systems.

OUTCOMES:

The students will be able to

Learning the basic concepts of photography

Explaining the types and characteristics of Lens and filters

Acquiring the knowledge of functions of films and SD cards

Gaining the knowledge of aesthetic photography and lightings.

UNIT I: BASICS OF PHOTOGRAPHY

Photography- Definition and concept-Nature and Functions of Photography- Historical development of Photography- Camera-Introduction to camera- Human Eye and Camera - Concept of Visual Perception-Basics of Camera: Different types of Camera- Box - TLR- SLR and Digital; Parts and Functions of Camera- Aperture- Shutter- Lens and Film-Camera Accessories.

UNIT II: LENS

Lens- Definition and Concept- Nature and Characteristics of Lens- Types of Lens- Wide angle- Normal and Tele- Special Lens- Zoom- Fish eye and Macro Lens- Focus- Definition and Concept- Types of Focus- Split Image and Macro Image Focusing- Focal Length- Types of Focal Length- Short- Long and Variable Focal Length- Exposure- Depth of Field Aperture Priority and Shutter Priority- Filter- Definition and concept- Characteristics of Filters- Types of Filters- UV- Polarizing Filter- Grey Grad Color Balancing Filter- Neutral Density Filter and Soft Focus Filter.

UNIT III: PHOTOGRAPHIC FILM

Film- Definition and Concept- Function and Characteristics of Film- Cross Section of Film- Types of Film- Film Speed Definition- Functions of Film Speed- Types of Film Speed- Fast Speed and Slow Speed- Film Speed Numbers- ASA- ISO and DIN- Digital Storage- Digital Storage process- Types of Digital Storage- Compact Flash (CF)- Secure Digital Card(SD)- Mini SD Card- Micro SD and etc.- Film Developing Process- Developing- Fixing- Washing and Drying- Film Printing Process- Digital Printing Process.

UNIT IV: LIGHTING

Lighting- Definition and concept- Nature of Light- Characteristics of Light- Understanding Light- Indoor and Outdoor-Types of Light- Natural and Artificial- Three Point Lighting- Key-Fill and Back Light- Types of Lighting Equipments Pro-lit- Soft Box and etc- Different accessories of Lighting- Umbrella- andetc- Flash- Functions of Flash- Light MeterDefinition and concept- Functions of Light Meter.

UNIT V: AESTHETICS OF PHOTOGRAPHY

Aesthetics of Photography- Framing- Characteristics of Framing- Composition- Characteristics of Compositions- Types of Composition- Rule of Third- Frame within Frame and Etc.- Scope of Photography- Types of Photography- Photo Journalism-Ad Photography- Natural Photography- Wild life Photography- Fashion Photography and Industrial Photography.

TEXT BOOKS

1. James Curran, The Photography Handbook, 2nd Edition, Routledge, 2013.
2. Ben Long, Complete Digital Photography, 6th Edition, PTR, 2010.

REFERENCES

1. Linda Good, Teaching and Learning with Digital Photography, Sage Publications, 2009.
2. Ian Jeffrey, The Photography Book, Focal Press, 2nd Edition, 2000.
3. Michael Langford, Basic Photography, Focal Press, 6th Edition, 2000.

OPEN ELECTIVE PAPER-3

C.ENERGY RESOURCES

OBJECTIVES:

To make the students to understand about energy resources

To understand the importance of solar energy

To learn the importance of energy from the ocean

To study about the wind energy and hydrogen energy

To understand the importance of energy management

OUTCOMES:

The students will be able to

Identify the importance of energy resources

Appreciate the importance of solar energy

Analyze the importance of energy from the ocean

Acquire knowledge of wind energy and hydrogen energy

Identify the importance of energy management

UNIT I: INTRODUCTION TO ENERGY SOURCES

Renewable and non-renewable energy sources, energy consumption as a measure of Nation's development - strategy for meeting the future energy requirements Global and National scenarios-Prospects of renewable energy sources.

UNIT II: SOLAR ENERGY

Solar radiation - beam and diffuse radiation, solar constant, earth sun angles- attenuation and measurement of solar radiation-solar cooker, solar heating and cooling of buildings- photo voltaics - solar cells and its applications.

UNIT III: ENERGY FROM THE OCEAN

Ocean Thermal Electric Conversion (OTEC) systems like open cycle-closed cycle- Hybrid cycle- prospects of OTEC in India. Energy from tides- basic principle of tidal power- single basin and double basin tidal power plants- advantages- limitation and scope of tidal energy.

UNIT IV: WIND ENERGY AND HYDROGEN ENERGY

Principle of wind energy conversion-Basic components of wind energy conversion systems-wind mill components-various types and their constructional features Hydrogen Energy-Introduction- Hydrogen Production methods-Hydrogen storage-hydrogen transportation-utilization of hydrogen gas-hydrogen as alternative fuel for vehicles.

UNIT V: ENERGY MANAGEMENT

Energy economics-energy conservation-energy audit-general concept of total energy system-scope of alternative energy system in India.

TEXTBOOKS

1. Rai. G.D., Non-conventional energy sources, 4th Edition, Khanna Publishers, 2009.
2. Garg H.P. & Jai, Solar Energy: Fundamentals and Applications by Prakash, Tata McGraw Hill, 1977.
3. Singhal B.L., Alternative Energy Sources, 2nd Edition Tech Max Publication, 2007.

REFERENCES

1. Duffie J.A and Beckman W.A ,Solar Engineering of Thermal Processes , 3rd Edition ,John Wiley & sons, New York, 1975.
2. Giri.N.K, Alternate energy sources and application, 2nd Edition, Khanna Publication, 2004.
3. Sukhatme S,P, Solar Energy: Principles of Thermal Collection and Storage, 3rd Edition ,Tata McGraw Hill, 2008.

SEMESTER IV
PAPER - 10
ORGANIC CHEMISTRY IV

OBJECTIVE:

To know the methods of synthetic strategies and applications. To apply the knowledge of chemical reactions in organic synthesis. To learn the chemistry of terpenes and alkaloids and their importance. To understand the techniques involved in the rearrangements and their synthetic utility. To understand the different chromatographic techniques and their applications. To know the separation and purification methods.

OUTCOMES:

The student will be able to

- *Develop problem solving skills requiring application of chemical reaction.*
- *Acquire knowledge of terpenes and alkaloids.*
- *Elucidate the structure of proteins and nucleic acids.*
- *Solve problems related to molecular rearrangements*
- *Attain skills on separation and purification of organic compounds.*

UNIT-I: MODERN SYNTHETIC METHODS, REACTIONS AND REAGENTS

Synthesis of simple organic molecules using acetylation and alkylation of enamines, Grignard reactions, Diels - Alder reaction, phosphorus and sulphur ylides, Robinson annulation. Retrosynthetic Analysis: Basic principles and terminology of retrosynthesis, one group and two group C-X disconnections, one group C-C and two group C-C disconnections, amine and alkene synthesis. Protection and deprotection of functional groups

(R-OH, R-CHO, RCO-R, R-NH₂ and R-COOH). Uses of the following reagents: DCC, Trimethylsilyliodide, 1,3-Dithiane (Umpolung), and diisobutylaluminiumhydride (DIBAL).

UNIT-II: TERPENES AND ALKALOIDS

Introduction - classification - isoprene rule - structural determination of terpenoids - Citral, geraniol - linalool - farnesol - α -pinene and camphor.

Introduction - isolation of alkaloids - total synthesis of quinine - morphine and reserpine.

UNIT-III PROTEINS AND NUCLEIC ACIDS

Proteins - peptides and their synthesis - synthesis of tripeptide - Merrifield synthesis - determination of tertiary structure of protein - biosynthesis of proteins - nucleic acids - types - DNA & RNA polynucleotide chain - components - biological functions - structure

and role of (genetic code) DNA and RNA (nucleotides only) - Biosynthesis of Cholesterol

UNIT-IV: MOLECULAR REARRANGEMENTS

A detailed study with suitable examples of the mechanism of the following rearrangements: Wagner - Meerwein, Pinacol - Pinacolone, Demjanov, Dienone - phenol, Favorskii, Baeyer - Villiger, Wolff, Hofmann- Lofler-Freytag – Sommelet- Hauser-Stevens and Von Richter rearrangements.

UNIT-V: SEPARATION AND PURIFICATION TECHNIQUES

Thin layer chromatography, Gas Chromatography, HPLC, Ion-exchange chromatography- Basic principles and applications.

Distillation: fractional, steam, azeotropic and vacuum distillations. Recrystallization of organic compounds.

Recommended Books:

1. Eric E.Conn, Paul. R. Stumpf, George Bruening and Roy H. Dole, Outlines of Biochemistry, V Edition, John Wiley and Sons.
2. Stuart Warren, Work book for organic synthesis, The Disconnection Approach, John Wiley & Sons (Asia) Pvt. Ltd.
3. I. L. Finar, Organic Chemistry, Vol. II, V Edition ELBS publication.
4. J. March, Advanced organic reaction mechanism and structure, Tata McGraw Hill.
5. L. Smith, Robert L. Hill I. Robert Lehman, Robert J. Let Rowitz, Philip Handlar and Abraham white, Principles of Biochemistry General Aspects, VII Edition McGraw Hill Int.,
6. Lubert Stryer, Biochemistry, Freeman and Co., New York.
7. O.P. Agarwal, Chemistry of organic Natural Products, Goel Publishing House, Meerut.
8. Parmer and Chawla, Organic reaction mechanisms, S. Chand and Co.,
9. Paul de Mayo, Molecular Rearrangements, Vol. I and II.
10. Fundamental of Analytical Chemistry, D.A. Skoog, D.M. West, Holler and Crouch, 8th Edition, 2005, Saunders College Publishing, New York.
11. Analytical Chemistry, G.D. Christian, 5th ed., 2001 John Wiley & Sons, Inc, India.
12. Quantitative Analysis, R.A. Day and A.L. Underwood, 6th edition, 1993, prentice Hall, Inc. New Delhi.
13. Vogel's Textbook of Quantitative Chemical Analysis, J. Mendham, R.C. Denney, J.D. Barnes and M.J.K. Thomas, 6th edition, Third Indian Reprint. 2003 Pearson Education Pvt. Ltd., New Delhi.
14. Analytical Chemistry Principles, John H. Kennedy, 2nd edition, Saunders College Publishing, California, 1990.
15. Introduction to Chromatography Theory and practice, V.K. Srivastava, K.K. Srivastava, Chand & Company Ltd, New Delhi
16. S. M. Mukherji and S.P. Singh, Organic Reaction Mechanism, MacMillan India Ltd., Chennai (1990).

PAPER-11

PHYSICAL CHEMISTRY-IV

OBJECTIVE

To study the principles of photochemical reactions. To study the Experimental methods and kinetics studies of photochemical reactions. Study of electrode - electrolytic interface. To study the fundamental principles of quantum chemistry and its application to chemical bonding. Schrödinger wave equation and its applications. To study statistical thermodynamics, quantum statistics and irreversible thermodynamics.

OUTCOMES:

The student will be able to

- *Explain photophysical processes with the help of Jablonski diagram and analyze stern-volmer equation.*
- *Describe photovoltaic, galvanic cell and solar energy conversion.*
- *Illustrate Schrodinger equation and its applications.*
- *Explain Huckel theory of conjugate molecules and compare LCAO and MO theory for diatomic molecules.*
- *Illustrate Einstein and Debye heat capacity models and Derive Sackur tetrode equation.*

UNIT- I: PHOTOCHEMISTRY - I

Absorption and emission of radiation - Franck - Condon Principle - decay of electronically excited states - Jablonski diagram - radiative and non-radiative processes - fluorescence and phosphorescence - spin forbidden radiative transition - Internal conversion and intersystem crossing - energy transfer process - kinetics of unimolecular and bimolecular photophysical processes - excimers and exciplexes - static and dynamic quenching - Stern-Volmer analysis.

UNIT- II: PHOTOCHEMISTRY - II

Experimental methods - quantum yield and life time measurements - steady state principle - quantum yield and chemical actinometry.

Kinetics of photochemical reactions: hydrogen and halogen reactions,

Brief study about photoredox, photosubstitution, photoisomerization and photosensitized reactions - photovoltaic and photogalvanic cells, photo electrochemical cells, photo-assisted electrolysis of water, aspects of solar energy conversion.

UNIT- III: QUANTUM CHEMISTRY - I

Failure of classical mechanics - Compton effect - wave particle duality - uncertainty principle - waves - wave equation for electrons - quantum mechanical postulates - The concept of operators - Hermitian property. Schrodinger wave equation - application of Schrodinger's equation - the particle in a box (one, and three dimensional cases) - particle in a ring, solution to rigid rotor and harmonic oscillator. Schrodinger equation for hydrogen atom (no derivation is required) and the solutions.

UNIT- IV: QUANTUM CHEMISTRY - II

Approximation methods - Perturbation and Variation methods - application to hydrogen molecule and helium atoms. Born - Oppenheimer approximation - valence bond theory for hydrogen molecule - LCAO - MO theory for diatomic molecules. Concept of hybridization - Huckel theory for conjugated molecules (Ethylene, butadiene and benzene).

UNIT- V: STATISTICAL THERMODYNAMICS - II

Thermodynamic functions in terms of partition functions - application of partition function to heat capacity of ideal gases - nuclear partition function - contribution to heat capacity of ortho and para hydrogen. Heat capacity of solids - Einstein and Debye models, Negative Kelvin temperature. Entropy of monoatomic gases - Sackur-Tetrode equation.

Irreversible thermodynamics - forces and fluxes - linear force - flux relation - phenomenological equations.

TEXT BOOKS

N.J.Turro, Modern Molecular Photochemistry, Benjamin, Cumming, Menlo Park, California (1978).

K.K.Rohatgi, Mukherjee, Fundamentals of Photochemistry, Wiley Eastern Ltd., (1978).

R.K. Prasad, Quantum Chemistry, Wiley Eastern, New Delhi (1992).

D.A. Mcquarrie, Quantum Chemistry, University Science Books, Mil Valley, California (1983).

Quantum Chemistry, Allyn and Bacon, Boston (1983).

R.Anantharaman, Fundamentals of Quantum Chemistry, Mac Millan India Limited (2001).

M.W. Hanna, Quantum Mechanics in Chemistry, W.A. Benjamin Inc. London (1965).

M.C.Gupta, Statistical thermodynamics, Wiley Easter, New Delhi (1990).

R.Hasee, Thermodynamics Of Irreversible Process, Addition Wesley, Reading, Mass (1969).

L.K. Nash, Elements of Chemical Thermodynamics, Addision Wesley (1962).

G.M. Barrow, Physical Chemistry, McGraw Hill (1988).

R.L. De Koch and H.B. Gray, Chemical Structure and Bonding, Benjamin- Cumming, Menlo Park, California. S.Glasstone, Text Book of Physical Chemistry.M.Sc. Chemistry: Syllabus (CBCS)

Suggested References

A.K. Chandra, Introductory Quantum Chemistry, Tata Mc Graw Hill.

D.A. Mc Quarrie, Quantum Chemistry, University Science Books, Mill Valley, California (1983).

P.W. Atkins, Molecular Quantum Mechanics, Oxford University Press, Oxford (1983).

J.G.Clavert and J.N.Pitts, Photochemistry, Wiley, London (1966).

R.P.Wayne, Photochemistry, Butterworths, London (1970).

B.J.Mc Clenlland, Statistical Thermodynamics, Chapman and Hall, London (1973).

Cleyde, Physical Chemistry, Schaum Series, Mc Graw Hill (1976).

Dole, Thermodynamics, Prentice Hall, New York (1954).

Prigogine, Introduction to Thermodynamics of Irreversible Process, Interscience, New York (1961).

N.O.Smith, Elementary Statistical Thermodynamics - A Problem Approach, Plenum Press, NewYork (1961).

G.Clavert and J.N.Pitts, Photochemistry, Wiley, London (1966).

R.P.Wayne, Photochemistry, Butterworths, London (1970).

Francis W Sears and Gerhard L Salinger, Thermodynamics, kinetic theory, and statistical thermodynamics.

**CORE PRACTICAL
PRACTICAL PAPER - 4
ORGANIC CHEMISTRY PRACTICAL - II**

I. ANY SIX PREPARATIONS FROM THE FOLLOWING INVOLVING TWO STAGES

1. sym-Tribromo benzene from aniline (bromination, diazotization and hydrolysis)
2. Benzanilide from benzophenone (addition and Beckmann rearrangement)
3. m-Nitro benzoic acid from methyl benzoate (nitration and hydrolysis)
4. 2, 4.- Dinitrobenzoic acid from p-nitrotoluene (oxidation and nitration)
5. m-Nitro benzoic acid from benzaldehyde (oxidation and nitration)
6. Benzil from benzaldehyde (rearrangement)
7. Anthraquinone from phthalic anhydride (Friedel Crafts reaction)
8. Acetyl salicylic acid from methyl salicylate (hydrolysis and acetylation)
9. 2- Phenyl indole from phenyl hydrazine (Fischer indole reaction)
10. m-nitroaniline from nitrobenzene (nitration and reduction)

II. ANY TWO EXERCISES IN THE EXTRACTION OF NATURAL PRODUCTS

1. Caffeine from tea leaves
2. Lactose from milk
3. Citric acid from lemon
4. Piperine from black pepper

III. CHROMATOGRAPHIC SEPARATIONS

1. Column chromatography - Separation of anthracene and picric acid from anthracene picrate.
2. Thin layer chromatography - Separation of green leaf pigments.
3. Paper chromatography - Identification of amino acid.

IV. ANY FIVE ESTIMATIONS

1. Estimation of aniline
2. Estimation of phenol
3. Estimation of glucose
4. Estimation of ethyl methyl ketone
5. Estimation of amino group
6. Estimation of amide group
7. Saponification of fat or an oil
8. Iodine value of an oil
9. Estimation of sulphur in an organic compound

**V.SPECIAL INTERPRETATION OF ORGANIC COMPOUNDS USING UV, IR,
PMR AND MASS SPECTRA OF THE FOLLOWING 15 COMPOUNDS**

[See ANNEXURE – I]

Recommended Books

Arthur I.Vogel, A text book of Practical Organic Chemistry, ELBS

Raj K. Bansal, Laboratory Manual of Organic Chemistry, Wiley Eastern limited.

UNIVERSITY EXAMINATION MARKS

University Examination	Marks
Estimation	25
Preparation	25
Interpretation of spectra	10
Viva Voce	10
Record	05
Total	75

CONTINUOUS INTERNAL ASSESSMENT MARKS (CIA MARK)

MAX. MARKS = 25

Evaluation method for practical paper:

Distribution of Marks

Internal assessment	Marks
Two Tests	10
Results accuracy	10
Attendance/ Regularity	5
Total	25

**PRACTICAL
PAPER - 5
INORGANIC CHEMISTRY PRACTICAL - II**

1. ANALYSIS OF ORES

1. Determination of percentage of calcium and magnesium in dolomite.
2. Determination of percentage of MnO_2 in pyrolusite.
3. Determination of percentage of lead in galena.

II. ANALYSIS OF ALLOYS

1. Estimation of tin and lead in solder.
2. Estimation of copper and zinc in brass.
3. Estimation of chromium and nickel in stainless steel.

III. ANALYSIS OF INORGANIC COMPLEX COMPOUNDS

1. Preparation of cis and trans potassium bis (oxalato) diaquochromate(III) and analysis of each of these for chromium.
2. Preparation of potassium tris (oxalato) ferrate (III) and analysis for iron and oxalate.

**IV. QUANTITATIVE ANALYSIS OF THE FOLLOWING MIXTURES
(one by volumetric and one by gravimetric method)**

1. Copper and Nickel
2. Copper and Zinc
3. Iron and Nickel
4. Iron and Magnesium

V. COLORIMETRIC ANALYSIS USING PHOTOELECTRIC METHOD

1. Estimation of iron
2. Estimation of nickel
3. Estimation of manganese
4. Estimation of copper

VI. AMPEROMETRIC TITRATIONS (With dead stop endpoint)

1. Thiosulphate - iodine system
2. Iron (II) - cerium (IV) systems.

Reference book.

N.N. Greenwood and A. Earnshaw, Chemistry of the Elements, Vol.II, Pergamon Press (1997)

VII. SPECTRAL INTERPRETATION OF THE FOLLOWING INORGANIC COMPOUNDS

[See ANNEXURE – II]

UNIVERSITY EXAMINATION MARKS

University Examination	Marks
I. Estimation of mixture containing two metal ions	
procedure	5
Volumetric analysis	15
Gravimetric analysis	10
II. Colorimetric estimation (or) Amperometric titration	
Estimation	15
Procedure	5
III. Interpretation of spectra	10
Viva Voce	10
Record	05
Total	75

CONTINUOUS INTERNAL ASSESSMENT MARKS (CIA MARK)

MAX. MARKS = 25

Evaluation method for practical paper:

Distribution of Marks

Internal assessment	Marks
Two Tests	10
Results accuracy	10
Attendance/ Regularity	5
Total	25

**PRACTICAL
PAPER - 6
PHYSICAL CHEMISTRY PRACTICAL- II**

**EXPERIMENTS IN ELECTROCHEMISTRY:
CONDUCTOMETRY, POTENTIOMETRY, PH METRY AND SPECTROSCOPY.**

I. CONDUCTIVITY MEASUREMENTS

1. Determination of equivalent conductance of a strong electrolyte and verification of Debye - Huckel - Onsager Equation
2. Verification of Debye-Huckel limiting law
3. Verification of Ostwald's Dilution law for a weak electrolyte.
4. Determination of pK_a values of weak acids and weak bases.
5. Conductometric titrations between acid (simple and mixture of strong and weak acids) - base,
6. Precipitation titrations including mixture of halides.

II. E.M.F MEASUREMENTS

1. Determination of standard potentials (Copper, Silver & Zinc)
2. Determination of thermodynamic quantities from EMF measurements –
3. Potentiometric titrations – Neutralization reactions
4. Determination of pH of buffer solution and calculation of pK_a .
5. Determination of stability constant of a complex.
6. Determination of solubility product of a sparingly soluble salt.
7. Potentiometric titrations – Redox titrations.
8. Potentiometric titrations – Precipitation titration of mixture of halides by EMF measurements.

III. SPECTROSCOPY: INTERPRETATION OF SPECTRA [See ANNEXURE – III].

1. Experiments given only to familiarize the interpretation of spectra provided.
2. Interpretation of UV-Visible spectra of simple molecules for the calculation of molecular data
3. Identification of functional groups (5 typical spectra will be provided).
4. IR and NMR spectral calculations of force constant and coupling constants respectively
5. Identification and interpretation of a spectra (5 each in IR and NMR will be provided)

LIST OF EXPERIMENTS SUGGESTED FOR PHYSICAL CHEMISTRY PRACTICAL II

Typical list of possible experiments are given.

Experiments of similar nature and other experiments may also be given.

The list given is only a guideline.

Any 15 experiments have to be performed in a year.

1. Determination of the equivalent conductance of a weak acid at different concentrations and verify Ostwald's dilution law and calculate the dissociation constant of the acid.
2. Determination of equivalent conductance of a strong electrolyte at different concentrations and examine the validity of the Onsager's theory as limiting law at high dilutions.
3. Determination of the activity co-efficient of Zinc ions in the solution of 0.002M Zinc sulphate using Debye-Huckel limiting law.
4. Determination of the solubility product of silver bromate and calculate its solubility in water and in 0.01 M KBrO_3 using Debye-Huckel limiting law.
5. Conductometric titrations of a mixture of HCl , CH_3COOH and CuSO_4 and NaOH .
6. Determination of the dissociation constant of an acid at different dilution.
7. Determination of the solubility of the lead iodide in water, 0.04 M KI and 0.04 M $\text{Pb}(\text{NO}_3)_2$ at 298 K
8. Determination of the solubility product of leadiodide at 298 K and 308 K and calculate the molar heat of solution of lead iodide.
9. Compare the relative strength of acetic acid and mono chloroacetic acid by conductance method.
10. Determine the basicity of organic acids (oxalic /benzoic).
11. Determine the electrode potentials of Zn and Ag electrodes in 0.1M and 0.001M solutions at 298 K and find the standard potentials for these electrodes and test the
12. Determine the activity co-efficient of an electrolyte at different molalities by EMF measurements.
13. Determine the dissociation constant of acetic acid titrating it with sodium hydroxide using quinhydrone as an indicator electrode and calomel as a reference electrode.
14. Study of the electrolytic separation of metals (Ag, Cu, Cd and Zn)
15. Determine the strength of a given solution of KCl using differential potentiometric titration technique.

16. Determine the dissociation constant of acetic acid in DMSO, DMF, acetone and dioxane by titrating it with KOH.
17. Determine the transport number of Ag ions and nitrate ions by Hittorf's method.
18. Determine the transport number of cadmium ions and sulphate ions by measuring emf of concentration cells with and without transference.
19. Determine the dissociation constant of monobasic or dibasic acid by all the Alber-Serjeant method.
20. Determine the pH of the given solution with the help of indicators using buffer solutions and by colorimetric method.
21. Perform acid-base titration in a non aqueous medium.
22. Determine the pH of a given solution by EMF method using glass and calomel electrodes and evaluate pK_a value of an acid.
23. Determine the pH of a given solution by emf methods using hydrogen electrode and quinhydrone electrode.
24. Estimate the concentration of cadmium and lead ions by successive reduction in polarography. Verify Illkovic equation.
25. Determine lead ion by amperometric titrations with potassium dichromate.
26. Determine ferric ion by amperometric titration.
27. Determine pH value of an acid-base indicator (methyl red) by colorimetry.
28. Determine the composition and instability constant of a complex by mole ratio method.
29. By colorimetry determine simultaneously Mn and Cr.
30. Study the effect of solvent on the conductivity of AgNO₃/acetic acid and determine the degree of dissociation and equilibrium constant in different degree of dissociation and mixtures (DMSO, DMF, dioxane, acetone, water) and test the validity of Debye-Huckel Onsager's equation.
31. Determine the solubility of Ca(TiO₃)₂ in deionised water and in dilute solution of KCl at 298 K. Determine the solubility product graphically.
32. Determine the equivalent conductivity of a Ca electrolyte and dissociation constant of the electrolyte.
33. Determine the equivalent dissociation constant of a polybasic acid.
34. Calculate the thermodynamic parameters for the reaction $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ by emf method.
35. Determine the formation constant of silver-ammonia complex and stoichiometry of the complex potentiometrically.
36. Determine the stability constant of a complex by polarographic method.
37. Determine the g value from a given ESR spectrum.

**CORE ELECTIVE
PAPER- 4
(to choose 1 out of 3)**

A. INORGANIC CHEMISTRY-IV

OBJECTIVE:

To study about the Inorganic Spectroscopy and Nuclear Chemistry.

OUTCOMES:

The students will be able to

- *Explain the different types of inorganic spectra and also interpretation.*
- *Applying and interpreting NMR spectrums of various inorganic compounds.*
- *Applying and interpreting ESR spectrums of various inorganic compounds.*
- *Describe Koopman's theorem, structure, chemical shift and correlation with electronic charges of photo electron spectroscopy.*
- *Illustrate the principle, instrumentation and applications of AAS, AES and AFS.*

UNIT-I: INORGANIC SPECTROSCOPY - I

Applications to inorganic systems of the following: ultra violet, visible, infra-red and Raman spectra of metal complexes, organometallic and simple inorganic compounds with special reference to coordination sites and isomerism.

UNIT-II: INORGANIC SPECTROSCOPY - II

Application to Inorganic systems of the followings

NMR, NQR and Mossebauer spectra - NMR of ^{31}P , ^{19}F , NMR shift reagents. NQR - Nitrosyl compounds. Mossebauer spectra of Fe and Sn systems.

UNIT-III: INORGANIC SPECTROSCOPY - III

ESR Introduction - Zeeman equation, g-value, nuclear hyperfine splitting, interpretation of the spectrum, simple carbon centered free radicals. Anisotropy - g-value and hyperfine splitting constant. McConnell's equation, Kramer's theorem. ESR of transition metal complexes of copper, manganese and vanadyl complexes.

Photoelectron spectroscopy (UV and X-ray) - photo electron spectra - Koopman's theorem, fine structure in PES, chemical shift and correlation with electronic charges.

UNIT-IV: INSTRUMENTAL ANALYSIS - I

AAS, AES and AFS – Principle, instrumentation and applications, advantages of AAS, interferences; GLC and HPLC – Principle, instrumentation and working, types of detectors; Inductively coupled plasma spectroscopy (ICP)- introduction, instrumentation, interferences and applications.

UNIT-V INSTRUMENTAL ANALYSIS - II

Laser Raman spectroscopy - principle, interfaces, advantages and applications.

Magnetic susceptibility and its determination - Guoy method, Faraday method and applications.

Polarography and Amperometry - Principle, instrumentation and applications.

TEXT BOOKS

1. A. Earnshaw, Introduction to Magneto Chemistry, Academic Press, London, (1968).
2. C.N.R. Rao, I.R. Ferraro, Spectroscopy in Inorganic Chemistry, Vol. I and Vol. II, Academic Press, (1970).
3. D. A. Skoog and D.M.West, Principles of Instrumental Methods of Analysis, Saunder's College Publ. III Edition, (1985).
4. E. A. V. Ebsworth, D. W. H. Rankin and S. Cradock, Structural Methods in Inorganic Chemistry, II Edition, Blackwell Scientific Publications, Oxford, London (1991).
5. G.D. Christian and J.E.G. Reily, Instrumental Analysis, Allegn Becon, II Edition, (1986).
6. H.A. Strobel, Chemical Instrumentation, Addison - Wesley Pub. Co., (1976).
7. R. S. Drago, Physical Methods for Chemists, Saunders College Publishing, Philadelphia (1992).
8. Willard Merrit, Dean and Settle, Instrumental methods of analysis, CBS Publ. VI edition, (1986).

Suggested References

1. AI Vogel, Text book of Qualitative Analysis - IV Edition (1985).
2. C. N. Banwell and E.M. Mc Cash, Fundamentals of Molecular Spectroscopy, IV edition, Tata McGraw Hill, New Delhi (1994).
3. D.A. Skoog D.M. West, Holt Reinhert and Winston, Fundamental of Analytical Chemistry, Publication, IV Edition (1982).
4. D.N. Sathyanarayana, Electronic Absorption Spectroscopy and Related Techniques, Universities Press (India) Ltd., Hyderabad (2001).
5. FA Cotton and G Wilkinson, Advanced Inorganic Chemistry, John Wiley and Sons, V Edition (1988).

6. G. Aruldas, Molecular Structure and spectroscopy, Prentice Hall of India Pvt. Ltd., New Delhi (2001).
7. J. Huheey, Inorganic Chemistry, Harper and Collins, NY, IV Edition, (1993).
8. J. M. Hollas, Modern Spectroscopy, IV edition, John Wiley & Sons, Ltd., Chichester (2004).
9. M.C. Shriver, P.W Atkins, CH. Langford, Inorganic Chemistry, OUP (1999).
10. Nakamoto, Infrared and Raman Spectra of Inorganic and Coordination Compounds, III Edn., John Wiley and Sons, New York, (1986).
11. O. Khan, Molecular Magnetism, New York, VCH (1993).
12. R.L. Carlin, Magneto chemistry, Springer-Verlag, New York, (1986).
13. S.F.A.Kettle, Physical Inorganic Chemistry: A Coordination Chemistry Approach, Oxford University Press, (1998)

CORE ELECTIVE PAPER-4

B. ENVIRONMENTAL CHEMISTRY

OBJECTIVES:

To understand the concept of different types of pollution. To learn the various techniques involved in the analysis of pollutants. To know the methods for the control of pollution

OUTCOMES:

The students will be able to

Understanding of adverse effect of pollution.

Knowledge on sampling techniques.

Understanding on the adverse effect of air, water, and noise pollution.

Awareness on radioactive pollution.

UNIT-I AIR POLLUTION AND WATER POLLUTION

Classification of air pollution according to origin, chemical composition and state of matter - effects of air pollutants on living and nonliving things - ambient air quality standards - problems of air pollution in India - pollutions in industrial area (cement industry and thermal power plant) - Effect and consequences of air pollution: acid rain, green house effect, global warming and ozone depletion - major air pollution disasters - Bhopal Gas Leak - Chernobyl Nuclear Accident and Three Mile Island disaster.

Classification of water pollutants: DOD, BOD and COD - Effects of water pollutant on life and Environment.

UNIT-II SAMPLING AND ANALYSIS OF WATER AND AIR POLLUTANTS

Methods of sampling of gaseous, liquid and solid pollutant - analysis and effect of sulfur oxides, nitrogen oxides and carbon monoxide - biochemical effects and toxicology of Cd, Cr, As, Pb and Cu. Environmental implications of fertilizers, insecticides, pesticide - effect of pesticide residue on life - analytical techniques for pesticides residue analysis (Neutron Activation Analysis, Anodic Stripping Voltammetry and Atomic Absorption Spectroscopy) .

UNIT-III METHODS OF CONTROL OF AIR AND WATER POLLUTION

Methods of control of air pollution: Electrostatic precipitations - wet and dry scrubber, filters, gravity and cyclonic separation - adsorption, absorption and condensation of gaseous effluent.

Methods of control of water pollution: Water and waste water treatment - aerobic and anaerobic - aeration of water - principle of coagulation, flocculation, softening, disinfection, demineralization and fluoridation.

UNIT – IV NOISE POLLUTION

The decibel scale - effect: physiological, psychological, acute and chronic - Measurement of noise level (Sound level meter, Magnetic tap recorder, noise limit indicator) - noise control in industries: Administrative, engineering and path control - Protection of the personne (ear plugs, ear muffs. Helmets) - acoustic absorptive materials - noise control methods in industrial plants.

UNIT-IV RADIOACTIVE POLLUTION

Classification: Non-ionizing and ionizing radiation - radioactive pollution and their sources - natural and anthropogenic - biological effect of radiation on the human body - radiation doses -preventive measure from nuclear radiation - regulations from safety measure.

Radioactive wastes: Classification - low level and high level - radioactive waste disposal - geological disposal - ocean dumping - sub-sea bed dumping - subductive waste disposal method - transmutation of high - level radioactive waste - radioactive waste management in India.

TEXT BOOKS

1. S.S Dara ,“ A Text Book of Environmental chemistry and Pollution Control “,S.. Chand & company Ltd, New Delhi
2. V. K. Ahluwalia,” Environmental chemistry”, Ane Books India, Chennai.
3. Anu Gopinath and Chandradasan, Environmental Chemistry., Vishal Publishing Co, Delhi.

REFERENCE BOOKS

1. A. K. De. “Environmental Pollution”, New age intenational publishers, New Delhi
2. G. S. Sodhi, “Fundamental Concepts of Environmental Chemistry”, Narosa Publishing House, New Delhi.
3. S.M. Khopkar, Environmental Pollution Analysis,
4. S. P.Mahajan, Pollution control in process industries.

<http://www.nios.ac.in/media/documents/313courseE/L36.pdf>

<http://www.iisc.ernet.in/currsci/dec252001/1534.pdf>

<http://www.sciencelog.net/2014/12/radioactive-pollution-causes-and-effect.html>

http://collegesat.du.ac.in/UG/Envinromental%20Studies_ebook.pd

**CORE ELECTIVE
PAPER - 4
C. MEDICINAL CHEMISTRY AND DRUG DESIGN**

Objectives:

Students should be able to understand concepts of drug design and mechanism of drug action of different drugs. Students will be aware of metabolism and delivery methods of different classes of drugs.

OUTCOMES:

The students will be able to

Have knowledge on principles of drug design and development.

Understanding the mechanism of drug action.

Acquire Knowledge on various types of medicinal compounds.

Gain Knowledge on quantitative analysis of drugs.

UNIT-I: DRUG DESIGN

Development of new drugs, concepts of pro-drugs and soft drugs, Principles of drug design, Quantitative structure activity relationships. History and development of QSAR (Quantitative Structure Activity Relationships) - Concepts of drug parameters. High throughput Screening.

UNIT-II: IMPORTANCE AND MECHANISM OF DRUG ACTION

Antibiotics: Drug action of penicillin, cephalosporin, tetracycline and macrocyclic antibiotics (no synthesis). Antimalarials: Trimethoprim- NSAIDs: Paracetamol, Meperidine, Aminopyrine-Ibuprofen, Oxyphenylbutazone, Diclophenac sodium, Indomethacin-Antitubercular and antileprotic: Ethambutol, Isoniazide and Daspace - Anaesthetics: Lidocaine, - Antihistamines: Phenobarbital, Diphenylhydramine- Tranquilizers: Diazepam, Trimeprazine, Thiopental - Anti AIDS agents: Acyclovir, Ganciclovir.

UNIT-III: PHYSICO-CHEMICAL FACTORS AND BIOLOGICAL ACTIVITIES

Physical properties - Features governing drug action - Structurally specific - nonspecific drugs -Thermodynamic activity - Theories - Cut-off point - Factors governing ability of drugs -Absorption - Distribution - Excretion - Biotransformation - Intramolecular distances -Dissociation constants - Isosterism and Bioisosterism.

UNIT-IV: CLASSIFICATION OF MEDICINAL COMPOUNDS

Central Nervous system acting drugs – (General and Local anaesthetics, Sedatives and Hypnotics, Anticonvulsants, Narcotic and Non-narcotic analgesics, Anti-

Parkinsonian agents, Anti-depressants, Tranquilizers, Psychomimetics) - Pharmacodynamic agents (Anti-arrythmics, Anti-anginals, Vasodialators, Anti-hypertensives, Diuretics, Antihistamines) - Chemotherapeutic Agents (Antibiotics, Antivirals, Antifungals) - Drugs for metabolic and endocrine disorders (Anti-thyroid drugs, Anti-diabatic drugs, biosynthetic insulin) – Therapeutic Index (Definitions with examples).

UNIT-V: DRUG ANALYSIS

Principles of quantitative analysis of the following drugs in formulations: Aspirin - benzyl penicillin - ascorbic acid - isoniazid - codeine - chloramphenical - riboflavin and folic acid.

Reference Books

1. Burger's Medicinal Chemistry & Drug discovery, Vol 1-3, 5th Ed, 1995.
2. Wilson, Gisvold & Dorque: Text book of Organic Medical and Pharmaceutical Chemistry, 10th Ed, Lippincoh pover publishers, 1998.
3. David A Williams, William O. Foye & Thomas L. Lemke, Foye's Principles of medicinal Chemistry, 6th Edition, Lippincott Williams & Wilkins, 2002.
4. Zubay G, Biochemistry, Maxwell Macmillan International Editions, second edition, 1987.
5. R. L. Foster, The Nature of Enzymology, Croom Helm, 1980.
6. D. L. Purich, (Ed), Contemporary Enzyme kinetics and Mechanisms, Academic Press, 1983.
7. Dugas H, Bio-organic Chemistry, A chemical approach to enzyme action, Springer 2003.
8. Chemistry of drug design and drug action-. R. B. Silverman (2004) Acad. press
9. Graham Patrick, An Introduction to Medicinal Chemistry- 2nd Edn. Qxford, 2010
10. N. K. Jain, Advances in Controlled and Novel Drug Delivery, CBS, 2001.
11. Lednicer, The Organic Chemistry of Drug Synthesis, Vol. 1, 5th Edition, John Wiley & Sons, 2001.
12. Foye's Principles of Medicinal Chemistry, Sixth Edition, Wolters Kluwer, 2008
13. G.R. Chatwal, Medicinal Chemistry, Himalaya Publishing House.
14. V.K. Ahluwalia and M. Chopra, Medicinal Chemistry, Ane Book Pvt. Ltd., 2008.
15. J. B. Taylor and P . D. Kenewell., Introductory medicinal chemistry.
16. D. C. Garratt., Quantitative analysis of drugs.
17. G. L. Patrick., An introduction to medicinal chemistry.
18. Beckett and Stenlake., Practical pharmaceutical chemistry. Vol 1 and 2.

**OPEN ELECTIVE
PAPER-4
(To choose 1 out of 3)**

A.POLYMER AND PLASTICS

OBJECTIVES:

- *To make the students learn the concept of polymers and plastics.*
- *To understand the classification of polymers.*
- *To understand the methods of molecular weight determination.*
- *To learn the importance of freons and rubber.*
- *To appreciate the applications of plastics*

OUTCOMES:

The student will be able to

- *Classify the different types of polymers.*
- *Illustrate the importance of stereochemistry of polymers*
- *Apply the methods for determination of molecular weight*
- *Acquire knowledge on the various types of rubber*
- *Differentiate thermoplastic and thermosetting plastic*

UNIT-I 1.1. Basic concepts : An introduction to polymers and macro molecules. Natural and synthetic polymers. Classification of Polymers-addition and condensation polymers. 1.2. General methods of preparation of polymers. Polymerization through functional groups, multiple bonds and ring opening. Coordination polymerization.

UNIT-II 2.1. Structure of polymers- linear, branched and cross linked Stereochemistry of polymers-Isotactic, Syndiotactic and Atactic. 2.2. properties of polymers : The crystalline melting point. The glassy state and glass transition temperature.

UNIT-III 3.1. Copolymerisation – Definitions – homo and copolymers. Block copolymers and Graft copolymers. 3.2. Molecular weight of polymers. Number average molecular weight and weight average molecular weight. Determination of molecular weight by Viscosity and Osmometry methods.

UNIT-IV 4.1. Poly olefins-polythene, PTFE, Freons, PVC, polypropylene and polystyrene. 4.2. Natural and synthetic rubbers.-Constitution of natural rubber. Butyl, Buna, Buna-S, Buna-N, Neoprene, SBR, Thiocol, Polyurethane and silicone rubbers. 138

UNIT-V 5.1. Plastics and Resins Definitions. Thermoplastic and thermosetting resins. Constituents of plastic-fillers, dyes, pigments, plasticizers, Lubricants and catalysts. Uses of thermoplastic resins and thermo setting resins.

REFERENCES: 1. V. R. Gowrikar ,N.V.Viswanathan : Polymer Science- Wiley Eastern Limited ,New Delhi. 1986
2. R.B.Seymour, Introduction to Polymer Chemistry, MC Craw Hill, New York 1971.
3. S.S.Dara , A Text Book in Engineering Chemistry, S.Chand & Company Ltd, New Delhi. Third Edition ,!992.

OPEN ELECTIVE PAPER-4

B.BASICS OF FORENSIC SCIENCE

OBJECTIVES:

To define forensic science or criminalistics, and describe the major contributors to the development of forensic science.

To define the physical evidence of a crime scene and explain the difference between the identification and

comparison of physical evidence of crimes

To demonstrate the ability to identify, collect, and preserve a variety of fingerprint types and will demonstrate the ability to analyze components

To explain the various methods for analyzing DNA from a crime scene

OUTCOMES:

Learn the concept and basics of forensic sciences

Gaining the knowledge of microanalysis of DNA

Describing the forensic engineering and finger print analysis

Explaining the legal aspects and trace analysis

UNIT I: CONCEPTS OF FORENSIC SCIENCE

Forensic Science- History and Development of Forensic Science - What Is a Forensic Scientist? - Career Information – Indian and Other Forensic Science Systems - The Organization of Forensic Science Laboratories- The Functions of the Forensic Scientist -Crime Scene Investigation - The Crime Scene as Recent History - Preserving and Recording the Crime Scene - Crime Scene Investigation Process - Recognition of Bloodstain Patterns – other examples.

UNIT II: FORENSIC SCIENCE IN THE LABORATORY

The Forensic Laboratory - Identification and Characterization of Blood and Bloodstains Identification of Biological Fluids and Stains - Techniques of DNA Analysis - Microanalysis and Examination of Trace Evidence – Fingerprints - Forensic Footwear Evidence - Forensic Tire Impression and Tire Track Evidence - Firearm and Tool Mark Examinations - Questioned Documents - Analysis of Controlled Substances.

UNIT III: FORENSIC ENGINEERING AND INVESTIGATION

Forensic Pathology - How to Become a Forensic Pathologist - Investigation of Death: Coroners and Medical Examiners - Death Investigation Process - The Postmortem Interval (PMI)—Time of Death – Exhumations - The Teamwork Approach - The Human Skeleton - Identification of Skeletal Remains - The Significance of Age - The Biological Profile -Individualization of Human Bone - Collection of Bones - Forensic Odontology

UNIT IV: FORENSIC TRACE EVIDENCES

Forensic Analysis of Metals, soils, Plants, Paints – The Chemistry of fire and analysis of flammable residues - Explosions and Explosives - Collection and Analysis of Evidence of Explosives – Fingerprints – History of Fingerprints - Classification of Fingerprints - Automated

Fingerprint Identification Systems- Methods of Detecting Fingerprints - Preservation of Developed Prints- Digital Imaging for Fingerprint Enhancement - Document Examination - The Document Examiner - Handwriting Comparisons-Typescript Comparisons-Alterations, Erasures, and Obliterations

UNIT V: LEGAL ASPECTS OF FORENSIC SCIENCE

Forensic Science and the Law - Admissibility of Evidence - Laboratory Reports - Expert Testimony - Countering Chaos- Logic, Ethics, and the Criminal Justice System - Forensic Science and the Law - Legal Issues in Forensic DNA

TEXTBOOKS

1. Jay A. Siegel, Kathy Mirakovits, Forensic Science: The Basics, 2nd Edition, CRC Press, 2010.
2. Stuart H. James, Jon J. Nordby, Suzanne Bell, Stuart H. James, Jon J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, CRC Press, 2002.
3. Richard Saferstein, Forensic Science, An Introduction, Pearson Education, Inc. (Pearson Prentice Hall), 2011.

REFERENCE BOOKS

1. Robert Milne, Forensic Intelligence, Taylor and Francis Group, 2013.
2. Robert Bruce Thompson and Barbara Fritchman Thompson, An Illustrated Guide to Home Forensic Science Experiments-DIY Science-O'Reilly Media Inc., 2012.
3. Louis B. Schlesinger, Sexual Murder Catathymic and Compulsive Homicides, CRC Press, 2004.
4. Terrence F. Kiely, Forensic Evidence: Science and The Criminal Law, CRC Press LLC, 2001.

**OPEN ELECTIVE
PAPER-4
C.HEALTH SCIENCE**

OBJECTIVES:

*To give students a knowledge about role of science in health care
To introduce physical principles of instrumentation involved in medical diagnosis
To describe the scientific basis for regulating exposures to radiations
To lay the foundations for further studies in medical science and radiology*

OUTCOMES :

*Explaining the fundamentals of health science
Gaining knowledge of types of radiations
Gaining knowledge of breathing mechanism of cardiovascular system
Describing about the environmental effects on health.*

UNIT I: HEALTH SCIENCE FUNDAMENTALS

Electromagnetic spectrum and its medical application- Light - Chemistry of light, Intensity of light, limits of Vision and color vision Sound - Physics of sound- Normal sound levels Ultrasound fundamentals- Generation of ultrasound-Ultrasound Transducer – Interaction of Ultrasound with Materials-Reflection and Refraction – Absorption and Scattering.

UNIT II: RADIATION

Radioactivity- Transformation mechanisms- Transformation kinetics- Naturally Occurring Radiation- Interaction of radiation with matter- Alpha rays- Beta rays- Gamma rays- Radiation - external exposure- dosimetry- dose response characteristics- Radiation safety guidelines.

UNIT III: SCIENCE OF CARDIOPULMONARY SYSTEM

The Airways, - blood and lung interaction –pressure air flow volume relationships of lungs – physics of alveoli – the breathing mechanism – Major components of cardiovascular system – O₂ and CO₂ exchange in the capillary system – Physical activity of heart – transmural pressure – Bernolli's principles applied to cardiovascular system - Blood flow – laminar and turbulentzz.

UNIT IV: HEALTH SCIENCE INSTRUMENTATION

Radiation detectors- Particle counting instruments- types of counters- resolving time- Nuclear Spectroscopy- Dose measuring instruments- types of dosimeters- neutron measurements- detection reactions- neutron dosimetry- calibration- counting statistics.

UNIT V: ENVIRONMENTAL HEALTH SCIENCE

Naturally occurring radioactive material- Radon- Environmental monitoring programs- Environmental releases- Regulatory guidelines for effluent pathways- Doses from liquid effluent pathways- Doses from gaseous effluent pathways- Pathway selection- Model parameters.

TEXTBOOKS

1. Herman Cember, Thomas E. Johnson, Introduction to Health Physics, 4th Edition, 2008.
2. Joseph John Bevelacqua, Contemporary Health Physics: Problems and Solutions, 1st edition, 1995.

REFERENCES

1. Brown B.H, PV Law ford, R H Small wood, D R Hose, D C Barber , Medical Physics and Biomedical Engineering, CRC Press, 1999.
2. Gopal B.Saha Physics and Radiobiology of Nuclear Medicine, 3rd edition, Springer, 2006.

THIRUVALLUVAR UNIVERSITY

BACHELOR OF SCIENCE

B.Sc., BOTANY

UNDER CBCS

(With effect from 2022 - 2023)

The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
		SEMESTER I							
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-1	6	4	Phycology and Mycology	25	75	100
	III	Core Practical	Practical-1	4	0		0	0	0
4.	III	Allied -1	Paper-1	4	3	(To Choose 1 out of 2) 1. Zoology I 2. Chemistry I	25	75	100
	III	Allied- 1	Practical-1	2	0		0	0	0
5.	III	PE	Paper 1	6	3	Professional English I	25	75	100
6.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		Sem. Total		36	20		150	450	600
		SEMESTER II					CIA	Uni. Exam	Total
7.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
8.	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
9.	III	Core Theory	Paper-2	5	4	Microbiology, Lichens, Bryology and Plant Pathology	25	75	100
10.	III	Core Practical	Practical-1	3	2	Covering Papers 1 and 2	25	75	100
11.	III	Allied-1	Paper-2	4	3	(To Choose 1 out of 2) 1. Zoology II 2. Chemistry II	25	75	100
12.	III	Allied Practical - 1	Practical-1	2	2	Zoology	25	75	100
13.	III	PE	Paper 1	6	3	Professional English II	25	75	100
14.	IV	Value Education		2	2	Value Education	25	75	100
15.	IV	Soft Skill		2	1	Soft Skill	25	75	100
		Sem. Total		36	25		225	675	900

S.NO	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title							
SEMESTER III							CIA	Uni. Exam	Total
16.	I	Language	Paper-3	6	4	Tamil/Other Languages	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-3	4	5	Pteridology, Gymnosperms and Paleobotany	25	75	100
	III	Core Practical	Practical-2	3	0		0	0	0
19.	III	ALLIED-2	Paper-3	4	3	(To Choose 1 out of 2) 1. Zoology I 2. Chemistry I	25	75	100
	III	Allied Practical	Practical-2	3	0		0	0	0
20.	IV	Skill based Subject	Paper-1	2	2	Horticulture	25	75	100
21.	IV	Non-major elective	Paper-1	2	2	Medicinal Botany	25	75	100
				30	20		150	450	600
SEMESTER IV							CIA	Uni. Exam	Total
22.	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
23.	II	English	Paper-4	6	4	English	25	75	100
24.	III	Core Theory	Paper-4	4	5	Plant Cell Biology	25	75	100
25.	III	Core Practical	Practical-2	3	3	Covering Papers 3 and 4	25	75	100
26.	III	ALLIED-2	Paper-4	4	3	(To Choose 1 out of 2) 1. Zoology II 2. Chemistry II	25	75	100
27.	III	Allied Practical-2	Practical-2	3	2		25	75	100
28.	IV	Skill based Subject	Paper-2	2	2	Mushroom Cultivation	25	75	100
29.	IV	Non-major elective	Paper-2	2	2	Horticulture	25	75	100
				30	25		200	600	800
SEMESTER V							CIA	Uni. Exam	Total
30.	III	Core Theory	Paper-5	6	5	Anatomy and Embryology of Angiosperms	25	75	100
31.	III	Core Theory	Paper-6	6	5	Morphology and Taxonomy of Angiosperms & Economic Botany	25	75	100
32.	III	Core Theory	Paper-7	6	5	Genetics, Plant Breeding, Evolution and Biostatistics	25	75	100
	III	Core Practical	Practical-3	3	0		0	0	0
	III	Core Practical	Practical-4	3	0		0	0	0
33.	III	Internal Elective	Paper-1	3	3	A. Tissue Culture B. Mass Cultivation of Algae C. Bio safety and Bioethics	25	75	100
34.	IV	Skill based Subject	Paper-3	3	2	Ethno Botany and Herbal Medicines	25	75	100
				30	20		125	375	500

SEMESTER VI							CIA	Uni. Exam	Total
35.	III	Core Theory	Paper-8	5	5	Plant Physiology and Plant Biochemistry	25	75	100
36.	III	Core Theory	Paper-9	5	5	Ecology, Phytogeography and Toxicology	25	75	100
37.	III	Core Practical	Practical-3	3	3	Covering Papers 5, 6 & 7	25	75	100
38.	III	Core Practical	Practical-4	3	3	Covering Papers 8 & 9	25	75	100
39.	III	Core Project	Project – 1	5	5	(Individual / Group Project)	25	75	100
40.	III	Internal Elective	Paper-2	3	3	(to choose one out of 3) A. Plant Biotechnology B. Bio fertilizers C. Postharvest Technology	25	75	100
41.	III	Internal Elective	Paper-3	3	3	(to choose one out of 3) A. Fermentation Technology B. Computer Application in Botany C. Forestry	25	75	100
42.	IV	Skill based Subject	Paper-4	3	2	Plant and Water Conservation & Management	25	75	100
43.	V	Extension Activities		-	1		100	0	100
				30	30		300	600	900
					140				4300

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Allied Practical	2	2		100	200
	Electives	3	3	9	100	300
	Core	9	(3-5)	43	100	900
	Core practical	4	(2-3)	11	100	400
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	43		140		4300

ANNEXURE - I

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

B.Sc. BOTANY – 2022-2023 onwards

Programme Objectives:

1. The students need proper understanding of the different aspects of basic botany and experimental techniques so that they can apply those techniques in the upcoming advanced courses when they have finished their UG 3 year syllabus
2. After the completion of program, students will be able to have in-depth knowledge of basic concepts in Botany.
3. Students will be able to apply the laws of Botany in real life situations to solve the problems.
4. Student will acquire knowledge to service the society oriented through skill based subjects
5. Student develop attitude of doing research through undertaking small projects.

Programme Educational Objectives:

1. After completion of the course students can join PG Botany as a higher education course.
2. It drives the students to join any administrative services by go through the competitive Examinations
3. After studying the UG Programme students to become a Teacher by studying B.Ed., Programme
4. After studying the UG Programme students can join Integrated Ph.D programme offered by central/state government institutions
5. It stimulates younger generation to pursue research based PG programme and they can get the job in research and development centre.

Programme Specific Outcomes:

1. To understand the basic laws and explore the fundamental concepts of Botany.
2. To understand the concepts and significance of the various Biological phenomena.
3. To carry out experiments to understand the principles and concepts of Botany.
4. To apply the theories learnt and the skills acquired to solve real life problems
5. Emphasis will be given on laboratory techniques specially the importance of Tissue culture, antimicrobial activity, Plant Anatomy etc.
6. Providing a hands-on learning experience such as in Biotechnological experiments and the basic concepts of Biochemistry, practices of practical knowledge in the field of Mushroom cultivation etc.

7. By studying the basic concepts in Bioethics can understand by the students.
8. Understand the theoretical concepts of Physiology of Plants, Morphology of Angiosperms, Plant Breeding and Concepts of Evolution.
9. To understand the basic concepts and applications in everyday.
10. The course as a whole opens up several career doors in private, public and government sectors.

Programme Outcomes:

1. Acquire adequate knowledge of the Botany subject.
2. Craft a foundation for higher learning of Botany programme.
3. Be initiated into the basics of research.
4. Develop problem solving skills.
5. Acquire the knowledge of practical aspects by experimental learning.
6. Biological and ethical values.
7. Become conscious of environmental and societal responsibilities.
8. Attain skills for good communication and career.
9. Learn to tolerate diverse ideas and different points of view.
10. Become empowered to face the challenges of the changing universe.

THIRUVALLUVAR UNIVERSITY

BACHELOR OF SCIENCE

B.Sc. BOTANY

UNDER CBCS

(With effect from 2022 - 2023)

SEMESTER: I

CORE PAPER - I

PHYCOLOGY AND MYCOLOGY

OBJECTIVES

- ❖ To understand the Salient features and classification of Algae
- ❖ To Study the structure, reproduction and life cycle of various genera
- ❖ To know the importance of Algae
- ❖ To acquire knowledge on general characteristic and classification of fungi
- ❖ To familiarize the structure ,function and economic importance of fungi

UNIT-I

General characters of algae, Classification of algae (Lee, 2008). Distribution of algae, Thallus organization, Structure of algal cell. Significant, Contributions of Important Phycologists (Fritsch, Smith, M.O.P. Iyengar, R. N. Singh, T.V. Desikachary, H.D. Kumar)

UNIT-II

Salient features of Chlorophyceae. Detailed study of structure, reproduction and Life cycle of Chlorella, Oedogonium and Chara. Salient features of Bacillariophyceae Detailed study of structure, reproduction and life cycle of Diatoms.

UNIT-III

Salient features of Phaeophyceae. Detailed study of structure, reproduction and life cycle of Sargassum. Salient features of Rhodophyceae. Detailed study of structure, reproduction and life cycle of Gracilaria. Salient features of Cyanophyceae. Detailed study of structure, reproduction and life cycle of Nostoc. Economic importance of Algae (Eg. Agar, Alginate acid, Diatomite and Spirulina).

UNIT-IV

General characters, mode of nutrition and occurrence of fungi. Classification for Fungi - (Ainsworth, 1973). Detail study of structure, reproduction and life cycle of Myxomycetes and Phycomycetes: Example - *Stemonites* and *Albugo*.

UNIT-V

Detailed study of structure, reproduction and life cycle of Ascomycetes, Basidiomycetes and Deuteromycetes. Example - *Penicillium*, *Cercospora* and *Puccinia*. Economic importance of Fungi.

TEXT BOOKS

Unit-1: Sharma, O.P (2011). Algae, Tata McGraw Hill Education Private limited, New Delhi.

Unit-2: Vashishta, BR, Sinha AK, and SinghVP (2011). Botany For Degree Students Algae, S. Chand. Pub. New Delhi

Unit-3: Pandey, BP (1994). Algae.S. Chand & Company Ltd. New Delhi.

Unit-4: Sharma, OP (2011). Fungi and allied microbes The McGraw –Hill companies, New Delhi

Unit-5: Sharma, PD (2003).The Fungi. Rastogi Publications, Meerut

REFERENCE ITEMS: BOOKS, JOURNAL

1. Bold, HC & Wynne, MJ (1985). Introduction to the Algae. Prentice Hall of India, New Delhi.
2. Fritsch, FE (1945). Structure and reproduction of Algae. Cambridge University press.
3. Round, FE.(1984).The Ecology of Algae. Cambridge University Press.
4. Lee, RD (2008). Phycology 4th Edition, Cambridge University Press, New York
5. Burnett, J.H. (1971).The fundamentals of Mycology. ELBS Publication, London
6. Bessey, E.A (1979). Morphology and Taxonomy of fungi, Vikas publishing House Pvt.Ltd,New Delhi.
7. Mehrotra, RS, Aneja KR (1990).An Introduction to Mycology , New Age International Pub, New Delhi
8. Sundararajan, S. (2004). Practical manual of fungi , Anmol publications Pvt.ltd New Delhi
9. Webster, J (1970) introduction to fungi , Cambridge university press ,London

E-MATERIAL

https://gurukpo.com/Content/B.SC/Algae_Lichens_and_Bryophyta.pdf

<https://www.austincc.edu/ddingley/MLAB1331/LectureGuide/Mycology.pdf>

COURSE OUT COMES

1. To learn about the general characters of algae
2. To impart knowledge on various major groups of algae
3. To understand the life history of various groups of algae
4. To differentiate the various groups of fungi
5. To know the knowledge of general distribution of fungi

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	L
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

ALLIED - 1
PAPER - 1

ZOOLOGY I

Objective;

To acquire knowledge about different kinds of animals species.

To study the systematic and functional morphology of invertebrates and chordates.

UNIT-I

Type study includes life history. Protozoa – entamoeba, Porifera- Sycon. Coelenterata – Obelia geniculata. Platyhelminthes - Teania solium.

UNIT II

Annelida – earthworm , Arthropoda – Prawn, Mollusca – Freshwater Mussel, Echinodermata – Sea Star.

UNIT-III

Type study includes morphology, digestive system, respiratory system, circulatory system and urinogenital system of Chordate. Chordate – general characters, Prochordata; morphology of Amphioxus. Vertebrates; Pisces –Shark.

UNIT-IV

Amphibia; Frog, Reptiles; calotes.

UNIT-V

Aves; Pigeon, Mammalia; Rabbit.

References;

1. Ayyar, E.K. and T.N. Ananthakrishnan. 1992. Manual of Zoology. Volume I & II, S. Viswanathan (printers and publishers) Pvt. Ltd., Madras, 891 p.
2. Kotpal series, 1998 – 1992. Rastogi publications, Meerut.
3. Jordan E.L. and P.S. Verma. 1993. Invertebrate Zoology 12th edition, S. Chand & Co., Ltd., New Delhi.
4. Jordan, E.L. and P.S. Verma. 1995. Chordate Zoology and Elements of Animal physiology , S. Chand & Co., Ltd., New Delhi.

Outcomes:

1. The students will be able to understand the life – cycle to and adaptations of protozoa, porifera coelenterata and platy helminthes.
2. The student will be able to understand the functional morphology of Annelids, Arthropods , Molluscs and Echinoderms.
3. The student will be able acquire knowledge about the functional morphology of chordata, prochordatas and pisces.
4. The student will be able have a thorough knowledge about Frog and Calotes.
5. The student will be able to understand the functional morphology of Aves and Mammals.

SEMESTER: II

CORE PAPER – 2

MICROBIOLOGY, LICHENOLOGY, BRYOLOGY AND PLANT PATHOLOGY

OBJECTIVES:

1. To give an idea of the world of microbes and to evaluate their role in environment and human welfare.
2. To understand the structure, reproduction, classification and economic importance of bacteria viruses and lichens
3. To understand the structure, reproduction, classification and economic importance of Bryophytes with special reference to the life cycles of few Bryophytes.
4. To have knowledge about the causes and preventive measures of diseases of important plants.

UNIT-1

Introduction to Microbiology – Classification - R.H. Whittaker's five kingdom concept, Carl Woese's – three Domain classification. Bacterial Staining (simple and differential) , Study of sub viral particles -viroids,virusoids, prions and satellite viruses. Brief account of special groups of bacteria –Archaeobacteria, Mycoplasma, Chlamydia, Actinomycetes, Rickettsias and Cyanobacteria, Economic importance of micro organisms.

UNIT-2

Bacteria – General characteristics, Classification, Cell structure, Types of flagellation, Nutritional types (based on carbon, nitrogen and energy sources), Respiration, Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction),Viruses –Classification of viruses, Nature of viruses. Transmission of plant viruses, Structure and replication of plant virus (tobacco mosaic virus); Bacteriophages - Structure and multiplication of T4 bacteriophage (Lytic and Lysogenic cycle).

UNIT-3

Symbiotic Associations - Lichens - General account, classification, occurrence, thallus organization, structure, physiology and reproduction of crustose, foliose and fruticose lichens, Lichen ecology with particular reference to role in environmental pollution and succession, Economic importance. Mycorrhiza – Types of mycorrhiza - ectomycorrhiza and endomycorrhiza. Significance of mycorrhiza

UNIT-4

Bryophytes - General Characters, Classification of bryophytes (Reimers, 1954). Study of thallus Structure, reproduction and life cycle of the following types. (Excluding the developmental studies) *Marchantia*, *Anthoceros* and *Polytrichum*. Economic importance of Bryophytes.

UNIT-5

Plant pathology – Scope of Plant pathology, classification of plant diseases, Methods of Plant Protection a) Cultural b) Mechanical c) Physical d) Chemical and f) Legal. Study of etiological agent, symptoms, epidemiology, life cycle and management of the following diseases.

- a) Citrus canker
- b) Cauliflower Mosaic Disease
- c) Bunchy top of banana

TEXT BOOKS:

Unit-1: Ananthanaryanan R and Panikar J (2005) Text book of Microbiology, Orient Longmans., and New Delhi. Dubey R.C and Mahewari – (2014) A Text Book of Microbiology – Chand and Co., New Delhi

Unit-2: Dube H.C. (2007) A Text Book of fungi, bacteria and viruses, Student Edition, New Delhi.

Unit-3: Siddiqui K.A. (2013) Text book of Botany-II (Diversity of Algae, Lichens & Bryophytes) – Kitab Mahal Publisher, New Delhi.

Unit-4: Pandey, B.P. (2001). College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.

Unit-5: Bilgrami, K.S. and Dubey, R.C. (1985). Text book of Modern Plant Pathology. Vikas Publishing House Private Limited, New Delhi.

REFERENCE ITEMS:

1. Oladele Ogunseitan (2008) Microbial Diversity: Form and Function in Prokaryotes Wiley- Blackwell. New Jersey, United States.
2. Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.
3. Prescott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata Mc Graw-Hill Co., New Delhi.
4. Smith, G.M (1955): Cryptogamic Botany (Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York.
5. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction (10th edition). Pearson Benjamin Cummings, U.S.A.
6. Prescott L.M. Harley J.P. and Klein D.A. (2013) Microbiology Mcgrawhill, New York
7. Mehrotra, R.S. (2003). Plant Pathology (Second edition). Tata McGraw-Hill Education, New Delhi.
8. Rangasami, G. and Mahadevan, A. (1998). Diseases of Crop Plants in India. Prentice Hall of India
9. Sharma P.D., (2019), Microbiology and Plant pathology, Rastogi Publication. New Delhi.

E- MATERIALS:

1. General Microbiology at Boundless - <https://bio.libretexts.org>
2. Plant Disease: An Advanced Treatise: How Disease Is Managed edited by James G. Horsfall - <https://books.google.co.in>

COURSE OUT COMES:

1. To understand the diversity of microorganisms, their importance and basics of microscopes.
2. To know about bacteria and viruses and how they are classified.
3. To know about symbionts in botany.
4. To know about bryophytes, the non vascular plants.
5. To understand the concept of plant diseases and protective measures.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CORE PRACTICAL – I

PHYCOLOGY, MYCOLOGY, MICROBIOLOGY, LICHENOLOGY, BRYOLOGY AND PLANT PATHOLOGY

OBJECTIVES

1. To learn practical knowledge of structure and reproduction of algae
2. To know the microscopic structure of various fungi genera.
3. To knowledge the structure of bacteria and virus
4. To learn the thallus and reproduction structure of lichens.
5. To familiarize the detailed internal structure and some bryophytes

I. PHYCOLOGY AND MYCOLOGY

1. A detailed study of structure of thallus and reproductive structure of forms given below *Nostoc*, *Chlorella*, *Oedogonium*, *Chara*, *Diatoms*, *Sargassum* and *Gracilaria*.
2. Observation and recognition of materials and organisms given in fungi. *Stemonites*, *Albugo*, *Penicillium*, *Cercospora* and *Puccinia*.
3. Economic importance of Agar-Agar, Diatomite, Spirulina, Edible Mushroom and Penicillin.

II. MICROBIOLOGY, LICHENOLOGY, BRYOLOGY AND PLANT PATHOLOGY

1. Structure of bacteria (*E. coli*), TMV and T4-Bacteriophage
2. General observation of thallus and reproductive structure of Crustose, foliose and fruticose lichens, *Marchantia*, *Anthoceros* and *Polytrichum*.
3. Recognition of Pathological specimens and control measures of plant diseases given in Unit V.

REFERENCE ITEMS: BOOKS, JOURNAL

1. Bold, HC & Wynne, MJ (1985). Introduction to the Algae. Prentice Hall of India, New Delhi.
2. Burnett, J.H. (1971). The fundamentals of Mycology. ELBS Publication, London
3. Sundararajan, S. (2004). Practical manual of fungi, Anmol publications Pvt.ltd New Delhi
4. Mehrotra, R.S. 2003. Plant Pathology (Second edition). Tata McGraw-Hill Education, New Delhi.

5. Pandey, B.P. (2001). College Botany Vol. I:Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.

ALLIED 1
PAPER 2
ZOOLOGY II

Objective;

- To study the principles of Cell biology and Genetics.
- To study the principles of Developmental Biology and Physiology.
- To have a complete knowledge about circulatory systems and excretory system.
- To create awareness towards recent changes in the environment and preventive measures.
- To understand the concepts of origin of life.

UNIT-I

Cell Biology – structure of animal cell, Genetic; molecular structure of gene – gene function, sex linked inheritance. Genetic engineering and its application.

UNIT-II

Embryology – cleavage and gastrulation of Amphioxus. Human Physiology; Digestion, circulation – blood components, structure of heart, heart function.

UNIT-III

Disease of Circulatory system – blood pressure, heart disease – Ischemia, Myocardial infarction, Rheumatic heart disease, stroke. Excretion – structure of kidney and mechanisms of urine formation.

UNIT-IV

Environmental Biology – Biotic factors and Abiotic factors, food chain and food web. Pollution – Environmental Degradation, (Air, Water and Land) – Green house effect – Bioremediation, - Global warming – acid rain.

UNIT-V

Evolution; Theories of Lamarkism & Darwinism.

Reference:

1. Ekambaranatha Ayyar, and Ananthakrishnan, T.N. 1993. Outlines of Zoology, Vol I & II, Viswanathan and Co, Madras.
2. Sambasiviah, I, Kamalakara Rao, A.P., Augustine Chellappa, S. 1983. Text book of Animal Physiology, S. Chand & Co., New Delhi.
3. Verma and Agarwal. 1983. Text book of animal Ecology, S. Chand & Co., New Delhi.

4. Verma and Agarwal and Tyagi. 1991. Chordate Embryology, S. Chand & Co., New Delhi.
5. Rastogi and Jayaraj. 2000. Text book of genetics. Rastogi publications, Meerut.
6. Verma and Agarwal. 2000. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S. Chand & Co., New Delhi.

Outcomes;

1. The student will acquire knowledge about cell structure, gene function and Genetic engineering.
2. The student will be able to understand the cleavage pattern and gastrulation in Amphioxus.
3. The students will have a thorough knowledge about the diseases of circulatory systems and urine formation.
4. The student will be have an awareness about the environment.
5. The student will understand the basic concepts of evolution.

ALLIED PRACTICAL

ZOOLOGY

I MAJOR PRACTICAL

DISSECTIONS

Cockroach; Digestive and nervous system

Prawn; nervous system

II MINOR PRACTICAL

MOUNTING

1. Mouth parts of Mosquito and Honey bee
2. Earthworm – Body setae
3. Placoid scales of Shark

III SPOTTERS

Entamoeba, Sycon, Obelia, Taenia solium (entire, scolex) earthworm (entire, Pineal setae) Prawn (entire), Fresh water mussel, Sea star, Amphioxus – Entire, Amphioxus – T.S. through pharynx, Shark, Frog, Calotes, Pigeon, feathers of pigeon and Rabbit.

Sphygmomanometer, Stethoscope, Rain gauge.

References;

- 1.verma. P.S. 2011. A manual of practical Zoology – INVERTEBRATES. Chand & Co., Ltd., Ram Nagar, New Delhi.
2. Verma. P.S. 2011. A manual of practical Zoology – CHORDATES. Chand & Co., Ltd., Ram Nagar, New Delhi.

SEMESTER: III

CORE PAPER- 3

PTERIDOLOGY, GYMNOSPERMS AND PALEOBOTANY

COURSE OBJECTIVES :

- ❖ To understand the distribution and classification of pteridophytes.
- ❖ To study the structure and life cycle of various groups of pteridophytes.
- ❖ To provide information to characteristics, classification ,economic importance and life cycle of various groups of gymnosperms.
- ❖ To understand the importance of fossils and fossilization process in tracing evolution.
- ❖ To impart knowledge on various types of fossil plants.

UNIT - I

General characters, Distribution, Classification of Pteridophytes (Reimer 1954). Stelar evolution. Homospory and Heterospory. Origin of seed habits. Apogamy and Apospory.

UNIT - II

Structure and life cycle of the following types (Excluding developmental studies) *Lycopodium*, *Selaginella*, *Equisetum*, *Adiantum* and *Marselia*.

UNIT - III

General characters of gymnosperms, Distribution of gymnosperms, Classification of gymnosperms by K.R. Sporne (1965). Economic importance - Detailed study of the following types: *Cycas*, *Pinus* and *Gnetum*

UNIT - IV

Geological time scale. Radio carbon dating. Types of fossilization - Impressions, compressions, casts, molds, petrifications, and coal balls. Importance of the study of paleobotany.

UNIT - V

Nomenclature of fossil plants. Detailed study of the following fossils: *Lepidodendron*, *Lepidocarpon*, *Calamites* and *Williamsonia*

TEXT BOOKS

Unit - I: Vashishta , P.C , Sinha and Anilkumar (2010). Pteridophytes, S.Chand &company Ltd, New Delhi

Unit - II: Sharma, O.P. (2012). Textbook of Pteridophyta, TATA MacMillan India Ltd., New Delhi

Unit - III: Johri , RM, Lata S , Tyagi K (2005), A text book of Gymnosperms , Dominate pub and

Distributer, New Delhi

Unit - IV: Atchley W.R & Woodnuff D.S. (1981). Evolution and speciation, Cambridge University Press, Cambridge.

Unit - V: Kirkaldy, J.E. (1963). The study of Fossils. Hutchinson Educational, London

REFERENCE ITEMS: BOOKS, JOURNAL :

1. Eames, A.J.(1936). Morphology of Vascular Plants - Lower groups, Tata McGraw Hill Publishing company Ltd., New Delhi.
2. Sporne, K.R. (1972) . The Morphology of Pteridophytes, B.I. Publications, Madras
3. Sporne, K.R. (1970). The morphology of Pteridophytes (The structure of Ferns and Allied Plants) Hutchinson University, London.
4. Chamberlain, C.J. (1934). Gymnosperms: Structure and Evolution. Chicago Reprinted 1950) New York.
5. Delveloryas, T. (1962). Morphology and evolution of fossil plants.
6. Doyle, W.T. (1970). Non Vascular Plants: Form and function. Belmont, California.
7. Kimura, M. (1983). The natural theory of molecular evolution, Cambridge University Press, Cambridge.
8. Arora M.P. (1990). Evolutionary biology, Himalaya Publication House, Delhi.

E- Materials :

[https://bio.libretexts.org/Bookshelves/Botany/Book%3A_Introduction_to_Botany_\(Shipunov\)/06%3A_A_Growing_Diversity_of_Plants/6.02%3A_Pteridophyta_-_the_Ferns](https://bio.libretexts.org/Bookshelves/Botany/Book%3A_Introduction_to_Botany_(Shipunov)/06%3A_A_Growing_Diversity_of_Plants/6.02%3A_Pteridophyta_-_the_Ferns)
<http://www.auburn.edu/academic/classes/biol/1030/rajamani/topic5%20BIOL1030NR.pdf>
<http://www1.biologie.uni-hamburg.de/b-online/palbot/teach/palbotteach.html>
<http://www1.biologie.uni-hamburg.de/b-online/ibc99/pbio100/lec19.html>
<http://www1.biologie.uni-hamburg.de/b-online/palbot/teach/palbotteach.html>

Course Out Comes:

1. To discuss the general Characteristic of pteridophytes
2. To differentiate the various genera in pteridophytes.
3. To learn the salient features and importance of gymnosperms
4. To acquire knowledge on fossils and fossilization
5. To know on various groups of fossil plants

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	L	L	L
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	L	S	M	S	M	S	L
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	L	L	L

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CHEMISTRY - I

OBJECTIVE:

- Basic knowledge on Metallurgy, Cycloalkanes, Polarising Effects, Stereochemistry, Chemical Kinetics, Catalysis, Photochemistry, VSEPR Theory, Fuels, Osmosis, Nuclear Chemistry, Petroleum Chemistry, Chemistry of Naphthalene, Conductors and Applications wherever necessary are to be taught for I- Semester.

UNIT – I

1.1 General Metallurgy - Extraction of Metals - Minerals and Ores- Difference between Minerals and Ores – Minerals of Iron, Aluminum and Copper - Ore Dressing or Concentration of Ores - Types of Ore Dressing- Froth Floatation process, Gravity separation and Magnetic separation.

1.2 Calcination, Smelting, Roasting, Fux, Slag - Definition - Reduction methods - Goldschmidt Aluminothermic process and Carbon Reduction method - Refining of Metals - Electrolytic, Van Arkel and Zone Refining.

1.3 Ores of Titanium and Cobalt - Extraction of Titanium and Cobalt.

UNIT – II

1. Cycloalkanes - Preparation – Wurtz reaction and Dieckmann's condensation - Properties of Cycloalkanes – Substitution and Ring opening reactions.

2.2 Polarisation - Inductive effect, Mesomeric effect and Steric effect (Acid and Base Strength).

2.3 Stereoisomerism – Types - Cause of Optical Activity – Enantiomers - Diastereomers - Meso form - Optical Activity of Lactic acid and Tartaric acid - Racemisation and Resolution – Definition and Methods - Geometrical isomerism – Definition and example - Maleic and Fumaric acid – Differences.

UNIT – III

3.1 Chemical Kinetics – Rate of a reaction – Definition of Order and Molecularity – Distinction between Order and Molecularity - Derivation of First order rate equation - Half Life Period of first order reaction.

3.2 Catalysis - Catalyst - Autocatalyst - Enzyme catalyst - Promoters - Catalytic poisons –

Active Centre - Differences between Homogeneous and Heterogeneous Catalysis - Industrial Applications of Catalysts.

3.3 Photochemistry – Grothus-Draper's law – Stark-Einstein's law - Quantum yield – Photosynthesis - Phosphorescence – Fluorescence.

UNIT – IV

4.1 VSEPR Theory – Hybridisation and Shapes of simple molecules BF_3 , PCl_5 , SF_6 and XeF_6 .

4.2 Fuels – Classification of Fuels - Calorific value of Fuels – Water gas, Carbureted Water gas and Producer gas – Composition and Uses - Non-Conventional fuels - Need of Solar Energy - Applications - Biofuels – Oil gas, Natural gas and LPG – Uses.

4.3 Osmosis - Osmotic pressure - Reverse osmosis – Definition - Desalination of Sea water.

UNIT – V

5.1 Nuclear Chemistry – Atomic number, Mass number - Isotopes, Isobars and Isotones – Definition and Examples - Definition of Half life period - Nuclear Binding Energy, Mass Defect and N/P ratio - Nuclear Fission and Nuclear Fusion (Elementary idea) - Applications of Radioisotopes in Medicine, Agriculture and Industries – Carbon Dating.

5.2 Crude Oil - Petroleum - Petroleum Refining - Cracking - Applications of Cracking

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Naphthalene – Preparation – Haworth's method – Properties – Oxidation, Reduction and Uses of Naphthalene - Structure of Naphthalene (Structural elucidation not necessary).

5.3 Conductors, Insulators, Semiconductors, N- and P- Type Semiconductors – Definitions and Examples.

SKILL BASED SUBJECT

PAPER -1

HORTICULTURE

Course Objectives :

- ❖ To promote the profession of Horticulture and the professionalism of those working in the industry
- ❖ To act as an authoritative body; consulting with Government and other policy making bodies on matters of interest or concern to professional horticulturists
- ❖ To confer recognized status upon professionally qualified and experienced horticulturists.
- ❖ To promote educational and training opportunities and encourage the development of all disciplines within horticulture
- ❖ To improving the environment

UNIT - I

Introduction, Divisions of horticulture, Importance and scope of horticulture, Principles of garden making, Types of pots and containers, Potting mixture and potting media – soil, sand, peat, sphagnum moss, vermiculite, Soil types, Soil preparation, Irrigation methods, Hydroponics

UNIT - II

Propagation methods, Cuttings, Layering – Air layering, Ground layering (Tip, Trench and Compound), Budding – T- budding, Grafting – Approach grafting, Bridge grafting, whip and tongue grafting, Garden tools and implements, Manures and fertilizers, Farmyard manure, compost, vermi compost and biofertilizers- Chemical fertilizers – NPK. Time and application of manures and fertilizers. Foliar sprays

UNIT - III

Components of Garden, Lawns and landscaping Trees, shrubs and shrubberies, climbers and creepers, Flower beds and borders, ornamental hedges, edges Drives, roads, walks and paths, Carpet beds, topiary, trophy, rockery. Conservatory or green houses, Indoor garden, Roof garden, Bonsai.

UNIT - IV

Flower Arrangement, Containers and requirements for flower arrangements Free style, Shallow and Mass arrangement, Japanese – Ikebana, Bouquet and garland making, Dry flower arrangement,

Harvesting Methods, Storage, Marketing of Fruits, vegetables and flowers, Preservation and processing of fruits and vegetables.

UNIT - V

Growth regulators in horticulture, Rooting hormones , Growth promoters, Flower induction, Parthenocarpy, Plant protection, Common diseases of fruits and vegetable crops. Weedicides, Fungicides, Pesticides

Field Study: Visit to a Botanical garden under the guidance of the teacher is encouraged.

Text Books:

Unit - I: Kumar, N., (1997). Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.

Unit - II: Edmond Musser & Andres (1994) Fundamentals of Horticulture, McGraw Hill Book Co., New Delhi.

Unit - III: Manibhushan Rao, K. Text book of Horticulture. Macmillan India Ltd. Chadha K.L(2003). Hand book of Horticulture, ICAR publication , New Delhi.

Unit - IV: Randhava, GS (1973). Ornamental horticulture in India. Today and Tomorrow Printers and Publishers, New Delhi.

Unit - V: Edmond Musser & Andres (1994) Fundamentals of Horticulture, McGraw Hill Book Co., New Delhi.

Reference Items: books, Journal:

1. Williams, CN., Uzo, JO , Peregrine, WTH (1991). Vegetable production in Tropics. Longman Scientific & Technical, Essex (UK).
2. Yawalkar, KS (1961). Vegetable crops of India. Agri-Horticultural Publishing House, Dharmapath, Nagpur.

E- Materials:

<http://ecoursesonline.iasri.res.in/course/index.php?categoryid=89>

Course Out Comes :

1. To increase food and ornamental plant production
2. To providing employment, often in rural areas
3. To improving the environment and management
4. To creating and managing valuable sports and recreation facilities as one of the main leisure pursuits - gardening
5. To gain knowledge of growth regulators, promoters and common diseases of horticultural crops.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No

2	Yes	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	L	S	S	L	M	L	M
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	M	S	M	S	L	S	L
CO4	S	L	S	M	S	S	S	M	M	M
CO5	S	S	S	L	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

NON MAJOR ELECTIVE

PAPER-1

MEDICINAL BOTANY

Course Objectives :

- ❖ To support the education of healthcare professionals in phytotherapy.
- ❖ To promote the production of medicinal plants as an alternative for diversification and the generation of income for family farms.
- ❖ To stimulate agro ecological practices.
- ❖ To support research and the implementation of medicinal plant programmes and projects in the municipalities
- ❖ To educate, study, develop, cultivate, benefits of medicinal plants

UNIT - I

Pharmacognosy - Definition and History. A general account of different survey of Different systems of Medicines - Indian systems of medicine – Siddha, Ayurveda and Unani systems. Classification of drugs (elementary).

UNIT - II

Morphological studies - Chemical constituents. Therapeutic and other Pharmaceutical uses of Bark - Cinchona, Leaves - Adathoda and Eucalyptus, Flower - Clove.

UNIT - III

Fruits and seed - Wood apple, Goosberry and Poppy seed, Underground stem - Ginger, Unorganized drugs. Gum - Acacia, Resin - Turpentine, Fixed oil - Castor oil.

UNIT - IV

A brief account of the following: a) Drugs acting on the Central Nervous system b) Drugs used in the disorders of the Gastro Intestinal tract and c) Cardio Vascular drugs. (Five Plant examples for each mentioned above)

UNIT - V

Cultivation of medicinal plants in India. Medicinal plants . Breeding methods applied to medicinal herbs. Drug Adulteration. Methods of Drug evaluation.

Text Books

Unit - I: John Jothi Prakash, E. (2003). Medicinal Botany and Pharmacognosy. JPR Publication, Vallioor, Tirunelveli.

Unit - II: Gokhale, SB., Kokate, CK. and Purohit, AP (1995). Pharmacognosy. Nirali Prakashan,

pune

Unit - III: Prajapathi, Purohit, Sharma and Kumar. (2003). A Hand book of Medicinal plants. Agrobios Publications, Jodhpur.

Unit - IV: Kumar,NC (1993). An Introduction to Medical Botany and Pharmacognosy

Unit - V: John Jothi Prakash, E. (2003). Medicinal Botany and Pharmacognosy. JPR Publication, Vallioor, Tirunelveli.

Reference Items: books, Journal:

1. Kanny, Lall, Dey and Raj Bahadur, (1984). The indigenous drugs of India, International Book Distributors.
2. Sivarajan V.V and Balachandran Indra (1994). Ayurvedic drugs and their plant source. Oxford IBH Publishing Co.
3. Wallis,T.E (2005) Text Book of Pharmacognosy by CBS Pub. Delhi.
4. Kirthikar and Basu.(2012) Indian Medicinal Plants
5. Mohammed Ali, (2008–Vol-1). Pharmacognosy by CBS Publishers and Distributors
6. Ashutosh Kar, (2007). Pharmacognosy and Pharmaco Biotechnology - New Age. Publisher New Delhi.

E- Materials:

<https://science.umd.edu/classroom/bsci124/lec29.html>

Course Out Comes:

1. To discuss the various systems of medicines
2. Promotion of cultivation and conservation of medicinal plants.
3. To identify the plants to be conserved
4. To gain knowledge about the drugs process
5. To provide information to cultivate drug adulteration and evaluation

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	L
CO2	S	S	S	M	S	S	S	M	L	M

CO3	S	S	S	L	S	M	S	M	S	L
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	M	M	L

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

SEMESTER IV

CORE PAPER - 4

PLANT CELL BIOLOGY

Course Objectives:

- ❖ Students will understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles
- ❖ Students will understand how these cellular components are used to generate and utilize energy in cells
- ❖ Students will understand the cellular components underlying mitotic cell division.
- ❖ Students will apply their knowledge of cell biology to selected examples of changes or losses in cell function.
- ❖ To learn environmental or physiological changes, or alterations of cell function brought about by mutation.

UNIT - I

History and progress of cell biology- Prokaryotic and Eukaryotic cell. Ultra structure of plant cell, Cell wall with chemistry and function. Structure, Chemistry and function of Cytoplasm and plasma membrane.

UNIT - II

Cell Organelles: Structure and origin of the following: Endoplasmic Reticulum, Golgi complex, Lysosomes, Vacuole, Peroxisomes, Mitochondria, Plastids and Ribosomes. Structure and Functions of Nucleus, Nucleoplasm, Nucleolus and Chromatin.

UNIT - III

Chromosome, special types of chromosomes - Polytene and Lambrush chromosomes, Variation in Chromosome number (Numerical aberrations)- aneuploidy and Euploidy- haploidy, polyploidy- significance. Variation in Chromosome structure (Structural aberrations) - deletion, duplication, inversion and translocation- significance

UNIT - IV

Central Dogma, Semi conservative DNA replication – mechanism, enzymes involved in DNA replication- DNA polymerase, DNA gyrase, Helicase, Ligase, primase and other accessory proteins, Eukaryotic replication with special reference to replication licensing factor, assembly of new nucleosome, replication at the end chromosome telomere, telomerase concept.

UNIT - V

RNA processing, Aminoacylation of tRNA, Translation. Cell inclusions (Non living): Cystolith, crystals, raphids, starch grains. Cell divisions – Amitosis, Mitosis and Meiosis and their significances. Gene regulation – Lac operon.

Text Books:

Unit - I: Turner, P.C. A.G. MC Lennan. A.D. Bates And M.R.H. White. 1998. Instant Notes in Molecular. Biology. Viva Books Pvt. Ltd. Chennai.

Unit - II: Verma.P.S and Agarwal, V.K. 2007. Cytology. S. Chand & Co. Chennai.

Unit - III: Wolfe, S.L. 1993. Molecular and Cellular Biology. Wadsworth Publishing Co, Clifornia.

Unit - IV: Rastogi, SC (1992) .Cell biology , Tata McGrew-Hill,New Delhi

Unit - V: Sundararajan ,S (2000). Cytology , Anmol publication (P) ltd, New Delhi

Reference Items: books, Journal:

1. Dyansager,V.R (1986.Cytology and Genetics.Tata McGrew-Hill,New Delhi.
2. Karp,G (1995)Cell and Molecular Biology,John Wiley and Sons,New York

E- Materials :

https://cellbiology.med.unsw.edu.au/cellbiology/index.php/2010_Lecture_1

https://cellbiology.med.unsw.edu.au/cellbiology/index.php/2010_Lecture_2

<https://employees.csbsju.edu/ssaupe/biol327/Lecture/cell-wall.htm>

Course Out Comes:

1. Compare and contrast animal and plant cells and be able to distinguish each type under the microscope.
2. Identify the following structures on the slides and explain the functions of plasma membrane, cytoplasm, nucleus, nucleolus, cell wall, and plastids
3. To gain knowledge structure and functions of chromosomes.
4. To knowledge of DNA structure and replication
5. To gathering knowledge of RNA functions and their properties.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	M

CO5	S	S	S	M	S	S	S	M	M	M
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PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CORE PRACTICAL - II

PTERIDOLOGY, GYMNOSPERMS, PALEOBOTANY AND PLANT CELL BIOLOGY

Course Objectives :

- ❖ To learn practical knowledge of internal structures of pteridophytes
- ❖ To know Morphological characters and reproductive parts.
- ❖ To gain knowledge of structure and reproductive parts of gymnosperms
- ❖ To study the fossil plants
- ❖ To know detailed study of cell and cell division.
- ❖

PTERIDOLOGY

1. Study of morphology, internal structure and reproductive parts of *Lycopodium*, *Selaginella*, *Equisetum*, *Gleichenia*, *Adiantum* and *Marselia*.

GYMNOSPERMS

1. Study of morphology, internal structure and reproductive parts of *Cycas*, *Pinus* and *Gnetum*

PALEOBOTANY

1. Study of *Rhynia*, *Lepidodendron*, *Lepidocarpon*, *Calamites* and *Williamsonia*.

CELLBIOLOGY

1. Study of structure of plant cell and organelles by electron microscopy pictures from standard books.
2. Study of Cell inclusions (non living)- cystolith, crystals, raphids, starch grains.
3. Study of Mitosis by Squash technique (Onion root tip)
4. Study of Meiosis (Demonstration only)

ALLIED - 2 PAPER - 4 CHEMISTRY – II

OBJECTIVE:

- Basic knowledge on Coordination Chemistry, Industrial Chemistry, Carbohydrates, Aminoacids, Proteins, Electrochemistry, Paints and Pigments, dyes, Vitamins, Medicinal Chemistry, Corrosion and Applications

wherever necessary are to be taught for II- semester.

UNIT – I

1.1 Coordination Chemistry - Nomenclature of Coordination Compounds - Ligands, Central Metal Ion and Complex Ion – Definition and Examples – Coordination Number - Werner's Theory of Coordination Compounds - Chelates - Functions and Structure of Haemoglobin and Chlorophyll.

1.2 Industrial Chemistry - Fertilisers and Manures – Biofertilisers - Organic Manures and their importance - Role of NPK in plants - Preparation and Uses of Urea, Ammonium Nitrate, Potassium Nitrite and Super Phosphate of Lime.

1.3 Contents in Match Sticks and Match Box - Industrial making of Safety Matches – Preparation and Uses of Chloroform, DDT, Gammexane and Freons.

UNIT – II

2.1 Carbohydrates - Definition and Examples - Classification – Oxidation and Reduction Reactions of Glucose - Structure of Glucose (Structural elucidation not necessary) - Uses of Starch - Uses of Cellulose Nitrate and Cellulose Acetate.

2.2 Amino Acids – Definition and Examples - Classification of Amino Acids - Preparation - Gabriel Phthalimide Synthesis – Properties – zwitterion and Isoelectric point - Structure of Glycine.

2.3 Proteins – Definition - Classification of Proteins based on Physical properties and Biological functions - Primary and Secondary Structure of Proteins (Elementary Treatment only) – Composition of RNA and DNA and their Biological role - Tanning of Leather - Alum (Aluminum chloride tanning) - Vegetable tanning – Chrome Tanning.

UNIT – III

3.1 Electrochemistry - Electrolytes – Definition and Examples – Classification - Specific and Equivalent Conductance - their determination – Variation of Specific and Equivalent conductance with Dilution – Ostwald's Dilution Law and its Limitations.

3.2 Kohlrausch's Law - Determination of Dissociation Constant of weak Electrolytes using Conductance measurement - Conductometric titrations.

3.3 pH – Definition and pH determination by indicator method - Buffer solutions - Buffer action - Importance of buffers in the living systems.

UNIT – IV

4.1 Paints - Components of Paint – Requisites of a Good Paint - Pigments – Classification of Pigments on the basis of Colour – Examples - Dyes – Definition – Chromophores and Auxochromes – Examples - Colour and Dyes - Classification based on Constitution and Application – Examples.

4.2 Vitamins – Definition – Classification – Water Soluble and Fat Soluble – Occurrence - Biological Activities and Deficiency Diseases caused by Vitamin A, B, C, D, E and K - Hormones – Definition and Examples – Biological Functions of Insulin and Adrenaline.

4.3 Chromatography - Principles and Applications of Column and Paper chromatography- R_f value.

UNIT – V

5.1 Drugs - Sulpha Drugs – Preparation and Uses of Sulphapyridine and Sulphadiazine - Mode of Action of Sulpha Drugs - Antibiotics - Uses of Penicillin, Chloramphenicol and Streptomycin - Drug Abuse and Their Implication - Alcohol – LSD.

5.2 Anaesthetics - General and Local Anaesthetics - Antiseptics - Examples and their Applications - Definition and One Example each for Analgesics, Antipyretics, Tranquilizers, Sedatives - Causes, Symptoms and Treatment of Diabetes, Cancer and AIDS.

5.3 Electrochemical Corrosion and its Prevention – Electroplating – Applications.

ALLIED PRACTICAL

CHEMISTRY

VOLUMETRIC ANALYSIS

1. Estimation of HCl – Standard sulphuric acid.
2. Estimation of Borax - Standard Sodium Carbonate.
3. Estimation of NaOH – Standard Oxalic Acid.
4. Estimation of FeSO_4 – Standard FAS.
5. Estimation of Oxalic acid – Standard FeSO_4 .
6. Estimation of FAS – Standard Oxalic Acid.
7. Estimation of Oxalic acid – Standard Oxalic Acid.
8. Estimation of Fe^{2+} using Diphenylamine / N- Phenyl Anthranilic acid as indicator.

ORGANIC ANALYSIS

Systematic Analysis of Organic Compounds containing One Functional Group and Characterisation by Confirmatory Tests.

Reactions of Aromatic Aldehyde, Carbohydrates, Mono and Dicarboxylic acids,
Phenol, Aromatic Primary Amine, Amide and Diamide.

REFERENCE BOOKS

- ❖ Inorganic Chemistry - P. L. Soni - Sultan Chand (2006).
- ❖ Inorganic Chemistry - B. R. Puri, L. R. Sharma and K. C. Kallia – Milestone Publications (2013).
- ❖ Selected Topics in Inorganic Chemistry - W. U. Malik, G. D. Tuli and R. D. Madan - S. Chand Publications (2008).
- ❖ Text Book of Inorganic Chemistry – R. Gopalan, Universities Press – 2012.
- ❖ Text Book of Organic Chemistry - P. L. Soni - Sultan Chand & Sons - 2007.
- ❖ Advanced Organic Chemistry - Bahl and Arun Bahl - Sultan Chand and Co. Ltd – 2012.
- ❖ Organic Reaction Mechanisms - Gurdeep Chatwal- Himalaya Publishing House.
- ❖ A Text Book of Organic Chemistry K. S. Tewari, N. K. Vishol, S. N. Mehrotra-Vikas Publishing House – 2011.
- ❖ Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishal Publishing Company – 2013.
- ❖ Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N. Dash - Sultan Chand & Co – 2006.
- ❖ Understanding Chemistry – C. N. R. Rao, Universities Press – 2011.

SKILL BASED SUBJECT PAPER - 2

MUSHROOM CULTIVATION

Course Objectives :

- ❖ To strengthen the promotion of mushroom cultivation practices.
- ❖ To understand the techniques involved in the cultivation of edible mushrooms.
- ❖ To study the different preparation in pure culture methods.
- ❖ To create awareness the production and consumption of mushrooms.
- ❖ To explain the food types prepared from mushrooms and export value.

UNIT - I

Introduction - history - scope of edible mushroom cultivation - Types of edible mushrooms available in India - temperate mushroom, sub-tropical mushroom and tropical mushroom. Detail study of *Pleurotus citrinopileatus*, *Agaricus bisporus*.

UNIT - II

Pure culture - preparation of medium (PDA and Oatmeal agar medium) sterilization - preparation of test tube slants to store mother culture – culturing of *Pleurotus* mycelium on Petri plates, preparation of mother spawn in saline bottle and polypropylene bag and their multiplication.

UNIT - III

Cultivation Technology : Infrastructure: substrates (locally available) Polythene bag, vessels, Inoculation hood, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house), water sprayer, tray, small polythene bag. Mushroom bed preparation - paddy straw, sugarcane trash. Factors affecting the mushroom bed preparation - Low cost technology.

UNIT - IV

Storage and nutrition: Short-term storage (Refrigeration - upto 24 hours) Long term Storage (canning, pickles, papads), drying, storage in salt solutions. Nutritional value of Proteins and amino acids, mineral elements - Carbohydrates, Crude fibre content - Vitamins. Medicinal values of mushrooms

UNIT - V

Food Preparation: Types of foods prepared from mushroom; Soup, Cutlet, Omelets, Samosa, Pickles, Curry. Value added products of mushroom. – mushroom soup powder, mushroom biscuit, mushroom nuggets, mushroom ketchup, candy, murabba, chips etc.,. Research Centers - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

Text Books:

Unit - I: Marimuthu, T, Krishnamoorthy, AS, Sivaprakasam, K. and Jayarajan. R (1991). Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.

Unit - II: Swaminathan, M. (1990) Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., Bangalore.

Unit - III: Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications, Delhi

Unit - IV: Nita Bahl (1984-1988) Hand book of Mushrooms, II Edition, Vol. I & Vol. II.

Unit - V: Manjit singh, Bhuvnesh vijay, Shwet kamal, GC Wakchaure (Eds.) (2011). Mushrooms - cultivation, marketing and consumption. Directorate of Mushroom research, ICAR, Chambaghat, Solan , HP-173213.

Reference Items: books, Journal:

1. Manjit singh, Bhuvnesh vijay, Shwet kamal, GC Wakchaure (Eds.) (2011) Mushrooms - cultivation, marketing and consumption. Directorate of Mushroom research, ICAR, Chambaghat, Solan , HP-173213.
2. Marimuthu, T, Krishnamoorthy, AS, Sivaprakasam, K. and Jayarajan. R (1991). Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.

E- Materials:

https://www.academia.edu/11324578/Mushroom_Production_and_Processing_Teaching_Note
<https://www.agrimoon.com/mushroom-culture-horticulture-icar-pdf-book/>

Course Out Comes :

1. To gain knowledge about edible mushrooms
2. To state the culture and methods of edible mushrooms
3. To know the cultivation technology and their factors affecting the mushrooms.
4. To state the different process of storing , nutrition and medicinal values of mushrooms
5. To understand the food preservation and processing techniques.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	L	L
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	M	S	M	S	M	S	L
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

NON MAJOR ELECTIVE

PAPER - 2

HORTICULTURE

Course Objectives :

- ❖ To promote the profession of Horticulture and the professionalism of those working in the industry.
- ❖ To act as an authoritative body; consulting with Government and other policy making bodies on matters of interest or concern to professional horticulturists
- ❖ To confer recognized status upon professionally qualified and experienced horticulturists.
- ❖ To promote educational and training opportunities and encourage the development of all disciplines within horticulture
- ❖ To improving the environment

UNIT- I

Importance and scope of Horticulture. Types of Gardens – Public Garden, Kitchen Garden, Indoor Garden – Potted Plants, Hanging Baskets, Cut Flowers, Bonsai, Hydroponics and Soilless Production. Garden Components - lawn, trees, shrubs, climbers and creepers, flower beds and borders, hedge and edges, paths, rockery, Water garden and Topiary.

UNIT - II

Plant Propagation Methods – Cutting, Layering, Grafting, Budding, Stock – Scion Relationship. Use of Plant Hormones in Plant Propagation.

UNIT - III

Manures, Role, advantages and disadvantages of important types of fertilizers. Time and Application of Manures, Fertilizers and Plant Regulators. Foliar application of Nutrients. Drip irrigation – Fertigation.

UNIT - IV

Cultivation of Vegetables – Brinjal, Tomato and Onion. Cultivation of Fruits – Banana, Mango and Apple. Cultivation of Flowers – Jasmine, Rose and Orchid. Cultivation of Medicinal Plants – Nilavembu, Sarpagandha and Pepper. Organic Cultivation. Green House – Cultivation of Vegetables, Fruits and Flowers.

UNIT - V

Plant Protection and Weed control. General account of insecticides, fungicides, Pesticides and Biocontrol. Common Diseases of Fruits and Vegetable crops (Apple Scab, Blight of Potato and Bunchy top of Banana)

Text Books

- Unit - I:** Bose T.K. & Yadaw, C.P. (1989) commercial flowers, naya prokash Calcutta - India.
Unit - II: Edmond. J.B. Senn. T.L. Andrews - F.S. and Halfacre. R.G. (1988) Fundamental of Horticulture, Tata MacGraw - Hill Publishing Company Ltd., New Delhi-110 006.
Unit - III: Bose. T.K. and Mukerjee. D (1987) Gardening in India, Oxford Book house, 66, Janapath, New Delhi-110 001.
Unit - IV: Prasad. S and Kumar U. (1999) Principal of Horticulture, Agrobotanica, 4E/176 J.N. Vyasnagar, Bikaner, India-334 003.
Unit - V: Chardha K.C. & Pareek (1993) Advance in Horticulture, Vol: 1 - XII Malhotra Publishing House, New Delhi – India.

Reference Items: books, Journal:

1. Prasad. S and Kumar U. (1999) Principal of Horticulture, Agrobotanica, 4E/176 J.N. Vyasnagar, Bikaner, India-334 003.
2. Edmond. J.B. Senn. T.L. Andrews - F.S. and Halfacre. R.G. (1988) Fundamental of Horticulture, Tata MacGraw - Hill Publishing Company Ltd., New Delhi-110 006.

E- Materials:

<http://ecoursesonline.iasri.res.in/course/index.php?categoryid=89>

Course Out Comes :

1. To increase food and ornamental plant production
2. To providing employment, often in rural areas
3. To improving the environment and management
4. To creating and managing valuable sports and recreation facilities as one of the main leisure pursuits - gardening
5. To gain knowledge of growth regulators, promoters and common diseases of horticultural crops.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	L	L
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	L	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

SEMESTER V
CORE PAPER-5

ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

Course Objectives :

- ❖ To study the basis of tissues in plants
- ❖ To knowledge the complex tissues and stomata types
- ❖ To understand various aspects of anatomical features of plants.
- ❖ To create knowledge of structure and development of anther, male and female gametophytes
- ❖ To study of pollination, types of endosperm and polyembryony.

UNIT - I

Meristems: Classification, distribution, structure and function. Shoot apex and Root apex organization. Theories: Histogen, Tunica – Corpus and quiescent center. Simple permanent tissues: Parenchyma, Collenchyma, Sclerenchyma. (Fibers and Sclereids)

UNIT - II

Complex tissues: Xylem – Tracheids, Vessels, Xylem fibres and Xylem parenchyma. Secondary Xylem, Annual rings, Heart wood and Sap wood, Tyloses. Phloem: Sieve elements, companion cells, phloem fibre and phloem parenchyma. Secondary phloem. Stomatal types: Anomocytic, Anisocytic, Paracytic, Diacytic and Graminaceous. Trichomes- Types.

UNIT - III

Nodal anatomy – Uni, tri and multilacunar node. Primary and secondary structure of Dicot Stem & Root. Anomalous secondary growth in stems of *Bignonia*, *Nyctanthes*, *Dracaena*. Primary structure of monocot stem and root. Structure of Dicot and Monocot leaf.

UNIT - IV

Structure and development of Anther. Development of male gametophyte. Types of ovules. Nucellus. Development of Female gametophyte: Monosporic (*Polygonum*).

UNIT - V

A brief account on pollination, Fertilization, Double fertilization and Triple fusion. Endosperm: Nuclear, Cellular, Helobial and Ruminant. Endosperm haustoria. Development of Embryo in Dicot (*Capsella-bursa pastoris*). Polyembryony.

Text Books:

Unit - I: ESAU, Plant Anatomy, 1965 Wiles Eastern, New Delhi.

Unit - II: Eams A.J. and Mac Daniel. An Introduction to Plant Anatomy. TMH Edition. Tata MC. Graw Hill Publishing Co.ltd. Bombay - New Delhi.

Unit - III: Pandey, B.P. 1979. Plant Anatomy. S. Chand & Co, Ram Nagar, New Delhi.

Unit - IV: Singh.V., P.C. Pandey and D.K.Jain. 2003. Embryology of Angiosperms. Rastogi Publications. Meerut.

Unit - V: Bhatnagar,SP, Dantu P.K, Bhojwani SS (2014) The Embryology of Angiosperms 6th edition Vikas Publishing House. Delhi

Reference Items: books, Journal:

1. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, 5th Edition, Vikas Publishing House. Delhi.
2. Pandey , AK (2000). Introduction to Embryology of Angiosperms 1st Edition :CBS; New Delhi
3. Maheswari, P.(1976). An introduction to the Embryology of Angiosperms.TATA McGraw-Hill Publishing Co., Ltd., New Delhi.
4. Johri, B.M. I (1984). Embryology of Angiosperms, Springer-Verlag
5. Swamy ,B.G.L and Krishnamurthy ,K.V From flower to fruit .Tata McGraw Hill Co.Pvt. Ltd, New Delhi
6. Davis, G.L. (1966). Systematic Embryology of the Angiosperms.
7. Bhojwani, S.S. and Bhatnagar, S.P. 1981. Embryology of angiosperms. Vikas Publication Pvt.Ltd. New Delhi.

E- Materials:

<http://www-plb.ucdavis.edu/courses/bis/1c/text/Chapter25nf.pdf>

https://archive.org/stream/introductiontoem00mahe/introductiontoem00mahe_djvu.txt

Course Out Comes :

1. To learn the structure and function, types of simple tissues.
2. To have knowledge on complex tissues and stomata types
3. Gathering knowledge of nodal anatomy and internal structures of primary and secondary growth.
4. To know the male and female gametophytes
5. To explain the types of endosperm and development of embryo.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
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1	Yes	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CORE PAPER-6

MORPHOLOGY, TAXONOMY OF ANGIOSPERMS AND ECONOMIC BOTANY

Course Objectives :

- ❖ To study the morphological features of vegetation and types of inflorescence.
- ❖ To understand the characters of androecium, gynoecium, fruits and seeds.
- ❖ To impart knowledge on botanical nomenclature, merits and demerits of systems of classification
- ❖ To learn systematic selected families of the plants.
- ❖ To gather knowledge on the economically important plants.

UNIT - I

Morphology – Root System - Modification of Roots, Shoot System - Modification of Stem, Leaf – Structure of a Leaf, Phyllotaxy, Leaf shape, leaf margin, leaf venation, types of leaves, Inflorescence – Types of inflorescence, Flower parts, symmetry, position of the ovary, Prianth - calyx, corolla, forms of corolla, Aestivation.

UNIT - II

Androecium – attachment of anthers, dehiscence of anthers, union of Stamens, length of stamens and Pollen, Gynoecium – Types, Placentation, Ovule types. Types of Pollination. Fruits types, Dispersal of Fruits and seeds.

UNIT - III

Aims and significance of Taxonomy, ICBN principles.- Author citation, Type concept, Brief knowledge about Botanical Survey of India (BSI), Brief study on herbarium techniques, Chemotaxonomy, Numerical taxonomy and Molecular Taxonomy. Outline and classification of Bentham and Hooker (Natural), Linnaeus(Artificial).

UNIT - IV

Detailed study of the following families with special features and economic importance of Annonaceae, Capparidaceae, Rutaceae, Asclepiadaceae, Convolvulaceae, Verbenaceae, Nyctaginaceae, Amaranthaceae, Liliaceae and Poaceae.

UNIT - V

Brief study of the following economic products with special reference to the Botanical name, family, morphology and useful part and also the uses of the following commercial products. Cereals –Wheat and Ragi, Pulses – Green gram and Bengal gram, Spices–Cardamom and Pepper, Oils- Sesame and Groundnut, Dyes – Saffron and Indigo, Fibres – Cotton, Resins & Gum– Canada balsam and Turpentine.

Text Books

Unit - I: Lawrence, GHM. (1995). The Taxonomy of vascular Plants (Vol I-IV) ,Central Book, Dept., Allahabad

Unit - II: Pandey, B.P.(1997).Taxonomy of Angiosperms , S.Chand & Co., New Delhi.

Unit - III: Singh, V. & Jain, K.K. (1989). Taxonomy of Angiosperms – Rastogi, Meerut

Unit - IV: Sharma, O.P. (1996). Plant Taxonomy. TATA McGraw Hill, New Delhi Gurcharan Singh Plants Systematics 3 edition

Unit - V: Vashista, P.C. (1990). Taxonomy of Angiosperms S. Chand & Co.,New Delhi.

Reference Items: books, Journal:

1. Hutchinson, J. (1973). The Families of Floweing plants , Oxford University press, London.
2. Gamble,J.S , Fisher,L.E.F .(1967). The Flora of The presidency of madras (Vol- III) BSI, Calcutta
3. Davis , P.H and Heywood ,V.M. (1965). Principles of Angiosperm Taxonomy, Oliver and Boyd Edinburgh
4. Simpson M.G.(2006). Plant systematics, Elsevier Academic Press,USA
5. Takhtajan, A.L. (1969). Flowering Plants – Origin and dispersal – Oliver & Boyed
6. Gangulee H.C ., Das ,K.S and Datta C.T (1964) college Botany –Vol I , basant Panchami ,Calcutta
7. Narayanaswamy R.V and Rao ,K.N (1976) . Outline of botany. S .Viswanthan printer and publisher ,Chennai

E- Materials

<http://webapp1.dlib.indiana.edu/inauthors/view?docId=VAC0868&doc.view=print>
<http://www.auburn.edu/academic/classes/biol/1030/rajamani/topic7%20BIOL1030NR.pdf>
<https://www.eeob.iastate.edu/classes/bio366/notes.html>

Course Out Comes:

1. Graduates will easily identify common and economically important plants.
2. To knowledge about special features and economically important plants.
3. To acquire knowledge on significance of taxonomy and herbarium technique.
4. To provide information pertaining to fruits and seed characters.
5. To understand the key aspects of morphology.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
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1	Yes	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	L
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	M	S	M	S	L	S	M
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	M	L	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CORE PAPER-7

GENETICS, PLANT BREEDING, EVOLUTION AND BIOSTATISTICS

Course Objectives :

- ❖ To study Mendel's inheritance.
- ❖ To understand recombination of chromosomes, determination and inheritance in plants.
- ❖ To study the structure and functions of genes and their various units.
- ❖ To provide information on methods and role of crop improvements in plant breeding.
- ❖ To impart knowledge on mechanism of evolution and biostatistics

UNIT - I

Mono hybrid and Dihybrid Cross, test cross, back cross, Mendel's Laws. Deviation from Mendelian ratio – incomplete dominance, lethal factor, complementary factor, supplementary factor, duplicate, epistasis and inhibitory factor. Polygenic inheritance – Inheritance of Wheat Kernel and hair length in Maize.

UNIT - II

Linkage – Crossing over and recombination. Gene Mapping, Chromosome theory of inheritance. Sex determination in plants, Sex Linked Inheritance- Types, sex linked diseases- hemophilia, colour blindness, Sex limited Genes. Extra nuclear inheritance - male sterility in corn, population genetics, Hardy - Weinberg's principles.

UNIT - III

Gene concept: Biochemical mutant in *Neurospora*, split gene, exon, intron, cistron, recon, muton, gene regulation, operon concept, control system in lac, (lac operons), gene expression in eukaryotes.

UNIT - IV

Plant Breeding: Objectives, Plant introduction, selection, hybridization techniques, Hybrid Vigor, heterosis, Interspecific and intergeneric. Polyploidy and its applications in plant breeding. Breeding for crop improvement for paddy, *Gajanus gajan* and Sugarcane.

UNIT - V

Evolution: Origin of life, Evolutionary theories of Lamarck, Darwin, De Vries, Modern synthetic theory of evolution.

Biostatistics: Mean, median, mode.

Text Books

Unit - I: Gupta, P.K, 2000. Genetics. Rastogi publications, Meerut.

Unit - II: Vijendra Das, L.D. 2005. Genetics and Plant Breeding, New Age International (P) Ltd., New Delhi.

Unit - III: Strickberger, M.W. (1999). Genetics. Prentice Hall of India Pvt Ltd. New Delhi

Unit - IV: Singh, B.D. 2005. Plant Breeding, Principles and Methods. Kalyani Publications, New Delhi

Unit - V: Mandal & Nambiar : Agricultural Statistics, Agrobios Publications, Jodhpur.

Reference Items: books, Journal:

1. Gunther S. Stent, 1986, Molecular Genetics, Macmillan Publishing Co,
2. Karp, G (1995) Cell and Molecular Biology, John Wiley and Sons, New York
3. Lewin (2007). Gene IX. Jones and Barlett Pub.
4. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics, John Wiley & Sons Inc., India. .
5. Meyyan RP (2000) genetics, Saras Publication, Nagercoil.

E- Materials:

<http://ecoursesonline.iasri.res.in/course/view.php?id=134>

<https://www.southalabama.edu/geology/haywick/GY112/112lect41.pdf>

<http://www.auburn.edu/academic/classes/biol/1020/bowling/lecturenotes/chapter22activity.pdf>

<https://www.ohio.edu/plantbio/staff/showalte/PBIO%203300%20&%205300/>

Course Out Comes :

1. To apply basic principles of genetics and Mendel's inheritance.
2. To understand the recombination and chromosome theory of inheritance and sex Determination.
3. To explain the importance of gene concepts and gene expression in plant cell.
4. To state the improvement of crop plants and describe the basic principles of hybrid vigor.
5. To know the theory of evolution and biostatistics problems.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	L
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	S	S	M	S	S	S	L
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	S	S	L

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

**INTERNAL ELECTIVE
PAPER - 1**

(to choose one out of 3)

A. TISSUE CULTURE

Course Objectives :

- ❖ To incubate the basics principles and cell differentiate of plant tissue culture.
- ❖ To study the sterilization, plant cell culture methods and culture media.
- ❖ To understand the various culture techniques and their morphogenesis.
- ❖ To assess the process of seeds and various tools and techniques of culture methods.
- ❖ To trace the crop improvements and gene transfer technology in plant tissue culture.

UNIT - I

History of plant tissue culture research - Basic principles of plant tissue - Totipotency of cells, differentiation, dedifferentiation and redifferentiation.

UNIT - II

Methodology - Sterilization (physical and chemical methods), Plant cell culture methods, Culture media MS and B5, Phytohormones, Callus induction

UNIT - III

Organ culture, Shoot tip Culture, Apical Meristem culture, Ovary Culture, Ovule Culture, Endosperm Culture, Embryo culture – application of Embryo rescue technique. Callus subculture maintenance, Metabolic patterns in callus culture, Harvesting and measurements, Morphogenesis in callus culture.

UNIT - IV

Synthetic Seeds – Limitation of synthetic seeds, production of synthetic seeds, artificial seeds, use of artificial seeds(Commercial production and Uses) Protoplast isolation and purification and culture, media (F5- Medium Frearson et. Al. 1973 Nagata and Takeba 1971, Modified B5 Medium), Methods of isolation (Enzymatic Isolation), Isolation from leaves, shoot and root apex, root storage organs, Pollen grain etc, Protoplast fusion.

UNIT - V

Tissue culture and crop improvement - Agro bacterium mediated gene transfer technology - microinjection - particle bombardment; Bioreactors in plant tissue culture.

Text Books:

Unit - I: Kalyankumar De (2008). Plant tissue culture. New Central Book Agency, Calcutta.

Unit - II: Sathyanarayana BN and Vergheese DB (2000). Plant tissue culture - Practices and new

experimental protocols, ILK Publ. New Delhi.

Unit - III: Bhojwani, SS. and Razdan, MK. (2004). Plant Tissue Culture, Read Elsevier India Pvt.Ltd.

Unit - IV: Islam, AS (1996). Plant tissue culture. Oxford & IBH Publ.

Unit - V: Purohit SS (2010). Plant tissue culture, Student edition, Jodhpur

Reference Items: books, Journal:

1. Dubey, R.C., (2001). A text book of biotechnology. S. Chand & Co., New Delhi.
2. Gupta, P.K. (1994). Elements of Biotechnology. Rastogi Publications, Meerut.
3. Ignacimuthu, S.J.(2003). Plant Biotechnology. Oxford & IBH Publishing, New Delhi.
4. John Jothi Prakash, E. (2005). Outlines of Plant Biotechnology. Emkay Publishers, New Delhi.
5. Dix, PJ (1990). Plant cell line and selection. VCH Publ.
6. Hammond, J.C. McGarvey and V. Yusibov, (2009). Plant Biotechnology, Springer Verlag, New York.

E- Materials:

<https://nptel.ac.in/courses/102/106/102106080/>

Course Out Comes :

1. To gain knowledge about principles, to tipotancy of cell and differentiation in plant tissue culture.
2. To acquire knowledge on physical and chemical methods and media.
3. To impart knowledge about the various aspects of tissue culture and their applications.
4. Employ various techniques in seeds and to describe the methods, isolation and purification of tissue culture
5. To gain information about tissue culture and gene transfer techniques.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	M	M	L
CO3	S	S	S	M	S	M	S	S	S	M
CO4	S	S	S	M	S	S	S	M	M	S
CO5	S	S	S	M	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER - 1

B. MASS CULTIVATION OF ALGAE

Course Objectives :

- ❖ To study of morphology and history of mass culture.
- ❖ To understand the values of algal plants.
- ❖ To know the various marine macroalgae.
- ❖ To gain information of economic importance of algae.
- ❖ To know the method of preparation and application of biodiesel.

UNIT - I

Morphology, life history and mass culture of microalgae: *Spirulina*, *Chlorella*, *Dunaliella*, *Haematococcus* and *Botryococcus*.

UNIT - II

High value products - SCP, phycocyanin, β -carotene, astaxanthin – biofuel, media composition - scale up - lab to land - raceway ponds, photobioreactor.

UNIT - III

Marine macroalgae: Morphology, life history and mass cultivation of *Hypnea*, *Gracilaria*, *Gelidiella*, *Kappaphycus*, *Porphyra*, *Laminaria*, *Enteromorpha*, *Ulva* and *Sargassum*.

UNIT - IV

Polysaccharides - agar, carrageen, alginate. economic importance - seaweed as food, feed, Environment Impact Assessment of algal cultivation.

UNIT - V

Liquid seaweed fertilizer: Method of preparation and application. Biodiesel from algae: algae producing biodiesel; Advantages over other sources of biodiesel.

Text Books:

Unit - I: BARSANTI, LAURA AND PAOLO GUALTIERI 2005 *Algae-Anatomy, Biochemistry and Biotechnology*. Taylor & Francis, London, New York.

Unit - II: BECKER, E.W. 1994 *Microalgae-Biotechnology and microbiology*. Cambridge University Press.

Unit - III: CHANDRAMOHAN, D. 2007. Prospects of Biodiesel from marine microorganisms. Proceedings of the National Workshop on BIODIESEL, Organised by School of Energy, Environment & Natural Resources, Madurai Kamaraj University, Madurai and Ahimsa Agri division, Chennai, 17th and 18th October, 2007.

Unit - IV: TRIVEDI, P.C. 2001 Algal Biotechnology. Pointer publishers, Jaipur, India.

Unit - V: VENKATARAMAN, L.V. AND E.W. BECKER 1985. Biotechnology and Utilization of Algae – The Indian Experience. Dept. Science and Technology, New Delhi and Central Food Research Institute, Mysore, India.

Reference Items: books, Journal:

1. BECKER, E.W. 1994 *Microalgae-Biotechnology and microbiology*. Cambridge University Press.
2. BARSANTI, LAURA AND PAOLO GUALTIERI 2005 *Algae-Anatomy, Biochemistry and Biotechnology*. Taylor & Francis, London, New York.

Course Out Comes:

1. To study of morphology and history of mass culture.
2. To understand the values of algal plants.
3. To know the various marine macroalgae.
4. To gain information of economic importance of algae.
5. To know the method of preparation and application of biodiesel.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	M	S	M
CO3	S	S	S	M	S	M	S	S	S	S
CO4	S	S	S	S	S	S	S	S	M	M
CO5	S	S	S	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER - 1

C. BIOSAFETY AND BIOETHICS

Course Objectives:

1. To understand the need of biosafety
2. To understand the guidelines and policies of biosafety
3. To have knowledge about patenting
4. To have knowledge about ethics in scientific development.

UNIT - I

Biosafety Introduction- Historical perspective, objectives, Introduction to the concept of containment level, health hazards concerning biotechnology, risk assessment in biotechnological research, physical and biological contaminants, bio-safety concerns at the level of individuals, institutions, society, region, country and world with special emphasis on Indian concerns. Biosafety levels for plant and microbial research.

UNIT - II

Biosafety Guidelines– Operation of biosafety guidelines and regulations of Government of India; Definition of GMOs & LMOs. Roles of Institutional Biosafety Committee, RCGM, GEAC etc. for GMO applications in food and agriculture. Environmental release of GMOs - Risk - Analysis, Assessment, management and communication. Laboratory biosafety Guidelines.

UNIT - III

Intellectual Property Right - Introduction , definition and types, patent, copyright, trademarks, design registration, trade secret, geographical indicators - International position, multilateral treaties, national level, Indian position; plant variety protection. Rights of Plant Breeders, farmers and researchers, advantage and limitations of IPRs. Introduction to IPR, WTO, GATT, TRIPS, WIPO – Establishment and function.

UNIT - IV

Patents and patent processing: Introduction, Objectives of the patent system - Basic, principles and general requirements of patent law. Essential requirements, International scenario of patents, patenting of biological materials, Patent application, Procedures and granting, protection of biotechnological inventions, Patent Act (1970), Patent (Amendments) Act (2002). Patenting in India: Indian patent act.

UNIT - V

Bioethics: Introduction, Ethical issues related to biotechnology, legal and socioeconomic impacts of biotechnology, Ethical concerns of gene cloning, hazards of environmental engineering, Ethical issues in Human Cloning and stem cell research. National & International issues on Genetic modification & recombinant DNA technologies, Human embryonic cloning & stem cell research, transgenic plants and animals.

Text Books:

1. H.K.Das (2007). Text book of biotechnology 3rd Edition, Ailey India Private Ltd.,
2. Diane O. Fleming and Debra L. Hunt (2006) Biological Safety: Principles And Practices 4th Edition, ASM Press, American Society of Microbiology, Washington.
3. Dawn P. Wooley; Karen B. Byers (2017). Biological Safety: Principles and Practices, 5th Edition, ASM Press, Washington, DC, USA.
3. Rajmohan Joshi , (2006). Biosafety and Bioethics. Gyan Publishing House, Delhi
4. Deepa Goel and Shomini Parashar IPR, Biosafety and Bioethics 1st Edition, Pearson Publications, New Delhi.

Reference Items:

1. Senthil Kumar Sadasivam and Mohammed Jaabir M. S. (2008). IPR, Biosafety and Biotechnology Management, Jasen Publications, India.
2. Singh BD. (2007). Biotechnology: Expanding Horizon. Kalyani Publisher, New Delhi.
3. Beier F.K, Crespi R.S and Straus T. (1985). Biotechnology and Patent protection, Oxford and IBH Publishing Co. New Delhi.
4. Jeffrey M. Gimble, (2004). Academia to Biotechnology, Elsevier Academic Press.
5. Rajmohan Joshi (Ed.). (2006). Biosafety and Bioethics. Isha Books, Delhi.
6. Fleming, D.A., Hunt, D.L., (2000). Biotechnology and Safety Assessment (3rd Ed) Academic press.
7. Sibley (1994) Law and Strategy of biotechnological patents. Butterworth publication.
8. Ganguli (2001) Intellectual property rights- -Tat McGrawhill.
9. Thomas, J.A., Fuch, R.L. (2002). Biotechnology and safety Assessment (3rd Ed) Academic press

E- Materials:

Biological Safety: Principles and Practices –December-2001-ResearchGate

Course Out Comes :

1. To know what is biosafety and its importance.
2. To know about various organizations involved in biosafety and guidelines of biosafety.
3. To Intellectual property rights.
4. To understand the process of patenting.
5. To completely understand ethics involved biological research and its importance.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	S	S	M	S	M	S	L
CO4	S	S	S	M	S	S	S	S	S	L
CO5	S	S	S	M	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

SKILL BASED SUBJECT PAPER - 3

ETHNO BOTANY AND HERBAL MEDICINES

Course Objectives:

- ❖ To study of traditional values in plant parts

- ❖ To know the different systems of phytomedicines.
- ❖ To identify the pharmacognostic studies of crude drugs.
- ❖ To be familiarize the pharmacological analysis and utilization.
- ❖ To knowledge the importance of herbal medicines.

UNIT - I

Ethnobotany-Introduction, history, scope and importance. Tribes of Tamil Nadu and their relevance in ethno medicine. Erosion of traditional cultures related to ethno medicine. Wild medicinal plants of Tamil Nadu a general account. Different types of crude drugs (based on origin, application and purpose / use). Potential medicinal plants of Tamil Nadu and their therapeutic values. Importance of Ethnomedicine in the establishment of alternative medicine.

UNIT - II

Phytomedicine and other systems of medicine - Different systems of indigenous medicine (Traditional Medicine, Ayurveda, Siddha, Unani) Homeopathy and Allopathy. Role of Phytomedicine in modern systems of medicine.

UNIT - III

Pharmacognostic studies of crude drugs - Introduction, history, scope and applications of Pharmacognosy. Phytopharmacy: constitution, identification of different constituents; Classification of drugs; analytical methods-drug adulteration, drug evaluation, anatomical and phytochemical analysis of crude drugs: preliminary screening, fractionation and separation of different groups of biodynamic compounds and biological evaluation

UNIT - IV

Pharmacological analysis and utilisation - Ethno pharmacology, phytopharmacology, dosimetry and administration of drugs; Phytopharmaceuticals: Drugs of alkaloids, volatile oils, tannins, resins and gums. Natural pesticides, antibiotics, allergens and poisonous plants. Potential drug yielding plants and their marketing avenues. Intellectual Property Rights and patenting of active principles.

UNIT - V

Herbal Medicine - Scope and Importance of Medicinal Plants. Indigenous Medicinal Sciences. Ethnomedicinal plant Gardens. Important medicinal plants and their uses. Folk medicines of

ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India. Application of natural products to certain diseases- Jaundice, cardiac, infertility, diabetics, Blood pressure and skin diseases.

Text Books:

Unit - I: Cotton, CM. 1996. *Ethnobotany: principles and applications*.

Unit - II: Dey, A.C.1988. *Indian Medicinal Plants and Ayurvedic preparations*, Bishen Singh, M. Singh.

Unit - III: Kokate, CK., AP. Purohit & SB. Gokhale. 2000. *Pharmacognosy*. NiraliPrakashan Publ.

Unit - IV: Trease, GE and WC Evans. 2002. *Pharmacognosy*. Saunders. New York.

Unit - V: Peter B. Kaufman *et al.*, 1999. *Natural Products from Plants*

Reference Items: books, Journal:

1. Gibbs, R.D. 1974. *Chemotaxonomy of flowering plants*. Montreal & London.
2. Kokate,CK, Khandelwal, SB Gokhale 1996. *Practical Pharmacognosy*. NiraliPrakashan, Pune.
3. Manitto, P. 1981. *The biosynthesis of natural products*. Ellis Horwood, Chichester.
4. Martin, G.J. 1996. *Ethnobotany. A methods manual*. Chapman&Hall. London
5. Ramachandran, S.P. 1991. *Recent Advances in Medicinal, aromatic and spice crops*.

E- Materials:

https://www.edouniversity.edu.ng/oer/lecturenotes/economic_botany_and_ethnobotany

Course Out Comes :

1. To study of traditional values in plant parts
2. To know the different systems of phytochemicals.
3. To identify the pharmacognostic studies of crude drugs.
4. To be familiarize the pharmacological analysis and utilization.
5. To knowledge the importance of herbal medicines.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	L	M
CO2	S	S	S	S	S	S	S	M	M	L
CO3	S	S	S	S	S	M	S	S	S	M
CO4	S	S	S	S	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

**SEMESTER VI
CORE PAPER - 8**

PLANT PHYSIOLOGY AND PLANT BIOCHEMISTRY

Course Objectives :

- ❖ To learn the mechanism involved in plants.
- ❖ To know the energy production and its utilization in plants.
- ❖ To understand the respiration , growth hormones, germination types and dormancy

- ❖ and fruit ripening in plants.
- ❖ To effort the knowledge on functions of various biomolecules and their metabolism.
- ❖ To provide knowledge of the bio energetic and biological reaction.

UNIT - I

Water uptake, Osmosis, Translocation of water, ascent of sap, transpiration, stomatal physiology, water stress and its significance. Mineral nutrition - micro and macronutrients and their deficiency symptoms. Growth measurement -growth curve. Plant growth regulators: auxins, gibberellins, cytokinins and ethylene, their regulation and application in agriculture. Photoperiodism, vernalization, phytochrome.

UNIT - II

Photosynthesis - Radiant energy, Absorption spectrum, Action spectrum - structure of Photosynthetic pigments, - Red Drop Phenomena, Enhancement effect. Cyclic and Non - cyclic photophosphorylation, C3 and C4 pathways, photorespiration.

UNIT - III

Classification, structure and Properties of Carbohydrates, Lipids and Proteins. Enzymes - Properties, Nomenclature and classification as per ECIUB (Enzyme commission of the international Union Biochemistry) - Cofactor - Co - enzymes and factors affecting enzyme action.

UNIT - IV

Respiration - Aerobic, Anaerobic: Glycolysis - Krebs's cycle - Oxidation - Reduction potential - ATP synthesis, bioenergetics - factors affecting respiration. Respiration as an amphibolic process.

UNIT - V

Nitrogen metabolism: sources of nitrogen, role of Nitrogen, Conversion of nitrate to ammonia - assimilation of ammonia. urea cycle, mechanism of biological nitrogen fixation. Protein synthesis and Genetic code.

Text Books:

Unit - I: Gupta, N.K and Gupta, S. 2005. Plant Physiology. Oxford &IBH Publishing Co. Ltd., New Delhi.

Unit - II: Mukherji, S. and Ghosh, A.K. 2005. Plant physiology. New Central Book Agency Ltd. Kolkata

Unit - III: Rastogi , S.C (2003). Outlines of Biochemistry , CBS Publishers &Distributors New Delhi

Unit - IV: Jain J.L. *et al.*,(2008). Fundamentals of Biochemistry, Chand ,New Delhi

Unit - V: Satyanaryana U, Chakrapaani U, (2006). Biochemistry, Books and Allied (P)Ltd.

Reference Items: books, Journal:

1. Verma, S. K. 1995. A Textbook of Plant Physiology, Biochemistry & Biotechnology. S. Chand & Co.
2. Pandey, S.N and Sinha, B.K. 1989. Plant Physiology, Vikas Pub. House . New Delhi.
3. Jain, V.K. 1988. Fundamentals of Plant Physiology, S.Chand and Co. Ltd.,New Delhi.
4. Apps *et al.*, (1992). Biochemistry, ELBS.
5. Caret *et al.*, (1993). Inorganic, Organic and Biological Chemistry, WMC Brown Pub. USA.
6. Nelson D.L, Cox M.M.(2005). Lehninger Principle of Biochemistry, W.H. freeman and Company, New York
7. Rawn, D. (1989).Biochemistry, Neil Patterson.
8. Zuley G.L., (1998).Biochemistry, Wm. C .Brown Publishers USA

E- Materials:

<http://www.uky.edu/~dhild/1/lect.html>
https://www.brainkart.com/subject/Plant-Biochemistry_257/
<https://employees.csbsju.edu/ssaupe/biol327/lecture-home.htm>
<https://www.bialigy.com/10-plant-physiology.html>

Course Out Comes :

1. Understand the various steps involved in the water uptake, minerals nutrition and growth measurement in plants.
2. Gain knowledge in the various process involved in the photosynthesis,
3. Impact knowledge in nitrogen metabolism and respiration.
4. Acquire knowledge on catabolic pathway of metabolites and properties of carbohydrates, protein and lipids.
5. Illustrate the mechanism of enzymes action and enzymatic kinetics.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	L	S	M	S	M	S	L
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CORE PAPER - 9

ECOLOGY, PHYTOGEOGRAPHY AND TOXICOLOGY

Course Objectives :

- ❖ To know the biotic and abiotic factors and their vegetation.
- ❖ Learn to concept, components and types of ecosystem.
- ❖ Study the plant communities and stages of plant succession.
- ❖ Know the causes, effects and control measures of pollution and describe the heavy metal toxicity and bioaccumulation.
- ❖ Study the different types of vegetation and forest.

UNIT - I

Biotic and abiotic factors and their influence on vegetation – a brief account of microbes, plants, animals, soil, wind, light, temperature, rainfall and fire. Biogeochemical cycles (Nitrogen, Carbon). Ecosystem – concept, processes and components. Food chain, food web, energy flow, pyramids. Types of ecosystems - fresh water, marine and grassland.

UNIT - II

Autecology and Synecology – Vegetation – Formation, Association, Consociation, Society – development of vegetation. Migration – ecesis, colonization, Methods of study of vegetation (Quadrat and transect). Plant succession – Hydrosere and Xerosere. Morphological and anatomical features of hydrophytes, mesophytes and Xerophytes.

UNIT - III

Pollution -air, water, soil, noise, thermal, radiation and its control. Agricultural pollution, insecticides, pesticides, fungicides, herbicides. Waste water treatment.

UNIT - IV

Phytogeography – principles – vegetation types in India. Tropical rain forest, Sholas and Deciduous Forest – Sand dunes and Mangrove vegetation and Scrubjungle, phytogeographical regions of India.

UNIT - V

Environmental toxicants-classification-occurrence-source-effects on plants. Heavy metal toxicity-lead and chromium-bioaccumulation. Atmospheric toxicants-carbon monoxides, sulphur oxides.

Text Books:

Unit - I: Sharma, P.D (2009). Ecology and Environment, Rastogi Publications.

Unit - II: Shukla, R.S. &P.S. Chandel (1991) :Plant Ecology & Soil Science S.Chand &Co.New Delhi

Unit - III: Vasishta, P.C, 1979 Plant Ecology, Vishal Publication

Unit - IV: Verma, V,A 1981 Text Book of plant Ecology, Emkay Publication.

Unit - V: Sharma, P.D. 1993, Environmental biology and toxicology. Rastogi and co, Meerut.

Reference Items: books, Journal:

1. Cain, S.A . (1944). Foundations of Plant Geography Harper & Brothers, N.Y.
2. Mani, M.S (1974) : Ecology &Biogeography of India Dr. W. Junk Publishers,he Haque
3. Good, R. (1997) : The Geography of flowering Plants (2ndEdn.,)Longmans, Green & Co., Inc., London & Allied Science Publishers, New Delhi- 495ppE- Materials
4. Ambasht R.S., 1978 The Book of Plant Ecology, Students friends Co.
5. Willings W.D.1964 Plants and Ecosystem, Wasworti Publishing Co.
6. Daubenmire R.F,1973 Plant and Environment. John Willey.

E- Materials:

<https://www.ohio.edu/plantbio/staff/mccarthy/dendro/ecology.htm>

<https://www.lcps.org/cms/lib4/VA01000195/Centricity/Domain/14721/Ecology%20Notes.pdf>

<http://ib.berkeley.edu/courses/ib168/LectureHandouts/Lecture26.pdf>

<https://www.coursehero.com/file/8469123/PHYTOGEOGRAPHY-Lecture-34/>

Course Out Comes:

1. To understand the aspects of biotic and abiotic factors.
2. To acquire knowledge on ecosystem.
3. To be familiarize with plant communities and ecological adaptations of plant.
4. To know about the hazards of pollution and the importance of environmental toxicants.
5. To gain an insight into the vegetation types and their importance.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CORE PRACTICAL - III

ANATOMY, EMBRYOLOGY, MORPHOLOGY, TAXONOMY, ECONOMIC BOTANY, GENETICS, PLANT BREEDING AND EVOLUTION

Course Objectives :

- ❖ To gain practical knowledge of tissues and internal structures of stem, root and leaves.
- ❖ To familiarize the fertilization, male and female gametophyte developments
- ❖ To know characters of different family plants and its importance.
- ❖ To know gene inheritance and its practical solutions.
- ❖ To knowledge of plant breeding techniques.

ANATOMY

1. Study of simple & Complex tissues (primary and secondary).
2. Study of internal structure of Young and old stem of dicotyledons. Young and Old root of dicotyledons. Normal stem and root of Monocotyledons. Anomalous stem of dicotyledons - *Bignonia*, *Nyctanthes* and Monocotyledons - *Dracaena*.
3. Study of internal structure of Dicot and Monocot leaves.
4. Study of Stomatal types.
5. Nodal Anatomy: uni, tri, and multi lacunar node.

EMBRYOLOGY:

1. T.S. anther at various stages of development (permanent slide)
2. Types of ovule (permanent slide)
3. Male gametophyte, Female Gametophyte.
4. Embryo sac (permanent slide)
5. Stages in the development of dicot and monocot embryos (slide)
6. Mounting of Dicot embryos (Globular, Heart shaped stage)
7. Types of Endosperms (Permanent slide)

REFERENCE BOOKS:

EMBRYOLOGY

1. Bhojwani. S.S. and Bhatnagar. S.P. 1978. The embryology of Angiosperms. Vikas Publishing Pvt. Ltd., Delhi.
2. Maheswari P.1971. An introduction to embryology of Angiosperms Tata Mc Graw Hill, Delhi.
3. Swamy B.G.L. and Krishnamurthy K.V. 1950. From flower to fruit. Tata Mc Graw Hill, New Delhi.

PRACTICAL: MORPHOLOGY:

Morphology study of root, stem, leaf and inflorescence. Fruit types with suitable examples.

TAXONOMY

1. A detailed study of the range of vegetative and floral characters of plants belonging to the families mentioned in the theory part.
2. Submission of 15 herbarium sheet with proper field note book for practical examination.
3. Field trips to places of plant diversity within or outside Tamilnadu with a minimum duration of seven days compulsory for plant collection and also to study the plants in their natural habitats.
4. A brief report of the trip has to be submitted.
5. Economic botany: Cereals, Pulses, Spices, Oils, Dyes, Fibres, Resins & Gum

REFERENCE BOOKS:

MORPHOLOGY:

Annie Ragland, 1999. Fundamentals of botany Vol.3. Saras publication.

TAXONOMY:

1. Singh, V. and Jain, D.K - Taxonomy of Angiosperms - Rastogi Publications, Meerut.
2. Pandey, B.P. 2007 Botany for Degree Students. S. Chand & Co. New Delhi.
3. Vasishta, P.C. 1974 Taxonomy of Angiosperms. S. Chand & Co., Chennai.

ECONOMIC BOTANY:

1. Hill AW. 1951 Economic Botany - Mc Graw Hill, New Delhi.
2. Pandey, B.P., Economic Botany, S.Chand & Co., NewDelhi.

**GENETICS:
PRACTICAL**

1. Simple problems on Monohybrid and Dihybrid ratio and interaction of factors.
2. Construction of chromosome maps using three - point test cross data.

PLANT BREEDING

1. Hybridization techniques - Emasculation, Bagging (For demonstration only)

REFERENCES:

1. Gupta, P.K. 2000. Genetics. Rastogi publications. Meerut.
2. Sinnott, E.W; L.C. Dunn and T. Dobzhansky 1958. Principle of genetics. McGraw Hill, Newyork.
3. Verma, P.S and Agarwal. V.K. 2007. Genetics. S. Chand & Co. Chennai.

CORE PRACTICAL - IV

PLANT PHYSIOLOGY AND PLANT BIOCHEMISTRY

Course Objectives :

- ❖ To gain practical knowledge of physiological functions of plant.
- ❖ To know the photosynthesis under different CO₂ concentrations
- ❖ To know fermentation techniques
- ❖ To knowledge of enzymes activity
- ❖ To knowledge of ecological vegetations and phytogeographical regions.

LIST OF PHYSIOLOGY EXPERIMENTS:

1. Determination of solute potential by plasmolytic method.
2. Colorimetric determination of effect of solvents and temperature on membrane permeability.
3. Separation of plant pigments by paper chromatography.
4. Study the rate of photosynthesis under different light intensities.
5. Study the rate of photosynthesis under different CO₂ concentrations.
6. Determination of respiration rate under different substrates using respiroscope method.

II. LIST OF BIOCHEMISTRY EXPERIMENTS:

1. Preparation of standard graph for KmNO₄ by using colorimetric method.
2. Qualitative test for amino acid and protein.
3. Qualitative test for sugars (Glucose, sucrose & starch)

III. DEMONSTRATION EXPERIMENTS IN PLANT PHYSIOLOGY AND BIOCHEMISTRY:

1. Fermentation experiment.
2. Study of relative rates of transpiration of different plants.
3. Assay of protease or amylase.
4. Test for alkaloid.
5. Induction of roots by auxins.
6. Effect of temperature, pH on enzyme activity.

IV. TOXICOLOGY

1. lead, copper, zinc and chromium

V. ECOLOGY & PHYTOGEOGRAPHY

1. Study of morphological and internal structural adaptations of locally available hydrophytes, xerophytes, mesophytes and epiphytes. Eg. Hydrophyte: Nymphaea, Hydrilla. Xerophytes: Nerium, Casuarina. Mesophytes: Tridax, Vernonia. Epiphytes: Vanda
2. Construction of meter quadrat – to study the percentage of frequency & abundance.
3. Map of phytogeographical regions of India

REFERENCE BOOKS:

1. Bidwell .R.G.S. 1974. Plant Physiology. Macmillan. Publication Co. Newyork.
2. Ting. I.P. 1982 Plant Physiology. Addison Wesley Publication Co. Philippines.
3. Conn. E.E.; P.K. Stumps; G. Brueming and Doi. R.G. 1987. Outlines of Biochemistry. John wiley & Co. Newyork.

(to choose one out of 3)

A. PLANT BIOTECHNOLOGY

Course Objectives :

- ❖ To train the students in advanced level of biotechnological principles and genome organization.
- ❖ To study the cloning strategies, gene transfer methods and genetic manipulation in genetic engineering.
- ❖ To understand the methods of transgenic plants and molecular farming.
- ❖ To provide information pertaining to bio sector, metabolites and algal and fungal biomass production.
- ❖ To trace and discuss about the intellectual property rights.

UNIT - I

Introduction to plant Biotechnology, scope; Plant genome organization - chloroplast genome; nucleosome; C-value paradox; TATA box.

UNIT - II

Genetic engineering - Basic principles, Restriction endonucleases; Cloning vectors – plasmids, phages and cosmids, Transposons; Methods of gene transfer –electroporation, viral vectors, particle gun method and microinjection; Ti plasmid mediated transfer –*Agrobacterium tumefaciens*. Genetic manipulation of eukaryotic cells.

UNIT - III

Methodology to develop transgenic plant - herbicides resistance, drought resistance, pests and insects resistance and pathogens resistance. Biocontrol of plant diseases and pest. Molecular farming - edible vaccines; Flavr savr tomato.

UNIT - IV

Plant as a bioreactor, Production of primary and secondary metabolites by plant tissue culture. Algal biotechnology - Algal biomass production and maintenance. Fungal biotechnology - single cell protein production.

UNIT - V

Intellectual property rights – Private public sector issues – Physical property and intellectual property – Farmers rights – Plant breeders’ right – trade secrets. Patents – Patenting of biological Materials – patents for higher plants and microbes – Patenting transgenic organisms.

Text Books:

Unit - I: Dubey, RC (2004) A text book of Biotechnology” 3rd Edition , S.Chand & Company Ltd, New Delhi.

Unit - II: Gupta, PK.(2004). Elements of Biotechnology”, 1st edition Rastogi publications – Meerut

Unit - III: Razdan, MK (2008) Introduction to plant tissue culture” , 2nd edition Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.

Unit - IV: Kumaresan, V(2009) .Biotechnology”, Saras Publications, Nagercoil,

Unit - V: Brown TA (2006) gene cloning and DNA analysis ; Blackwell scientific publishers

Reference Items: books, Journal:

1. Prime rose SB, Twyman RM & old RW (2001) .principle of gene manipulation; an Introduction to genetic engineering. 6th Ed Blackwell oxford
2. Wilson K & walker J (2008) principle and techniques of Biochemistry and molecular Biology . Cambridge university Press.
3. Smith JE(2005) Biotechnology , Cambridge university press, UK.

E- Materials:

<https://www.agrimoon.com/principles-of-plant-biotechnology-icar-ecourse-pdf/>

<https://cnx.org/resources/f523305248cf1c5a5e6a320b70d907ff2c73cb4b/PlantBioI-INTRODUCTION.pdf>

http://www.unice.fr/EB/USTH%202013/BP04_introduction_biotechnology_part_1.pdf

Course Out Comes :

1. To learn about genomic organization
2. To know the tools and techniques of genetic engineering
3. To assess the transgenic plant and molecular farming.
4. To gain knowledge about the bioreactor, metabolites by plant tissue culture and describe the microbial biotechnology.
5. To know the intellectual property rights and patenting.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	M	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	M	S	L
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	S	M	L

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

INTERNAL ELECTIVE PAPER -2

B. BIOFERTILIZERS

Course Objectives :

- ❖ To incubate the basics of biofertilizers and their mass cultivation
- ❖ To study the isolation and maintenance of *azospirillum* and *azotobactor*.
- ❖ To understand cyanobacteria association and their factor affecting growth.
- ❖ To study the VAM mycorrhizal association and its influence on growth and yield of crop plants.
- ❖ To improve knowledge of organic farming and their methods.

UNIT - I

General account about the microbes used as biofertilizer – Rhizobium – isolation, identification, mass cultivation, carrier based inoculants, symbiosis.

UNIT - II

Azospirillum, isolation and mass cultivation – carrier based inoculant, associative effect of different microorganisms. *Azotobacter* – classification, characteristics – crop response to *Azotobacter* inoculum, maintenance and mass cultivation.

UNIT - III

Cyanobacteria (blue green algae), *Azolla* and *Anabaena azolla* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation.

UNIT - IV

VA-Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.

UNIT - V

Organic farming – Green manuring and organic fertilizers, recycling of biodegradable municipal, agricultural and Industrial wastes – biocompost making methods, types and method of vermi composting – field Application.

Text Books:

Unit - I: Dubey, R.C., 2005 A Text book of Biotechnology S.Chand & Co, New Delhi.

Unit - II: Subha Rao, N.S. 2000, Soil Microbiology, Oxford & IBH Publishers, New Delhi.

Unit - III: John Jothi Prakash, E. 2004. Outlines of Plant Biotechnology. Emkay Publication, New Delhi.

Unit - IV: Sathe, T.V. 2004 Vermiculture and Organic Farming. Daya publishers.

Unit - V: Kumaresan, V. 2005, Biotechnology, Saras Publications, New Delhi.

Reference Items: books, Journal:

1. Vayas,S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic Farming Akta Prakashan, Nadiad.
2. Dubey, R.C., 2005 A Text book of Biotechnology S.Chand & Co, New Delhi.

E- Materials:

<http://eagri.org/eagri50/SSAC222/lec17.pdf>

<http://www.hillagric.ac.in/edu/coa/agronomy/lect/agron-3610/Lecture-12-BINM-Biofertilizers.pdf>

Course Out Comes :

1. To realizes about the microbes used as biofertilizer.
2. To understand the msaa cultivation of *Azospirillum* and *Azotobacter*
3. To gain knowledge on *Azolla* and anabaena association.
4. To knowledge about the VAM-Mycorrhizal types, growth and yield of crop plants.
5. To know about the organic farming and fertilizers.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO1	S	S	S	M	S	S	S	M	M	S
CO2	S	S	S	S	S	S	S	M	M	M
CO3	S	S	S	M	S	M	S	S	S	S
CO4	S	S	S	S	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

INTERNAL ELECTIVE PAPER -2

C. POSTHARVEST TECHNOLOGY

Course Objectives :

- ❖ To learn how to maintain quality of fruits and vegetables.
- ❖ To know protect food safety for us
- ❖ To knowledge of reduce losses between harvest and consumption
- ❖ To learn various techniques of postharvest in crop plants.
- ❖ To knowledge of storage techniques in different crops

UNIT - I

Introduction to post harvest technology of agricultural produce; Status of Production, Losses, Need, Scope and Importance. Introduction to various post harvest operations such as Primary Processing Operation Vs. Secondary Operation, Operations like Harvesting, Handling cleaning, grading, sorting, drying, storage, milling, size reduction, expelling, extraction, blending, heat treatment, separation, material handling (transportation, conveying, elevating), washing; their functions and use in the post harvest processing.

UNIT - II

Introduction, importance of drying, principles of drying and factors affecting drying, types of drying methods i.e. sun drying & artificial drying by mechanical means – Psychometric Chart, Moisture content representation, equilibrium moisture content, determination of moisture content by direct and indirect methods.

UNIT - III

Introduction to various grain drying systems - solar drying system, batch drying system, continuous flow drying system. Precautions during drying. Principles and operation of different types of Dryers viz. Deep Bed Dryers, Flat Bed Dryers, Continuous Flow Dryers, L.S.V. Dryers, Spray Dryer, Fluidized Bed Dryers, Rotary Dryer, Spouted Beds, Freeze Dryer, Tray And Tunnel Dryers

UNIT - IV

Introduction, need and importance, general principles of storage. Temperature and moisture changes during storage i.e. influence of moisture content, relative humidity, temperature, fungi etc. on stored product. Fungi, insect and other organism / Infections associated with stored grains. Familiarization with the various types of storage structures. Deep and shallow bins. Traditional and modern storage structures. Management of storage structures. Losses during storage and their control, space requirement of bag storage structure. Types of material conveying Systems. Belt Conveyor, Bucket Elevator, Screw Conveyor, Pneumatic Conveyor.

UNIT - V

Methods of Harvesting and Post harvest losses in fruits and vegetables, Handling of Fruits and Vegetables. Introduction to the storage of fruits and vegetables. Need and importance of storage. Principle of storage of fruits and vegetables. Recommended storage operation conditions for some important fruits and vegetables and their storage life. Post harvest treatment to increase shelf life i.e. freezing, chilling, dehydration, canning, thermal processing. Introduction to Packaging of fruits and vegetables and types of packaging. Concept of modified atmosphere packaging.

Text Books:

Unit - I: K. P. Sudeer and V. Indra. 2007. Post harvest technology of horticultural crops. New India Publishing Agency, New Delhi.

Unit - II: Amalendu Chakraverti, Arun S. Mujumdar, G.S. Vijayaraghavan and Hosahalli S. Ramaswamy. 2003. Handbook of Post Harvest Technology. Mercel-Dekker Inc. USA.

Unit - III: K.K. Balachandran. 2001. Post Harvest Technology of Fish and Fish Products. Daya Publishing House, New Delhi.

Unit - IV: A. Chakraverty. 2019. Post Harvest Technology of Cereals, Pulses and Oilseeds. Oxford & IBH Publishing Company

Unit - V: P. Jacob John. 2008. A Handbook on Post Harvest Management of Fruits and Vegetables. Daya Publishing House, New Delhi.

Reference Items: books, Journal:

A. Chakraverty. 2019. Post Harvest Technology of Cereals, Pulses and Oilseeds. Oxford & IBH Publishing Company

E- Materials:

<http://www.fao.org/3/y4358e/y4358e05.htm>

https://casfs.ucsc.edu/documents/Teaching%20Direct%20Marketing/4.7_Harvest_Post-Harvest.pdf

Course Outcomes:

1. To learn how to maintain quality of fruits and vegetables.
2. To know protect food safety for us
3. To knowledge of reduce losses between harvest and consumption
4. To learn various techniques of postharvest in crop plants.
5. To knowledge of storage techniques in different crops

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No

4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	L
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	S	S	M	S	M	S	S
CO4	S	S	S	M	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

INTERNAL ELECTIVE PAPER -3

(to choose one out of 3)

A. FERMENTATION TECHNOLOGY

Course Objectives :

- ❖ To impart knowledge of enzymes production.
- ❖ To know the production of distilled beverages liquors
- ❖ To familiarize alcohol production and fermentation methods
- ❖ To study antibiotics-strain improvement for secondary metabolite production
- ❖ To knowledge of principles and practices in fermentation

UNIT - I

Theory and principles of industrial fermentation, Batch, fed-batch and continuous cultures, Microbial growth and product formation kinetics, media formulation and sterilization, isolation, preservation and improvement of industrially important micro-organisms, inoculums development for industrial fermentations, fermenter design, various types of fermenters used in industrial fermentation. Surface, submerged and solid-state fermentation processes. Basic principal of microbial fuel cells and its application.

UNIT - II

Alcohol production: Preparation of medium, Fermentation process and recovery; Production of Malt beverages: Production of Beer-malting process, mashing process and finishing; other malt products. Production of Wine: Microbial process, wine from grapes, Fermentation and recovery, types of wine-white and red wine.

UNIT - III

Production of distilled beverages or liquors-rum, whiskey and brandy; Microbial production of organic acids-vinegar production (substrate, Microbial processing and product recovery); Citric Acid-fermentation, recovery and uses; Lactic acid-fermentation, medium and manufacturing process, recovery and uses.

UNIT - IV

Production of antibiotics-strain improvement for secondary metabolite production; Penicillin-Fermentation and recovery; Tetracycline and Chloramphenicol production; Streptomycin-structure, media composition, production and recovery, Production of Amino acids: L-Lysine production and

strain improvement for lysine production; L-glutamic acid production-strain improvement for glutamic acid production and recovery process; Tryptophan production and recovery.

UNIT - V

Production of enzymes: Pectolytic enzymes- Pectinases production, harvest, recovery and uses; Invertase and Lipase production; Cellulase production and recovery; Production of vitamins: Vitamin B12 (Cyanocobalamin) production; Riboflavin (vitamin B2) production; Biotransformation of steroids. Algal biomass cultivation, harvesting and extraction of value added compounds. Production of lipids and carbohydrate for production of biodiesel and bioethanol from algal biomass.

Text Books:

Unit - I: A.N. Shukla, Industrial Bioprocess Technology, ISBN: 9789350560303, 9789350560303

Unit - II: Modi H.A. Bioprocess Technology, Pointer Publishers) ISBN: 9788171325924, 9788171325924.

Unit - III: P T Kalaiselvan and I. Arul Pandi. Bioprocess Technology: Volume 1. MJP PUBLISHERS. 9788180940323.

Unit - IV: A.N. Shukla, Advanced Bioprocess Technology. ISBN Number: 978 935056 0273

Unit - V: Stanbury, P.E. and Whitaker A., Principles of Fermentation Technology (1984) Pergamon Press.

Reference Items: books, Journal:

1. Pirt, S.J. Principles of Microbial and Cell Cultivation. Blackwell Scientific Publication, London.

E- Materials:

<http://www.himpub.com/documents/Chapter941.pdf>

Course Out Comes :

1. To knowledge of principles and practices in fermentation
2. To familiarize alcohol production and fermentation methods
3. To know the production of distilled beverages liquors
4. To study antibiotics-strain improvement for secondary metabolite production
5. To impact knowledge of enzymes production.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	M	M
CO2	S	S	S	M	S	S	S	M	M	S
CO3	S	S	S	S	S	M	S	S	S	M
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

INTERNAL ELECTIVE PAPER -3

B. COMPUTER APPLICATIONS IN BOTANY

Course Objectives :

- ❖ To learn the basic application of computer and internet.
- ❖ To gain a working knowledge on computer operations and search strategies.
- ❖ To recognize the database and operating skills.

- ❖ To assess the biological database and search engines.
- ❖ To educate the importance and applications of bioinformatics.

UNIT - I

Types of computers, accessories and its functions, input&output devices, concepts of different operation systems, details of Networks, internet & email. Databases types and its uses, fundamentals of digital imaging.

UNIT - II

Introduction to MS - WINDOWS and LINUX, application of MS WORD - word Processing, editing tools (cut, copy, paste), formatting tools. MS EXCEL - creating worksheet, data entry, sorting data. Statistical tools (SUM, MEAN, MEDIAN and MODE). Preparation of graphs and diagrams (Bar diagram, pie chart, line chart, histogram). MS-POWERPOINT - presentation based on a biological topic; inserting tables, charts, pictures. Open source and free alternatives, to MS Office: Libre Office, Open Office (brief study).

UNIT - III

Computer Network (LAN,WAN), DATA-Representation- Number systems- Binary, arithmetic, Organizing information- the database – definition-Data entry indexing – storage – retrieval – Operating systems – WINDOWS 2000, Word Processing software MS-Office. Introduction to DESKTOP PRINTING (DTP).

UNIT - IV

Biological Sequence searching and comparison Softwares (Blast), Search engines: Google.com; GIS Softwares (Google Earth), Meta search engine – Dogpile.com; academic search - Google scholar. Educational sites related to Biological Science – Scitable.

UNIT - V

Introduction to Bioinformatics and its applications, EMBL and GenBank Data libraries, PIR Database, Fundamentals of Geographic Information Systems (GIS) and Remote Sensing and its uses in biology, Information systems – BTIS, ENVIS.

Text Books:

Unit - I: Pradeep K. Sinha and Priti Sinha, 2004. Computer Fundamentals, 6th Edition, PBP

Publications, New Delhi- 110002.

Unit - II: Naidu, B. E. V. L., Kavuri Sridhar, Kumar, V. S. N. 2018. Computer Fundamentals and Photoshop, 3rd Edition, Publisher : Pragati Prakashan

Unit - III: Alexis Leon and Mathews Leon, 2008. Introduction to Computers, Vikas Publishing House,
New Delhi.

Unit - IV: Rajaraman, V. 2003. Fundamentals of Computers, 4th Edition, Prentice Hall of India

Unit - V: Anita Goel, 2010. Computer Fundamentals. Dorling Kindersley (India) Pvt. Ltd

E- Materials:

<https://faculty.franklin.uga.edu/dhall/sites/faculty.franklin.uga.edu.dhall/files/lec1.pdf>

<http://ocw.jhsph.edu/index.cfm/go/viewCourse/course/MethodsInBiostatisticsI/coursePage/lectureNotes/>

Course Out Comes :

1. Acquisition of working knowledge on computer and surfing the internet.
2. Import knowledge on computer applications
3. Train knowledge on database and operating systems.
4. Employ knowledge on biological sequence search.
5. Study about the biological gene and information systems.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	M	M
CO3	S	S	S	S	S	M	S	M	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

INTERNAL ELECTIVE

PAPER -3

C. FORESTRY

Course Objectives :

- ❖ To know increasing forest area and restoring ecological balance
- ❖ To knowledge of controlling of pollution

- ❖ To learn soil erosion
- ❖ To conserve natural water spring
- ❖ To knowledge conserve the wildlife.

UNIT - I

Introduction to Forestry: - Forests; definitions, role, benefits-direct and indirect. History of Forestry- definitions - divisions and interrelationships. Classification of forests- Forest types- Agricultural lands and forests- Agroforestry systems; differences in nutrient cycling, diversity etc.

UNIT - II

Social forestry, joint forest management; programmes and objectives. Important acts and policies related to Indian forests. Global warming; forestry options for mitigation and adaptation- carbon sequestration. Introduction to world forests- Geographical distribution of forests and their classification- Factors influencing world distribution of forests- productivity potential and increment of world forests.

UNIT - III

Forest resources and forestry practices in different regions of the world; Western Europe, North America, Central America, Central Africa, Australia, Russia, Japan, and China. General problems of forest development and economy at national and Tamil Nadu State level.

UNIT - IV

Forest based Industries in developed and developing countries with special reference to India in general and Tamil Nadu in particular. Trade patterns of forest based raw materials. Recent trends in forestry development in the world. National and international organizations in forestry. Important events/dates related to forests and environment-themes and philosophy.

UNIT - V

Study of families, as survey of trees or woody plant resources: Magnoliaceae, Rhizophoraceae, Ebenaceae, Sapotaceae, Caesalpiniaceae, Santalaceae, Mimosaceae, Elaeagnaceae, Fabaceae, Meliaceae, Lauraceae, Apocynaceae, Moraceae, Tiliaceae, Euphorbiaceae, Pinaceae, Dipterocarpaceae, Guttiferae (Clusiaceae), Myrtaceae, Rubiaceae, Sterculiaceae, Bignoniaceae, Lamiaceae, Cycadaceae and Combretaceae.

Text Books:

Unit - I: Beazley, M. 1981. The International Book of Forest. London

Unit - II: Champion and Seth. 1968. Forest types of India.

Unit - III: K. C. Sahni. (2000). *the Book of Indian Trees*. Bombay Natural History Society. Mumbai.

Unit - IV: Westoby, J. 1991. Introduction to World Forestry. Wiley, 240p

Unit - V: Gurucharan Singh. (2000). *Plant Systematics*. Oxford and IBH Publishing Co. Pvt. Ltd.

New

Delhi.

Reference Items: books, Journal:

1. Mather, A.S. 1990. Global forest resources. Belhaven, London
2. Persson, R. 1992. World forest resources. Periodical experts, New Delhi.
3. Khanna, L.S. 1989. Principles and Practice of Silviculture. Khanna Bandhu, New Delhi.
4. M. S. Randhawa. (1957). *Flowering Trees in India*. SreeSaraswati Press Ltd. Kolkatta.
5. N. L. Bor (1990). *Manual of Indian Forest Botany*. Periodical Expert Book Agency. New Delhi.
6. PradipKrishnen (2013). *Jungle Trees of Central India*. Published by Penguin Books India Pvt. Ltd. New Delhi.

E- Materials:

<https://unaab.edu.ng/2009/12/forestry-a-wildlife-management-lecture-notes/>

<http://www.fao.org/3/t3500e/t3500e02.htm>

Course Out Comes :

1. To know increasing forest area and restoring ecological balance
2. To knowledge of controlling of pollution
3. To learn soil erosion
4. To conserve natural water spring
5. To knowledge conserve the wildlife.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

**SKILL BASED SUBJECT
PAPER - 4**

PLANT AND WATER CONSERVATION AND MANAGEMENT

Course Objectives

- ❖ Recognize the natural and human-caused factors that cause plant species to be rare or imperilled, and describe the genetic and ecological implications of rarity in plant species.
- ❖ Evaluate and generate a conservation strategy for a rare or imperilled plant species.
- ❖ Apply ecological and population genetics principles to evaluate the long-term viability of such a

plant species.

UNIT - I

Plant diversity- Definition, Importance of plants and importance of plant diversity, biodiversity at global, national (India) and regional levels. Hotspots and mega diversity countries, Biological diversity – Genetic and ecological species concept, classical and modern, inter and intra specific species diversity. Allopatric and sympatric speciation-endemism, relics and paleoendemism. Natural forests and their importance in biodiversity

UNIT - II

Threats to biodiversity - Red Data Book, Endangered and Endemic and extinct species of India, study of plant decline and its causes, invasive species, over collection, overexploitation, inappropriate fire regimes, clearing of vegetation, Inappropriate grazing regimes, fragmentation, habitat loss, natural calamities, effect of degeneration of biodiversity on future of evolution, effects of loss of species on ecosystems

UNIT - III

Plant Conservation - Concept and practices, ex situ conservation, in situ conservation, management of problem species, captive breeding, plant propagation, reestablishment and relocation, habitat conservation, botanical gardens, *wild plant conservation*, *Invasive species control*, reintroductions/habitat restoration, advance technology in service of endangered species, conservation of plant diversity in seed banks, gene banks or germplasm reserves, Global Strategy for Plant Conservation.

UNIT - IV

Water Conservation Introduction -Definition and aim of water conservation. History of water conservation in India & abroad. Water conservation and management policies, strategies and activities. Water resources in India, their distribution and quality parameters, Sources of water, Hydrology- surface water hydrology, groundwater hydrology (hydrogeology), and marine hydrology. Hydrological cycle- types and importance in water management.

UNIT - V

Methods of Water Conservation - Protection of Water from Pollution, Redistribution of Water, Use of Modern Irrigation Methods – drip, sprinkler and mist irrigation, Elementary knowledge of gully control structures, drop spillway, drop inlet spillway, chute spillway, check dams and diversion bunds. Grass waterways. Change in Crop Pattern, Role of grasses in water conservation. Role of forestry in water conservation. Watershed Management, Water harvesting and its techniques.

Text Books:

Unit: I, II and III

1. King, A. Cleveland H. and Streatfeild G. 1980. Bio resources for development: The renewable way of life. Pergamon Press, Headington Hill Hall.
2. Ananthkrishnan, T.N. 1989. Bio resources Ecology. Oxford and IBH Publishers, Delhi.
3. Krishnamurthy, K.V. 2009. An Advanced Textbook on Biodiversity Principles and Practice. Oxford and IBH Publishers, Delhi.
4. Rajamannar, 2004 Environmental studies EVR College Pub. Trichy.
5. Kalavathy, S (E.D) 2004, environmental studies, Bishop Heber College Pub., Trichy.

Unit: IV and V

1. Chatterjee S.N. (2008), Water Resources, Conservation and Management Atlantic Publishers, New Delhi.

Reference Books:

1. Chaudhuri A.B. and Sarkar, D. D., 2004 .Mega diversity Conservation: Flora, Fauna and Medicinal Plants of India's Hot Spots. Daya Publishing House, New Delhi.
2. Singh, M.P and S. Dey. 2004. Bio resources and Gene pool Conservation. Daya Publishing House, New Delhi.
3. Shiva, M.P. 1998. Inventory of Forest Resources for Sustainable Management and Biodiversity Conservation. Indus Publications New Delhi.
4. Heathcote, I.W. 1988. Integrated Watershed Management: Principles and Practices. John Wiley and Sons.
5. Ragunath, H.M. 2007. Hydrology: Principles, Analysis and Design, 3rd edition. New Age International Publishers, Chennai.
6. Ghanshyam Das, Hydrology: Soil Conservation and Watershed Management. PHI. Pvt. Ltd, Delhi.
7. Suresh, R. 2009. Soil and Water Conservation Engineering, 2nd revised edition .Standard Publishers, New Delhi.
8. Heywood, V.H. & Iriondo, J.M. 2003. Plant conservation: old problems, new perspectives. *Biological Conservation* 113 (3):321-335.
9. Krupnick, G.A. & Kress. 2005. *Plant conservation: a natural history approach*. Chicago: University of Chicago Press.
10. Soulé, M. 1985. What is Conservation Biology? *Bioscience* 35:727-734.

E- Materials:

1. 2000 IUCN Red List of Threatened Species By Craig Hilton-Taylor, Russell A. Mittermeier, International Union for Conservation of Nature and Natural Resources Species Survival

- Commission.
2. Soil and Water Conservation News, Volumes 9-10.

Course Out Comes :

1. To know about the importance and types of plant diversity.
2. To know about the causes and effects of loss of biodiversity.
3. To find out the ways of biodiversity conservation.
4. To know about the basics of water conservation.
5. To understand the ways of water conservation and management.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	M
CO2	S	S	S	M	S	S	S	M	M	M
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	M
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

CORE PRACTICAL - I

(COVERING PAPERS - I & II)

(Phycology, Mycology, Microbiology, Lichenology, Bryology and Plant Pathology)

Time: 3 hrs

Marks : 75

1. Cut transverse sections of **A, B** and **C** Stain and mount in glycerin. Identify giving reasons. Draw diagrams. Leave the slides for valuation-----**18**
2. Identify the two algal specimens in **D**. Draw diagrams and write short notes. -- **8**

3. Identify, draw diagrams and write notes of interest on **E, F, and G** ----- **12**
4. Name the genus, group and morphology of the given part of **H, I, J and K**
(Diagrams not necessary) -----**12**
5. Write the name of the disease, causal organism, symptoms of the pathological specimen, **L** and draw diagrams. ----- **9**
6. Identify and write notes on economic importance of **M and N**----- **6**

	65
Record	10
Total	75

CORE PRACTICAL - I
(COVERING PAPERS - I & II)

KEY

Time: 3 hrs

Marks : 75

1. **A-** Algae (Identification- 1, Diagram-1, Reasons-2, Slides-2) ----- **6**
B- Fungi (Identification -1, Diagram-1, Reasons-2, Slides -2) ----- **6**
C- Bryophytes (Identification- 1, Diagram-1, Reasons-2, Slides-2) -- ----- **6**
2. **D-** Algal mixtures
1. (Identification -1, Diagram-1, Notes-2)-----**4**
2. (Identification- 1, Diagram-1, Notes-2) -----**4**
3. **E-** Algae (Identification -1, Diagram-1, Notes-2) ----- **4**
F- Fungi (Identification -1, Diagram-1, Notes-2) ----- **4**
G- Bryophytes (Identification -1, Diagram-1, Notes-2)----- **4**
4. **H-** Algae (Genus-1, Group-1, Morphology - 1) -----**3**
I- Fungi (Genus-1, Group-1, Morphology-1) ----- **3**
J- Bryophytes (Genus-1, Group-1, Morphology-1)----- **3**
K- Lichens (Genus-1, Genus-1, Morphology-1)----- **3**
5. **L-** Plant Pathology / Fungi /Microbiology
(Name of the disease -1, Name of the Causal Organism -1, Diagram-3, Symptoms -
4) ----- **9**
Economic importance:
6. **M-** Algae / Fungi (Identification-1, Notes -2) ----- **3**
N- Microbiology / Lichenology (Identification – 1, Notes -2) ----- **3**

	65
Record	10
Total	75

CORE PRACTICAL - II
(COVERING PAPERS- III & IV)
(Pteridology, Gymnosperms, Paleobotany and Cell Biology)

Time : 3 Hrs

Marks : 75

1. Cut transverse sections of **A** and **B**. Stain and mount in glycerin. Identify giving reasons. Draw diagrams. Leave the slides for valuation ----- **16**
2. Make suitable micro preparation of **C**. Identify by giving reasons. Draw diagrams. Leave the slides for valuation ----- **8**
3. Make Acetocarmine preparation of **D**. Show any one dividing stage and draw diagrams. Leave the slides for valuation. Write explanatory notes.-----**8**
4. Identify the given Fossil slide/ Specimen **E**. Draw diagrams and write notes of interest----- **9**
5. Identify and draw diagrams with notes of interest on **F, G, H** and **I** ----- **16**
6. Give the names of Genus, Group and Morphology of the Given part of **J** and **K** (diagrams not necessary)-----**8**

	65
Record	10
Total	75

PRACTICAL-II – (COVERS PAPERS- III & IV)
(Peridology, Gymnosperms, Paleobotany and Plant Cell Biology)
KEY

Time : 3 Hrs

Marks : 75

1. **A** - Pteridophytes (Identification-1, Diagram-1, Reason-3, Slide-3)-----**8**
B - Gymnosperm (Identification-1, Diagram-1, Reason-3, Slide-3) -----**8**
2. Reproductive Parts of Pteridophytes or Gymnosperms
C - (Identification-1, Diagram-1, Reason-3, Slide-3) -----**8**
3. **D** - Root tip Squash ((Diagram-2, Notes-3, Slide-3) -----**8**
E - Fossil Slides (Identification 2, Diagram-3, Notes-4)-----**9**
4. Slides / Spotters
F - Pteridophytes (Identification-1, Diagram-1, Notes-2)-----**4**
G - Gymnosperms (Identification-1, Diagram-1, Notes-2)-----**4**
H – Cell Biology (Identification-1, Diagram-1, Notes-2)-----**4**
I - Cell Biology (Identification-1, Diagram-1, Notes-2)-----**4**
5. **J** - Pteridophytes (Genus-2, Group-1, Morphology-1)-----**4**
K - Gymnosperms (Genus-2, Group-1, Morphology-1)-----**4**

	65
Record	10
Total	75

CORE PRACTICAL - III
(COVERING PAPERS - V, VI & VII)

**(Anatomy, Embryology of Angiosperms, Morphology, Taxonomy of Angiosperms,
Economic Botany, Genetics, Plant Breeding, Evolution and Biostatistics)**

Time : 3 Hrs

Marks: 75

1. Cut transverse sections of **A**. Stain and mount in glycerin. Draw diagrams (Ground plan and a section enlarged) Identify by giving reasons. Leave the slides for valuation -----8
2. Dissect the material **B** and mount any one of the stage of the developing Embryo. Draw diagrams Leave the preparation for valuation.-----8
3. Refer **C** to their respective family. Find out the characters on which identification is based at each level. Diagrams not necessary. -----5
4. Describe **D** in technical terms. Draw diagrams of the floral parts and Construct the floral diagrams and write down the floral formula.-----5
5. Construct the Gene Map of **E** using three point test cross-----8
6. Identify and write notes of interest on **F, G, H, I** and **J**. -----10
7. Write name of the Genus ,Species ,Family and Morphology of the useful part of **K** and **L**-----8
8. **M** and **N** – Identify and write about the modification of the given specimens.-----8

	60
Herbarium	05
Record	10
Total	75

CORE PRACTICAL –III
(COVERS PAPERS -V, VI, & VII)
(Anatomy, Embryology of Angiosperms, Morphology, Taxonomy of Angiosperms, Economic Botany, Genetics, Plant Breeding, Evolution and Biostatistics)

KEY

Time : 3 Hrs

Marks: 75

1. **A** - Anatomy- Root, Stem or Leaf (Dicot or Monocot)
 (Identification-1 Diagram-2, Reason-2, Slide-3) -----8
2. Embryo mounting, Globular / Heart shaped
B - (Diagram-4, Slide -4)-----8
3. Respective Families
C - (Identification-1, Reason-4)-----5
4. Twig with flowers of any plant
D - (Technical description -2, Diagram-3)-----5
5. Genetics
E - Genetic Map Construction. -----8
6. Slides /Spotters
F – Anatomy (Identification-1, Diagram & Notes-1)-----2
G – Embryology (Identification-1, Diagram & Notes-1)-----2
H - Genetics (Identification-1, Diagram & Notes-1)-----2
I - Plant Breeding (Identification-1, Diagram & Notes-1) -----2
J - Evolution and Biostatistics (Identification-1, Diagram & Notes-1)-----2
7. Economic Botany,
K - (Genus-1, Species-1, Family-1, Morphology-1)-----4
L - (Genus-1, Species-1, Family-1, Morphology-1)-----4
8. Morphology
M - (Identification-1, Notes-3)-----4
N - (Identification-1, Notes-3)-----4

	60
Herbarium	05
Record	10
Total	75

CORE PRACTICAL –IV
(COVERS PAPERS- VIII, IX & X)

(Plant Physiology, Plant Biochemistry, Ecology, Phytogeography and Toxicology)

Time : 3 Hrs

Marks: 75

1. Outline the procedure, Apparatus and Materials required for investigating the Physiology problem **A** assigned. Setup the experiment. Tabulate the data observed and report the results. Leave the setup for valuation-----**20**
2. Based on the Morphological and Anatomical characters, assign **B** and **C** to their respective probable habitats. Draw suitable diagrams. Submit the slide for valuation.
-----**14**
3. Comment on the setup **D**.-----**7**
4. Identify and write critical notes on **E, F, G** and **H**-----**16**
5. Identify **I**, the Phytogeographical region of India and write notes.-----**4**
6. Identify **J**, the Heavy metal toxicity and write notes-----**4**

	65
Record	10
Total	75

PRACTICAL-IV – (COVERS PAPERS- VIII, IX & X)

(Plant Physiology, Plant Biochemistry, Ecology, Phytogeography and Toxicology.)

KEY

Time : 3 Hrs

Marks: 75

1. Physiological experiments - Individual
A - (Procedure-5, Apparatus and Materials- 4, Tabulated data-4, Results-4, Setup- 3) -----20
2. Ecological Adaptation:
B - (Habitat-1, Reasons-2, Diagram-2, Slide-2)----- 7
C - (Habitat-1, Reasons-2, Diagram-2, Slide-2)----- 7
3. Biochemistry - Any test D ----- 7
4. E - Physiology setup (Identification-1 ,Notes-3) -----4
F - Any Pollution Related (Identification-1, Notes-3) -----4
G - Ecological quadrat (Identification-1, Notes-3) -----4
H - Hot Spots in India Map (Identification-1, Notes-3) -----4
5. I - Phytogeographical region of India. (Identification-1 ,Notes-3)-----4
6. J - Heavy metal toxicity (Identification-1, Notes-3)-----4

	65
Record	10
Total	75

THIRUVALLUVAR UNIVERSITY
MASTER OF COMPUTER SCIENCE
(CBCS PATTERN)
(With effect from 2022 - 2023)

I. PROGRAMME OBJECTIVES

1. To impart a sound understanding of the advanced principles of Computer Science and up-to-date methodologies.
2. To significantly advance a student's career prospects within the IT industry.
3. To edify technical and soft skills for the students to become competent personnel in Information Technology and / or related industries.
4. To identify and develop technocrats, industrialists and business stalwarts from potential students.
5. To conduct research and development in cutting-edge technologies towards the proliferation of education, governance, social and rural development.

II. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: To build successful professionals in industry, government, academia, research, entrepreneurial pursuit and consulting firms.

PEO2: To educate them to contribute to the society as expressive, ethical and responsible citizens with proven expertise.

PEO3: To achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, design and implementation skills.

PEO4: To adapt rapidly changing technologies, tools and industrial environments.

PEO5: To thrive in order to pursue life-long learning to fulfil their goals.

III. PROGRAMME OUTCOMES (POs)

Upon completion of the programme, the students are expected to have acquired

PO1: Basic fundamental knowledge in problem solving and in depth knowledge in computer science.

PO2: Ability to identify, analyze, design, optimize and implement systems and solutions using appropriate algorithms with acceptable complexity.

PO3: Capacity to produce cost effective, quality and maintainable software products and solutions meeting the global standards and requirements with the knowledge acquired and using the emerging techniques, tools and software engineering methodologies and principles.

PO4: Ability to understand the intricacies of a various process across the globe, by extracting facts and build models for marketing and business strategies.

PO5: Capable to work with multidisciplinary teams in small and large scale projects by utilizing modern software engineering tools and emerging technologies to develop complex products for the societal and engineering needs with skills to communicate effectively in group discussions and report writing.

PO6: Enriched knowledge to plan, develop and manage software tools and/or become an entrepreneur with the due consideration of the public health and safety, in the context of cultural, societal, and environmental situations.

PO7: Provide socially acceptable technical solutions to complex computer science engineering problems with the application of modern and appropriate techniques for sustainable development relevant to professional engineering practice.

PO8: Responsibility towards societal issues and environmental sustainability with an orientation to optimize resource utilization and conservations.

PO9: Apply the knowledge of ethical and management principles required to work in a team as well as to lead a team.

PO10: Ability to communicate within the computing community to interpret, produce, and present clear instructions, as well as design and create good documentation.

IV. PROGRAMME SPECIFIC OUTCOMES (PSOs)

On successful completion of this programme, students should be able to:

PSO1: Apply the knowledge gained during program from Mathematics and Computing Sciences to identify, formulate and solve real life complex problems and R&D problems with an orientation to lifelong learning.

PSO2: Ability to design and develop hardware and software in emerging technology environments like cloud computing embedded products, real-time systems, Internet of Things etc.

PSO3: Acquaintance in data management systems in association with cloud and distributed computing so as to solve problems using the relevant techniques.

PSO4: Comprehend and write effective project reports in multidisciplinary environment in the context of changing technologies.

PSO5: Sound knowledge base and skill sets to develop and expand professional careers in fields related to human-computer interaction and management of industrial processes for the design and implementation of intelligent systems

V. THE COURSE OF STUDY AND SCHEME OF EXAMINATION

S.No	Study Components		Ins.	Credit	Title of the Paper	Maximum Marks		
	Course Title		Hrs./ week			CIA	Uni. Exam	Total
SEMESTER 1								
1.	Core	Paper -1	5	3	Relational Database Management System	25	75	100
2.	Core	Paper -2	5	3	Enterprise Java Programming	25	75	100
3.	Core	Paper -3	5	3	Programming using C#.NET	25	75	100
4.	Practical	Paper -1	3	2	Practical 1:Relational Database Management System	25	75	100
5.	Practical	Paper -2	3	2	Practical 2: Enterprise Java Programming	25	75	100
6.	Practical	Paper -3	3	2	Practical 3: Programming using C#.NET	25	75	100
Internal Elective for same major students								
7.	Core Elective	Paper-1	3	3	(to choose one out of 3) A. Computer Organization B. Parallel Computing C. Embedded System	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
8.	Open Elective	Paper - 1	3	3	(to choose one out of 3) A. E-Commerce B. Introduction to Computer Applications C. Principles of Internet	25	75	100
			30	21				800

SEMESTER II						CIA	Uni. Exam	Total
9.	Core	Paper -4	5	3	Advanced Enterprise Java Programming	25	75	100
10.	Core	Paper -5	4	3	Design and Analysis of Algorithm	25	75	100
11.	Core	Paper -6	4	3	Web Application using C#.NET	25	75	100
12.	Practical	Paper -4	3	2	Practical 4: Advanced Enterprises Java Programming	25	75	100
13.	Practical	Paper -5	3	2	Practical 5: Design and Analysis of Algorithm	25	75	100
14.	Practical	Paper -6	3	2	Practical 6: Web Application using C#.NET	25	75	100
Internal Elective for same major students (Choose any one)								
15.	Core Elective	Paper -2	3	3	(To choose one out of 3) A. Human Computer Interaction B. Social Information Networks C. Cloud Computing	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
16.	Open Elective	Paper –2	3	3	(To choose one out of 3) A. Principles of Web Design B. Open Source Applications C. Problem Solving Techniques	25	75	100
17.	Field Study		-	2	Field Work	100	-	100
18.	Compulsory Paper		2	2	Human Rights	25	75	100
			30	25				1000

SEMESTER III						CIA	Uni. Exam	Total
19.	Core	Paper -7	5	4	Distributed Operating System	25	75	100
20.	Core	Paper -8	5	4	XML and Web Services	25	75	100
21.	Core	Paper -9	5	3	Programming using Python	25	75	100
22.	Practical	Paper -7	3	2	Practical 7: Distributed Operating System	25	75	100
23.	Practical	Paper -8	3	2	Practical 8: XML and Web Services	25	75	100
24.	Practical	Paper -9	3	2	Practical 9: Programming using Python	25	75	100
Internal Elective for same major students								
25.	Core Elective	Paper -3	3	3	(To choose one out of 3) A. Blockchain Technology B. Internet of Things C. Network Security	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
26.	Open Elective	Paper -3	3	3	(To choose one out of 3) A. Programming using C B. Programming using C++ C. Programming using Python	25	75	100
27.	MOOC Courses		-	2				100
			30	25		200	600	900

SEMESTER IV						CIA	Uni. Exam	Total
28.	Core	Paper-10	5	4	Mobile Application Development	25	75	100
29.	Core	Paper-11	6	4	Software Project Management	25	75	100
30.	Practical	Paper-10	3	2	Practical 1: Mobile Application Development	25	75	100
31.	Core	Project Work with Viva-Voce	10	5	Project Work (Compulsory)	100 (75 Project + 25 viva)		100
Internal Elective for same major students (Choose any one)								
32.	Core Elective	Paper -4	3	3	(To choose one out of 3) A. Big Data Analytics B. Artificial Intelligence C. Machine Learning	25	75	100
External Elective for other major Students (Inter/multi-disciplinary papers)								
33.	Open Elective	Paper -4	3	3	(To choose one out of 3) A. Cyber Security B. Decision Support System C. Research Methods and Ethics	25	75	100
			30	21		125	375	600
			120	92				3300

Semester: **I** Paper type: **Core** Paper code: **Paper -1** Name of the
 Paper: **Relational Database Management System** Credits: **3**
 Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: -

Course Objectives

1. To have a broad understanding of database concepts and database management system software
2. To have a high-level understanding of major DBMS components and their function
3. To be able to model an application's data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model.
4. To be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
5. To be able to program a data-intensive application using PL/SQL.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to have a broad understanding of database concepts and database management system software
2. After studied unit-2, Students are able to have a high-level understanding of major DBMS components and their function
3. After studied unit-3, Students are able to know the various normalization techniques.
4. After studied unit-4, Students are able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
5. After studied unit-5, Students are able to understand the PL/SQL and Stored Procedures.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	No	No

UNIT - I: INTRODUCTION TO DATABASE CONCEPTS

Teaching Hours: 15

Introduction : Flat File - Database System – Database – Advantages – Architecture – Database Management System as Implemented in Modern Database Packages – System Databases.

The Entity - Relationship Model : Introduction - The Entity Relationship Model – Entities – Entity Sets – Relationships – Relationship Sets – Mapping Cardinalities – Mapping Constraints – Keys – Roles in E-R Diagrams – Weak Entity Sets in E-R Diagrams – Non Binary Relationships – Combining Two E-R Diagrams – Representation of Strong and Weak Entity Sets – Linking a Weak to a Strong Entity – Breaking Higher Cardinalities into Lower Cardinalities – Use of Entity or Relationship Sets – Generalization - Aggregation.

Data Models: Introduction - Relational Approach – Relational Rules - The Hierarchical Approach – Hierarchical Model - The Network Approach – Higher Level Operations.

UNIT - II: STORAGE AND RELATIONAL DATA STRUCTURE

Teaching Hours: 15

Storage Structure : File Organization and Addressing Schemes – Sequential and Indexed Sequential Organizations – Direct Organization of File – Interface Indexing – Hashing Scheme of File Organization – Dynamic Hashing Technique – Insertion Scheme in Dynamic Hashing – B-Trees – Indexing Methods - Clustering.

Relational Data Structure: Introduction - Relations - Domains.

UNIT - III: NORMALIZATION

Teaching Hours: 15

Normalization: Introduction – Purpose of Normalization - Normalization - Definition of Functional Dependence (FD) - Normal Forms: 1NF, 2NF, 3NF and BCNF.

UNIT - IV: STRUCTURED QUERY LANGUAGE (SQL)

Teaching Hours: 15

Creating, Dropping and Altering Tables – create table – drop table – alter table – Inserting Rows – Querying the Database – Simple select Statement Sub-Selects – Aggregate Functions – String, Number and Date Functions – SET Operations – Views – create view – drop view – Modifying the Database – insert – update – delete Statements.

UNIT - V: PROCEDURAL LANGUAGE – SQL (PL/SQL)

Teaching Hours: 15

Data Types and Variables – Program Control Statements – null Statement – Assignment Statement – Conditional Statements – Loops – Program Structure – Anonymous Blocks –

Procedures and Functions – Stored Procedures and Functions – Packages – Triggers – Database Access using Cursors.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

For Units – I, II and III

1. Rajesh Narang, “Database Management Systems”, PHI Learning Private Limited, New Delhi, Fifth Printing, 2010.

For Units – IV and V

2. Rajshekhar Sunderraman, “ORACLE 8 Programming – A Primer” Addition – Wesley Publication, 2000.

References

1. Raghu Ramakrishnan and Johannes Gehrke, “Database Management Systems”, Tata McGraw-Hill Publishing Company, 2003.
2. Ramez Elmasri and Shamkant B. Navathe, “Fundamental Database Systems”, Third Edition, Pearson Education, 2003.
3. Hector Garcia–Molina, Jeffrey D.Ullman and Jennifer Widom- “Database System Implementation”- Pearson Education- 2000.
4. Narang, ”Database Management Systems”, 2nd ed., PHI.

Web References

1. <https://www.tutorialspoint.com/sql/sql-rdbms-concepts.htm>
2. <http://www.rjspm.com/PDF/BCA-428%20Oracle.pdf>
3. <http://kadakiaeducation.edu.in/Course/BCA/Course%20Material/RDBMS.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	L	M	L	M	L	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	S	L	S	M	S	M	M
CO3	S	S	M	M	M	L	M	M	L	M	M	S	M	M	S
CO4	S	S	S	L	M	S	M	L	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	L	M	S	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Core** Paper code: **Paper -2** Name of the
 Paper: **Enterprise Java Programming** Credits: **3**
 Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: -

Course Objectives

1. To introduce programming with Applet and AWT.
2. An overview of database access and details for managing information using the JDBC API.
3. Examine the use of networking and collections.
4. Learn how to program Servlet and JSP.
5. To understand the web programming concepts in the perspective of Client and Server.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about applets concepts.
2. After studied unit-2, Students are able to understand java networking system.
3. After studied unit-3, Students are able to understand about collections and design patterns.
4. After studied unit-4, Students are able to develop applications using JSP.
5. After studied unit-5, Students are able to concept of web programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTRODUCTION**Teaching Hours: 15**

Applet Fundamentals- Applet Class - Applet lifecycle- Steps for Developing Applet Programs- Passing Values through Parameters- Graphics in Applets; GUI Application - Dialog Boxes - Creating Windows - Layout Managers – AWT Component classes – Swing component classes- Borders – Event handling with AWT components - AWT Graphics classes - File Choosers - Color Choosers – Tree – Table –Tabbed panels–Progressive bar - Sliders.

UNIT-II: JDBC AND JAVA NETWORKING**Teaching Hours: 15**

JDBC -Introduction - JDBC Architecture - JDBC Classes and Interfaces – Database Access with MySQL -Steps in Developing JDBC application - Creating a New Database and Table with JDBC - Working with Database Metadata; Java Networking - Basics of Networking - Networking in Java- Socket Program using TCP/IP - Socket Program using UDP- URL and InetAddressclasses.

UNIT-III: COLLECTIONS AND DESIGN PATTERNS**Teaching Hours: 15**

Collection Framework - ArrayList class - LinkedList class - ArrayListvs Linked List - ListIterator interface - HashSet class, LinkedHashSet class, TreeSet class PriorityQueue class - Map interface, HashMap class, LinkedHashMapclass ,TreeMap class - Comparable interface , Comparator interface, Comparable vs Comparator; Design Patterns: Introduction to Design patterns - Catalogue for Design Pattern - Factory Method Pattern, Prototype Pattern, Singleton Pattern, Adapter Pattern, Proxy Pattern, Decorator Pattern, Command Pattern, Template Pattern, Mediator Pattern;

UNIT-IV: SERVLET AND JSP**Teaching Hours: 15**

Servlet: Advantages over Applets - Servlet Alternatives - Servlet Strengths - Servlet Architecture - Servlet Life Cycle – GenericServlet, HttpServlet - First Servlet - Invoking Servlet - Passing Parameters to Servlets - Retrieving Parameters - Server-Side Include – Cookies; JSP : JSP Engines Working with JSP - JSP and Servlet - Anatomy of a JSP Page.

UNIT-V: WEB PROGRAMMING**Teaching Hours: 15**

Client-Side Programming: Client-side programming technologies - Form design using HTML, XHTML and DHTML and CSS - Client side validation Using JavaScript - Content Structuring using XML - Adding Interactivity with AJAX -JQuery Framework; Server-side Programming:

Web Servers - Handling request and response - Handling Form data - Session management - Database Access.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. S. Sagayaraj, R. Denis, P.Karthik& D. Gajalakshmi “Java Programming”, Universities Press, 2018.

References

1. Patrick Naughton& Herbert Schildt, "The Complete Reference: Java 2", Tata McGraw Hill, 1999.
2. Deitel&Deitel, "Java How to Program", Prentice Hall, 5th Edition, 2002
3. Peter Hagggar, "Practical Java: Programming Language Guide", Addison-Wesley Pub Co, 1st Edition, 2000.
4. C.Muthu, "Programming with Java", McGraw Hill, Second Edition, 2008.

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1. <http://math.hws.edu/javanotes/c6/index.html>
2. <http://www.tutorialspoint.com/awt/>
3. www.studytonight.com
4. www.javatpoint.com
5. www.learnjavaonline.org
6. www.codingbat.com

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	M	L	M	S	S	M	S	S
CO2	S	M	M	L	M	M	M	M	M	M	M	M	S	M	M
CO3	M	S	S	M	M	L	M	L	S	L	M	S	M	L	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	M	M	M	M	L	S	S	M	L	M	S	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Core** Paper code: **Paper -3** Name of the

Paper: **Programming using C#.NET** Credits: **3**

Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: **-**

Course Objectives

1. To know the differences between desktop and web application.
2. To construct classes, methods, and accessor and instantiate objects.
3. To create and manipulate GUI components in C#.
4. To code solutions and compile C# projects within the .NET framework.
5. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about introduction of C#.NET.
2. After studied unit-2, Students are able to understand what is mean by windows forms.
3. After studied unit-3, Students are able to understand about delegates and events.
4. After studied unit-4, Students are able to understand reflection and remoting.
5. After studied unit-5, Students are able to understand about database in C#.NET.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTRODUCTION

Teaching Hours: **15**

Introduction to .NET – Features of C# - Data Types – Value Types – Reference Types - Variables and Constants – Declaring – Assigning values – variables of nullable types – Operators – Type Conversions – Implicit and Explicit Type Conversions – Arrays – Single Dimensional and Multidimensional – Control Flow Statements – Selection – Iteration and Jump – Classes and

Objects – Access Modifiers – Defining a Class – Variables – Properties and Methods – Creating Objects – Inheritance – Polymorphism- Constructor and Destructors.

UNIT-II: WINDOWS FORMS

Teaching Hours: 15

Windows Forms – Form Class – Common Operations on Forms – Creating a Message Box – Handling Events – Mouse Events – Keyboard Events – Common Controls in Windows Forms – Label – TextBox – Button – Combo Box – List Box – Check Box – Radio Button – Group Box – Picture Box – Timer – Open File Dialog – Save File Dialog – Font Dialog – Color Dialog – Print Dialog – Tree View – Menu.

UNIT-III: DELEGATES AND EVENTS

Teaching Hours: 15

Delegates – Declaring a Delegate – Defining Delegate Methods – Creating and Invoking Delegate Objects – Multicasting with Delegates – Events – Event Sources – Event Handlers – Events and Delegates.

UNIT-IV: REFLECTION AND REMOTING

Teaching Hours: 15

Life Cycle of threads-Using Reflection – Reflecting the Members of a Class - Dynamic Loading and Reflection - .NET Remoting – Architecture – Hosting of Objects – Single Ton and Single Call – Remoting Server – Remoting Client.

UNIT-V: DATABASE

Teaching Hours: 15

Creating Connection String – Creating a Connection to a Database – Creating a Command Object – Working with Data Adapters – Using Data Reader to work with Databases – Using Dataset.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.

- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Vikas Gupta , “Comdex .NET Programming “ , Dream Tech Press, New Delhi, 2011
2. Kogent Solutions, “ C# 2008 Programming Black Book”, Dream Tech Press, New Delhi, Platinum Edition, 2009

References

1. Rebecca M.Riordon, “Microsoft ADO .Net 2.0 Step by Step”, Prentice Hall of India Private Limited, New Delhi, 2007
2. David S.Platt , “Introducing Microsoft .Net”, Prentice Hall of India(Private) Limited, Third Edition, New Delhi, 2006

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2. <http://csharp.net-tutorials.com/classes/introduction/>
3. <http://www.homeandlearn.co.uk/csharp/csharp.html>
4. <http://www.indiabix.com/c-sharp-programming/questions-and-answers/>
5. <https://www.wiziq.com/online-tests/43860-c-basic-quiz>
6. <http://www.withoutbook.com/OnlineTestStart.php?quizId=71>
7. http://www.compileonline.com/compile_csharp_online.php <http://www.ideone.com>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	S	M	L	S	S	M	L	S	S	S	M	M	S
CO4	M	M	S	L	S	M	M	S	M	M	M	M	M	S	S
CO5	M	S	M	M	M	S	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Practical** Paper code: **Paper -1** Name of the Paper: **1 - Relational Database Management System** Credits: **2**

Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

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Course Objectives

1. To have a broad understanding of database concepts and database management system software
2. To have a high-level understanding of major DBMS components and their function
3. To be able to model an application's data requirements using conceptual modelling tools like ER diagrams and design database schemas based on the conceptual model.
4. To be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
5. To be able to program a data-intensive application using PL/SQL.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to have a broad understanding of database concepts and database management system software
2. After studied unit-2, Students are able to have a high-level understanding of major DBMS components and their function
3. After studied unit-3, Students are able to know the various normalization techniques.
4. After studied unit-4, Students are able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
5. After studied unit-5, Students are able to understand the PL/SQL and Stored Procedures.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	No	No

1. Creating database tables and using data types.

- Create table, • Modify table, • Drop table

2. Data Manipulation.

- Adding data with Insert, • Modify data with Update, • Deleting records with Delete

3. Implementing the Constraints.

- NULL and NOT NULL, • Primary Key and Foreign Key Constraint • Unique, Check and Default Constraint

4. Data Retrieval

- Simple select clause, • Accessing specific data with Where, Ordered By, Distinct and Group By

5. Aggregate Functions.

- AVG, • COUNT, • MAX, • MIN, • SUM, • CUBE

6. String functions.

7. Date and Time Functions, Union, intersection and set difference.

8. Nested Queries & JOIN operation.

9. Practical Based on performing different operations on a view.

10. Practical Based on implementing use of triggers, cursors & procedures.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	L	M	L	M	L	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	S	L	S	M	S	M	M
CO3	S	S	M	M	M	L	M	M	L	M	M	S	M	M	S
CO4	S	S	S	L	M	S	M	L	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	L	M	S	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Practical** Paper code: **Paper -2** Name of the Paper: **2 – Enterprise Java Programming** Credits: **2**

Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

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Course Objectives

1. To introduce programming with Applet and AWT.
2. An overview of database access and details for managing information using the JDBC API.
3. Examine the use of networking and collections.
4. Learn how to program Servlet and JSP.
5. To understand the web programming concepts in the perspective of Client and Server.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about applets concepts.
2. After studied unit-2, Students are able to understand java networking system.
3. After studied unit-3, Students are able to understand about collections and design patterns.
4. After studied unit-4, Students are able to develop applications using JSP.
5. After studied unit-5, Students are able to concept of web programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Develop Applet Programming with various techniques.
2. Develop applications using AWT.
3. Working with Graphics, Color and Font
4. Working with JDBC Classes (Database Operations- Create, Insert, Delete, Update, Select)
5. Handling ResultSet and Statements.

6. Jasper Report Generation
7. Working with Servlet and JDBC
8. Handling Client/Server Networking
9. Develop Java Server Pages applications using JSP Tags.
10. Working with Java Collections.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	M	L	M	S	S	M	S	S
CO2	S	M	M	L	M	M	M	M	M	M	M	M	S	M	M
CO3	M	S	S	M	M	L	M	L	S	L	M	S	M	L	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	M	M	M	M	L	S	S	M	L	M	S	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Practical** Paper code: **Paper -3** Name of the Paper: **3 – Programming using C#.NET** Credits: **2**

Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

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Course Objectives

6. To know the differences between desktop and web application.
7. To construct classes, methods, and accessor and instantiate objects.
8. To create and manipulate GUI components in C#.
9. To code solutions and compile C# projects within the .NET framework.
10. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

6. After studied unit-1, Students are able to understand about introduction of C#.NET.
7. After studied unit-2, Students are able to understand what is mean by windows forms.
8. After studied unit-3, Students are able to understand about delegates and events.
9. After studied unit-4, Students are able to understand reflection and remoting.
10. After studied unit-5, Students are able to understand about database in C#.NET.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Variables, Constants and Arrays
2. Classes and Objects
3. Inheritance
4. Polymorphism
5. Windows Form Controls (Label, Text, Button, Check Box, Radio)
6. Windows Form Controls (List, Combo, Timer, Group Box, Picture Box)
7. Menu Handling

8. Reflection
9. ADO.NET Connection
10. Data Command

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	S	M	L	S	S	M	L	S	S	S	M	M	S
CO4	M	M	S	L	S	M	M	S	M	M	M	M	M	S	S
CO5	M	S	M	M	M	S	S	M	M	S	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Core Elective** Paper code: **Paper -1** Name of the
Paper: **A – Computer Organization** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand the basics of Computer Organization.
2. To know about the functions of various languages and translation
3. To know the relationship between computer instruction and the Machine code execution.
4. To recognize the need of various types of computer organizations.
5. To understand the influence of parallel and vector processing.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about Organization and design concepts
2. After studied unit-2, Students are able to describe the translation model of assembly language to machine language.
3. After studied unit-3, Students are able to understand about Micro program control concepts.
4. After studied unit-4, Students are able to understand central processor unit.
5. After studied unit-5, Students are able to understand about pipeline and vector processing concepts.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: ORGANIZATION AND DESIGN**Teaching Hours: 9**

Instruction Codes - Computer Registers - Computer Instructions – Timing and Control – Instruction Cycle - Memory Reference Instructions – Input-Output and Interrupts.

UNIT-II: COMPUTER PROGRAMMING**Teaching Hours: 9**

Introduction - Machine language - Assembly language - The assembler - Program loops - Programming arithmetic and logical operation – Subroutines - Input-output programming.

UNIT-III: MICRO PROGRAM CONTROL**Teaching Hours: 9**

Control Memory – Address Sequencing – Micro program Examples – Design of Control Unit..

UNIT-IV: CENTRAL PROCESSOR UNIT**Teaching Hours: 9**

Introduction – General Register Organization – Stack Organization – Instruction Formats – Addressing Modes.

UNIT-V: PIPELINE AND VECTOR PROCESSING**Teaching Hours: 9**

Parallel Processing – Pipelining - Arithmetic pipeline - Instruction pipeline - Vector Processing - Array Processor.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Morris Mano M. “Computer System Architecture”. New Delhi: Prentice Hall of India Private Limited, 2011

References

1. William Stallings. “Computer Organization and Architecture”. 8th edition. Pearson Publication, 2010
2. Morris Mano. “Digital Login and Computer Design”. New Delhi: Prentice Hall of India Private Limited, 2001.

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3. <https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/>
4. <https://www.javatpoint.com/computer-organization-and-architecture-tutorial>
5. <https://www.studytonight.com/computer-architecture/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	L	M	L	M	M	S	S	M	S	M	M	S
CO2	S	M	S	M	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	M	S	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Core Elective** Paper code: **Paper -1** Name of the
Paper: **B – Parallel Computing** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To learn the Kinds of parallelism, Parallel computer architectures (processor arrays, centralized memory multiprocessors, distributed memory multiprocessors, and multicomputers)
2. To know and develop the Parallel algorithm design
3. To identify the MPI library of message-passing functions
4. To recognize the development of data-parallel programs and development of manager-worker programs with functional parallelism

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about Scalability and clustering concepts.
2. After studied unit-2, Students are able to understand about enabling technologies.
3. After studied unit-3, Students are able to understand interconnections of systems.
4. After studied unit-4, Students are able to understand Parallel Programming.
5. After studied unit-5, Students are able to understand about Message Passing Programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	No	No	No

UNIT-I: SCALABILITY AND CLUSTERING Teaching Hours: 9

Evolution of Computer Architecture – Dimensions of Scalability – Parallel Computer Models – Basic Concepts Of Clustering – Scalable Design Principles – Parallel Programming Overview – Processes, Tasks and Threads – Parallelism Issues – Interaction / Communication Issues – Semantic Issues In Parallel Programs.

UNIT-II: ENABLING TECHNOLOGIES**Teaching Hours: 9**

System Development Trends – Principles of Processor Design – Microprocessor Architecture Families – Hierarchical Memory Technology – Cache Coherence Protocols – Shared Memory Consistency – Distributed Cache Memory Architecture – Latency Tolerance Techniques – Multithreaded Latency Hiding

UNIT-III: SYSTEM INTERCONNECTS**Teaching Hours: 9**

Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms

UNIT-IV: PARALLEL PROGRAMMING**Teaching Hours: 9**

Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

UNIT-V: MESSAGE PASSING PROGRAMMING**Teaching Hours: 9**

Message Passing Paradigm – Message Passing Interface – Parallel Virtual Machine.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.

- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Kai Hwang and Zhi.Wei Xu, “Scalable Parallel Computing”, Tata McGraw-Hill, New Delhi,2003.

References

1. David E. Culler & Jaswinder Pal Singh, “Parallel Computing Architecture: A Hardware/Software Approach”, Morgan Kaufman Publishers, 1999.
2. Michael J. Quinn, “Parallel Programming in C with MPI & OpenMP”, Tata McGrawHill, New Delhi, 2003.
3. Kai Hwang, “Advanced Computer Architecture” Tata McGraw-Hill, New Delhi, 2003.

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1. www.computing.llnl.gov/tutorials/parallel_comp/
2. www.geeksforgeeks.org/introduction-to-parallel-computing/
3. www.techopedia.com/definition/8777/parallel-computing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	S	M	S	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	L	M	L	M	S	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	L	M	M	M	M	S	S
CO5	S	S	M	M	M	S	M	M	L	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I**

Paper type: **Core Elective**

Paper code: **Paper -1** Name of the

Paper: **C– Embedded System**

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand basic concepts in the embedded computing systems area;
2. To determine the optimal composition and characteristics of an embedded system;
3. To understand what is a microcontroller, microcomputer, embedded system
4. To design and program an embedded system at the basic level;
5. To develop hardware-software complex with the use of the National Instruments products.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand introduction about embedded system.
2. After studied unit-2, Students are able to understand about processors of embedded system
3. After studied unit-3, Students are able to understand about memory systems.
4. After studied unit-4, Students are able to understand about basic peripheral of embedded system.
5. After studied unit-5, Students are able to understand about Real-Time Operating system.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-I: INTRODUCTION

Teaching Hours: 9

Replacement for discrete logic-based circuits-Provide functional upgrades- Provide easy maintenance upgrades-Improves mechanical performance- Protection of intellectual property- Replacement for analogue circuits. Inside the embedded system-ProcessorMemory-Peripherals- Software-Algorithms -Microcontroller-Expanded microcontrollerMicroprocessor based-Board based.

UNIT-II: EMBEDDED PROCESSORS

Teaching Hours: 9

8 bit accumulator processors-Register models-8 bit data restrictions-Addressing memorySystem integrity-Example 8 bit architectures-Z80-Z80 programming model-MC6800- Microcontrollers-MC68HC05-MC68HC11-Architecture-Data processors-Complex instructions, microcode and nanocode-INTEL 80286-Architecture-Interrupt facilitiesInstruction set-80287 floating point support-Feature comparison. INTEL 80386DXArchitecture-Interrupt facilities-Instruction set-80387 floating point coprocessor-Feature comparison-INTEL 80486-Instruction set-Intel 486SX and overdrive processors-Intel Pentium-Multiple branch prediction-Data flow analysis-Speculative execution-The MMX instructions-The Pentium II- Motorola MC68000-The MC68000 hardware-Address bus-Data bus-Function codes-Interrupts-Error recovery and control signals.

UNIT-III: MEMORY SYSTEMS

Teaching Hours: 9

Memory technologies-DRAM technology - Video RAM - SRAM - Pseudo-static RAM - Battery backed-up SRAM - EPROM and OTP - Flash - EPROM - Memory organisation - By 1 organisation - By 4 organisation - By 8 and by 9 organisations - By 16 and greater organisations - Parity - Parity initialisation - Error detecting and correcting memory - Access times - Packages - Dual in line package - Zig-zag package - SIMM and DIMM - SIP - DRAM interfaces - The basic DRAM interface - Page mode operation - Page interleaving - Burst mode operation 87 EDO memory-DRAM refresh techniques - Distributed versus burst refresh - Software refresh - RAS only refresh - CAS before RAS (CBR) refresh - Hidden refresh - Memory management - Disadvantages of memory management - Segmentation and paging - Memory protection units - Cache memory - Cache size and organisation

UNIT-IV:BASIC PERIPHERALS

Teaching Hours: 9

Parallel ports-Multi-function I/O ports-Pull-up resistors-Timer/counters-Types-8253 timer modes-Interrupt on terminal count-Programmable one-shot -Rate generator-Square wave rate generator-Software triggered strobe-Hardware triggered strobe-Generating interruptsMC68230 modes-Timer processors-Real-time clocks-Simulating a real-time clock in software-Serial ports-Serial peripheral interface-I2C bus-Read and write access-Addressing peripherals-Sending an address index-Timing.

UNIT-V: REAL-TIME OPERATING SYSTEMTeaching Hours: 9

What are operating systems?-Operating system internals-Multitasking operating systemsContext switching, task tables, and kernels-Time slice -Pre-emption-Co-operative multitasking-Scheduler algorithms-Rate monotonic- Deadline monotonic scheduling-Priority guidelines-Priority inversion-Disabling interrupts -Message queues-Waiting for a resourceVMEbus interrupt messages-Fairness systems-Tasks, threads and processes-ExceptionsMemory model-Memory allocation-Memory characteristics-Example memory mapsMemory management address translation-Bank switching-Segmentation-Virtual memoryChossoing an operating system-Assembler versus high level language-ROMable codeScheduling algorithms-Pre-emptive scheduling-Modular approach-Re-entrant code-Crossdevelopment platforms-Integrated networking-Multiprocessor support-Commercial operating systems-pSOS+ - pSOS+ kernel-pSOS+m multiprocessor kernel-pREPC+ runtime supportpHILE+ file system -pNA+ network manager-pROBE+ system level debugger-XRAY+ source level debugger-OS-9.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Heath S. “Embedded Systems Design”, Butterworth - Heinemann 1997.

References

1. Kirk Zurell - “C Programming for Embedded Systems” R & D, Books - 2000
2. David. E, Simon, “An embedded software primer”, Pearson Education Asia - Addison Wesley Longman (Singapore), Low Priced Edition, 2001, ISBN - 81 - 7808 - 045 - 1.
3. Michael Barr, “Programming Embedded Systems in C and C++”, Shroff Publishers & Distributors Pvt.Ltd., Calcutta. March 2001, ISBN - 81 - 7366 - 076 - X.

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2. www.internetofthingsagenda.techtarget.com/definition/embedded-system
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Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	L	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	M	M	M	L	M	M	L	S	L	S	M	M	S
CO4	M	S	M	L	M	M	M	S	M	M	M	S	M	L	S
CO5	S	S	M	M	M	M	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Open Elective** Paper code: **Paper - 1** Name of the
Paper: **A – E-Commerce** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To demonstrate an understanding of the foundations and importance of E-commerce
2. To demonstrate an understanding of retailing in E-commerce by: analyzing branding and pricing strategies, using and determining the effectiveness of market research and assessing the effects of disintermediation.
3. To analyze the impact of E-commerce on business models and strategy
4. To describe Internet trading relationships including Business to Consumer, Business to Business, Intra-organizational.
5. To describe the infrastructure for E-commerce
6. To describe the key features of Internet, Intranets and Extranets and explain how they relate to each other.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamentals of E-Commerce.
2. After studied unit-2, Students are able to understand about E-Procurement.
3. After studied unit-3, Students are able to understand about Customer relationship management.
4. After studied unit-4, Students are able to understand about M-Commerce.
5. After studied unit-5, Students are able to understand about Management of mobile commerce services.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: E-COMMERCE FUNDAMENTALS**Teaching Hours: 9**

Introduction - The e-commerce environment - The e-commerce marketplace - Focus on portals - Location of trading in the marketplace - Commercial arrangement for transactions - Focus on auctions - Business models for e-commerce - Revenue models - Focus on internet start-up companies - E-business infrastructure: Introduction on Internet - Internet standards - Focus on controls the internet - Managing e-business infrastructure - Focus on web service and service-oriented - Focus on new access devices.

UNIT-II: E-PROCUREMENT**Teaching Hours: 9**

Introduction - Drivers of e-procurement - Focus on estimating e-procurement cost savings - Risks and impacts of e-procurement - Implementing e-procurement - Focus on electronics B2B marketplaces - The future of e-procurement E-marketing: Introduction - E-marketing planning - Situation analysis - Objective setting – Strategy - Focus on characteristics of newmedia marketing communications – Tactics - Focus on online branding – Actions - Control.

UNIT-III: CUSTOMER RELATIONSHIP MANAGEMENT**Teaching Hours: 9**

Introduction:e-CRM-conversion marketing - the online buying process - customer acquisition management - focus on marketing communications for customer acquisition - customer retention management focus on excelling in e- commerce service quality - customer extension - Analysis and design: Introduction - process modeling - Data modeling - Design for e-business - Focus on user centered site design - Focus on security design for e-business.

UNIT-IV:M-COMMERCE**Teaching Hours: 9**

Introduction to m-commerce: Emerging applications - different players in m-commerce - mcommerce life cycle - Mobile financial services - mobile entertainment services - and proactive service

UNIT –V: MANAGEMENT OF MOBILE COMMERCE SERVICES Teaching Hours: 9

Content development and distribution to hand-held devices - content caching - pricing of mobile commerce services - The emerging issues in mobile commerce: The role of emerging wireless LANs and 3G/4G wireless networks - personalized content management - implementation challenges in m-commerce - futuristic m-commerce services.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Dave Chaffey, “E-Business and E-Commerce Management”, 3rd Edition, 2009, Pearson Education.

References

1. Henry Chan, Raymod Lee and etl., “E-Commerce Fundamental and Applications”, Wiley.
2. Brian Mennecke and Troy Strader, “Mobile Commerce: Technology, Theory”.
3. Nansi Shi, “Mobile Commerce Applications”, IGI Global, 2004.
4. Gary P. Schneider, “Electronic Commerce”, 7th Edition, CENGAGE Learning India, New Delhi.
5. K.K. Balaji, D.Nag “E-Commerce”, 2nd Edition, Mc Graw Hill Education, New Delhi.
6. P.T.Joseph,” E-Commerce an Indian Perspective,” PHI Publication, New Delhi.
7. Bhaskar Bharat, “Electronic Commerce – Technology and Application”, McGraw Hill.

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1. www.feinternational.com/blog/what-is-e-commerce-an-introduction-to-the-industry/
2. www.abetterlemonadestand.com/what-is-ecommerce/

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	M	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	M	M
CO3	S	S	M	M	M	S	M	M	L	S	M	S	M	M	S
CO4	S	M	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	L	L	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Open Elective** Paper code: **Paper - 1** Name of the
Paper: **B – Introduction to Computer Applications** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To know about computer and basic applications of computer.
2. To get knowledge about operating system
3. To aim at imparting a basic level appreciation Programme

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to know about computer.
2. After studied unit-2, Students are able to operate computer using GUI based Operating system.
3. After studied unit-3, Students are able to understand about word processing.
4. After studied unit-4, Students are able to understand about spread sheet.
5. After studied unit-5, Students are able to understand about making PPT presentation.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: KNOWING COMPUTER

Teaching Hours: 9

What is Computer - Basic Applications of Computer - Components of Computer System - Central Processing Unit (CPU) – VDU - Keyboard and Mouse - Other input/output Devices - Computer Memory - Concepts of Hardware and Software - Concept of Computing - Data and Information; Applications of IECT - Connecting keyboard – mouse - monitor and printer to CPU and checking power supply.

UNIT-II: OPERATING COMPUTER USING GUI BASED OPERATING SYSTEM

Teaching Hours: 9

What is an Operating System - Basics of Popular Operating Systems - The User Interface - Using Mouse - Using right Button of the Mouse and Moving Icons on the screen - Use of Common Icons - Status Bar - Using Menu and Menu – selection - Running an Application - Viewing of File - Folders and Directories - Creating and Renaming of files and folders - Opening and closing of different Windows - Using help - Creating Short cuts - Basics of O.S Setup - Common utilities.

UNIT-III: UNDERSTANDING WORD PROCESSING

Teaching Hours: 9

Word Processing Basics - Opening and Closing of documents - Text creation and Manipulation - Formatting of text - Table handling - Spell check -language setting and thesaurus - Printing of word document.

UNIT-IV:USING SPREAD SHEET

Teaching Hours: 9

Basics of Spreadsheet - Manipulation of cells - Formulas and Functions - Editing of Spread Sheet - printing of Spread Sheet.

UNIT –V: MAKING SMALL PRESENTATION

Teaching Hours: 9

Basics of presentation software - Creating Presentation - Preparation and Presentation of Slides - Slide Show - Taking printouts of presentation / handouts.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.

- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Introduction to Computer Applications, TNAU, Tamil Nadu.
<https://www.agrimoon.com/introduction-to-computer-applications-pdf-book/>

Web References

1. <https://homepage.cs.uri.edu/faculty/wolfe/book/Readings/Reading01.htm>
2. <https://peda.net/kenya/ass/subjects2/computer-studies/form-1/itc2>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	M	M	M	S	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	M
CO3	S	S	S	M	M	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	M	S	M	M	M	M	S	S
CO5	S	S	S	M	M	L	M	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **I** Paper type: **Open Elective** Paper code: **Paper - 1** Name of the
Paper: **C – Principles of Internet** Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To learn the basics of Internet.
2. To provide fundamental knowledge in WWW.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about what is internet
2. After studied unit-2, Students are able to learn about connecting to the internet.
3. After studied unit-1, Students are able to understand about world wide web.
4. After studied unit-2, Students are able to learn about multimedia on the internet.
5. After studied unit-1, Students are able to understand about safeguarding the internet.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: INTERNET

Teaching Hours: 9

The wired world of the internet –Information travels across the internet –TCP/IP – Understanding internet addresses and domains –Anatomy of web connections –Internet file types. Internet's Underlying Architecture: Domain name system –Routers –The internet's client/server architecture. Applications of IECT - Connecting keyboard – mouse - monitor and printer to CPU and checking power supply.

UNIT-II: CONNECTING TO THE INTERNET**Teaching Hours: 9**

Connecting your computer –Connecting to the internet from online services –ISDN –The internet/television connection –Network computers –DSL(Digital Subscriber Line). Communicating on the internet:E-mail–Usenet and newsgroups –Internet chat and instant messaging –Making phone calls on the internet.

UNIT-III: WORLD WIDE WEB**Teaching Hours: 9**

Webpages –Web browsers –Markup Languages –Hypertext –Image maps and interactive forms –Web host servers –Websites with databases. Common Internet Tools:Gophers –Telnet –FTP and downloading files –Searching the internet.

UNIT-IV:MULTIMEDIA ON THE INTERNET**Teaching Hours: 9**

Audio on the internet –Video on the internet –Intranet and shopping on the internet.

UNIT –V: SAFEGUARDING THE INTERNET**Teaching Hours: 9**

Firewalls–Viruses –Digital certificates.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Preston Gralla, “How the Internet works”, 10th Edition, Que publishers, 2014.

References

1. Raj Kamal, “Internet and Web Technologies”, Tata Mc Graw Hill, 2002.
2. C Xavier, “World Wide Web design with HTML”, Tata Mc-Graw Hill, 2008.

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1. www.informatics.buzdo.com/p912-internet-principles.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	M	S	M	M	L	M	S	M	M	S
CO2	S	M	M	L	M	M	L	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	L	M	L	S	M	M	M
CO4	M	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	M	S	M	M	M	S	S	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Core** Paper code: **Paper -4** Name of the
Paper: **Advanced Enterprise Java Programming** Credits: **3**
Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To expose the knowledge of MVC and Java server faces
2. To provide the knowledge and skills required to develop web applications using the MVC framework provided by Apache Struts
3. To Develop Enterprise web application using EJB.
4. To understand and implement the object-relation mapping using Hibernate
5. To explore the knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to work with JSP, JSF and Servlet using MVC approach.
2. After studied unit-2, Students are able to develop the web applications using the MVC framework provided by Apache Struts
3. After studied unit-3, Students are able to develop Enterprise web application using EJB.
4. After studied unit-4, Students are able to implement the Object-Relation Mapping technique using Hibernate
5. After studied unit-5, Students are able to gets knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTEGRATING SERVLETS AND JSP, JAVA SERVER FACES

Teaching Hours: 15

JSP: Basics – Life cycle of JSP- Static and dynamic content- javaBeans components; Understanding the need for MVC: implementing MVC with request dispatcher, summarizing the MVC code, interpreting relative URL, three data sharing approaches; JSF: Basics, Framework roles, Simple JSF application, Life Cycle of JSF page, using core tags, using HTML Component tags, localized messages, Standard Converters and Validators.

UNIT-II: STRUTS FRAMEWORK

Teaching Hours: 15

Introduction to Struts , Understanding Struts , Struts Flow Control Six Basic steps in using Struts, FormBeans, Forms, Using properties files, Advanced Action, Manual Validation, validation in the Action, validation in the form bean, Struts Tiles, Motivations , Basics, Tiles definitions file.

UNIT-III: ENTERPRISE JAVA BEANS

Teaching Hours: 15

EJB: Session Bean, Entity Bean, Message driven Bean, defining clients access with interfaces, life cycle of enterprise Bean, creation of Enterprise Bean, web client, other Enterprise Bean features, handling exceptions, Container- Managed Transactions, Bean Managed Transactions.

UNIT-IV: HIBERNATE

Teaching Hours: 15

Basics- Enterprise Application architectures, Hibernate Motivation, Object Relation Mapping, Collection Mapping, Association Mapping, Collection and Association Relationships, Relationships in Java and Databases, Component Mapping, Inheritance Mapping, Life cycle of Hibernate Entities, Transactions, HQL, Native SQL, Querying Terminology, SQL Query Options, Querying With Hibernate.

UNIT-V: SPRING

Teaching Hours: 15

Foundation: Motivation- Spring Hello World, Runtime environment, Dependency injection Inversion of control ,Spring IoC container, Spring framework composition, Spring container instantiation, Spring bean definitions ,Bean naming, Bean scoping, Referencing other

beans, Properties integration-Resource integration - Collection mapping, AOP with spring framework.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Marty Hall, Larry Brown., “Core Servlets and Java Server Pages”, 2nd Edition, Pearson Education, 2004
2. Stephanie Bodoffetl., “The J2EETM Tutorial”, Pearson Education, Second Edition, 2005
3. Hibernate Reference Documentation 3.3.1, Copyright © 2004 Red Hat Middleware, LLC available at http://www.hibernate.org/hib_docs/v3/reference/en/html_single/
4. Gary Mak, Josh Long and Daniel Rubio, “Spring Recipes: A Problem-Solution Approach”, Apress Publications, Second Edition, 2010
5. Craig Walls, ”Spring in action”, Manning Publisher, Third Edition, 2011

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1. Cay S.Horstmann, Gary Cornell, “Core Java Volume I – Fundamentals Core Concepts”, Prentice Hall of India, Ninth Edition, 2012
2. Cay S.Horstmann, Gary Cornell, “Core Java Volume II – Advanced Features”, Prentice Hall of India, Ninth Edition, 2013
3. Minter Dave, Linwood Jeff, “Beginning Hibernate, From Novice to Professional”, Apress, Second Edition, 2006
4. Doray, Arnold, “Beginning Apache, From Novice to Professional”, Apress, Second Edition, 2006

Web References

1. <http://courses.coreservlets.com/Course-Materials/struts.html>
2. <http://www.roseindia.net/jsp/index.shtml>
3. <http://www.oracle.com/technetwork/java/javaee/javaserverfaces-139869.html>
4. <http://docs.oracle.com/javaee/1.4/tutorial/doc/JSFIntro.html>
5. <http://docs.oracle.com/javaee/6/tutorial/doc/bnaph.html>
6. http://en.wikipedia.org/wiki/JavaServer_Faces

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	M	S	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	M	S	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	M	S	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	S	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Core** Paper code: **Paper -5** Name of the
 Paper: **Design and Analysis of Algorithm** Credits: **3**
 Total Hours per Week: **4 Hour** Lecture Hours: **3** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. To understand the basic knowledge of algorithm design and its implementation.
3. To learn the key techniques of Divide-and-Conquer and Greedy Method.
4. To recognize the concept of Dynamic Programming and its algorithms
5. To familiarize with Backtracking algorithms.
6. To understand Branch and Bound techniques for designing and analyzing algorithms.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. After studied unit-2, Students are able to learn the key techniques of Divide-and-Conquer and Greedy Method.
3. After studied unit-3, Students are able to recognize the concept of Dynamic Programming and its algorithms
4. After studied unit-4, Students are able to understand backtracking.
5. After studies unit-5, Students are able to understand Branch and Bound techniques for designing and analyzing algorithms.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: INTRODUCTION**Teaching Hours: 12**

Algorithm Specification-Performance Analysis: Space complexity- Time Complexity Asymptotic notations-practical complexities-performance measurement- Randomized algorithms: An informal Description- Identifying the repeated element- Primality testing Advantages and Disadvantages.

UNIT-II: DIVIDE-AND-CONQUER AND GREEDY METHOD**Teaching Hours: 12**

Divide-and-conquer: General method-Binary Search-Finding the maximum and minimum Merge sort- quick sort- Strassen's Matrix multiplication- The greedy Method: The general method- Knapsack problem-Minimum cost spanning tree

UNIT-III: DYNAMIC PROGRAMMING**Teaching Hours: 12**

Dynamic Programming: Dynamic programming- All pairs shortest paths- Single source shortest paths- String editing- 0/1 knapsack- The traveling salesperson problem-Flow shop scheduling

UNIT-IV: BACKTRACKING**Teaching Hours: 12**

Backtracking: General Method-8 queen's problem- Sum of subsets- Graph coloring - Hamiltonian cycles-Knapsack Problem

UNIT-V: BRANCH AND BOUND**Teaching Hours: 12**

Branch-and-Bound: General method of algebraic problem-Modular arithmetic- Comparison trees-Lower bound through reduction-Planar graph coloring problem-Bin packing.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, “Fundamentals of Computer Algorithms”, Galgotia Publications Pvt.Ltd, 2005

References

1. S.K.Basu, “Design Methods and Analysis of Algorithms”, Fourth edition, 2010
2. A.V.Aho, J.E. Hopcroft and J.D.Ullman, “The Design and Analysis of Computer Algorithms”, Pearson Education Asia, Addison-Wesley Publishing Company, 2003
3. Anany Levitin, “Introduction to the Design and Analysis of Algorithm”, Pearson Education Asia, Dorling Kindersley India Pvt.Ltd, 2003

Web Reference

1. <http://www.personal.kent.edu/~rmuhamma/Algorithms/algorithm.html>
2. <http://cs.uef.fi/pages/franti/asa/notes.html>
3. <http://computerstuff7090.blogspot.in/2012/11/design-analysis-and-algorithm-video.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	L	M	S	S	M	S	M	M	S
CO2	S	M	S	L	M	M	M	M	M	M	L	M	S	M	S
CO3	S	S	M	M	S	S	M	L	L	M	L	S	M	M	S
CO4	S	S	S	S	M	M	M	S	S	S	M	M	M	L	M
CO5	S	S	S	M	M	M	S	M	S	M	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome
S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II**

Paper type: **Core**

Paper code: **Paper -6** Name of the

Paper: **Web Application using C#.NET**

Credits: **3**

Total Hours per Week: **4 Hour** Lecture Hours: **3** Tutorial Hours: **1** Practical Hours: -

Course Objectives

1. To know the differences between desktop and web application.
2. To construct classes, methods, and accessor and instantiate objects.
3. To create and manipulate GUI components in C#.
4. To code solutions and compile C# projects within the .NET framework.
5. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to to know the differences between desktop application and web application.
2. After studied unit-2, Students are able to construct classes, methods, and access modifier and instantiate objects.
3. After studied unit-3, Students are able create and manipulate GUI components in C# for windows application.
4. After studied unit-4, Students are able to code solutions and compile C# projects within the .NET framework.
5. After studies unit-5, Students are able to build the web application with Database.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I:INTRODUCTION TO ASP.NET AND WEB FORMS**Teaching Hours: 12**

Developing ASP.NET Applications - ASP.NET File Types - The bin Directory - Application Updates - A Simple Application from Start to Finish-web.config file Web Form Fundamentals - A Simple Page Applet - The Problem With Response.Write - Server Controls - HTML Server Controls - ViewState - The HTML Control Classes - Events - Event Handling Changes - The Currency Converter application-Adding Support for Multiple Currencies - Adding Linked Images - Setting Styles – A Deeper Look at HTML control classes-HTML control events-The HTML control Base class-The HtmContainerControl Class-The HtmlInputControl Class-The Page class-The Controls collection-The HttpRequest Class-The HttpResponse Class-The ServerUtility Class-Assessing HTML Server controls

UNIT-II:WEB CONTROL**Teaching Hours: 12**

Web Controls - Stepping Up to web Controls - Basic Web Control Classes - The web Control Tags - The WebControl Base Class - Units Enumerated Values - Colors - Fonts - List Controls - Table Controls - AutoPostBack and Web Control Events - How Postback Events Work - The Page Lifecycle - The Greeting Card Applet - Validation and rich Controls- The Calendar Control-Formatting the Calendar-restricting Dates- The AdRotator control-The Wizard control-Validation-The Validation Controls -The Validation Process-The Validator Class-A Simple Validation Example –Sever side example-Manual Validation-Understanding Regular Expressions-Literals and MetaCharacters-Finding a Regular expression- A Validated Customer Form

UNIT-III: COMPONENT BASED PROGRAMMING**Teaching Hours: 12**

Introduction – Creating a Simple Component – Properties and State – Database Components – Consuming the Database Component – Enhancing the Component with Error Handling – Aggregate Information – Data Objects.

UNIT-IV: CUSTOM CONTROLS**Teaching Hours: 12**

User Controls – Creating a Simple User Control – Visual Studio.NET Custom Control Support – Independent User Controls – Integrated User Controls – User Control Events – Limitations – Deriving Custom Controls.

UNIT-V: DATABASE ACCESS WITH COMMAND, ADAPTER AND XML

Teaching Hours: 12

ADO.NET Data Access - About the ADO.NET Example - Obtaining the Sample Database - Simple Data Access - Simple Data Update - Importing the Namespaces - Creating a Connection - The Connection String SQL - Making the Connection - Defining the Select Command - Using a Command with a DataReader - Updating Data - Using Update - Insert - and Delete Commands - Accessing Disconnected Data - Selecting Disconnected Data - Selecting Multiple Tables - Modifying Disconnected Data - Modifying and Deleting Rows - Adding Information - to a DataSet - Updating Disconnected Data - The Command Builder - Updating a DataTable - Controlling Updates - An Update Example – Using XML - XML's Hidden Role in .NET - XML Basics - Attributes - Comments - The XML Classes - the XML TextWriter - The XML Text Reader - Working with XML Documents - Reading an XML Document - Searching an XML Document - XML Validation – CreatingXML Schema -XSD Documents - Validating an XML File.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Mathew MacDonald, “ASP.NET: The Complete Reference”, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006
2. Dino Eesposito, “Introducing Microsoft ASP.NET 2.0”, AsokeK.Ghosh, Prentice Hall of India, Eastern Economy Edition, New Delhi, 2006

References

1. Stephen Walther, “ASP.NET 3.5 Unleashed”, Pearson Education, Dorling Kindersley Pvt. Ltd, Second Edition, 2008

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1. <http://csharp.net-tutorials.com/index.php>
2. <http://csharp.nettutorials.com/classes/introduction/>
3. <http://www.homeandlearn.co.uk/csharp/csharp.html>
4. <http://www.indiabix.com/c-sharp-programming/questions-and-answers/>
5. <https://www.wiziq.com/online-tests/43860-c-basic-quiz>
6. <http://www.withoutbook.com/OnlineTestStart.php?quizId=71>
7. http://www.compileonline.com/compile_csharp_online.php <http://www.ideone.com>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	S	M	S	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	S	S	M	S	S	S
CO3	M	S	M	M	M	S	M	L	S	M	S	S	M	M	M
CO4	M	S	L	L	M	M	M	S	S	M	M	M	M	M	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Practical** Paper code: **Paper -4** Name of the
Paper: **4 - Advanced Enterprise Java Programming** Credits: **2**
Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours:-Practical Hours: **3**

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Course Objectives

1. To expose the knowledge of MVC and Java server faces
2. To provide the knowledge and skills required to develop web applications using the MVC framework provided by Apache Struts
3. To Develop Enterprise web application using EJB.
4. To understand and implement the object-relation mapping using Hibernate
5. To explore the knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to work with JSP, JSF and Servlet using MVC approach.
2. After studied unit-2, Students are able to develop the web applications using the MVC framework provided by Apache Struts
3. After studied unit-3, Students are able to develop Enterprise web application using EJB.
4. After studied unit-4, Students are able to implement the Object-Relation Mapping technique using Hibernate
5. After studied unit-5, Students are able to gets knowledge of Aspect Oriented Programming using Spring and Spring MVC.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. JSP and MVC with Request Dispatcher
2. JSF in JSP Pages, Using all HTML and core render kit
3. Actions and Forms
4. Properties and Messages
5. Creating Web Client and Session Bean
6. Bean Managed Transactions and Container Managed Transaction
7. Object Relation Mapping and Collection Mapping
8. Association Mapping and Component Mapping
9. Inheritance Mapping
10. Spring Actions and Spring MVC

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	M	M	S	M	M	S	M	M	S
CO2	S	M	S	L	M	M	S	M	M	S	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	M	S	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	S	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Practical** Paper code: **Paper -5** Name of the
Paper: **5 - Design and Analysis of Algorithm** Credits: **2**
Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

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Course Objectives

1. To prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. To understand the basic knowledge of algorithm design and its implementation.
3. To learn the key techniques of Divide-and-Conquer and Greedy Method.
4. To recognize the concept of Dynamic Programming and its algorithms
5. To familiarize with Backtracking algorithms.
6. To understand Branch and Bound techniques for designing and analyzing algorithms.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to prove the correctness and analyze the running time of the basic algorithms for those classic problems.
2. After studied unit-2, Students are able to learn the key techniques of Divide-and-Conquer and Greedy Method.
3. After studied unit-3, Students are able to recognize the concept of Dynamic Programming and its algorithms
4. After studied unit-4, Students are able to understand backtracking.
5. After studies unit-5, Students are able to understand Branch and Bound techniques for designing and analyzing algorithms.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Divide and Conquer with Recursive Function
2. Divide and Conquer with Non-Recursive Function
3. Strassen's Matrix Multiplication
4. Greedy Method
5. Dynamic programming
6. Shortest path problem
7. Travelling sales person problem
8. Back tracking
9. Modular Arithmetic
10. Bin Packing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	L	M	S	S	M	S	M	M	S
CO2	S	M	S	L	M	M	M	M	M	M	L	M	S	M	S
CO3	S	S	M	M	S	S	M	L	L	M	L	S	M	M	S
CO4	S	S	S	S	M	M	M	S	S	S	M	M	M	L	M
CO5	S	S	S	M	M	M	S	M	S	M	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Practical** Paper code: **Paper -6** Name of the
 Paper: **6 - Web Application using C#.NET** Credits: **2**
 Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

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Course Objectives

1. To know the differences between desktop and web application.
2. To construct classes, methods, and accessor and instantiate objects.
3. To create and manipulate GUI components in C#.
4. To code solutions and compile C# projects within the .NET framework.
5. To build own desktop application with Database

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to to know the differences between desktop application and web application.
2. After studied unit-2, Students are able to construct classes, methods, and access modifier and instantiate objects.
3. After studied unit-3, Students are able create and manipulate GUI components in C# for windows application.
4. After studied unit-4, Students are able to code solutions and compile C# projects within the .NET framework.
5. After studies unit-5, Students are able to build the web application with Database.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Web Configuration File
2. ViewState
3. HTML Control Classes, Control Events, Container and Input Control Classes,
4. Web Control Classes & Control Tags
5. Validation Controls
6. Rich Controls
7. Data Access
8. Components
9. Custom Controls
10. User Controls

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	S	M	S	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	S	S	M	S	S	S
CO3	M	S	M	M	M	S	M	L	S	M	S	S	M	M	M
CO4	M	S	L	L	M	M	M	S	S	M	M	M	M	M	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	L	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Core Elective** Paper code: **Paper -2** Name of the Paper:
A – Human Computer Interaction Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: -
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Course Objectives

1. To plan and Develop procedures and life cycle of Human Computer Interaction
2. To analyze product usage through appropriate assessments and testing techniques.
3. To apply the interface structure standards/rules for different users.
4. To encourage communication between understudies of brain science, structure, and software engineering on UI improvement projects.
5. To understand the intensity of HCI in the cutting edge world and the job it can play in advancing value, openness, and progress.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to plan and Develop procedures and life cycle of Human Computer Interaction
2. After studied unit-2, Students are able to analyze product usage through appropriate assessments and testing techniques.
3. After studied unit-3, Students are able to apply the interface structure standards/rules for different users.
4. After studied unit-4, Students are able to encourage communication between understudies of brain science, structure, and software engineering on UI improvement projects.
5. After studies unit-5, Students are able to understand the intensity of HCI in the cutting edge world and the job it can play in advancing value, openness, and progress.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: HCI FOUNDATIONS**Teaching Hours: 9**

Input–output channels, Human memory, Thinking: reasoning and problem solving, Emotion, Individual differences, Psychology and the design of interactive systems, Text entry devices, Positioning, pointing and drawing, Display devices, Devices for virtual reality and 3D interaction, Physical controls, sensors and special devices, Paper: printing and scanning, Memory, Processing and networks: Design focus - The myth of the infinitely fast machine

UNIT-II:DESIGNING INTERACTION**Teaching Hours: 9**

Introduction, Models of Interaction, Framework and HCI, Ergonomics, Interaction Styles, Elements of WIMP Interfaces, Interactivity, Paradigms of Interaction, Interaction design basics, Process of design, User focus, Scenarios, Navigation design, Screen design and layout, Iteration and prototyping. Design Rules – Principles to support usability, Standards, Guidelines, Golden rules and heuristics, HCI Patterns

UNIT-III: EVALUATION TECHNIQUES**Teaching Hours: 9**

Evaluation, Goals of evaluation, Evaluation through expert analysis, Evaluation through user participation, Choosing and evaluation method. Universal design: Introduction, design principles, Multi-Modal Interaction – Designing websites for screen readers, Choosing the right kind of speech, Apple Newton, Designing for diversity. User Support – Requirements of User support, Approaches to user support, Adaptive help systems, designing user support systems.

UNIT-IV: MODELS AND THEORIES**Teaching Hours: 9**

Model Human Processor - Working Memory, Long-Term Memory, Processor Timing, Keyboard Level Model - Operators, Encoding Methods, Heuristics for M Operator Placement, What the Keyboard Level Model Does Not Model, Application of the Keyboard Level Model, GOMS - CMN-GOMS Analysis, Modeling Structure, State Transition Networks - Three-State Model, Glimpse Model, Physical Models, Fitts' Law. Guide Lines in HCI - Shneiderman's eight golden rules, Norman's Seven principles, Norman's model of interaction, Nielsen's ten heuristics, Heuristic evaluation, contextual evaluation, and Cognitive walk-through.

UNIT-V: COLLABORATION AND COMMUNICATION MODELSTeaching Hours: 9

Face-to-face Communication, Conversation, Text-based Communication, Group working. Task Analysis: Introduction. Differences between task analysis and other techniques, Task

decomposition, Knowledge based analysis, Entity relationship based techniques, Sources of information and data collection, Use of task analysis. Dialog design notations, Diagrammatic notations, Textual dialog notations, Dialog semantics, Dialog analysis and design.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field

Textbook

1. Dix, A., Dix, A. J., Finlay, J., Abowd, G. D., & Beale, R. “Human-computer interaction”. Pearson Education, Haddington, 2003.

Web References

1. <https://www.udacity.com/course/human-computer-interaction--ud400>
2. <https://www.edx.org/professional-certificate/gtx-human-computer-interaction>
3. https://www.tutorialspoint.com/human_computer_interface/index.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	S	M	M	S	M	S	M	M	S
CO2	S	M	S	S	M	M	S	M	M	M	L	M	S	L	M
CO3	M	S	M	M	M	S	M	L	L	S	S	S	M	M	L
CO4	S	M	S	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Core Elective** Paper code: **Paper - 2** Name of the

Paper: **B – Social Information Networks**

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand the real world applications
2. To comprehend the elements of the social network
3. To demonstrate and envision the social network
4. To understand the role of web in the social network
5. To apply the concept of social network in appropriate application

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to clear understanding of real world applications.
2. After studied unit-2, Students are able to comprehend the elements of the social network
3. After studied unit-3, Students are able to demonstrate and envision the social network
4. After studied unit-4, Students are able to understand the role of web in the social network.
5. After studies unit-5, Students are able to apply the concept of social network in appropriate application.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: INTRODUCTION

Teaching Hours: 9

Introduction to social network analysis – Fundamental concepts in network analysis – social network data – notations for social network data – Graphs and Matrices, Relations and attributes, Analysis of network data, Interpretation of network data.

UNIT-II: MEASURES & METRICS

Teaching Hours: 9

Strategic network formation - network centrality measures: degree, betweenness, closeness, eigenvector - network centralization–density – ego-centric and socio-centric-reciprocity – transitivity – ego network – measures for ego network - dyadic network – triadic network - cliques - groups- clustering – search.

UNIT-III: COMMUNITY NETWORKS

Teaching Hours: 9

Community structure - modularity, overlapping communities - detecting communities in social networks – discovering communities: methodology, applications - community measurement - evaluating communities – Applications, Models.

UNIT-IV: NETWORK DYNAMICS

Teaching Hours: 9

Small world network - Watts–Strogatz networks - Statistical Models for Social Networks – Network evolution models: dynamical models, growing models - Nodal attribute model: exponential random graph models – Preferential attachment - Power Law - random network model: Erdos-Renyi and Barabasi- Albert–Epidemics - Hybrid models of Network Formation.

UNIT-V: THE WORLD WIDE WEB

Teaching Hours: 9

Structure of the web - Modelling and aggregating social network data – developing social semantic application – evaluation of web-based social network extraction – Data Mining – Text Mining in social network – Tools – case study.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.

- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Structure of the web - Modelling and aggregating social network data – developing social semantic application – evaluation of web-based social network extraction – Data Mining – Text Mining in social network – Tools – case study.

Web References

1. <https://www.classcentral.com/course/sna-338>
2. https://www.tutorialspoint.com/internet_technologies/social_networking.htm
3. <https://www.datacamp.com/community/tutorials/social-network-analysis-python>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	L	S	M	L	L	M	S	M	M	S
CO2	S	M	M	S	M	M	S	M	M	M	L	M	S	S	S
CO3	S	S	L	S	S	S	M	L	L	S	L	S	M	M	M
CO4	S	M	M	L	M	M	M	S	M	M	S	M	M	L	L
CO5	M	S	M	M	M	S	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Core Elective** Paper code: **Paper - 2** Name of the
Paper: **C – Cloud Computing** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To introduce the broad perceptive of cloud architecture and model.
2. To understand the concept of parallel and distributed computing
3. To be familiar with the different technologies.
4. To understand the features of virtualization.
5. To learn to design the trusted cloud Computing system with different cloud platforms

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the broad perceptive of cloud architecture and model.
2. After studied unit-2, Students are able to understand the concept of parallel and distributed computing
3. After studied unit-3, Students are able to understand the different technologies.
4. After studied unit-4, Students are able to understand understand the features of virtualization.
5. After studies unit-5, Students are able to design the trusted cloud computing system with different cloud platforms

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-I: INTRODUCTION

Teaching Hours: 9

Cloud Computing at a Glance, The Vision of Cloud Computing, Defining a Cloud, Cloud Computing Reference Model, Characteristics and Benefits, Challenges Ahead, Historical Developments - Distributed Systems, Virtualization, Web 2.0, Service-Oriented Computing, Utility-Oriented Computing, Building Cloud Computing Environments - Application Development, Infrastructure and System Development, Computing Platforms and Technologies - Amazon Web Services (AWS), Google AppEngine, Microsoft Azure, Hadoop, Force.com and Salesforce.com

UNIT-II: PRINCIPLES OF PARALLEL AND DISTRIBUTED COMPUTING

Teaching Hours: 9

Parallel vs. Distributed Computing, Elements of Parallel Computing - Hardware Architectures for Parallel Processing, Approaches to Parallel Programming, Levels of Parallelism, Laws of Caution, Elements of Distributed Computing - General Concepts and Definitions, Components of a Distributed System, Architectural Styles for Distributed Computing, Models for Inter-Process Communication, Technologies for Distributed Computing - Remote Procedure Call, Distributed Object Frameworks, Service Oriented Computing. Virtualization - Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Execution Virtualization, and Other Types of Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples - Xen: Paravirtualization, VMware: Full Virtualization, Microsoft Hyper-V

UNIT-III: CLOUD COMPUTING ARCHITECTURE

Teaching Hours: 9

Introduction, Cloud Reference Model - Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds - Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud, Open Challenges - Cloud Definition, Cloud Interoperability and Standards, Scalability and Fault Tolerance, Security, Trust, and Privacy, Organizational Aspects. High-Throughput Computing: Task Programming - Task Computing, Characterizing a Task, Computing Categories, Frameworks for Task Computing, Task-based Application Models, Aneka Task-Based Programming.

UNIT-IV: ANEKA

Teaching Hours: 9

Cloud Application Platform - Framework Overview, Anatomy of the Aneka Container - From the Ground Up: Platform Abstraction Layer, Fabric Services, Foundation Services, Application Services, Building Aneka Clouds - Infrastructure Organization Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode, Cloud Programming and Management - Aneka SDK, Management Tools. Concurrent Computing: Thread Programming- Introducing Parallelism for Single Machine Computation, Programming Applications with Threads - Techniques for Parallel Computation with Threads, Multithreading with Aneka - Introducing the Thread Programming Model, Aneka Thread vs. Common Threads, Programming Applications with Aneka Threads - Aneka Threads Application Model, Domain Decomposition: Matrix Multiplication Functional Decomposition: Sine, Cosine, and Tangent.

UNIT-V: CLOUD PLATFORMS IN INDUSTRY

Teaching Hours: 9

Amazon Web Services - Compute Services, Storage Services, Communication Services, Google AppEngine - Architecture and Core Concepts, Application Life-Cycle, Cost Model, Observations, Microsoft Azure - Azure Core Concepts - SQL Azure - Windows Azure Platform Appliance. Cloud Applications - Scientific Applications - Healthcare: ECG Analysis in the Cloud - Biology: Protein Structure Prediction - Biology: Gene Expression Data Analysis for Cancer Diagnosis - Geoscience: Satellite Image Processing, Business and Consumer Applications - CRM and ERP - Productivity - Social Networking - Media Applications - Multiplayer Online Gaming. Advanced Topics in Cloud Computing - Energy Efficiency in Clouds, Market Based Management of Clouds, Federated Clouds / InterCloud, Third Party Cloud Services

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Rajkumar Buyya, Christian Vecchiola, and S. Thamarai Selvi. Mastering cloud computing: foundations and applications programming. Tata McGraw Hill Education Private Limited, New Delhi , 2013

References

1. Rittinghouse and Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2016.
2. Michael Miller “Cloud Computing Web based application that change the way you work and collaborate online”. Pearson edition, 2008.
3. Kris Jamsa, Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More, Jones & Bartlett Learning, 2012.

Web References

1. <https://www.ibm.com/cloud>
2. <https://www.javatpoint.com/cloud-computing-tutorial>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	S	S	M	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	L	M	L	S	M	L	M	S	S	S	M	M	L
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Open Elective** Paper code: **Paper - 2** Name of the
Paper: **A – Principles of Web Design** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To provide a comprehensive overview of the largest Web Technologies, Hyper Text Markup Languages (HTML) and Cascading Style Sheet (CSS).
2. To learn through hands-on, practical instruction that will assist the students to tackle the real-world problems they face in building websites today—with a specific focus on HTML5 and CSS3.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to learn how to combine basic HTML elements to create Web pages.
2. After studied unit-2, Students are able to understand the use of HTML tags and tag attributes to control a Web page's appearance.
3. After studied unit-3, Students are able to understand capable to learn how to add absolute URLs, relative URLs, and named anchors to Web pages.
4. After studied unit-4, Students are able to understand to gain a good understanding of using tables and frames as navigational aids on a Web site.
5. After studies unit-5, Students are able to control appearance webpages by applying style sheet

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: HTML INTRODUCTION**Teaching Hours: 9**

Web page: Static & Dynamic Page - Web Browsers - HTML Editors - Tags – Elements – Attributes - HTML Page Structure - HTML Basic tags: Head – Title – Body. Basic text formatting: Heading tags – Paragraph tag – hr tag - Line break – Pre formatted. Presentational Element - Phrase Elements. List Tags: Ordered List – Unordered List – Definition List.

UNIT-II: LINKS, IMAGES AND TABLES**Teaching Hours: 9**

Link: Basic link – Directories and directory structure – creating links. Image and Object: Adding image to your site – Adding other objects – Using image as links. Tables: Basic table elements and attributes – Advanced table – Accessibility issues with tables

UNIT-III: FRAMES AND FORMS**Teaching Hours: 9**

Frames: The Frameset, No Frame Element - Creating Link between Frames - Nested Frameset. Form: Text Fields - Password Field - Radio Button – Checkbox - Submit Button – Reset Button – Button – Select – option – text area.

UNIT-IV: CASCADING STYLE SHEET-I**Teaching Hours: 9**

Introduction – syntax – ID selector - Class selector – External CSS – Internal CSS – Inline CSS – Font property: Font family - font size – font weight - font style - font variant - font stretch - font size adjust. Text Formatting: Color, text-align, vertical-align, decoration – indent- shadow – transform- letter spacing –word pacing- white space - direction. Text Pseudo Classes: First-letter pseudo class - First line pseudo class.

UNIT-V: CASCADING STYLE SHEET-II**Teaching Hours: 9**

Background: color – image – repeat – position – attachment. List: style type – style position – style image – marker offset. Table: table specific – border collapse – border spacing – caption side – empty cell – table layout. Outlines: outline width – outline style – outline color. The :focus and :active pseudo classes

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.

- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jon Ducktt. “Web Programming with HTML, CSS and JAVA SCRIPT”, Wiley Publishing, 2005. Unit – I : Ch.1 Unit – II : Ch. 2, 3 & 4 Unit - III : Ch.5, 6 Unit – IV : Ch.7 Unit - V : Ch.8

References

1. Joel Skylar. “Principles of Web Design”. Singapore : Thomson Asia Pvt. Ltd 2000
2. Powell , Thomas A. “Web Design – The Complete Reference”, Tata McGraw Hill Edition 2000
3. Alexis Goldstein, Louis Lazaris, Estelle Weyl. “HTML5 & CSS3 for the Real World”.

Web References

1. <http://www.w3schools.com/css>
2. <http://www.tutorialspoint.com/css>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	M	S	M	M	M	M	S	M	M	S
CO2	S	M	M	S	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Open Elective** Paper code: **Paper - 2** Name of the Paper:

B – Open Source Applications

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand the features of PHP
2. To develop the different applications using PHP
3. To demonstrate the applications using PHP with Mysql
4. To understand the concepts of Perl
5. To develop the applications using Perl

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the features of PHP
2. After studied unit-2, Students are able to develop the different applications using PHP.
3. After studied unit-3, Students are able to demonstrate the applications using PHP with Mysql.
4. After studied unit-4, Students are able to understand understand the concepts of Perl.
5. After studies unit-5, Students are able to develop the applications using Perl

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: BASIC PHP**Teaching Hours: 9**

Web Server-Apache-PHP-Data Types-User defined Variables-Constants-Operators-Control Structures-User defined Functions-Directory Functions-File system Functions-Arrays-String Functions-Date and Time Functions-Mathematical Functions-Miscellaneous Functions.

UNIT-II: ADVANCED PHP WITH MYSQL**Teaching Hours: 9**

Exceptions handling-Error Handling Functions-Predefined Variables-Cookies-Sessions-COM- DOM- CURL-SOAP-Classes and Objects-Mail Function-URL Functions. PHP with MySQL: PHP MySQL Functions-Database driven application

UNIT-III: ADVANCED PHP WITH AJAX, SEO AND CMS PHP WITH AJAX**Teaching Hours: 9**

Introducing Ajax-Ajax Basics-PHP and Ajax-Database Driven Ajax. PHP with SEO: Basic SEO- Provocative SE Friendly URLs-Duplicate Content- CMS: Wordpress Creating an SEFriendly Blog.

UNIT-IV: BASIC PERL**Teaching Hours: 9**

Introduction-Scalar Data- Lists and Arrays-Subroutines-Input and Output- Hashes-Regular Expressions-Control Structures-Perl Modules-File Tests

UNIT-IV: ADVANCED PERL**Teaching Hours: 9**

Directory Operations-Strings and Sorting-Smart Matching-Process Management- Advanced Perl Technique

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Unit 1& 2 :

Mehdi Achour, Friedhelm, Betz Antony Dovgal, Nuno Lopes, Hannes Magnusson, Georg Richter, Damien Seguy, Jakub Vrana And several others, “PHP Manual (Download the manual from PHP official website www.php.net)”, 1997-2011 the PHP Documentation Group.

2. Unit 3 :

Lee Babin, “Beginning Ajax with PHP From Novice to Professional”, Apress, 2007 (Chapters 1, 2, 3 and 4) Jaimie Sirovich and Cristian Darie, “Professional Search Engine Optimization with PHP A Developer’s Guide to SEO”, Wiley Publishing, Inc., Indianapolis, Indiana ,2007 (Chapters 2, 3, 5 and16)

3. Unit 4 & 5:

Randal L. Schwartz, Tom Phoenix, brian d foy, “Learning Perl, Fifth Edition Making Easy Things Easy and Hard Things Possible”, O'Reilly Media, June 2008

References

1. Steven D. Nowicki, Alec Cove, Heow Eide-goodman ,“Professional PHP”, Wrox Press, 2004.

Web References

1. www.php.net
2. www.phpclasses.org

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	M	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	S	S	S	L	M
CO3	S	S	M	M	M	S	M	L	M	S	M	S	M	M	M
CO4	S	S	L	S	M	M	M	S	S	M	M	M	M	M	S
CO5	S	S	M	M	M	L	S	M	L	S	M	M	S	S	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **II** Paper type: **Open Elective** Paper code: **Paper - 2** Name of the Paper: **C**
– **Problem Solving Techniques** Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To develop problem solving skills with top down design principles.
2. To become competent in algorithm design and program implementation.
3. To develop skills to apply appropriate standard methods in problem solving

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to develop programming techniques required to solve a given problem.
2. After studied unit-2, Students are able to develop problem solving skill using top – down design principles
3. After studied unit-3, Students are able to design an algorithm for a problem.
4. After studied unit-4, Students are able to develop techniques to handle array structure
5. After studies unit-5, Students are able to develop techniques such as searching and sorting

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I:PROGRAMMING TECHNIQUES**Teaching Hours: 15**

Steps Involved in Computer Programming – Problem Definition – Outlining The Solution – Flow Chart – Developing Algorithms – Efficiency of Algorithms - Analysis of Algorithms.

UNIT-II:FUNDAMENTAL ALGORITHMS**Teaching Hours: 15**

Exchanging the Values – Counting – Summation of Set of Number – Factorial Computation – Sine Computation – Fibonacci Sequence – Reversing the Digits of an Integer – Base Conversion – Character to Number Conversion

UNIT-III: FACTORING METHODS**Teaching Hours: 15**

Finding the Square Root of a Number – Smallest Divisor of an Integer – GCD of Two Integers – Generating Prime Numbers – Computing the Prime Factors of an Integer – Generation of Pseudo-Random Numbers – Raising a Number to a Large Power – Computing the Nth Fibonacci Number.

UNIT-IV: ARRAY TECHNIQUES**Teaching Hours: 15**

Array Order Reversal – Array Counting or Histogram – Finding the Maximum Number in a Set – Removal of Duplicates from an Ordered Array – Partitioning an Array – Finding the kth Smallest Element – Longest Monotone Subsequence.

UNIT-V:MERGING, SORTING AND SEARCHING**Teaching Hours: 15**

Two Way Merge - Sorting by Selection, Exchange, Insertion, Partitioning - Binary Search – Hash Searching

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Dromey R G, “How to Solve it by Computer”, Prentice Hall of India, 1997

References

1. Michael Schneider, Steven W. Weingart, David M. Perlman, “An Introduction to Programming and Problem Solving with Pascal”, Wiley Eastern Limited, New Delhi, 1982.
2. Harold Abelson and Gerald Sussman with Julie Sussman, “ Structure and Interpretation of Computer Programs”, MIT Press, 1985

Web References

1. <http://nptel.ac.in/courses/106104074/>
2. <http://javahungry.blogspot.com/2014/06/algorithm-problem-solving-techniques-or-approaches-forsoftware-programmer.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	M	M	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	S
CO3	S	M	L	M	M	M	M	L	S	L	S	S	M	M	S
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Core** Paper code: **Paper - 7** Name of the
Paper: **Distributed Operating System** Credit: **4**
Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: -

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Course Objectives

1. To understand foundations of Distributed Systems.
2. To introduce the idea of memory management
3. To understand in detail the system level and support required for distributed system.
4. To understand the shell script commands of Unix

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand foundations of Distributed Systems.
2. After studied unit-2, Students are able to get the idea of memory management.
3. After studied unit-3, Students are able to comprehend in detail input and output process
4. After studied unit-4, Students are able to know the concept of multimedia operating system.
5. After studied unit-5, Students are able to understand the concept of security mechanism in distributed operating system

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT-I: INTRODUCTION

Teaching Hours: 15

Operating system concepts - System Calls - OS Structure - Process and Threads: Process - Threads - Inter Process Communication - Scheduling - Classical IPC Problems.

UNIT-II: MEMORY MANAGEMENT**Teaching Hours: 15**

Memory abstraction - Virtual Memory - Page Replacement Algorithm - Design issues for paging systems - implementation issues - Segmentation. File Systems: Files - Directories - File System Implementation - File System Management and Optimization.

UNIT-III: INPUT/OUTPUT**Teaching Hours: 15**

Principles of I/O hardware - Principles of I/O software - I/O Software Layers - Disks - Clocks - User Interface - Thin Clients - Power Management. Deadlocks: Resources - Introduction - The Ostrich Algorithm - Deadlock Avoidance - Deadlock Prevention - Other issues.

UNIT-IV: MULTIMEDIA OPERATING SYSTEM**Teaching Hours: 15**

Introduction - Multimedia Files - Video & Audio compression - Multimedia Process Scheduling - Multimedia File System Paradigms - File placement - Caching - Disk scheduling for Multimedia - Multiple Processor system: Multiprocessor - Multicomputers - Virtualization - Distributed systems.

UNIT-V: SECURITY**Teaching Hours: 15**

Security Environment - Basics of Cryptography - Protection Mechanisms - Authentication - Insider Attacks - Exploiting Code Bugs - Malware – Defenses - Case Study: LINUX.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Andrew S. Tanenbaum - Modern Operating System - Prentice Hall of India Pvt Limited, 2001

References

1. Pradeep K. Sinha. - Distributed Operating Systems Concepts and Design - Prentice Hall of India Pvt Limited, 2008
2. Andrew S. Tanenbaum and Maarten Van Steen - Distributed Systems - Prentice Hall of India Pvt Limited, 2002.

Web References

1. https://en.wikipedia.org/wiki/Distributed_operating_system
2. <https://www.tutorialspoint.com/distributed-operating-system>
3. https://lasr.cs.ucla.edu/classes/188_winter15/readings/distributed_os_notes.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	S	M
CO3	S	S	L	M	M	S	M	L	S	M	S	S	M	M	M
CO4	S	M	M	L	M	S	M	S	M	M	L	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**
and Web Services

Paper type: **Core**
Credit: **4**

Paper code: **Paper - 8** Name of the Paper: **XML**

Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: **-**

Course Objectives

1. To examine fundamental XML technology
2. To understand the use of JSON
3. To gain an understanding about the role of web services in commercial applications
4. To learn the emerging standard protocols like SOAP, WSDL and UDDI.
5. To introduce the role of web services in CMS

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamental XML technology
2. After studied unit-2, Students are able to understand the use of JSON.
3. After studied unit-3, Students are able to design collaborating web services according to a specification.
4. After studied unit-4, Students are able to know the concept of SOAP, WSDL and UDDI.
5. After studied unit-4, Students are able to know the role of web services in CMS.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	Yes
5	Yes	Yes	Yes	Yes	No	Yes

UNIT - I: XML TECHNOLOGY FAMILY**Teaching Hours: 15**

XML – benefits – Advantages of XML over HTML, EDI, Databases – XML based standards – DTD – XML Schemas – X-Files – XML processing – DOM – SAX – presentation technologies – XSL – XHTML – voiceXML – Transformation – XSLT – XLINK – XPATH.

UNIT - II: JSON AND JSON SCHEMA**Teaching Hours: 15**

Introduction to JSON – JSON Comparison with XML – JSON syntax, Datatypes, Objects – Examples – JSON Schema: Hello World! – The type Keyword – Declaring a JSON schema – JSON schema reference: Type specific keywords – Generic Keywords – Combining schemas – The \$schema Keyword – Regular Expression – Structuring a complex schema: Reuse.

UNIT - III: ARCHITECTING WEB SERVICES**Teaching Hours: 15**

Business motivations for web services – B2B – B2C – Technical motivations – limitations of CORBA and DCOM – Service-oriented Architecture (SOA) – Architecting web services – Implementation view – web services technology stack – logical view – composition of web services – deployment view – from application server to peer to peer – process view – life in the runtime.

UNIT - IV: WEB SERVICE BUILDING BLOCKS: SOAP, WSDL AND UDDI**Teaching Hours: 15**

Introduction to SOAP – Basic SOAP syntax – Sending SOAP messages – Future of SOAP – Introduction to WSDL – Basic WSDL syntax- SOAP binding – Introduction of UDDI – UDDI API – Future of UDDI.

UNIT - V: XML-E-BUSINESS & XML-CONTENT MANAGEMENT SYSTEM**Teaching Hours: 15**

Business to Business – Business to Customer – Different types of B2B Interaction – Components of E-business XML Systems – Enterprise Integration – ebXML – RosettaNet – Introduction of Web Content Management – Components of Content Management System – Role of XML in Web Content Management – Role of metadata (RDF and PRISM) in Web Content Management.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

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1. Ron Schmelzer et al. “XML and Web Services”, Pearson Education, 2002.
2. Micheal Droettboom, “Understanding JSON Schema Release 1.0”, 2013.

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2. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services: An Architect’s Guide”, Prentice Hall Edition, 2004.

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4. www.quackit.com/xml/tutorial/
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Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	L	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	L	M	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Core** Paper code: **Paper - 9** Name of the Paper:
Programming using Python Credits: **3**

Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: -

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Course Objectives

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures – lists, tuples, dictionaries.
6. To do input/output with files in Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to explore the fundamental concepts of Python.
2. After studied unit-2, Students are able to understand Basics of Python programming language.
3. After studied unit-3, Students are able to solve simple problems using Python.
4. After studied unit-4, Students are able to understand about modules and packages.
5. After studied unit-5, Students are able to understand about the concept of Object Oriented Programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I: OVERVIEW

Teaching Hours: 15

Introduction to Python: Features of Python - How to Run Python – Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) – Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers-Strings-List-Tuple-Set-Dictionary-Data type conversion.

UNIT - II: FLOW CONTROL & FUNCTIONS

Teaching Hours: 15

Flow Control: Decision Making-Loops-Nested Loops-Types of Loops. Functions: Function Definition-Function Calling - Function Arguments - Recursive Functions - Function with more than one return value.

UNIT - III: MODULES, PACKAGES AND FILE HANDLING Teaching Hours: 15

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling: Opening a File - Closing a File - Writing to a File – Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python.

UNIT - IV: OBJECT ORIENTED PROGRAMMING

Teaching Hours: 15

Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python Encapsulation - Data Hiding- Inheritance - Method Overriding Polymorphism. Exception Handling: Built-in Exceptions - Handling Exceptions - Exception with Arguments- Raising Exception - User-defined Exception - Assertions in Python

UNIT - V: REGULAR EXPRESSIONS & WEB APPLICATIONS Teaching Hours: 15

Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - Character Classes - Special Character Classes - Repetition Cases - findall() method - compile() method. Web Application Framework- Django Architecture- Starting development- Case Study: Blogging App.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jeeva Jose and P. SojanLal, “Introduction to Computing and Problem Solving with Python”, Khanna Book Publising Co. (P) Ltd., 2016.
2. ArshdeepBahga, Vijay Madiseti, “Cloud Computing: A Hands – On Approach” Universities press (India) Pvt. limited 2016

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1. Wesley J. Chun, “Core Python Programming”, Second Edition, Prentice Hall Publication, 2006.
2. Timothy A Budd, “Exploring Python”, Tata McGraw Hill, New Delhi, ISBN: 780071321228

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1. www.learnpython.org/
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3. <https://www.Codementor.io>
4. <https://www.Python.org>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	S	M	S	M	M	S	S	M	S	M	M
CO3	S	S	L	M	S	S	M	S	S	S	S	S	M	M	M
CO4	S	M	M	S	S	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Practical** Paper code: **Paper - 7** Name of the Paper: **7 - Distributed Operating System** Credit: **2**

Total Hours per Week: **3 Hour** Lecture Hours: - Tutorial Hours: - Practical Hours: **3**

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Course Objectives

1. To understand foundations of Distributed Systems.
2. To introduce the idea of memory management
3. To understand in detail the system level and support required for distributed system.
4. To understand the shell script commands of Unix

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand foundations of Distributed Systems.
2. After studied unit-2, Students are able to get the idea of memory management.
3. After studied unit-3, Students are able to comprehend in detail input and output process
4. After studied unit-4, Students are able to know the concept of multimedia operating system.
5. After studied unit-5, Students are able to understand the concept of security mechanism in distributed operating system

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

1. Write a shell script to copy, rename and print multiple files using choice menus.
2. Write a shell script to display logged in users who are using high CPU percentage.
3. Write a shell script to list processes based on CPU percentage and memory un-usage.
4. Write a shell script to display total used and free memory space.

5. Write a shell script that takes as command-line input a number n and a word. The program should then print the word n times, one word per line.
6. Write a shell scripts using the following statements. a) While-loop b) For-loop c) If-then-else d) Switch
7. Write a shell script using grep statement.
8. Write a shell script that can search all immediate sub-directories of the current directory for a given file and then quit if it finds one.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	S	M
CO3	S	S	L	M	M	S	M	L	S	M	S	S	M	M	M
CO4	S	M	M	L	M	S	M	S	M	M	L	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Practical** Paper code: **Paper - 8** Name of the Paper: **8 - XML and Web Services** Credits: **2**

Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

Course Objectives

1. To examine fundamental XML technology
2. To understand the use of JSON
3. To gain an understanding about the role of web services in commercial applications
4. To learn the emerging standard protocols like SOAP, WSDL and UDDI.
5. To introduce the role of web services in CMS

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamental XML technology
2. After studied unit-2, Students are able to understand the use of JSON.
3. After studied unit-3, Students are able to design collaborating web services according to a specification.
4. After studied unit-4, Students are able to know the concept of SOAP, WSDL and UDDI.
5. After studied unit-4, Students are able to know the role of web services in CMS.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	Yes
5	Yes	Yes	Yes	Yes	No	Yes

1. Simple XML file
2. Validating XML document using Internal DTD, External DTD
3. Validating an XML document using XSD

4. Validating an XML document with attributes using XSD
5. XML with mixed contents
6. Validating an XML document using XSD that implements user defined data type
7. Presenting an XML file using XSLT elements
8. Transforming XML using XSLT and implementing XPath – Nodeset functions
9. Transforming XML using XSLT and implementing XPath – number functions
10. Creating a Web Service and Creating and invoking a Web Service

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	L	S	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	L	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	L	M	M	M	L	M
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Practical** Paper code: **Paper - 9** Name of the Paper: **9 - Programming using Python** Credits: **2**

Total Hours per Week: **3 Hour** Lecture Hours: -Tutorial Hours: -Practical Hours: **3**

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Course Objectives

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures – lists, tuples, dictionaries.
6. To do input/output with files in Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to explore the fundamental concepts of Python.
2. After studied unit-2, Students are able to understand Basics of Python programming language.
3. After studied unit-3, Students are able to solve simple problems using Python.
4. After studied unit-4, Students are able to understand about modules and packages.
5. After studied unit-5, Students are able to understand about the concept of Object Oriented Programming.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Working with numbers.
2. Implementing String operations.
3. Working with Tuples and Set.
4. Implementation of Dictionaries.
5. Demonstrating List Operations.
6. Flow Control and Functions.
7. Modules and Packages.
8. File handling.
9. Object Oriented Programming.
10. Exception Handling and Regular Expressions.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	S	M	S	M	M	S	S	M	S	M	M
CO3	S	S	L	M	S	S	M	S	S	S	S	S	M	M	M
CO4	S	M	M	S	S	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Core Elective** Paper code: **Paper - 3** Name of the Paper: **A – Blockchain Technology** Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

Course Objectives

1. To understand the functions of Blockchain
2. To have clarity in the Concepts, challenges, solutions with respect to Blockchain
3. To understand the facts and myths related to crypto currencies.
4. To apply the concept of Blockchain for various applications.
5. To correlate current Indian scenario in governing crypto currencies in India with Global standard.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the function of Blockchain.
2. After studied unit-2, Students are able to understand the concepts of Blockchain
3. After studied unit-3, Students are able to understand the facts and myths related to cryptocurrencies.
4. After studied unit-4, Students are able to apply the concept of Blockchain for various applications.
5. After studied unit-5, Students are able to understand about the advanced concept of Blockchain.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – I: BLOCKCHAIN 1.0**Teaching Hours: 9**

Currency, Technology Stack: Blockchain, Protocol, Currency, the Double-Spend and Byzantine Generals' Computing Problems, How a Cryptocurrency Works, Summary: Blockchain 1.0 in Practical Use, The Blockchain Is an Information Technology.

UNIT – II: BLOCKCHAIN 2.0**Teaching Hours: 9**

Contracts, Financial Services, Crowdfunding, Bitcoin Prediction Markets, Smart Property, Smart Contracts, Blockchain 2.0 Protocol Projects, Wallet Development Projects, Blockchain Development Platforms and APIs, Blockchain Ecosystem: Decentralized Storage, Communication, and Computation, Ethereum: Turing-Complete Virtual Machine, Dapps, DAOs, DACs, and DASs: Increasingly Autonomous Smart Contracts, The Blockchain as a Path to Artificial Intelligence.

UNIT – III: BLOCKCHAIN 3.0**Teaching Hours: 9**

Justice Applications Beyond Currency, Economics, and Markets, Blockchain Technology Is a New and Highly Effective Model for Organizing Activity, Distributed Censorship-Resistant Organizational Models, Namecoin: Decentralized Domain Name System, Digital Identity Verification, Digital Art: Blockchain Attestation Services (Notary, Intellectual Property Protection), Blockchain Government.

UNIT – IV: BLOCKCHAIN 3.0**Teaching Hours: 9**

Efficiency and Coordination Applications Beyond Currency, Economics, and Markets, Blockchain Science: Gridcoin, Foldingcoin, Blockchain Genomics, Blockchain Health, Blockchain Learning: Bitcoin MOOCs and Smart Contract Literacy, Blockchain Academic Publishing: Journalcoin, The Blockchain Is Not for Every Situation, Centralization-Decentralization Tension and Equilibrium.

UNIT – V: ADVANCED CONCEPTS**Teaching Hours: 9**

Terminology and Concepts, Currency, Token, Tokenizing, Currency Multiplicity: Monetary and Nonmonetary Currencies, Demurrage Currencies: Potentially Inventory and Redistributable, Limitations: Technical Challenges, Business Model Challenges, Scandals and Public Perception, Government Regulation, Privacy Challenges for Personal Records, Overall: Decentralization Trends Likely to Persist.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Melanie. Swan. Blockchain: Blueprint for a new economy. "O'Reilly Media, Inc.", 2015.

References

1. Colm Gordon, "Blockchain Simplified", 2017.
2. Melanie Swan "Blockchain", O'Reilly Media, Inc., 2015.
3. Imran basher, "Mastering Blockchain" Packt publication, 2nd Edition, 2018.

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2. <https://www.tutorialspoint.com/blockchain/index.htm>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	L	M	L	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	L	M	M	S	M	M	M
CO4	S	M	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**

Paper type: **Core Elective** Paper code: **Paper - 3** Name of the Paper:

B – Internet of Things

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: -

Course Objectives

1. To design and Develop IOT based solution for real world applications
2. To realize the evolution of Internet in Mobile Devices, Cloud & Sensor Networks
3. To understand the building blocks of Internet of Things and its characteristics.
4. To understand the concepts of IOT and its application.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to develop IOT based solution for real world applications.
2. After studied unit-2, Students are able to realize the evolution of Internet in Mobile Devices.
3. After studied unit-3, Students are able to understand the building blocks of Internet of Things.
4. After studied unit-4, Students are able to apply the concept of Blockchain for various applications.
5. After studied unit-5, Students are able to understand the IOT and its applications.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I: INTRODUCTION**Teaching Hours: 9**

Introduction and Definition of Internet of Things, IoT Growth – A Statistical View, Application Areas of IoT, Characteristics of IoT, Things in IoT, IoT Stack, Enabling Technologies, IoT Challenges, IoT Levels, Is Cyber Physical System the same as IoT? Is WSN the same as IoT?

UNIT - II: INTRODUCTION TO SENSORS, MICROCONTROLLERS, AND THEIR INTERFACING**Teaching Hours: 9**

Introduction to Sensor Interfacing, Types of Sensors, Controlling Sensors through Webpages, Microcontrollers: A Quick Walkthrough, ARM. Protocols for IoT – Messaging and Transport Protocols, Messaging Protocols (MQTT, CoAP, AMQP), Transport Protocols (Li-Fi, BLE).

UNIT - III: PROTOCOLS FOR IOT**Teaching Hours: 9**

Addressing and Identification, Internet Protocol Version 4 (IPv4), Internet Protocol Version 6 (IPv6), Uniform Resource Identifier (URI). Cloud for IoT - Introduction, IoT with Cloud – Challenges, Selection of Cloud Service Provider for IoT Applications: An Overview, Introduction to Fog Computing, Cloud Computing: Security Aspects, Case Study: How to use Adafruit Cloud? Application of Data Analytics in IOT.

UNIT - IV: APPLICATION BUILDING WITH IOT**Teaching Hours: 9**

Introduction, Smart Perishable Tracking with IoT and Sensors, Smart Healthcare – Elderly Fall Detection with IoT and Sensors, Smart Inflight Lavatory Maintenance with IoT, IoT-Based Application to Monitor Water Quality, Smart Warehouse Monitoring – Let the Drone Fly for You, Smart Retail – IoT Possibilities in the Retail Sector, Prevention of Drowsiness of Drivers by IoT-Based Smart Driver Assistance Systems, System to Measure Collision Impact in an Accident with IoT.

UNIT - V: GETTING FAMILIARIZED WITH ARDUINO IDE**Teaching Hours: 9**

Architecture, Arduino Programming, A Simple Application, Arduino Playground. Getting Familiarized with Raspberry Pi - Story behind Raspberry Pi, Architecture, Compatible Peripherals, Add-Ons, and Accessories, Operating System for Raspberry Pi, Setting up Raspberry Pi, Initial Configuration for Raspberry Pi, Linux Based Softwares in Raspberry Pi, Application Development with Raspberry-Pi – A Quick Walk Through.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram, Internet of Things, Wiley, India, 2019.

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1. Vijay Madisetti and Arshdeep Bahga, “Internet of Things (A Hands-on Approach)”, 1st Edition, VPT, 2014.
2. Francis daCosta, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, Apress Publications, 2013.

Web References

1. <https://www.coursera.org/courses?query=iot>
2. <https://online.stanford.edu/courses/xee100-introduction-internet-things>
3. https://www.tutorialspoint.com/internet_of_things/index.htm

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	M	M
CO3	S	S	M	M	M	S	M	L	L	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**

Paper type: **Core Elective** Paper code: **Paper - 3** Name of the Paper:

C – Network Security

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

Course Objectives

1. Identify some of the driving factors needed for network security
2. Identify and classify attacks and threats
3. Compare and contrast symmetric and asymmetric encryption systems.
4. Identify the web systems vulnerable to attack.
5. Use appropriate secure mail applications and security protocols

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to identify some of the deriving factors needed for network security.
2. After studied unit-2, Students are able to identify and classify attacks and threats.
3. After studied unit-3, Students are able to compare and contrast symmetric and asymmetric encryption.
4. After studied unit-4, Students are able to identify the web systems vulnerable to attack.
5. After studied unit-5, Students are able to use appropriate secure mail applications and security protocols.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT- I: SECURITY IN COMPUTING ENVIRONMENT

Teaching Hours: 9

Need for Security - Security Attack - Security Services - Information Security - Methods of Protection. Basics of Cryptography: Terminologies used in Cryptography - Substitution Techniques- Transposition Techniques. Encryption and Decryption: Characteristics of Good Encryption Technique -Properties of Trustworthy Encryption Systems - Types of Encryption Systems - Confusion and Diffusion -Cryptanalysis.

UNIT-II: SYMMETRIC KEY ENCRYPTION

Teaching Hours: 9

Data Encryption Standard (DES) Algorithm - Double and Triple DES - Security of the DES - Advanced Encryption Standard (AES) Algorithm - DES and AES Comparison. Public Key Encryption: Characteristics of Public Key System - RSA Technique - Key Exchange -Diffie-Hellman Scheme - Cryptographic Hash Functions - Digital Signature – Certificates - Certificate Authorities.

UNIT - III: IP SECURITY

Teaching Hours: 9

Overview of IP Security (IPSec) - IP Security Architecture - Modes of Operation - Security Associations (SA) - Authentication Header (AH) - Encapsulating Security Payload (ESP) - Internet Key Exchange. Web Security: Web Security Requirements - Secure Socket Layer (SSL) - Transport Layer Security (TLS) - Secure Electronic Transaction (SET).

UNIT - IV: ELECTRONIC MAIL SECURITY

Teaching Hours: 9

Pretty Good Privacy - Threats to E-Mail - Requirements and Solutions - Encryption for Secure E-Mail - Secure E-Mail System. Firewalls: Firewalls – Types - Comparison of Firewall Types - Firewall Configurations - Planning and Enforcing Security Policies: Planning Security Policies - Risk Analysis - Security Policies for an Organization - External Security.

UNIT-V: PROTECTION OF COMPUTING RESOURCES

Teaching Hours: 9

Secure Programs - Non-malicious Program Errors - Viruses and Other Malicious Code - Targeted Malicious Code - Methods of Control. Security Features in Operating System: Objects to be Protected - Protection Methods of Operating Systems - Memory Protection - File Protection - User Authentication.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. William Stallings. Cryptography and network security, 4/E. Pearson Education India, 2006.

References

1. Singh, “Network Security and Management”, 2nd ed., PHI.

Web References

1. <https://alison.com/course/introduction-to-computer-network-security>
2. <https://www.udemy.com/course/certified-secure-netizen/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	L	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	M
CO3	S	M	L	M	M	S	M	L	S	M	L	S	M	M	M
CO4	S	M	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	L	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Open Elective** Paper code: **Paper - 3** Name of
the Paper: **A – Programming using C** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To identify situations where computational methods and computers would be useful.
2. To enhance their analyzing and problem-solving skills and use the same for writing programs in C.
3. To develop logics and that will help them to create programs, applications in C.
4. To identify programming task involved in a given computational problem.
5. To approach the programming tasks using techniques learned and write pseudo-code.
6. To choose the right data representation formats based on the requirements of the problem.
7. To use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
8. To enter the program on a computer, edit, compile, debug, correct, recompile and run it.
To identify tasks in which the numerical techniques learned are applicable and apply them to write programs

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the concept of data types and operators.
2. After studied unit-2, Students are able to understand the concept of arrays and functions.
3. After studied unit-3, Students are able to understand the concept of pointers.
4. After studied unit-4, Students are able to understand the concept of storage classes and unions.
5. After studied unit-5, Students are able to understand file management in c language.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I: DATA TYPES, OPERATORS AND STRUCTURES**Teaching Hours: 9**

Structure of a C program – Basic data types (int, float, char, double, void) – constants and variables (variable declaration, integer, real, float, character, variables) – operators and expressions (arithmetic operators, relational operators, logical operators, bitwise operators, type casting, type conversion, enumerated data type, typedef) – Control Constructs (if, switch, while, do...while, for, break and continue, exit() function, goto and label).

UNIT – II: ARRAYS AND FUNCTIONS**Teaching Hours: 9**

Arrays (declaration, one and two dimensional arrays) - Character Arrays and Strings. Function Fundamentals (General form, Function Definition, Function arguments, return value) – Parameter passing: call-by-value and call-by-reference – Recursion – Passing Arrays to Function – Passing Strings to Function.

UNIT – III: POINTERS**Teaching Hours: 9**

Understanding Pointers – Accessing the Address of a Variable – Declaring the Pointer Variables – Initialization of Pointer Variables – Accessing a Variable through its Pointer – Pointer Expressions – Pointers and Arrays – Pointers and Character Strings – Array of Pointers – Pointers as Function Arguments – Functions returning Pointers – Pointers to Functions.

UNIT – IV: STORAGE CLASSES, STRUCTURES AND UNIONS **Teaching Hours: 9**

Scope rules (Local variables and global variables, scope rules of functions) -Type modifiers and storage class specifier.

Structures – Basics of Structure – Declaring of Structure – Referencing Structure elements - Array of Structures – Nesting of Structures - Passing Structures to function – Pointers and Structures - Unions.

UNIT – V: FILE MANAGEMENT IN C **Teaching Hours: 9**

Introduction – Defining and Opening a File – Closing a File – Input / Output Operations on Files – Command Line Arguments.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. E.Balagurusamy, “Programming in ANSI C”, Seventh Edition, McGraw Hill Education Private Limited, NewDelhi: 2017.

References

1. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition - New Delhi: 2010
2. Ashok N. Kamthane, "Programming in C", Second Impression, Pearson: 2012.

Web References

1. <http://www.c4learn.com/?gclid=COK1y6nHk7wCFcUA4godmlgAKA/>
2. <http://www.cprogramming.com/tutorial/c-tutorial.html/>
3. <http://www.tutorialspoint.com/cprogramming/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	L	S	M	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	S
CO3	S	S	M	M	M	S	M	L	M	S	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	L	S	M	M	S	M	S

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III**

Paper type: **Open Elective**

Paper code: **Paper - 3** Name of

the Paper: **B – Programming using C++**

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand object oriented programming and advanced C++ concepts.
2. To understand the various functions and arguments in object oriented programming.
3. To understand the classes and objects in C++.
4. To be familiar with inheritance and polymorphisms.
5. To be able to understand the concepts of files and exception handling

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand Basic concepts of C++.
2. After studied unit-2, Students are able to understand the concept functions.
3. After studied unit-3, Students are able to understand the concept of Classes and Objects.
4. After studied unit-4, Students are able to understand the about inheritance and polymorphism.
5. After studied unit-5, Students are able to understand concept of exception handling files.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I: BASIC CONCEPTS

Teaching Hours: 9

A look at Procedure Oriented Programming – Object Oriented Programming Paradigm – Basic Concepts of Object Oriented Programming – Benefits of OOP – Object Oriented Languages – Beginning With C++ - A Simple C++ Program – Structure of C++ Program – Tokens – Basic Data Types – Scope Resolution Operator – Manipulators – Expressions – Control Structures.

UNIT – II: FUNCTIONS

Teaching Hours: 9

Functions – Function Prototyping – Call by Value – Call by Reference – Inline Functions – Default Arguments – Passing Arrays to Functions – Passing Structures to Functions – Recursion – Pointers – Function Overloading – Friend Functions.

UNIT – III: CLASSES AND OBJECTS

Teaching Hours: 9

Defining Member Functions – Private Member Function – Data Members – Member Functions – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Constructors and Destructors – Object Pointers.

UNIT – IV: INHERITANCE AND POLYMORPHISM

Teaching Hours: 9

Operator Overloading – Inheritance – Single Inheritance – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Virtual Base Classes – Abstract Classes – Polymorphism – Virtual Functions.

UNIT – V: EXCEPTION HANDLING AND FILES

Teaching Hours: 9

Exception Handling – File I/O Stream – File Stream Operations – Opening and Closing a File – Sequential Access

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. E Balagurusamy, “Object Oriented Programming with C++”, 5th Edition, McGraw Hill Education India Pvt Ltd. 2012.

References

1. Andrew C. Staugaard JR, “Structured and Object-Oriented Problem Solving Using C++”, 3rd Edition, Prentice Hall, 2002.
2. Herbert Schildt, “C++: The Complete Reference”, 3rd Edition, Tata McGraw Hill, 1999.

Web References

1. <http://www.doc.ic.ac.uk/~wjk/C++Intro/>
2. <http://www.ideone.com/>
3. <http://www.compilr.com/c-compiler>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	M	S	M	S	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	S	M	S	S	M
CO3	S	S	M	M	S	S	M	L	L	M	M	S	M	M	S
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **III** Paper type: **Open Elective** Paper code: **Paper - 3** Name of
the Paper: **C – Programming using Python** Credits: **3**
Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To know the basics of algorithmic problem solving
2. To read and write simple Python programs.
3. To develop Python programs with conditionals and loops.
4. To define Python functions and call them.
5. To use Python data structures – lists, tuples, dictionaries.
6. To do input/output with files in Python.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand fundamental concept of python.
2. After studied unit-2, Students are able to understand the concept functions.
3. After studied unit-3, Students are able to understand the concepts of file handling.
4. After studied unit-4, Students are able to understand the concepts of object oriented programming.
5. After studied unit-5, Students are able to understand concept of Regular Expressions.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Introduction to Python: Features of Python - How to Run Python – Identifiers - Reserved Keywords - Variables - Comments in Python - Indentation in Python - Multi-Line Statements - Multiple Statement Group (Suite) – Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers-Strings-List-Tuple-Set-Dictionary-Data type conversion.

UNIT - II: FLOW CONTROL & FUNCTIONS

Teaching Hours: 9

Flow Control: Decision Making-Loops-Nested Loops-Types of Loops. Functions: Function Definition-Function Calling - Function Arguments - Recursive Functions - Function with more than one return value.

UNIT - III: MODULES, PACKAGES AND FILE HANDLING Teaching Hours: 9

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function - The reload() function - Packages in Python - Date and Time Modules. File Handling: Opening a File - Closing a File - Writing to a File – Reading from a File - File Methods - Renaming a File - Deleting a File - Directories in Python.

UNIT - IV: OBJECT ORIENTED PROGRAMMING

Teaching Hours: 9

Class Definition - Creating Objects - Built-in Attribute Methods - Built-in Class Attributes - Destructors in Python Encapsulation - Data Hiding- Inheritance - Method Overriding Polymorphism. Exception Handling: Built-in Exceptions - Handling Exceptions - Exception with Arguments- Raising Exception - User-defined Exception - Assertions in Python

UNIT - V: REGULAR EXPRESSIONS & WEB APPLICATIONS Teaching Hours: 9

Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags - Regular Expression Patterns - Character Classes - Special Character Classes - Repetition Cases - findall() method - compile() method. Web Application Framework- Django Architecture- Starting development- Case Study: Blogging App.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jeeva Jose and P. SojanLal, “Introduction to Computing and Problem Solving with Python”, Khanna Book Publising Co. (P) Ltd., 2016.
2. ArshdeepBahga, Vijay Madiseti, “Cloud Computing: A Hands – On Approach” Universities press (India) Pvt. limited 2016.

References

1. Wesley J. Chun, “Core Python Programming”, Second Edition, Prentice Hall Publication, 2006.
1. Timothy A Budd, “Exploring Python”, Tata McGraw Hill, New Delhi, ISBN: 780071321228

Web References

1. www.learnpython.org/
2. <https://www.codecademy.com/learn/python>

3. <https://www.Codementor.io>
4. <https://www.Python.org>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	L	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	S	M	S	M	M	S	S	M	S	M	M
CO3	S	S	L	M	S	S	M	S	S	S	S	S	M	M	M
CO4	S	M	M	S	S	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Core** Paper code: **Paper - 10**

Name of the Paper: **Mobile Application Development**

Credits: **4**

Total Hours per Week: **5 Hour** Lecture Hours: **4** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To know the basis of Android application and development environment
2. To able to develop simple and professional application
3. To get ready for the job opportunity in mobile application development

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to know about the mobile application development environment.
2. After studied unit-2, Students are able to understand about fragments
3. After studied unit-3, Students are able to know about UI using views.
4. After studied unit-4, Students are able to understand about handling pictures
5. After studied unit-5, Students are able to understand concept of Telephony and SMS in android.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I: INTRODUCTION TO ANDROID

Teaching Hours: 15

History of Android Platform- Android APIs- Android Architecture Application Framework- Features of Android- Android Applications- Application Components - Manifest File-

Downloading and Installing Android and Android SDK - Setting up Android Virtual and physical Device - Exploring the Development Environment - The Java Perspective Using Eclipse - DDMS Perspective - Command-Line Tools- Developing and Executing the First Android Application - Using Eclipse IDE to Create an Application - Running Your Application - Exploring the Application - Using Command - Line Tools.

UNIT – II: ACTIVITIES, INTENTS AND FRAGMENTS

Teaching Hours: 15

Working with Activities- Creating an Activity- Starting an Activity – Managing the Life cycle of an Activity - Applying Themes and Styles to an Activity- Displaying a Dialog in the Activity - Hiding the title of the activity- Using Intents-Exploring Intent Objects- Exploring Intent Resolution- Exploring Intent Filters - Resolving Intent Filter Collision - Linking the Activities Using Intent - Obtaining Results from Intent – Passing Data Using an Intent Object- Fragments - Hiding Title Bar and Screen Orientation - Fragment Implementation - Finding Fragments - Adding, Removing and Replacing Fragments - Finding Activity Using Fragment - Using the Intent Object to Invoke Built-in Application..

UNIT - III: UI USING VIEWS AND VIEW - GROUPS

Teaching Hours: 15

Working with View Groups – Linear Layout – Relative Layout – Scroll Layout – Table Layout – Frame Layout – Tab Layout using the Action Bar – Working with Views – Text – Edit Text – Button – Radio Button – Check Box – Image Button – Toggle Button – Rating Bar – Binding Data with Adapter View Class – List View – Spinner – Gallery – Designing the Auto Text Complete View – Screen Orientation – Anchoring the Views of Current Activity – Handling UI Events – Handling User Interaction with Activities and Views – Specialized Fragments – List Fragment – Dialog Fragment – Preference Fragment – Creating Menus, Option Menus, Context Menu and Sub Menu.

UNIT - IV: HANDLING PICTURES AND MENUS WITH VIEWS AND STORING THE DATA

Teaching Hours: 15

Working with Image Views – Displaying Images in the Gallery View – Displaying Images in the Grid View – Using the Image Switcher View- Designing Context Menu for Image View- Using the Analog-Clock and Digital Clock Views – Embedding Web Browser in an Activity - Notifying the User Creating the Toast Notification - Creating the Status Bar Notification-

Creating the Dialog Notification - Introducing the Data Storage Options - Using Preferences - Using the SQLite Database Creating the Database - Executing the Database Operations.

UNIT - V: EMAILING, TELEPHONY AND SMS IN ANDROID Teaching Hours: 15

Building an Application to Send Email - Handling Telephony - Displaying Phone Information
Application Receiving Phone Calls – Making Outgoing Phone Calls Application - Handling SMS Sending SMS Using SMS Manager - Sending SMS Using Intent - Receiving SMS Using the Broadcast Receiver Object- Role of Default SMS Providers - . Publishing Android Application: Export android application – Google play store registration.
Supplementary Learning: Building Mobile Applications using Xamarin

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Pradeep Kothari, “Android Application Development (with kitkat support) Black Book”, Kogent Learning Solution Inc., Dreamtech Press India Pvt. Ltd, Wiley Publications.

2. Sayed Y. Hashimi, SatyaKomatineni, Dave MacLean, “Pro Android 2”, 2010 Edition, Wiley publications.

References

1. Reto Meier,”Professional Android Application Development”,2009 Edition, Willy Publication.
2. ZigurdMednieks, Laird Dornin, G. Blake Meike,and Masumi Nakamura, “Programming Android”, OReilly publications.

Web References

1. www.tutorialspoint.com
2. www.javatpoint.net
3. www.mkyong.com
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Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	L	S	M	M	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	L	S
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	M	M	M	L	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Core**

Paper code: **Paper - 11**

Name of the Paper: **Software Project Management**

Credits: **4**

Total Hours per Week: **6 Hour** Lecture Hours: **4** Tutorial Hours: **2** Practical Hours: **-**

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Course Objectives

1. To provide sound knowledge in Project Management.
2. To understand the importance of requirement gathering
3. To explore different models in Software Development
4. To know the workflow of a Project
5. To identify various actors in the activity

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand the introduction to software project management.
2. After studied unit-2, Students are able to learn about project planning.
3. After studied unit-3, Students are able to know about effort estimation and activity planning for the project.
4. After studied unit-4, Students are able to understand about risk management.
5. After studied unit-5, Students are able to learn how to work in groups.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT I: INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT

Teaching Hours: 18

Introduction: Project – Software Projects vs other types of Project – Activities Covered by SPM – Some Ways of Categorizing Software Projects – Stakeholders, Setting Objectives – The Business Case - Project Success and Failure - Management and Management Control. Project Evaluation: A Business Case – Project Portfolio Management – Evaluation of Individual Projects – Cost Benefit Evaluation – Risk Evaluation.

UNIT II: PROJECT PLANNING AND SELECTION OF PROJECT APPROACH

Teaching Hours: 18

Project Planning - Introduction to Step Wise Project Planning – Step 0 to Step 10. Selection of an Appropriate Project Approach -Introduction – Build or Buy – Choosing Methodologies and Technologies – Software Processes and Process Models – Choice of Process Models – The Waterfall Model– Prototyping – other ways of categorizing prototype- Agile Methods – Extreme Programming - Selecting the Most Appropriate Process Model.

UNIT III: EFFORT ESTIMATION AND ACTIVITY PLANNING Teaching Hours: 18

Effort Estimation – Introduction –Estimates – Problems with Over and Under-estimate – Basis for Software Estimating – Effort Estimation Techniques – Bottom-up Estimating – Top-down Approach and Parametric Models – Expert Judgment - Estimating by Analogy – Albrecht Function Point Analysis – Function Mark II – COCOMO & COCOMO II – Cost Estimation – Staffing Pattern. Activity Planning –Introduction – Objectives of Activity Planning – When to plan – Project Schedules – Project and Activities – Sequencing and Scheduling Activities – Networking Planning Models – Formulating a Network Model– Activity on Arrow Networks.

UNIT IV: RISK MANAGEMENT, RESOURCE ALLOCATION AND MONITORING

Teaching Hours: 18

Risk Management –Risk – Categories of Risk – A Framework for Dealing with Risk – Risk Identification – Risk Assessment – Risk Planning – Risk Management. Resource Allocation – Introduction – The Nature of Resources – Identifying Resource Requirements – Scheduling Resources. Monitoring –Creating the Framework – Collecting the Data – Review and Project Termination Review – Visualizing Progress – Cost Monitoring and Earned Value Analysis – Getting the Project Back to Target – Change Control – SCM.

UNIT V: MANAGING PEOPLE AND WORKING IN TEAMS

Teaching Hours: 18

Managing People –Understanding Behavior – Organizational Behavior – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation – The Oldham-Hackman Job Characteristics Model – Stress – Health and Safety. Working in Teams –Introduction – Becoming a Team – Decision Making – Organization and Team Structures – Coordination Dependencies – Dispersed and Virtual Teams – Communication Genres – Communication Plans – Leadership.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. BOB Huges, Mike Cotterell, Rajib Mall “Software Project Management”, McGraw Hill, Fifth Edition, 2011.

References

1. Futrell, “Quality software Project management”, Pearson Education India.
2. Royce, “Software Project Management”, Pearson Education India.

Web References

1. <https://www.lynda.com/Project-Management-training-tutorials/39-0.html>
2. www.rspa.com/spi/project-mgmt.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	M	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	L	S	M	L	L	M	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	M	M	M	M	S	L	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Practical** Paper code: **Paper - 10**

Name of the Paper: **10 - Mobile Application Development**

Credits: **2**

Total Hours per Week: **3 Hour** Lecture Hours: - Tutorial Hours: - Practical Hours: **3**

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Course Objectives

1. To know the basis of Android application and development environment
2. To able to develop simple and professional application
3. To get ready for the job opportunity in mobile application development

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to know about the mobile application development environment.
2. After studied unit-2, Students are able to understand about fragments
3. After studied unit-3, Students are able to know about UI using views.
4. After studied unit-4, Students are able to understand about handling pictures
5. After studied unit-5, Students are able to understand concept of Telephony and SMS in android.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

1. Simple Android Application.
2. Working with Activity
3. Working with Fragments
4. UI Controls (Text, Edit Text, Button, Radio Button)

5. UI Controls (Check Box, and Layout, Image Button, Toggle Button)
6. UI Controls (Rating Bar, List View, Gallery)
7. CRUD Operations Using SQLite DB
8. Emailing
9. Telephony
10. SMS

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	L	S	M	M	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	M	M	S	L	S
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	M	M	M	L	S	M	L	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Core Elective**

Paper code: **Paper - 4**

Name of the Paper: **A - Big Data Analytics** Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To understand the needs for Big Data and its environments.
2. To learn the basic requirements of Big Data Technologies.
3. To expose the knowledge of MapReduce programming framework(Hadoop).
4. To be familiar with NoSQL DB's Cassandra and MongoDB
5. To understand Hive and Pig technologies for analyzing the Big Data

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about big data.
2. After studied unit-2, Students are able to learn about big data analytics.
3. After studied unit-3, Students are able to know about concepts of database.
4. After studied unit-4, Students are able to understand the concept of Hadoop foundation and analytics.
5. After studied unit-5, Students are able to learn about hadoopmapreduce and yarn framework.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – I: INTRODUCTION TO BIG DATA**Teaching Hours: 9**

Data, Characteristics of data and Types of digital data: Unstructured, Semi-structured and Structured, Sources of data, Working with unstructured data, Evolution and Definition of big data, Characteristics and Need of big data, Challenges of big data, Data environment versus big data environment

UNIT – II: BIG DATA ANALYTICS**Teaching Hours: 9**

Overview of business intelligence, Data science and Analytics, Meaning and Characteristics of big data analytics, Need of big data analytics, Classification of analytics, Challenges to big data analytics, Importance of big data analytics, Basic terminologies in big data environment

UNIT – III: BIG DATA TECHNOLOGIES AND DATABASES**Teaching Hours: 9**

Introduction to NoSQL, Uses, Features and Types, Need, Advantages, Disadvantages and Application of NoSQL, Overview of NewSQL, Comparing SQL, NoSQL and NewSQL, Introduction to MongoDB and its needs, Characteristics of MongoDB, Introduction of apache cassandra and its needs, Characteristics of Cassandra

UNIT – IV: HADOOP FOUNDATION FOR ANALYTICS**Teaching Hours: 9**

History, Needs, Features, Key advantage and Versions of Hadoop, Essential of Hadoop ecosystems, RDBMS versus Hadoop, Key aspects and Components of Hadoop, Hadoop architectures

UNIT – V: HADOOPMAPREDUCE AND YARN FRAMEWORK**Teaching Hours: 9**

Introduction to MapReduce, Processing data with Hadoop using MapReduce, Introduction to YARN, Components, Need and Challenges of YARN, Dissecting YARN, MapReduce application, Data serialization and Working with common serialization formats, Big data serialization formats

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.

- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Seema Acharya and Subhashini Chellappan, “Big Data and Analytics”, Wiley India Pvt. Ltd., 016

References

1. “Big Data” by Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, Wiley Publications, 2014.
2. “Big Data Imperatives : Enterprise Big Data Warehouse, BI Implementations and Analytics” by Soumendra Mohanty, Madhu Jagadeesh and Harsha Srivatsa, Apress Media, Springer Science + Business Media New York, 2013
3. “Mining of Massive Datasets”, Anand Rajaraman, Jure Leskovec, Jeffery D. Ullman, Springer, July 2013.
4. “Hadoop: The definitive Guide”, Tom White, O'Reilly Media, 2010.

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1. <http://strata.oreilly.com/2010/09/the-smaq-stack-for-big-data.html>
2. http://blogs.computerworld.com/18840/big_data_smaq_down_storage_mapreduce_and_query

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	S	S	M	S	L	M	S	M	M	S
CO2	S	M	M	S	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	L	M	M	S	M	M	M
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Core Elective**

Paper code: **Paper - 4**

Name of the Paper: **B – Artificial Intelligence**

Credits:**3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: -

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Course Objectives

1. To provide a strong foundation of fundamental concepts in Artificial Intelligence
2. To provide a basic exposition to the goals and methods of Artificial Intelligence
3. To enable the student to apply these techniques in applications which involve perception, reasoning and learning

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about artificial intelligence.
2. After studied unit-2, Students are able to learn about heuristic search techniques.
3. After studied unit-3, Students are able to know about predicate logic.
4. After studied unit-4, Students are able to understand about representing knowledge using rules.
5. After studied unit-5, Students are able to learn about game playing.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT – I: INTRODUCTION

Teaching Hours: 9

AI Problems - AI techniques - Criteria for success. Problems, Problem Spaces, Search: State space search - Production Systems

UNIT – II: HEURISTIC SEARCH TECHNIQUES

Teaching Hours: 9

Generate and Test - Hill Climbing- Best-First - Means-end analysis. Knowledge representation issues: Representations and mappings -Approaches to Knowledge representations -Issues in Knowledge representations - Frame Problem.

UNIT – III: USING PREDICATE LOGIC

Teaching Hours: 9

Representing simple facts in logic - Representing Instance and Is a relationships - Computable functions and predicates - Resolution.

UNIT – IV: REPRESENTING KNOWLEDGE USING RULES

Teaching Hours: 9

Procedural Vs Declarative knowledge – Logic programming - Forward Vs Backward reasoning - Matching - Control knowledge.

UNIT – V: GAME PLAYING

Teaching Hours: 9

The minimax search procedure – Expert System - Perception and Action

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.

- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill Publishers company Pvt Ltd, Second Edition, 1991.

References

1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw-Hill, 2003.
3. George F. Luger, "Artificial Intelligence-Structures and Strategies for Complex Problem Solving", Pearson Education / PHI, 2002.

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1. https://www.tutorialspoint.com/artificial_intelligence/
2. <https://learn.saylor.org/course/view.php?id=96>
3. <https://in.udacity.com/course/intro-to-artificial-intelligence--cs271>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	M	M	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	L	S
CO3	S	S	M	M	M	S	M	L	L	S	M	S	M	M	S
CO4	S	S	M	L	M	M	M	S	S	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Core Elective**

Paper code: **Paper - 4**

Name of the Paper: **C – Machine learning**

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To introduce the concepts like conceptualization and summarization of big data and machine learning
2. Introduction to the course, recap of linear algebra and probability theory basics.
3. Bayesian Classification: Naive Bayes, Parameter Estimation (ML, MAP), Sequential Pattern Classification.
4. Non-parametric Methods: k-Nearest Neighbours Discriminative Learning models: Logistic Regression, Perceptrons, Artificial Neural Networks, Support Vector Machines.

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about machine learning.
2. After studied unit-2, Students are able to learn about types of learning.
3. After studied unit-3, Students are able to learn about learning algorithms.
4. After studied unit-4, Students are able to understand about unsupervised and learning algorithms
5. After studied unit-5, Students are able to learn about IOT machine learning.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT – I: INTRODUCTION TO MACHINE LEARNING

Teaching Hours: 9

Learning Systems- Goals and Applications- Aspects of developing a learning system- Training data- Linear Perceptrons as Neurons- Neural Nets- Working- Layers- Activation Functions- Feed Forward Neural Networks- Limitations- DBNs- Deep learning for Bigdata- Local minima-rearranging neurons- Spurious local minima- Comparison of AI- Machine learning & Deep learning.

UNIT – II: TYPES OF LEARNING

Teaching Hours: 9

Supervised Learning- Unsupervised Learning- Case Study- Classification- MLP in Practice- Overfitting-Linear and non-linear discriminative- decision trees- Probabilistic- K-nearest neighbor learning algorithm- curse of dimensionality.

UNIT – III: LEARNING ALGORITHMS

Teaching Hours: 9

Logistic Regression- Perceptron- Exponential Family- Generative Learning algorithms- Gaussian Discriminant Analysis- Naïve Bayes- SVM-Kernels- Model Selection- Bagging- Boosting- Evaluating and debugging- Classification errors.

UNIT – IV: UNSUPERVISED AND LEARNING ALGORITHMS

Teaching Hours: 9

Clustering- K-means Clustering- EM algorithm- Mixture of Gaussians- Factor Analysis- Principal and Independent Component Analysis- latent Semantic Indexing- Spectral or sub-space clustering.

UNIT – V: REINFORCEMENT LEARNING, IOT AND MACHINE LEARNING

Teaching Hours: 9

Markov Decision Processes- Bellman Equations- Value Iteration and Policy Iteration- Linear quadratic regulation- LQG Q-Learning- Policy versus value learning- POMDPs- IoT- Recent trends- various models. Case Study: Object Detection and smudging using gradient Descent, Spam Filtering based on Text Classification

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Rajiv Chopra, "Machine Learning", Khanna Publications, New Delhi, 2018.
2. V.K. Jain, "Machine Learning", Khanna Publications, New Delhi, 2018.

References

1. Introduction to Statistical Learning, Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Springer, 2013.
2. Pattern Classification, 2nd Ed., Richard Duda, Peter Hart, David Stork, John Wiley & Sons, 2001.
3. Pattern Recognition and Machine Learning, Christopher Bishop, Springer 2006.

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1. <https://www.datacamp.com/courses/introduction-to-machine-learning-with-r>
2. <https://elitedatascience.com/learn-machine-learning>
3. <https://www.analyticsvidhya.com/learning-path-learn-machine-learning/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	M	S	S	M	M	L	M	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	S	S	L	S	M	M	S
CO4	S	M	S	L	S	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Open Elective**

Paper code: **Paper - 4**

Name of the Paper: **A – Cyber Security** Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: -

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Course Objectives

1. To understand the cyber threats and their Impact
2. To have an awareness towards cybercrimes and legal impact against them
3. To avoid becoming a Victim to cyber threats
4. To assess risks and weakness in security policies
5. To respond to security alerts and identify flaws in systems and networks

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about cyberoffenses.
2. After studied unit-2, Students are able to learn about types tools and methods using in cybercrime
3. After studied unit-3, Students are able to computer forensics.
4. After studied unit-4, Students are able to understand about cyber security.
5. After studied unit-5, Students are able to learn about cybercrime.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT - I: INTRODUCTION TO CYBERCRIME AND CYBEROFFENSES

Teaching Hours: 9

Introduction, Cybercrime - Definition and Origins of the Word - Cybercrime and Information Security - Cybercriminals - Classifications of Cybercrimes - The Legal Perspectives - Cybercrimes: An Indian Perspective - Cybercrime and the Indian ITA 2000 - A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens. Cyberoffenses: How Criminals Plan Them – Introduction - How Criminals Plan the Attacks - Social Engineering – Cyberstalking - Cybercafe and Cybercrimes - Botnets: The Fuel for Cybercrime - Attack Vector - Basics of Cloud Computing.

UNIT - II: TOOLS AND METHODS USED IN CYBERCRIME

Teaching Hours: 9

Introduction - Proxy Servers and Anonymizers – Phishing - Password Cracking - Keyloggers and Spywares - Virus and Worms - Trojan Horses and Backdoors – Steganography - DoS and DDoS Attacks - SQL Injection - Buffer Overflow – Phishing - Identity Theft (ID Theft).

UNIT - III: UNDERSTANDING COMPUTER FORENSICS

Teaching Hours: 9

Introduction - Historical Background of Cyberforensics - Digital Forensics Science - The Need for Computer Forensics - Cyberforensics and Digital Evidence - Forensics Analysis of E-Mail - Digital Forensics Life Cycle, Chain of Custody Concept - Network Forensics - Approaching a Computer Forensics Investigation - Setting up a Computer Forensics Laboratory: Understanding the Requirements - Computer Forensics and Steganography - Relevance of the OSI 7 Layer Model to Computer Forensics - Forensics and Social Networking Sites: The Security/Privacy Threats - Computer Forensics from Compliance Perspective - Challenges in Computer Forensics - Special Tools and Techniques - Forensics Auditing – Antiforensics.

UNIT - IV: CYBERSECURITY

Teaching Hours: 9

Organizational Implications – Introduction - Cost of Cybercrimes and IPR Issues: Lessons for Organizations - Web Threats for Organizations: The Evils and Perils - Security and Privacy Implications from Cloud Computing - Social Media Marketing: Security Risks and Perils for Organizations - Social Computing and the Associated Challenges for Organizations - Protecting People's Privacy in the Organization - Organizational Guidelines for Internet Usage - Safe

Computing Guidelines and Computer Usage Policy - Incident Handling: An Essential Component of Cyber security - Forensics Best Practices for Organizations - Media and Asset Protection: Best Practices for Organizations - Importance of Endpoint Security in Organizations.

UNIT - V: CYBERCRIME AND CYBERTERRORISM

Teaching Hours: 9

Social, Political, Ethical and Psychological Dimensions – Introduction - Intellectual Property in the Cyberspace - The Ethical Dimension of Cybercrimes - The Psychology - Mindset and Skills of Hackers and Other Cybercriminals - Sociology of Cybercriminals - Information Warfare: Perception or An Eminent Reality? Cybercrime: Illustrations - Examples and Mini-Cases - Real-Life Examples - Mini-Cases - Illustrations of Financial Frauds in Cyber Domain - Digital Signature-Related Crime Scenarios - Digital Forensics Case Illustrations - Online Scams. Cybercrimes - Legal Perspectives - Why Do We Need Cyberlaws: The Indian Context - The Indian IT Act - Challenges to Indian Law and Cybercrime Scenario in India - Consequences of Not Addressing the Weakness in Information Technology Act - Digital Signatures and the Indian IT Act - Amendments to the Indian IT Act - Cybercrime and and Punishment, Cyberlaw, Technology and Students: Indian Scenario.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.

- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Jennifer L, Bayuk J, Heale P, Rohmeyer, Marcus Sachs, Jeffrey Schmidt and Joseph Weiss “Cyber security Policy Guidebook”, John Wiley & Sons ,2012.

References

1. Rick Howard, “Cyber Security Essentials”, Auerbach Publications, 2011.
2. Richard A, Clarke, Robert Knake, “Cyber war: The Next Threat to National Security & What to Do About It”, Ecco, 2010.
3. Dan Shoemaker, “Cyber security The Essential Body of Knowledge”, Cengage Learning, 2011.

Web References

1. <https://www.javatpoint.com/cyber-security-tutorial>
2. <https://www.pewresearch.org/internet/quiz/cybersecurity-knowledge/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	M	S	M	L	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	S	M
CO3	S	S	M	M	M	S	M	L	S	M	L	S	M	M	M
CO4	S	S	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	S	M	S	M	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Open Elective**

Paper code: **Paper - 4**

Name of the Paper: **B – Decision Support System**

Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To introduce the decision making system, models and support
2. To appraise the general nature and range of decision support and group support systems
3. To impart about knowledge based system and advanced intelligent systems

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about design making system.
2. After studied unit-2, Students are able to learn about types group support system
3. After studied unit-3, Students are able to learn about knowledge based system.
4. After studied unit-4, Students are able to understand about knowledge acquisition.
5. After studied unit-5, Students are able to learn about advanced intelligent system.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I: DECISION-MAKING SYSTEMS, MODELING, AND SUPPORT

Teaching Hours: 9

Decision-Making: Introduction and Definitions, Systems, Models, Phases of the Decision-Making Process, Decision-Making: The Intelligence Phase, the Design Phase, The Choice Phase,

The Implementation Phase, How Decisions Are Supported, Personality Types, Gender, Human Cognition, and Decision Styles, The Decision Makers

UNIT – II: DECISION SUPPORT AND GROUP SUPPORT SYSTEM Teaching Hours: 9

DSS Configurations, What Is a DSS?, Characteristics and Capabilities of DSS, Components of DSS, The Data Management Subsystem, The Model Management Subsystem, The User Interface (Dialog) Subsystem, The Knowledge-Based Management Subsystem, The User, DSS Hardware, DSS Classifications. **Group Support System:** Group Decision-Making, Communication, and Collaboration, Communication Support, Collaboration Support: Computer-Supported Cooperative Work, Group Support Systems, Group Support Systems Technologies, Group systems Meeting room and Online, The GSS Meeting Process, Distance Learning, Creativity and Idea Generation.

UNIT - III: KNOWLEDGE-BASED SYSTEMS

Teaching Hours: 9

Concepts and Definitions of Artificial Intelligence, Evolution of Artificial Intelligence, The Artificial Intelligence Field, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, How Expert Systems Work, Problem Areas Suitable for Expert Systems, Benefits and Capabilities of Expert Systems, Problems and Limitations of Expert Systems, Expert System Success Factors, Types of Expert Systems, Expert Systems on the Web.

UNIT- IV: KNOWLEDGE ACQUISITION, REPRESENTATION, AND REASONING

Teaching Hours: 9

Concepts of Knowledge Engineering, Scope and Types of Knowledge, Methods of Knowledge Acquisition from Experts, Knowledge Acquisition from Multiple Experts, Automated Knowledge Acquisition from Data and Documents, Knowledge Verification and Validation, Representation of Knowledge, Reasoning in Rule-Based Systems, Explanation and Meta knowledge, Inferencing with Uncertainty, Expert Systems Development, Knowledge Acquisition and the Internet.

UNIT – V: ADVANCED INTELLIGENT SYSTEMS

Teaching Hours: 9

Machine-Learning Techniques, Case-Based Reasoning, Basic Concept of Neural Computing , Learning in Artificial Neural Networks, Developing Neural Network-Based Systems, Genetic

Algorithms Fundamentals, Developing Genetic Algorithm Applications, Fuzzy Logic Fundamentals, Developing Integrated Advanced Systems.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. Efraim Turban and Jay E. Aronson, Decision Support System and Intelligent Systems, Prentice Hall International, 7th Edition 2007.

References

1. Janakiraman V. S and Sarukesi K, Decision Support Systems, Prentice Hall of India, 6th Printing 2006.
2. Lofti, Decision Support System and Management, McGraw Hill Inc, International Edition, New Delhi 1996.
3. Marakas, Decision Support System, Prentice Hall International, Paperback Edition, New Delhi, 2003

Web References

1. ndwrcdp.werf.org/documents/WU-HT-03-35/DSS%20Tutorial.pdf
2. www.slideshare.net/sursayantan92/decision-support-systemdss
3. www.uky.edu/BusinessEconomics/dssakba/instmat.htm
4. <https://ceit.aut.ac.ir/~shiry/lecture/DSS/Introduction.ppt>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	L	M	S	S	M	M	L	S	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	M	L	M	S	M	M
CO3	S	S	M	M	M	S	M	L	L	S	L	S	M	M	S
CO4	S	M	M	L	M	M	M	S	M	M	M	M	M	L	S
CO5	S	S	M	M	M	S	L	M	M	S	M	M	S	S	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

Semester: **IV**

Paper type: **Open Elective**

Paper code: **Paper - 4**

Name of the Paper: **C – Research Methods and Ethics** Credits: **3**

Total Hours per Week: **3 Hour** Lecture Hours: **2** Tutorial Hours: **1** Practical Hours: **-**

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Course Objectives

1. To demonstrate the knowledge of research processes (reading, evaluating, and developing);
2. To perform literature reviews using print and online databases;
3. To identify, explain, compare, and prepare the key elements of a research proposal/report;
4. To compare and contrast quantitative and qualitative research

Course Outcomes (five outcomes for each units should be mentioned)

1. After studied unit-1, Students are able to understand about foundation of research.
2. After studied unit-2, Students are able to learn about problem identification and formulation.
3. After studied unit-3, Students are able to learn about research design.
4. After studied unit-4, Students are able to understand about qualitative and quantitative research.
5. After studied unit-5, Students are able to learn the concepts of measurements in research.

Matching Table (Mark tick symbol in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT I: FOUNDATIONS OF RESEARCH**Teaching Hours: 9**

Meaning – Objectives – Motivation - Utility. Concept of theory – empiricism - deductive and inductive theory. Characteristics of scientific method –Understanding the language of research – Concept – Construct – Definition –Variable - Research Process.

UNIT II: PROBLEM IDENTIFICATION & FORMULATION**Teaching Hours: 9**

Research Question–Investigation Question –Measurement Issues –Hypothesis –Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing –Logic & Importance.

UNIT III: RESEARCH DESIGN**Teaching Hours: 9**

Concept and Importance in Research –Features of a good research design –Exploratory Research Design –concept, types and uses, Descriptive Research Designs –concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.

UNIT IV: QUALITATIVE AND QUANTITATIVE RESEARCH**Teaching Hours: 9**

Qualitative research –Quantitative research –Concept of measurement, causality, generalization, replication. Merging the two approaches.

UNIT V: MEASUREMENT**Teaching Hours: 9**

Concept of measurement–what is measured? Problems in measurement in research –Validity and Reliability. Levels of measurement –Nominal, Ordinal, Interval, Ratio.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in

the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.

Textbook

1. C. R. Kothari: Research Methodology: Methods & Technology, New Age Int. Publ.

References

1. Gupta Gupta : Research Methodology: Texts and cases with SPSS Application (2011 edn.), International Book House, New Delhi.
2. A.K.P.C.Swain : A Text Book of Research Methodology, Kalyani Publishers.

Web References

1. <https://libguides.wits.ac.za/c.php?g=693518&p=4914913>
2. <https://www.scribbr.com/dissertation/methodology/>
3. <https://www.intechopen.com/online-first/research-design-and-methodology>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	S	M	M	L	M	S	M	M	S
CO2	S	M	M	L	M	M	S	M	M	S	L	M	S	M	S
CO3	S	S	L	M	M	S	M	L	M	M	L	S	L	M	M
CO4	S	M	M	L	M	M	M	S	S	S	M	M	M	L	S
CO5	S	S	L	M	M	L	S	M	M	M	M	M	S	M	M

PO – Programme Outcome, CO – Course Outcome, PSO – Programme Specific Outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
B.Sc. CHEMISTRY PROGRAMME – 2022-2023 Onwards

PROGRAMME OBJECTIVES:

1. To impart knowledge of Chemistry and related sciences.
2. To develop scientific attitude to make the students open minded, critical and curious.
3. To develop skill in practical work, experiments, laboratory materials and equipment along with the collection and interpretation of scientific data to contribute to science.
4. To credit a skilled workforce to match the requirements of the society.
5. To enable the students to take up higher learning programmes.

PROGRAMME EDUCATIONAL OBJECTIVES:

1. To enable the students to apply the knowledge of Chemistry and related sciences in a broad spectrum of interdisciplinary and multidisciplinary fields.
2. To develop soft skills, problem solving skills, computational skills, experimental skills and scientific thinking of students for professional excellence.
3. To make the students to recognize the need for and possess the ability to engage in independent and lifelong learning.
4. To empower the students to exercise their abilities with great concern for the environment and society with moral and ethical values and contribute towards the development of the nation.

PROGRAMME SPECIFIC OUTCOMES:

1. Demonstrate systematic and coherent understanding of the fundamental concepts in Physical Chemistry, Organic Chemistry, Inorganic Chemistry and all other related allied chemistry subjects.
2. Identify chemical formulae and acquire ability and skill to become expertise over solving both theoretical and applied chemistry problems.
3. Apply laboratory skills, carry out experiments, record observations and inferences and analyze the results.
4. Know and follow the correct procedures and regulations for safe handling and usage of chemicals.
5. Communicate effectively various aspects of Chemistry using examples and their geometrical visualizations.
6. Discuss and evaluate scientific information from different sources (internet, newspaper articles, television, scientific texts and publications) and assess its credibility.
7. Describe and discuss ways in which science is applied and used to solve local and global problems.

8. Discuss how science and its applications interact with social, economic, political, environmental, cultural and ethical factors.
9. Find employability in core chemistry and other related fields.
10. Start their own industries / business in core-chemistry fields.

PROGEAMME OUTCOMES:

On completion of the UG Programme in Chemistry, the students will be able to:

1. Describe the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in day-to-day life.
2. Employ critical thinking for solving problems using basic chemistry knowledge and concepts.
3. Acquire skills in handling scientific instruments, planning and performing laboratory experiments and drawing logical inferences from the chemical experiments.
4. Analyze the given scientific data critically and systematically to draw a logical conclusion.
5. Develop various communication skills such as reading, listening, speaking, etc., to express ideas and views clearly and effectively.
6. Create an intellectual curiosity and ability to think in a scientific manner and get sensitized to social and environmental realities.
7. Develop an interest in pursuing higher studies in Chemistry and related subjects which are relevant to employment and entrepreneurship.
8. Capable of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling.
9. Demonstrate the knowledge of professional and ethical practices.
10. Integrate the knowledge and skills developed in multidisciplinary environments and function effectively as an individual or a leader and contribute towards the needs of the society.

THIRUVALLUVAR UNIVERSITY
BACHELOR OF SCIENCE
B.Sc. CHEMISTRY DEGREE COURSE
(With effect from 2022 - 2023)

The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
		SEMESTER I							
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-1	6	4	General Chemistry - I	25	75	100
	III	Core Practical	Practical-1	3	0	Volumetric Analysis	0	0	0
4.	III	Allied -1	Paper-1	4	3	(Choose any 1 out of 5) 1. Physics I 2. Botany I 3. Zoology I 4. Biochemistry I 5. Mathematics I*	25	75	100
	III	Allied- 1	Practical-1	3	0		0	0	0
5.	III	PE	Paper 1	6	3	Professional English I	25	75	100
6.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		Sem. Total		36	20		150	450	600
		SEMESTER II					CIA	Uni. Exam	Total
7.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
8.	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
9.	III	Core Theory	Paper-2	5	4	General Chemistry - II	25	75	100
10.	III	Core Practical	Practical-1	3	2	Volumetric Analysis	25	75	100
11.	III	Allied-1	Paper-2	3	3	(Choose any 1 out of 5) 1. Physics II 2. Botany II 3. Zoology II 4. Biochemistry II 5. Mathematics II*	25	75	100
12.	III	Allied Practical - 1	Practical-1	3	2		25	75	100
13.	III	PE	Paper 1	6	3	Professional English II	25	75	100
14.	IV	Value Education		2	2		25	75	100
15.	IV	Soft Skill		2	1		25	75	100
		Sem. Total		36	25		225	675	900

S.NO.	Part	Study Components		Ins. hrs	Credit	Title of the Paper	Maximum Marks		
		Course Title		/week					
SEMESTER III							CIA	Uni. Exam	Total
16.	I	Language	Paper-3	6	4	Tamil / Other Languages	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-3	5	4	General Chemistry – III	25	75	100
	III	Core Practical	Practical-2	3	0	Inorganic Qualitative Analysis & Preparations	0	0	0
19.	III	ALLIED-2	Paper-3	3	3	Any one from 1. Physics –I 2. Botany –I 3. Zoology –I 4. Biochemistry – I 5. Mathematics - I*	25	75	100
	III	Allied Practical	Practical-2	3	0	Allied practical-II	0	0	0
20.	IV	Skill Based Subject	Paper-1	2	2	Water Treatment and Analysis	25	75	100
21.	IV	Non-Major Elective	Paper-1	2	2	Medicinal Chemistry	25	75	100
				30	19		150	450	600
SEMESTER IV							CIA	Uni. Exam	Total
22.	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
23.	II	English	Paper-4	6	4	English	25	75	100
24.	III	Core Theory	Paper-4	5	4	General Chemistry - IV	25	75	100
25.	III	Core Practical	Practical-2	3	3	Inorganic Qualitative Analysis & Preparations	25	75	100
26.	III	Allied-2	Paper-4	3	3	Any one from 1. Physics -II 2. Botany -II 3. Zoology -II 4. Biochemistry - II 5. Mathematics - II*	25	75	100
27.	III	Allied Practical	Practical-2	3	2	Allied practical-II	25	75	100
28.	IV	Skill Based Subject	Paper-2	2	2	Food Chemistry	25	75	100
29.	IV	Non-Major Elective	Paper-2	2	2	Chemistry in Every Day Life	25	75	100
				30	24		200	600	800

S.NO.	Part	Study Components		Ins. hrs	Credit	Title of the Paper	Maximum Marks		
		Course Title		/week					
SEMESTER V							CIA	Uni. Exam	Total
30.	III	Core Theory	Paper-5	5	5	Inorganic Chemistry - I	25	75	100
	III	Core Practical	Practical-3	3	0	Gravimetric Estimation	0	0	0
31.	III	Core Theory	Paper-6	5	5	Organic Chemistry - I	25	75	100
	III	Core Practical	Practical-4	3	0	Organic Analysis and Preparations	0	0	0
32.	III	Core Theory	Paper-7	5	4	Physical Chemistry - I	25	75	100
33.	III	Internal Elective	Paper-1	3	3	Any one from A. Analytical chemistry - I B. Basis of computer programming in C and its applications in Chemistry c. Organic Synthesis	25	75	100
34.		Core Practical	Practical - 5	3	0	Physical Chemistry Practical	0	0	0
35.	IV	Skill Based Subject	Paper-3	3	2	AppliedChemistry	25	75	100
				30	19		150	450	600
SEMESTER VI							CIA	Uni. Exam	Total
36.	III	Core Theory	Paper-8	5	4	Inorganic Chemistry - II	25	75	100
37.	III	Core Theory	Paper-9	5	4	Organic Chemistry - II	25	75	100
38.	III	Core Theory	Paper-10	5	4	Physical Chemistry - II	25	75	100
39.		Compulsory Project		0	5		25	75	100
40.	III	Core Practical-3	Practica I-3	3	2	Gravimetric Estimation	25	75	100
41.	III	Core Practical-4	Practica I-4	3	2	Organic Analysis and Preparations	25	75	100
42.	III	Core Practical-5	Practica I-5	3	3	Physical Chemistry Experiments	25	75	100
43.	III	Internal Elective	Paper-2	2	3	Any one from A. Analytical Chemistry-II B. Textile Chemistry C. Nano Chemistry	25	75	100

44.	III	Internal Elective	Paper-3	2	3	Any one from A. Pharmaceutical Chemistry B. Polymer Chemistry C. Green Chemistry	25	75	100
45.	III	Skill based Subject	Paper-4	2	2	Agriculture and Leather Chemistry	25	75	100
46.	IV	Extension Activities		0	1		100	0	100
		TOTAL		30	33		350	750	1100

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Allied Practical	2	2		100	200
	Electives	3	3	9	100	300
	Core	10	(3-5)	42	100	1000
	Core practical	5	(2-3)	12	100	500
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	45		140		4500

*** Allied Mathematics:**

	Ins. Hrs/Week	Credit	CIA	University	Total Marks
Paper-1	7	4	25	75	100
Paper-2	7	6	25	75	100

if Mathematics is one of the Allied Subjects total no. of papers will be 44.

THIRUVALLUVAR UNIVERSITY

B.Sc., CHEMISTRY SYLLABUS UNDER CBCS (With effect from 2022- 2023)

SEMESTER I PAPER – 1 GENERAL CHEMISTRY – I

Objective:

Basic concepts regarding Atomic Structure, Periodic Properties, Bonding Concepts, Ionic Bond, VSEPR and MO Theories, Nomenclature of Organic Compounds, Hybridisation, Reaction Intermediates, States of Matter, Principle of Volumetric Analysis, Related Problems and Applications wherever necessary are to be taught for I- Semester.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Recollect the Chemistry of Quantum Numbers.
- 2) Review and apply periodicity of properties.
- 3) Discuss various types of bonding through VB & MO theories.
- 4) Name simple Aliphatic and Aromatic Compounds.
- 5) Illustrate and apply electron displacement effects and reaction mechanisms.
- 6) Elaborate the basic concepts of solid, liquid and gaseous states.
- 7) Apply the principles of Volumetric Analysis.

Total hours: 90

UNIT-I ATOMIC STRUCTURE (18h)

1.1 Quantum numbers n, l, m and s – Pauli's exclusion principle – Energy distribution and orbitals - Hund's rule of maximum multiplicity - Aufbau's principle – Electronic Configuration of elements - Stability of Half-filled and completely filled orbitals. Shapes of s, p, d and f orbitals.

1.2 Classification of elements – General characteristics of s, p, d and f- Block elements – Periodicity of properties- Definition and Periodicity of the following properties – Atomic radii and Ionic radii - Factors affecting the Atomic radii and Ionic radii.

1.3 Ionisation potential, Electron affinity and Electronegativity - Factors affecting the Ionisation potential, Electron affinity and Electronegativity – Pauling scale – Mulliken electronegativity scale – Applications of Electronegativity regarding the Bonding nature. Trends in periodic table and applications in predicting and explaining the chemical

behavior.

UNIT- II CHEMICAL BONDING (18h)

2.1 Ionic bond - Conditions for the formation of ionic bond - General properties – Energetics of formation of NaCl from Na^+ and Cl^- - Hydration energy, Lattice energy and their applications – Born-Haber cycle - Polarisation of ions- Fajan's rule - Transition from ionic to covalent character.

2.2 Covalent bond - Conditions for the formation of covalent bond - General properties - Polarity of bonds - Orbital overlap - Bond lengths and Bond energies - Hybridisation - Sigma and Pi bonds - VSEPR theory - Geometries of BeCl_2 , BF_3 , NH_3 , CH_4 , SF_4 , ICl_2^- , H_2O , PCl_5 , ClF_3 , XeF_6 , SF_6 and IF_7 molecules - Partial ionic character of covalent bond - Percentage of ionic character from dipole moment and electronegativity difference.

2.3 Molecular Orbital theory – Bonding and Anti-bonding orbitals - Relative order of

Energies of molecular orbitals - MO diagram of H_2 , He_2 , O_2 , O_2^{2+} , O_2^{2-} , N_2 , F_2 , HF and CO - Bond Order - Stability and Magnetic properties of the molecules - Comparison of VB and MO theories. Hydrogen bonding-types, examples and effect on properties.

UNIT- III BASIC CONCEPTS OF ORGANIC CHEMISTRY (18h)

3.1 Classification of Organic Compounds – Nomenclature of Organic Compounds –

Functional Groups - Homologous Series - IUPAC Recommendations for Naming Simple Aliphatic and Alicyclic Compounds.

3.2 Basic concepts of bonding in organic chemistry - Hybridisation – Definition – Geometry of Molecules - Methane, Ethane, Ethylene, Acetylene and Benzene - Electron displacement effects - Inductive - Inductomeric - Electromeric – Mesomeric Effect - Resonance - Hyperconjugation and Steric Effects.

3.3 Cleavage of bonds - Homolytic and Heterolytic fission of carbon-carbon bond – Methods to determine the Reaction Mechanism - Reaction intermediates - Structure and Stability of Carbocations, Carbanions and Free radicals.

UNIT-IV STATES OF MATTER (18h)

4.1 Gaseous state - Kinetic gas equation - Postulates and Derivation - Gas laws from the kinetic gas equation - Kinds of velocities - Mean, RMS, Most Probable Velocities - Calculation of molecular velocities - Maxwell's distribution of Molecular Velocities (No derivation) - Effect of Temperature on velocity distribution - Equipartition of energy - Heat capacity on molecular basis - Virial equation of state - Boyle temperature - Coefficient of Compressibility and Thermal expansion.

4.2 Liquid state - Density – Diffusion - Viscosity – Evaporation - Surface tension Determination using Stalagmometer - Effect of temperature on surface tension - Parachor - Definition and Applications only - Coefficient of Viscosity- determination using Oswald's Viscometer- Effect of Temperature and Pressure - Liquid crystals - Classification and Applications.

4.3 Solid State - Crystal lattices - Symmetry elements in crystals - Unit cell- Seven crystal systems - Space lattice - Bravais lattices - Laws of Crystallography-law of constancy of inter facial angles and Rational Indices- Miller indices, X-ray diffraction by crystals.

UNIT-V PRINCIPLES OF VOLUMETRIC ANALYSIS (18h)

5.1 Definitions of Molarity, Molality, Normality and Mole Fraction – Their Calculations - Definition and Examples for Primary and Secondary standards - Calculation of Equivalent Weight of Acid, Base, Oxidising Agent, Reducing Agent and Salts.

5.2 Principles of Volumetric Analysis - Theories of Acid- Base, Redox, precipitation titrations, Complexometric Iodometric and Iodimetric titrations.

5.3 Theories of indicators- Choice of indicators - Acid-base indicators - Redox, Metal ion and Adsorption indicators.

Text Books/Reference Books

1. Inorganic Chemistry: Principles of Structure and Reactivity - J. E. Huheey, E. A. Keiter, R. I. Keiter and O. K. Medhi - 2006.
2. Concise Inorganic Chemistry - J. D. Lee - III edition - Von Nostrand.
3. Vogel's Handbook of Quantitative Inorganic Analysis - Longman.
4. Text Book of Qualitative Inorganic Analysis - A. I. Vogel - III edition (1976).
5. Organic Chemistry - R. T. Morrison and Boyd - Pearson - 2010.
6. Organic Chemistry - I. L. Finar - Volume I and II - Pearson Education.
7. Text Book of Organic Chemistry - P. L. Soni - Sultan Chand & Sons - 2007.
8. Advanced Organic Chemistry - Bahl and Arun Bahl - S. Chand and Co. Ltd. - 2012.

Course materials:

1. <https://byjus.com/chemistry/quantum-numbers/#:~:text=The%20set%20of%20numbers%20used,are%20given%20by%20quantum%20numbers.>
2. [https://byjus.com/jee/s-block-elements/#:~:text=S%20block%20comprises%2014%20elements,%2C%20and%20radium%20\(Ra\).](https://byjus.com/jee/s-block-elements/#:~:text=S%20block%20comprises%2014%20elements,%2C%20and%20radium%20(Ra).)
3. <https://byjus.com/chemistry/electronegativity/>
4. https://en.wikipedia.org/wiki/IUPAC_nomenclature_of_organic_chemistry
5. <https://www.scienceworld.ca/resource/states-matter/>
6. http://veerashaivacollege.org/images/pdf/Study_Material/Volumetric_Analysis.pdf

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	M	S	M	S	M
CO2	S	M	M	S	M	S	S	M	M	S
CO3	S	M	S	S	S	M	M	S	S	M
CO4	M	M	S	S	M	S	S	M	M	S
CO5	M	S	M	M	S	M	S	S	S	M

ALLIED 1

(to choose one out of 5)

PAPER-1

1. PHYSICS I

Total Hours: 60

UNIT-1: Properties of Matter (12 h)

Gravitation: Acceleration due to gravity -Determination of 'g' by Simple pendulum - Drawbacks of simple pendulum -Determination of time period of compound pendulum - 'g' by compound pendulum -Centre of Oscillation and Centre of Suspension are interchangeable-Determination of 'g' by Bar/compoundpendulum.

Elasticity: Bending of beams -Expression for bending moment - Cantilever Depression at the loaded end of a cantilever Expression for Young's modulus -non-uniform bending-Pin and microscope method.

Torsion : Torsion couple – Potential energy in a twisted wire – Torsional pendulum – Time period - Determination of rigidity modulus by Torsional oscillation (without masses).

Viscosity: Viscosity of a liquid -Viscous force - Co-efficient of viscosity of a liquid – Poiseuille's formula -Experimental method using Burette- Effect of temperature and pressure on viscosity-applications.

Surface Tension: Surface tension of a liquid-Surface Tension and interfacial surface tension by the method of drops-applications.

UNIT-2: Thermo Electricity (12 h)

Seeback, Peltier and Thomson effects - laws of thermoelectric circuits -Peltier coefficient - Thomson coefficient -application of thermodynamics to a thermocouple and expressions for Peltier and Thomson coefficients -thermo electric power and thermo electric diagrams.

UNIT-3: Transient Current and Magnetism (12 h)

Growth and decay of current in a circuit containing resistance and inductance- Growth and decay of charge in circuit containing resistance and capacitor - growth and decay of charge in a LCR circuit – condition for the discharge to be oscillatory – frequency of oscillation.

Magnetism -Magnetic moment and pole strength of a magnet – Deflection magnetometer – Tan C Position- Vibration magnetometer – Theory – Period of Oscillation – Determination of M and B_H using the deflection magnetometer and the vibration magnetometer .

UNIT -4: Acoustics (12 h)

Sound: Transverse vibration of strings -Velocity and frequency of vibrations of a stretched string -

laws -Sonometer -A.C. Frequency - Steel wire- Brass wire.

Introduction to Ultrasonics – Piezo electric effect–production by Piezo electric method – properties –applications- Acoustics of buildings – reverberation time – derivation of Sabine's formula – determination of absorption coefficient-Acoustic aspects of halls and auditoria.

UNIT-5:Lasers and Fibre Optics (12 h)

Laser: Introduction - Principles of laser -Einstein's explanation for stimulated emission – Differences between stimulated and spontaneous emission - Population inversion –Properties of laser -Types of lasers - He- Ne Laser - Semiconductor Laser-Applications of laser.

Fibre optics: Basic principle of an optical fibre -Total internal reflection -Basic structure of an optical fibre -Numerical aperture –Coherent bundle – Attenuation and dispersion - classification of optical fibres-step index and graded index fibers – single mode and multi mode fibers-Fibre optic communication system block diagram.-applications.

Text Books

Unit 1 and Unit 4

1. R. Murugesan and KiruthigaSivaprasath, Properties of Matter and Acoustics, S. Chand & Co. New Delhi, Kindle edition.

Unit 2 and Unit 3

1. R. Murugesan, Electricity & Magnetism, S. Chand & Co. New Delhi, 2019.

Unit 5

1. N Subrahmanyam, BrijLal and M.N Avadhanulu, A Text Book of Optics, S. Chand &Co. New Delhi, Revised Edition as per UGC model syllabus.

Reference Books

1. BrijLal and N Subrahmanyam,Electricity and Magnetism, S Chand & Company Pvt Ltd, New Delhi, 2000.
2. D.C. Tayal, Electricity and Magnetism, Himalaya Publishing House,Bombay, 2014.
3. BrijLal and N.Subrahmanyam, A Text Book of Sound,Vikas Publications, New Delhi (2 Edition)
4. C.L.Arora, Physics for Degree Students B.Sc First Year, S. Chand Publishing, 2013.
5. K.Thyagarajan and Ajay Ghatak, Introduction to Fibre optics-, Cambridge University.
6. Ajay Ghatak and K.Thyagarajan, Fiber optics and Lasers-The two revolutions, Macmillan, 2006.

7. K.Thyagarajan and Ajay Ghatak, Lasers; Fundamentals and applications, Springer.
8. Modern Physics – R,Murugesan, KiruthigaSivaprasath, S.Chand&Co, New Delhi, 2016.

E-MATERIALS

1. <https://courses.lumenlearning.com/physics/chapter/16-4-the-simple-pendulum/>
2. https://www.youtube.com/watch?v=aw0_seEt4v0
3. https://en.wikipedia.org/wiki/Thermoelectric_effect
4. https://www.youtube.com/watch?v=S0I37M2sx_0
5. <https://physicscatalyst.com/electromagnetism/growth-and-delay-charge-R-C-circuit.php>
6. <https://www.youtube.com/watch?v=PLQQPXot6vE>
7. https://www.youtube.com/watch?v=d0_Eff4MXwM
8. <https://www.techglads.com/cse/sem1/production-of-ultrasonics-by-piezoelectric-methods/>
9. https://thefactfactor.com/facts/pure_science/physics/optical-fibre/5159/
10. <https://www.youtube.com/watch?v=auk1OS0SVWc> (Tamil video)

ALLIED 1

PAPER-1

2. BOTANY – I

Total Hours : 60 h

UNIT-I: Cell Biology(12 h)

Prokaryotic and Eukaryotic cell (plant cell)

Cell organells - Chloroplast, Mitochondrion and Nucleus.

Cell division – Mitosis.

UNIT-II: Anatomy(12 h)

Tissues - Meristematic and permanent tissues. Primary and Normal Secondary thickening of Dicot stem.

UNIT-III: Bacteria and Viruses(12 h)

Bacteria - General characters - shape - flagellation - Structure of E. Coil - reproduction - (Vegetative and asexual), Economic importance. Structure of Tobacco Mosaic Virus, Bacteriophage.

UNIT-IV: Structure and Life History of(12 h)

a) Chlorella and Gracilaria

b) Albugo, Penicilium and Agaricus

UNIT-V: Structure and Life History of(12 h)

a) Funaria

b) Lycopodium

c) Cycas

Economic importance of Chlorella, Penicillium and Agaricus.

ALLIED 1

PAPER-1

3. ZOOLOGY I

Total Hours : 60

UNIT-I(12 h)

Type study includes life history.

Protozoa – entamoeba, Porifera- Sycon. Coelenterata – Obelia geniculata. Platyhelminthes - Teania solium.

Unit II(12 h)

Annelida – earthworm , Arthropoda – Prawn, Mollusca – Freshwater Mussel, Echinodermata – Sea Star.

UNIT-III(12 h)

Type study includes morphology, digestive system, respiratory system, circulatory system and urinogenital system of Chordate. Chordate – general characters, Prochordata; morphology of Amphioxus. Vertebrates; Pisces – Shark.

UNIT-IV(12 h)

Amphibia; Frog, Reptiles; Calotes.

UNIT-V (12 h)

Aves; Pigeon, Mammalia; Rabbit.

References;

1. Ayyar, E.K. and T.N. Ananthakrishnan. 1992. Manual of Zoology. Volume I & II, S. Viswanathan (printers and publishers) Pvt. Ltd., Madras, 891 p.
2. Kotpal series, 1998 – 1992. Rastogi publications, Meerut.
3. Jordan E.L. and P.S. Verma. 1993. Invertebrate Zoology 12th edition, S. Chand & Co., Ltd., New Delhi.
4. Jordan, E.L. and P.S. Verma. 1995. Chordate Zoology and Elements of Animal physiology , S. Chand & Co., Ltd., New Delhi.

4. BIOCHEMISTRY I

Total hours 12

UNIT-I: Carbohydrates (12h)

Definition and Classification of carbohydrate. Monosaccharides–Glucose, Fructose and Arabinose, Linear and ring forms (Haworth formula)for glucose and fructose. Anomer, epimer and enantiomers- Definition with examples. Disaccharides –Definition- Sucrose, maltose and Lactose occurrence, structure and functions. Polysaccharides –Homopolysaccharides -Starch -Structure and functions. Heteropolysaccharides-Aminosugars and sugar acids.

UNIT-II: Amino acids (12h)

Definition and classification of amino acids. Reaction of amino acids with ninhydrin, Color reactions of amino acids (Xanthoproteic test, Morners test, Millons test, Sakaguchi test, Lead acetate test and Pauly's test), Amphoteric nature, isoelectric pH and Zwitter ion.

UNIT-III: Proteins (12h)

Proteins-Definition.Peptide bond formation. Classification of proteins based on solubility, shape and size. Denaturation. Structure of protein: primary, secondary, tertiary and quaternary structure.

UNIT-IV: Lipids (12h)

Definition, classification and functions of lipids. Occurrence, chemistry and biologicalfunctions of simple lipids, compound lipids (e.g. phospholipids) and derived lipids:steroids (e.g. cholesterol). Physical property-emulsification.Chemical property-saponification.Functions of bile acids and bile salts.

UNIT- V: Nucleic acids (12h)

Nucleic acid- Composition of nucleic acid. Definition - nucleoside, nucleotide and polynucleotide. Double helical model of DNAand its biological functions. Chargaff's rule. RNA-Structure, types and functions of RNA: tRNA, mRNAand rRNA. Differences between DNA and RNA

REFERENCES

3. J. L. Jain, Nitin Jain, Sunjai Jai., Fundamentals of Biochemistry 7th editionS. Chand @ Co.Ltd .,2016
4. U. Satyanarayanan BiochemistryElseiver 2017
5. David.L.Nelson, Michael. M.Cox Lehninger principles of Biochemistry 7theditionFreeman. W.H. and Company2017

6. Victor Rodwell Harper's Illustrated Biochemistry McGraw. Hill 2018

ALLIED 1

PAPER-1

MATHEMATICS – I

Total hours : 60

UNIT-I: ALGEBRA (12h)

Partial Fractions - Binomial, Exponential and logarithmic Series (without Proof) - Summation - Simple problems

UNIT-II : THEORY OF EQUATIONS (12h)

Polynomial Equations with real Coefficients - Irrational roots - Complex roots- Transformation of equation by increasing or decreasing roots by a constant - Reciprocal equations - Newton's method to find a root approximately - Simple problems.

UNIT-III : MATRICES (12h)

Symmetric - Skew-Symmetric - Orthogonal and Unitary matrices - Eigen roots and eigen vectors – Cayley - Hamilton theorem (without proof)-Verification and computation of inverse matrix

UNIT-IV: TRIGONOMETRY (12h)

Expansions of $\sin^n \theta$, $\cos^n \theta$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ - Expansions of $\sin \theta$, $\cos \theta$, $\tan \theta$ in terms of θ .

UNIT-V: DIFFERENTIAL CALCULUS (12h)

Successive differentiation upto third order, Jacobians -Concepts of polar co-ordinates-Curvature and radius of curvature in Cartesian co-ordinates and in polar co-ordinates.

Recommended Text:

P.Duraipandian and S.Udayabaskaran,(1997) *Allied Mathematics*, Vol. I & II.Muhil Publishers, Chennai.

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997) *Ancillary Mathematics*. Vol. I & II. Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) *Allied Mathematics* .Vol. I & II. VikasPublications, New Delhi.
3. P.R.Vittal (2003) *Allied Mathematics* .Marghan Publications, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) *Allied Mathematics* Vol-I, II S.Chand& company Ltd., New Delhi-55.
5. Isaac, *Allied Mathematics*. New Gamma Publishing House, Palayamkottai.

SEMESTER II
PAPER – 2
GENERAL CHEMISTRY - II

OBJECTIVES:

- Basic knowledge on s- and p- Block Elements, Group Study, Hydrocarbons, Cycloalkanes, Dienes, Quantum Chemistry, Thermochemistry, First Law of Thermodynamics, Derivation of Equations, Related Problems, Reaction Mechanism and Applications wherever necessary are to be taught for II- Semester.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Compare the basic properties of elements and their Compounds of s & p – block elements.
- 2) Explain the reaction mechanisms of alkanes, alkenes and alkynes and predict the products.
- 3) Classify dienes and analyze the stability of alkanes, alkenes and cycloalkanes.
- 4) Recollect the basic concepts of Quantum Theory and Thermodynamics.
- 5) Calculate the thermodynamic parameters using thermo chemical equations and data.

Total no. of Hours : 75

UNIT-I s- and p- Block Elements (15)

1.1 Alkali metals - Li, Na, K, Rb and Cs - Occurrence - Comparative study of Elements with respect to Oxides, Halides, Hydroxides and Carbonates - Exceptional property of Lithium - Diagonal Relationship of Li with Mg.

1.2 Alkaline earth metals - Be, Mg, Ca, Sr and Ba - Occurrence - Comparative study of the elements with respect to Oxides, Hydroxides, Halides, Sulphates and Carbonates - Exceptional property of Beryllium - Diagonal relationship of Be with Al - Comparison of Alkaline Earth Metals with Alkali Metals - Magnesium acting as bridge element between II A and II B groups - Magnesium resembles Zinc.

1.3 p- Block elements - Boron family - Group discussion - Anomalous behaviour of Boron - Diagonal Relationship between Boron and Silicon - Electron deficiency and Electron acceptor behaviour of Boron trihalides - Bonding in Diborane (Hydrogen-bridge structure) - Preparation, Properties, structure and Uses of Borazine, NaBH_4 , LiAlH_4 and boron nitride.

UNIT-II HYDROCARBONS (15)

2.1 Alkanes - Methods of preparation of alkanes - Wurtz method, Kolbe's method and Reduction of alkyl halides - Physical and Chemical Properties of alkanes - Mechanism of Free Radical Substitution in alkanes – Halogenation and Reactivity.

2.2 Alkenes - Properties of alkenes – Electrophilic and Free radical addition -

Addition reactions of Alkenes with mechanism - Addition of Hydrogen, Halogens, Hydrogen Halide (Markownikoff's rule) - Hydrogen bromide (Peroxide effect) - Sulphuric Acid, Water, BH_3 , Ozonolysis, Hydroxylation with KMnO_4 - Allylic substitution by NBS.

2.3 Alkynes - Acidity of alkynes - Addition of hydrogen - Hydroboration - Hydrohalogenation - Addition of hypohalous acid, Hydration - Addition of water with HgSO_4 catalyst - Oxidation with KMnO_4 - Ozonolysis - Formation of Acetylides.

UNIT-III DIENES AND CYCLOALKANES (15)

3.1 Dienes – Classification - Conjugated, Isolated and Cumulative Dienes - Stability of

Dienes - 1, 2- and 1, 4- Addition reactions of H_2 and HX with mechanisms – Synthesis of dienes – 1, 3 - Butadiene, Isoprene and Chloroprene - Diels-Alder reaction.

3.2 Cycloalkanes - Preparation using Wurtz's reaction, Dieckmann's ring closure and Reduction of aromatic hydrocarbons - Substitution and Ring opening reactions.

3.3 Stability of Alkanes, Alkenes and Cycloalkanes - Bayer's strain theory - Theory of Strainless rings.

UNIT-IV QUANTUM CHEMISTRY AND THERMOCHEMISTRY(15)

4.1 Planck's Quantum theory of radiation - Photoelectric Effect - Compton Effect - Wave mechanical concept of the atom - de Broglie's relationship – Davisson and Germer experiment - Wave nature of electron - Heisenberg's Uncertainty Principle.

4.2 Schrodinger wave equation (Without derivation) - Significance of wave functions ψ and ψ^2 - Shapes of s, p and d- orbitals.

4.3 Thermodynamics - Definition and Explanation of terms - System, Boundary, Surroundings - Homogeneous and Heterogeneous systems – Open, Closed and Isolated systems -Intensive and Extensive properties - State of a system - Independent state variables - Dependent state variables - Thermodynamic functions - State and Path functions.

UNIT-V THERMODYNAMICS(15)

5.1 Thermodynamic processes - Types of processes - Cyclic - Reversible – Irreversible - Isothermal – Adiabatic Process - Exact and Inexact Differentials - Concept of Heat and Work - Zeroth Law of Thermodynamics.

5.2 First law of Thermodynamics - Statement and Equation – C_p and C_v Relationship - Calculation of w , q , ΔE and ΔH for the Expansion of Ideal Gases under Reversible, Isothermal and Adiabatic Conditions.

5.3 Thermochemistry - Heat of a reaction - Exothermic and Endothermic reactions - Calculation of ΔH from ΔE and vice versa - Thermochemical equations - Bond dissociation energy - Calculation from thermochemical data - Variation of Heat of a reaction with temperature - Kirchoff's Equation and Its significance.

Text Books/Reference Books

1. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons

(1988).

2. Text Book of Inorganic Chemistry - R. Gopalan - Universities Press - 2012.
3. Modern Inorganic Chemistry - R. D. Madan - S. Chand Publications, Reprint, 2014.
4. Inorganic Chemistry: Principles of Structure and Reactivity - J. E. Huheey, E. A. Keiter, R. I. Keiter and O. K. Medhi - 2006.
5. Concise Inorganic Chemistry - J. D. Lee - III edition - Von Nostrand.
6. Organic Chemistry - R. T. Morrison and Boyd - Pearson - 2010.
7. Organic Chemistry - I. L. Finar - Volume I and II - Pearson Education.
8. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishnal Publishing Co., - 2013.
9. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N. Dash - Sultan Chand & Co., - 2006.

Course materials:

1. <https://byjus.com/chemistry/quantum-numbers/#:~:text=The%20set%20of%20numbers%20used,are%20given%20by%20quantum%20numbers.>
2. <https://wou.edu/chemistry/files/2017/01/CH105-Chapter-8-PDF-file.pdf>
3. <https://www.aakash.ac.in/important-concepts/chemistry/planck-s-quantum-theory>

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	S	M	M	S	M	S	M
CO2	S	M	S	M	M	S	S	M	M	S
CO3	S	M	M	S	S	M	M	S	S	M
CO4	M	S	S	M	M	S	S	M	M	S
CO5	M	S	M	M	S	M	S	M	S	M

CORE PRACTICAL

Paper – 1

VOLUMETRIC ANALYSIS

Total No. of Hours : 45

Acidimetry

1. Estimation of Borax - Standard Sodium Carbonate
2. Estimation of Sodium Hydroxide - Standard Sodium Carbonate
3. Estimation of HCl – Standard Oxalic Acid.

Iodometry

4. Estimation of Copper - Standard Copper Sulphate
5. Estimation of Potassium Dichromate - Standard Potassium Dichromate

Complexometry

6. Estimation of Magnesium using EDTA.
7. Estimation of Zinc using EDTA

Dichrometry

8. Estimation of Ferrous Iron using Diphenyl amine / N- pPhenylanthranillic acid as indicator.

Precipitation titration

9. Estimation of Chloride in neutral medium (Demonstration experiment).

Permanganometry

10. Estimation of Ferrous Sulphate – Standard FAS.
11. Estimation of Oxalic Acid – Standard Oxalic Acid.

- Students must write Short Procedure for the given estimation in Ten Minutes during the examination and submit the Paper for Evaluation.

**ALLIED 1
PAPER-2**

1. PHYSICSII

Total No. of hours: 45

UNIT-1: Special Theory of Relativity (9h)

Frames of reference-inertial frames and non-inertial frames -Galilean transformations - Michelson-Morley experiment-interpretation of results - postulates of special theory of relativity Lorentz transformation equations -length contraction - time dilation - transformation of velocities -variation of mass with velocity -Mass-energy equation.

UNIT-2: Atomic Physics (9h)

Bohr atom model – Critical Potentials - Experimental determination of critical potentials - Franck and Hertz's experiment -Sommerfield's Relativistic atom model The vector atom model – spatial quantization–spinning of an electron –quantum numbers associated with the vector atom model – coupling schemes –LS and jj coupling – the Pauli's exclusion principle – Stern and Gerlach experiment

UNIT-3: Nuclear Physics (9h)

Binding energy-Binding energy per nucleon-Packing fraction-Nuclear models – liquid drop model – semi empirical mass formula – merits and demerits -shell model -evidences for shell model – nuclear radiation detectors –ionization chamber – G.M Counter-Wilson cloud chamber-Particle accelerators-Cyclotron-Betatron.

Unit-4: Digital Electronics (9h)

Number systems -Decimal, Binary, Octal and Hexadecimal system – Conversion from one number system to another- Binary Arithmetic -Addition –Subtraction- 1's and 2's complement -Binary codes- BCD code – Excess 3 code, Gray code.

NAND, NOR and EXOR – functions and truth tables. NAND & NOR as universal gates-Half adder and Full adder - Half subtractor and Full subtractor using NAND gate only.

UNIT-5: Nanomaterial (9h)

Introduction-Nanomaterial- Properties of nanomaterial (size dependent) -synthesis of nanomaterial- sol gel- hydrothermal method-Scanning Electron Microscope (SEM)- Principle and Instrumentation-Fullerenes- Carbon nanotubes- Fabrication and structure of carbon nanotubes - Properties of carbon nanotubes (Mechanical and Electrical) - Applications ofCNT's.

Text Books

Unit 1 to Unit 3

1. Modern Physics – R.Murugesan, KiruthigaSivaprasath, S.Chand&Co, New Delhi, 2016

Unit 4

1. V.Vijayendran, Introduction to Integrated Electronics (Digital & Analog), S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007

Unit 5

1. V. Raghavan, *Material Science and Engineering*, Printice Hall India.,2004.

Reference Book

1. Allied Physics – R. Murugesan S. Chand & Co. New Delhi, 2005.
2. A Text book of Digital electronics – R.S.Sedha, S.Chand&Co, 2013
3. Malvino and Leech, Digital Principles and Application, 4th Edition, Tata McGraw Hill, New Delhi, 2000.
4. Dr. M.N. Avadhanulu, *Material science*, S.Chand& Company, New Delhi, 2014.
5. M.Arumugam, *Material science*, Anuradhapuplishers, 1990.
6. V. Rajendran, *Material Science*, Tata McGraw Hill Ltd, New Delhi,2001.
7. D.C.Tayal, Nuclear Physics, Himalaya Publishing House, 2009

E-MATERIALS

1. https://en.wikipedia.org/wiki/Galilean_transformation
2. https://www.youtube.com/watch?v=NH3_IIkSB9s
3. <https://www.youtube.com/watch?v=EEWuUst2GK4>
4. https://en.wikipedia.org/wiki/Vector_model_of_the_atom
5. <https://www.tutorialspoint.com/what-is-a-geiger-muller-counter>
6. <https://www.youtube.com/watch?v=jxY6RC52Cf0>
7. https://www.tutorialspoint.com/digital_circuits/digital_circuits_number_systems.htm
8. <https://www.youtube.com/watch?v=4ae9sJBBkvw>
9. <https://en.wikipedia.org/wiki/Nanomaterials>
10. <https://www.youtube.com/watch?v=mPxoJz6treE> (Tamil video)

ALLIED PRACTICAL- PHYSICS

List of Experiments (Any 12 Experiments only)

Total No. of Hours : 45

1. Determination of 'g' using Compound pendulum.
2. Young's modulus-Non-Uniform bending-Pin & microscope
3. Rigidity Modulus – Torsional oscillation method (without masses).
4. Rigidity Modulus – Static Torsion method using Scale and Telescope.
5. Surface tension and Interfacial Surface tension by Drop Weight method.
6. Sonometer – Frequency of a Tuning fork.
7. Sonometer –Determination of A.C. frequency- using steel and brass wire
8. Air Wedge – Determination of thickness of a thin wire
9. Newton's Rings – Radius of Curvature of a convex lens.
10. Spectrometer – Refractive index of a liquid – Hollow prism.
11. Spectrometer grating – Minimum Deviation- Wavelength of Mercury lines.
12. Potentiometer – Calibration of Low range voltmeter.
13. Deflection magnetometer and Vibration magnetometer-Tan C Position-Determination of m and B_H .
14. Figure of merit- Table galvanometer.
15. Construction of AND, OR gates using diodes and NOT gate using a transistor.
16. NAND/NOR as universal gate.
17. Half adder and Full adder using NAND gate.
18. Half subtractor and Full subtractor using NAND gate.
19. Lasers: Study of laser beam parameters.
20. Measurement of Numerical aperture (NA) of a telecommunication graded index optic fiber.
21. Fiber attenuation of a given optical fiber.

Text Books

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2018.
2. M.N.Srinivasan, S. Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015.

Reference Books

1. Dr. S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirapalli, 2012.
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi, 2011.

**ALLIED 1
PAPER-2**

2. BOTANYII

Total No. of hours: 45

UNIT-I: Taxonomy (9h)

General outline of Bentham and Hooker's system of classification. Study of the range of characters and economic importance of the following families: Annonaceae, cucurbitaceae, Apocynaceae, Euphorbiaceae and Liliaceae.

UNIT-II: Embryology (9h)

Structure of mature anther. Structure of mature ovule and its types. Fertilization.

UNIT-III: Plant Physiology & Plant Tissue Culture (9h)

Physiological role of micro and macro elements their deficiency symptoms
Photosynthesis - light reaction - Calvin cycle Respiration - Glycolysis - Krebs's cycle - electron transport system. Growth hormones – Auxins. Tissue culture and its principles.

UNIT-IV: Ecology (9h)

Ecosystem - fresh water ecosystem. Environmental pollution. Major pollutants - types of pollution - Air pollution, water pollution, soil pollution - control measures.

UNIT-V: Genetics & Evolution (9h)

Mendelism - Monohybrid and dihybrid crosses. Theories of evolution - Lamarckism, Darwinism.

ALLIED PRACTICAL BOTANY – I & II

Total No. of hours: 45

Description of plants in technical terms belonging to the families mentioned in the theory part.

To study the internal structure of Anatomy material, Pteridophytes and Gymnosperms. Identification and Description of Micro Preparation materials mentioned in the theory part.

Description of experimental setup of plant physiology.

BOOKS SUGGESTED

Ashok Bendre, A.K. and Pandey P.C. (1975) Introductory Botany. Rastogi Publication Meerut.

Ganguly, A.K. and Kumar.N.C. (1971) General Botany Vol.I & Vol. II, Emkay Publication, Delhi.

Rev. Fr. Ignacimuthu, S.J. (1975) Basic Biotechnology – Tata Mcraw till publication co., New Delhi.

Rao, K.N. Krishnamoorthy, K.V. and Rao.G. (1975) Ancillary Botany. S. Viswanathan Private. Ltd., Chennai.

ALLIED 1
PAPER-2
3. ZOOLOGY II

Total No. of hours: 45

UNIT-I (9h)

Cell Biology – structure of animal cell, Genetic; molecular structure of gene – gene function, sex linked inheritance. Genetic engineering and its application.

UNIT-II (9h)

Embryology – cleavage and gastrulation of *Amphioxus*.

Human Physiology; Digestion, circulation – blood components, structure of heart, heart function.

UNIT-III (9h)

Disease of Circulatory system – blood pressure, heart disease – Ischemia, Myocardial infarction, Rheumatic heart disease, stroke.

Excretion – structure of kidney and mechanisms of urine formation.

UNIT-IV (9h)

Environmental Biology – Biotic factors and Abiotic factors, food chain and food web. Pollution – Environmental Degradation, (Air, Water and Land) – Green house effect – Bioremediation, - Global warming – acid rain.

UNIT-V (9h)

Evolution; Theories of Lamarckism & Darwinism.

Reference;

1. Ekambaranatha Ayyar, and Ananthakrishnan, T.N. 1993. Outlines of Zoology, Vol I & II, Viswanathan and Co, Madras.
2. Sambasiviah, I, Kamalakara Rao, A.P., Augustine Chellappa, S. 1983. Text book of Animal Physiology, S. Chand & Co., New Delhi.
3. Verma and Agarwal. 1983. Text book of animal Ecology, S. Chand & Co., New Delhi.
4. Verma and Agarwal and Tyagi. 1991. Chordate Embryology, S. Chand & Co., New Delhi.
5. Rastogi and Jayaraj. 2000. Text book of genetics. Rastogi publications, Meerut.
6. Verma and Agarwal. 2000. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S. Chand & Co., New Delhi.

ALLIED PRACTICAL

ZOOLOGY

Total No. of hours: 45

I MAJOR PRACTICAL

DISSECTIONS

Cockroach; Digestive and nervous system

Prawn; nervous system

II MINOR PRACTICAL

MOUNTING

1. Mouth parts of Mosquito and Honey bee
2. Earthworm – Body setae
3. Placoid scales of Shark

III SPOTTERS

Entamoeba, Sycan, Obelia, Taenia solium (entire, scolex) earthworm (entire, Pineal setae) Prawn (entire), Fresh water mussel, Sea star, Amphioxus – Entire, Amphioxus – T.S. through pharynx, Shark, Frog, Calotes, Pigeon, feathers of pigeon and Rabbit.

Sphygmomanometer, Stethoscope, Rain gauge.

References;

- 1.verma. P.S. 2011. A manual of practical Zoology – INVERTEBRATES. Chand & Co., Ltd., Ram Nagar, New Delhi.
2. Verma. P.S. 2011. A manual of practical Zoology – CHORDATES. Chand & Co., Ltd., Ram Nagar, New Delhi.

**ALLIED 1
PAPER-2**

4. BIOCHEMISTRY II

Total No. of hours: 45

UNIT-I: Metabolism (9h)

Metabolism-Catabolism and anabolism-Definition. Reactions of glucose oxidation- Glycolysis, TCA cycle and its energetics, HMP shunt and its significance. Amino acid- transamination and Deamination, reaction, Urea cycle- Formation of urea.

UNIT-II: Metabolic Disorders (9h)

Diabetes mellitus- definition. Types and symptoms. Glycogen storage diseases-Types, Renal Glycosuria-Definition and causes. Inborn errors of amino acid metabolism- Phenylketonuria, Alkaptonuria (Black urine syndrome) and albinism

UNIT-III: Enzymes (9h)

Enzymes-Definition, IUB system of classification with one example. Mechanism of enzyme action- Lock and key mechanism, Induced Fit theory. Michaelis-Menten equation. Coenzymes- Vitamins as coenzymes (Tabulation of Coenzymes with functions in metabolism)

UNIT-IV: Vitamins (9h)

Vitamins- fat soluble (Vitamin A, D, E and K) and water soluble vitamins (Vitamin B1, B2, B3 and B12), Vitamin C - sources, RDA, biological function and deficiency of Vitamins of the above mentioned vitamins

UNIT V-Minerals (9h)

Minerals- sources, RDA, biological functions and deficiency of Calcium, Iron, Phosphorus, Sodium and potassium. Examples of minerals as cofactors in metabolism.

REFERENCES

1. J. L. Jain, Nitin Jain, Sunjai Jai., Fundamentals of Biochemistry 7th edition S. Chand @ Co.Ltd ., 2016
2. U. Satyanarayanan Biochemistry Elsevier 2017
3. David L. Nelson, Michael M. Cox Lehninger principles of Biochemistry 7th edition Freeman. W.H. and Company 2017
4. Victor Rodwell Harper's Illustrated Biochemistry McGraw. Hill 2018

ALLIED PRACTICAL
PRACTICAL I
BIOCHEMISTRY I & II

Total No. of hours: 45

Volumetric Estimation

1. Estimation of Glucose by Benedict's method.
2. Estimation of Ascorbic acid by 2, 6 dichlorophenol indophenols dye method.
3. Estimation of Glycine by Sorenson's formal titration.

A) Qualitative analysis of Carbohydrates

1. Qualitative analysis of Glucose,
2. Qualitative analysis of Fructose,
3. Qualitative analysis of Sucrose
4. Qualitative analysis of Maltose,
5. Qualitative analysis of Starch

B) Qualitative analysis of Amino acids

1. Qualitative analysis of Arginine,
2. Qualitative analysis of Cysteine,
3. Qualitative analysis of Tryptophan
4. Qualitative analysis of Tyrosine
5. Qualitative analysis of Histidine

REFERENCES

1. J. Jayaraman, Laboratory Manual in Biochemistry New Age International Pvt Ltd Publishers
2011
2. S. K. Sawhney Randhir Singh Introductory Practical Biochemistry Alpha Science International, Ltd, 2 edition, 2005.
3. Irwin H. Saegal Biochemical calculations Liss, Newyork 1991

5. MATHEMATICS - II

Total No. of hours: 45

UNIT-I: Application of Integration (9h)

Evaluation of double, triple integrals - Simple applications to area, volume - Fourier series for functions in $(0, 2\pi)$ and $\square \square \square \square \square \square \square$

UNIT-II: Partial Differential Equations (9h)

Formation, complete integrals and general integrals - Four standard types, Lagrange's equations.

UNIT-III: Laplace Transforms (9h)

Laplace Transformations of standard functions and simple properties - Inverse Laplace transforms - Applications to solutions of linear differential equations of order 1 and 2-simple problems

UNIT-IV: Vector Analysis (9h)

Scalar point functions - Vector point functions - Gradient, divergence, curl - Directional derivatives - Unit to normal to a surface.

UNIT-V: Vector Analysis (continued) (9h)

Line and surface integrals - Gauss, Stoke's and Green's theorems (without proofs) - Simple problem based on these Theorems.

Recommended Text

P.Duraipandian and S.Udayabaskaran,(1997) *Allied Mathematics*, Vol. I & II.Muhil Publishers, Chennai

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997)*Ancillary Mathematics*. Vol. I & II. Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) *Allied Mathematics* .Vol. I & II.Vikas Publications, New Delhi.
3. P.R.Vittal(2003). *Allied Mathematics* .Marghan Publications, Chennai.
4. P.Kandasamy, K.Thilagavathy (2003) *Allied Mathematics* Vol-I, II S.Chand& company Ltd., New Delhi-55.
5. Isaac, *Allied Mathematics*. New Gamma Publishing House, Palayamkottai

SEMESTER - III
CORE PAPER - 3
GENERAL CHEMISTRY - III

OBJECTIVE:

Basic concepts regarding the Principles of Inorganic Analysis and Applications of Qualitative Analysis, Types of Solvents, p- Block Elements, Group Study, Aromaticity, Electrophilic and Nucleophilic Substitution Reactions, Elimination Reactions, Reaction Mechanism, Second Law of Thermodynamics, Derivation of Equations, Related Problems and Applications wherever necessary are to be taught for III semester.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Explain the basic principles of Inorganic Qualitative Analysis.
- 2) Compare the properties of Carbon, Nitrogen and Oxygen elements and their compounds.
- 3) Apply Huckel's rule and predict the Aromaticity of compounds.
- 4) Discuss the mechanism of substitution and elimination reactions of Aliphatic and Aromatic compounds.
- 5) Explain the Thermodynamic second law and predict the spontaneity of a process.

Total no. of hours : 75

UNIT – I c

Semimicro Techniques - Principles of Acid-Base Equilibria - Common ion effect - Solubility Product and its Applications in Qualitative Analysis - Principles of Inorganic Analysis - Reactions involved in the Separation and Identification of Cations and Anions in Qualitative analysis - Spot test reagents - Aluminon, Cupferon, DMG, Thiourea, Magneson, Alizarin and Nessler's reagent - Types of solvents - Protic and Aprotic solvents - Amphiprotic / Amphoteric solvents - Aqueous and Non-aqueous solvents- Reactions in non-aqueous solvents with reference to - Liquid Ammonia and liquid SO₂. Acids and bases-Arrhenius, Bronsted-Lowry, Lewis and Lux-Flood concept .

UNIT – II (9h)

Carbon family - Group study - Comparative study of Elements with respect to Valency, Oxides, Halides, Hydrides and Oxyacids - Catenation - Comparison of Properties of Carbon and Silicon - Silicates - Classification and Structure - Silicones-Preparation, Properties and Uses -Nitrogen family - Group study - Comparative study of N, P, As, Sb and Bi with respect to Oxides, Oxyacids, Halides and Hydrides - Hydrazine and Hydroxylamine - Hydrazoic acid - Preparation and uses of NaBiO₃ - Oxygen family - Group study - Comparative study of O, S, Se and Te with respect to Catenation, Oxides, Halides, Hydrides and Oxyacids - Anomalous Behaviour of

Oxygen - Oxyacids of Sulphur (Structure only) - Peracids of Sulphur - Preparation, Properties and Structure - Differences Between Permonosulphuric Acid and Perdisulphuric Acid.

UNIT - III(9h)

Aromaticity - Modern Theory of Aromaticity - Huckel's ($4n + 2$) Rule and Its Simple Applications to Benzenoid and Non-benzenoid Compounds - Electrophilic substitution reactions in Aromatic Compounds - Mechanisms of Nitration, Halogenations, Sulphonation, Friedel-Crafts Acylation and Alkylation - Directive influence - Orientation - Ortho/Para ratio - Nuclear and Side chain Halogenation.

UNIT – IV (9h)

Aliphatic Nucleophilic Substitutions - Mechanisms of S_N1 , S_N2 and S_Ni Reactions - Effect of Structure of Substrate, Solvent, Nucleophile and Leaving Group - Elimination reactions - Mechanism of $E1$ and $E2$ reactions - Hoffmann and Saytzeff's rules - Cis and Trans Eliminations - Aromatic Nucleophilic Substitutions - Unimolecular Nucleophilic Substitution, Bimolecular Nucleophilic Substitution and their Mechanism.

UNIT – V (9h)

Second Law of Thermodynamics - Need for the II Law of Thermodynamics - Spontaneous Process - Criteria of Spontaneity - Different Forms of Statements of the Second Law - Cyclic Process - Definition - Heat Engines - Carnot's cycle - Efficiency - Carnot's theorem (Statement only) - Concept of Entropy - Definition and Mathematical Statement - Randomness and Entropy - Standard Entropy - Derivation of Entropy from Carnot Cycle - Entropy change of an Ideal Gas during Isothermal Process - Entropy changes in Cyclic, Reversible and Irreversible Processes - Entropy Changes in Physical Transformations - Calculation of Entropy Changes with Changes in T, V and P - Entropy of Mixing of Ideal Gases - Physical Significance of Entropy.

Text Books and Reference Books

1. Concise Inorganic Chemistry - J. D. Lee - III edition - Von Nostrand.
2. Text Book of Qualitative Inorganic Analysis - A. I. Vogel - III edition (1976).
3. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons (1988)
4. Modern Inorganic Chemistry - R. D. Madan - S. Chand Publications, Reprint, 2014.
5. Advanced Organic Chemistry - Bahl and Arun Bahl - S. Chand and Co. Ltd. - 2012.
6. Organic Chemistry of Natural Products - Volume I and II - O. P. Agarwal - Goel Publishing House

7. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishal Publishing Co., - 2013.
8. Elements of Physical Chemistry - Glasstone and Lewis - Macmillan.
9. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd.

Couse Materials

1. https://www.academia.edu/10186454/SEMI_MICRO_QUALITATIVE_ANALYSIS_OF_SIMPLE_INORGANIC_SALT
2. <https://ncert.nic.in/ncerts/l/kech204.pdf>
3. https://archive.nptel.ac.in/content/storage2/courses/122106029/pdf/1_Aromaticity.pdf
4. <https://www.sfu.ca/~mbahrami/ENSC%20388/Notes/Second%20Law%20of%20Thermodynamics.pdf>

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	S	M	M	S	M
CO2	M	M	S	M	M	S	M	S	M	S
CO3	S	S	M	S	M	S	M	S	M	M
CO4	S	M	S	M	M	M	S	M	S	S
CO5	M	S	M	M	S	M	M	S	M	S

ALLIED - 2

PAPER – 3

(to choose one out of 5)

1. PHYSICS – I

Total no. of hours : 45

UNIT - I (9h)

PROPERTIES OF MATTER

Elasticity : Hooke's Law - Elastic Constants - bending of beam - Bending moment - Cantilever Depression at the loaded end of a cantilever - determination of Young's modulus by non-uniform bending - Torsion : Torsion couple - Potential energy in a twisted wire - Torsional pendulum - Time period - Determination of rigidity modulus by Torsional oscillation (without masses) - Viscosity: Viscosity of a liquid - Viscous force - Co-efficient of viscosity of a liquid - Poiseuille's formula - Surface Tension: Surface Tension - Surface Tension and interfacial surface tension by the method of drops.

UNIT - II (9h)

HEAT

Heat: Specific heat - Newton's law of cooling - determination of specific heat of a liquid using Newton's law of cooling - Emissivity and Emissive Power - Low Temperature: J.K. Effect - Positive Effect - Negative Effect - Temperature of Inversion - Super conductors. Type I and II - Meisner Effect - Helium I and II.

UNIT – III(9h)

ELECTRICITY AND MAGNETISM

Electricity: Potentiometer - Principle - Calibration of low range voltmeter - Measurement of internal resistance of cell - measurement of an unknown resistance - Magnetism - Moment and pole strength of a magnet - Deflection magnetometer - Tan C position - Vibration magnetometer - Theory - Period of Oscillation - Determination of M and B_H using the deflection magnetometer in Tan C position and the vibration magnetometer.

UNIT - IV (9h)

SOUND AND ACOUSTICS OF BUILDING

Sound: Transverse vibration of strings - Velocity and frequency of vibrations of a stretched string - laws - sonometer - A.C. Frequency - Steel Wire - Brass wire - Ultrasonics - Production by Piezo - electric method - properties and uses - Acoustics of

buildings: Reverberation - Reverberation time - Sabine's formula (definition only) - Sound absorption coefficient of surface - conditions for the perfect acoustics.

UNIT - V (9h)

OPTICS

Interference: Air Wedge - Description - Test for optical flatness of glass plate - Determination of diameter of a thin wire by air wedge - Diffraction: Theory of transmission grating - Normal Incidence - Determination of Wavelength of monochromatic source and Wavelength of mercury line using a grating by normal Incidence - Fibre optics: principle-classification of optical fibres-fibre optic communication system block diagram.

Books for Study & Reference

1. Allied Physics - R. Murugesan S. Chand & Co. First Edition (2005).
2. Allied Physics - Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book Department, Chennai.
3. Allied Physics - Prof. Dhanalakshmi and others.
4. Elements of Properties of Matter - D.S. Mathur, S. Chand & Co. (1999).
5. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
6. A text book of Sound - by M. Narayanamoorthy and other National Publishing Companies (1986).
7. Modern Physics - R. Murugesan S. Chand & Co. (2004).
8. Introduction to Fibre optics- K.Thyagarajan and Ajay Ghatak, Cambridge, University Press (1999).

ALLIED - 2

PAPER – 3

2. BOTANY – I

Total No. of hours: 45

UNIT-I: Cell Biology (9h)

Prokaryotic and Eukaryotic cell (plant cell)

Cell organells - Chloroplast, Mitochondrion and Nucleus.

Cell division – Mitosis.

UNIT-II: Anatomy (9h)

Tissues - Meristematic and permanent tissues. Primary and Normal Secondary thickening of Dicot stem.

UNIT-III: Bacteria and Viruses (9h)

Bacteria - General characters - shape - flagellation - Structure of E. Coil - reproduction - (Vegetative and asexual), Economic importance. Structure of Tobacco Mosaic Virus, Bacteriophage.

UNIT-IV: Structure and Life History of (9h)

a) Chlorella and Gracilaria

b) Albugo, Penicillium and Agaricus

UNIT-V: Structure and Life History of (9h)

a) Funaria

b) Lycopodium

c) Cycas

Economic importance of Chlorella, Penicillium and Agaricus.

ALLIED - 2

PAPER - 3

3. ZOOLOGY I

Total No. of hours: 45

UNIT - I: (9h)

Type study includes life history.

Protozoa - Entamoeba, **Porifera** - Sycon. **Coelenterata** - Obelia geniculata. **Platyhelminthes** - Teania solium.

UNIT – II(9h)

Annelida - Earthworm, **Arthropoda** - Prawn, **Mollusca** - Fresh water mussel, **Echinodermata** - Sea star.

UNIT - III:(9h)

Type study includes Morphology, digestive system, respiratory system, circulatory system and urinogenital system of Chordate - **Chordata** - General characters, **Prochordata**: Morphology of Amphioxus - **Vertebrates:Pisces** - Shark.

UNIT – IV(9h)

Amphibia: Frog, **Reptiles**: Calotes

UNIT – V(9h)

Aves: Pigeon, **Mammalia**: Rabbit.

REFERENCES:

1. Ayyar, E.K. and T.N. Ananthakrishnan. 1992. Manual of Zoology. Vol I & II, S. Viswanathan (printers and publishers) Pvt. Ltd., Madras, 891 p.
2. Kotpal series, 1998 - 1992. Rastogi Publications, Meerut.
3. Jordan E.L. and P.S. Verma. 1993. Invertebrate Zoology 12th edition, S. Chand & Co., Ltd., New Delhi.
4. Jordan, E.L., and P.S. Verma. 1995. Chordate Zoology and Elements of Animal Physiology, S. Chand & Co., Ltd., New Delhi.

ALLIED - 2

PAPER - 3

4. BIOCHEMISTRY I

Total No. of hours: 45

UNIT - I

CHEMISTRY OF CARBOHYDRATES (9h)

Definition and Classification of carbohydrate. Monosaccharides - occurrence, structure; physical and chemical properties, linear and ring forms (Haworth formula) for glucose and fructose. Disaccharides - occurrence, structure; physical and chemical properties of sucrose and lactose. Polysaccharides - occurrence, structure, physical and chemical properties of starch.

UNIT - II

CHEMISTRY OF AMINO ACIDS (9h)

Definition and classification of amino acids. Reaction with ninhydrin, common properties of amino acids, amphoteric nature, isoelectric point, isoelectric pH and Zwitter ion.

UNIT - III

CHEMISTRY OF PROTEINS (9h)

Classification based on solubility, shape and size. Physical properties: salting in and salting out, denaturation, peptide bond. Structure of protein: primary, secondary, tertiary and quaternary structure.

UNIT - IV

CHEMISTRY OF LIPIDS (9h)

Definition, classification and functions of lipids. Occurrence, chemistry and biological functions of simple lipids, compound lipids (e.g. phospholipids) and derived lipids: steroids (e.g. cholesterol). Physical property-emulsification. Chemical property-saponification. Functions of bile acids and bile salts.

UNIT - V

CHEMISTRY OF NUCLEIC ACIDS (9h)

Definition - nucleoside, nucleotide and polynucleotide. Double helical model of DNA and its biological functions. Structure, types and functions of RNA: tRNA, mRNA and rRNA. Differences between DNA and RNA.

References

1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan worth Publishers.
2. Harper's Biochemistry-Rober K. Murray, Daryl K. Grammer, McGraw Hill, and Lange Medical Books. 25th edition.
3. Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.
4. Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.
5. Biochemistry-Dr. Ambika Shanmugam, Published by Author.
6. Biomolecules-C. Kannan , MJP Publishers, Chennai - 5.

ALLIED - 2

PAPER - 3

5. MATHEMATICS - I*

Total No. of hours: 45

UNIT - I

ALGEBRA (9h)

Partial Fractions - Binomial, Exponential and logarithmic Series (without Proof) - Summation - Simple problems

UNIT - II

THEORY OF EQUATIONS (9h)

Polynomial Equations with real Coefficients - Irrational roots - Complex roots - Transformation of equation by increasing or decreasing roots by a constant - Reciprocal equations - Newton's method to find a root approximately - Simple problems.

UNIT - III

MATRICES (9h)

Symmetric - Skew-Symmetric - Orthogonal and Unitary matrices - Eigen roots and eigen vectors - Cayley - Hamilton theorem (without proof)-Verification and computation of inverse matrix

UNIT - IV

TRIGONOMETRY (9h)

Expansions of $\sin^n \theta$, $\cos^n \theta$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ - Expansions of $\sin \theta$, $\cos \theta$, $\tan \theta$ in terms of θ .

UNIT - V

DIFFERENTIAL CALCULUS (9h)

Successive differentiation upto third order, Jacobians -Concepts of polar co-ordinates-Curvature and radius of curvature in Cartesian co-ordinates and in polar co-ordinates.

Recommended Text:

P.Duraipandian and S.Udayabaskaran,(1997) *Allied Mathematics*, Vol. I & II.Muhil Publishers, Chennai.

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997) *Ancillary Mathematics*.Vol.I & II.Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) *Allied Mathematics*. Vol.I&II.Vikas Publications, New Delhi.

3. P.R.Vittal (2003) *Allied Mathematics* .Marghan Publications, Chennai.
4. P.Kandasamy, K.Thilagavathy (2003) *Allied Mathematics* Vol-I, II S.Chand& company Ltd., New Delhi-55.
5. Isaac, *Allied Mathematics*. New Gamma Publishing House, Palayamkottai.

SKILL BASED SUBJECT
PAPER - 1
WATER TREATMENT AND ANALYSIS

Objective:

To impart knowledge about the various methods of Water Analysis and Treatment of Water.

Course Outcomes:

The Students will be able to

- 1) Classify water based on the presence of dissolved salts in it.
- 2) Explain the various methods to make the water potable.
- 3) Discuss the softening methods of hardwater and determine hardness of water.
- 4) Understand electrodialysis and RO methods to desalinate Brackish water.
- 5) Analyse the presence of Chemical substances in water indicative of pollution by measuring BOD and COD.
- 6) Illustrate the methods used for biological examination of water.

Total No. of hours : 30

UNIT – I(6h)

Introduction - Characteristics of water - Alkalinity - Hardness - Unit of hardness - Total solids - Oxidation - Transparency - Silica content - Purification of Water for drinking purpose - Potability of water - Clarification - Coagulation - Contact and Electrochemical Coagulation - Sterilisation and Disinfection of water - Precipitation - Aeration - Ozonisation - Chlorination.

UNIT – II(6h)

Water Softening Methods - Clark's process - Lime soda process - Modified lime soda process - Permutit or Zeolite process - Ion exchange process - Demineralisation of water - Determination of Hardness of water - Titration method - Complexometric method using EDTA - Expressing Hardness - Equivalents of Calcium Carbonate - Problems to determine Temporary and Permanent Hardness.

UNIT – III (6h)

Hard water and Industries - Industrial water treatment - Boiler feed water method of

Softening - Prevention of plumbo solvency - Scales in boilers - Consequences - Internal conditioning methods - Desalination of Brackish water - Electrodialysis - Reverse osmosis - Removal of Fe, Mn and Silicic acid - Effluent Treatment of Water from Paper Industry, Petrochemicals, Fertilizer industry and Power station.

UNIT – IV(6h)

Water analysis - Sampling of Water for analysis - Chemical Substances affecting Potability - Colour, Turbidity, Odour, Taste, Temperature, pH and Electrical Conductivity - Analysis of Solids present in water - Suspended Solids - Dissolved Solids - Total Acidity - Alkalinity - Free CO₂ - Free Chlorine - Ca, Mg, Fe, Mn, Ag and Zn - Water in Industry - Pollution of Water by Fertilisers, Detergents, Pesticides and Industrial wastes.

UNIT – V(6h)

Analysis of Chemical Substances Affecting Health - NH₃, Nitrate, Nitrite, Cyanide, Sulphate, Sulphide, Chloride and Fluoride - Measurement of Toxic Chemical Substances - Analysis of Chemical Substances indicative of Pollution - Dissolved oxygen - Biochemical Oxygen Demand (BOD) - Chemical Oxygen Demand (COD) - Bacteriological Examination of Water - Total Count Test - E. coli test - E. coli index - Most Probable Number method - Biological Examination of Water - Physical Examination of Water - Radioactivity of Water - Methods of removing Radioactivity from Water.

Reference Books

1. Industrial Chemistry (Including Chemical - Engineering) - B. K. Sharma - Goel Publishing House, Meerut (1987).
2. Pollution Control in Process Industries - S. P. Mahajan - Tata McGraw Hill Publishing Company Ltd., New Delhi (1991).
3. Water Pollution and Management - C. K. Varashney - Wiley Eastern Ltd., Chennai -20 (1991).

Course Materials

2. <https://theconstructor.org/environmental-engg/characteristics-of-water-physical-chemical-biological/4735/>
3. <https://www.egr.msu.edu/~hashsham/courses/ene806/docs/Water%20Softening.pdf>

[ning%201.pdf](#)

4. <https://irp-cdn.multiscreensite.com/915207aa/files/uploaded/HARDNESS%20AND%20WATER%20SOFTENING.pdf>

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	S	S	M	S	M
CO2	M	S	M	S	M	S	M	S	M	S
CO3	S	M	S	S	S	M	M	S	S	S
CO4	M	S	M	S	S	M	S	M	M	M
CO5	M	M	S	M	M	M	M	S	S	M

**NON-MAJOR ELECTIVE
PAPER - 1
MEDICINAL CHEMISTRY**

Objectives:

To learn the basic idea of Drugs and Names of Common Drugs, Blood, Blood Pressure, Diabetes, AIDS, Vitamins, Indian Medicinal Plants and First Aid.

Outcome:

The Students will be able to

- 1) Understand the composition of blood and biochemical analysis of Urine and Serum
- 2) Gain knowledge about uses and side effects of Antibiotics, Antipyretics, Analgesics and tranquilizers.
- 3) Explain the causes, symptoms and treatment of Blood pressure, Diabetes, Cancer and AIDS.
- 4) Classify and understand the sources and diseases caused by deficiency of Vitamins.
- 5) Analyse the therapeutic importances of Indian Medicinal plants
- 6) Describe the first Aid and Safety treatment of Shock, Haemorrhage, Cuts and wounds and Burns.

Total No. of hours : 30

UNIT – I (6h)

Clinical Health and Biochemical Analysis -Definition of Health - WHO standard - Sterilisation of Surgical Instruments - Biochemical Analysis of Urine and Serum - Blood - Composition of Blood - Blood grouping and Rh factor.

UNIT – II (6h)

Common Drugs -Antibiotics, Antipyretics and Analgesics - Examples, Uses and Side effects - Anti-inflammatory agents, Sedatives, Antiseptics and Antihistamines - Examples, Uses and Side effects - Tranquilizers, Hypnotics and Antidepressant drugs - Definition, Examples, Uses and Side effects.

UNIT – III (6h)

Vital Ailments and Treatment -Blood pressure - Hypertension and Hypotension - Diabetes, Cancer, AIDS - Causes, Symptoms and Treatment - Vitamins - Classification of Vitamins - Sources and Deficiency diseases caused by Vitamins.

UNIT – IV (6h)

Indian Medicinal Plants - Palak, Vallarai, Kizhanelli and Thumbai - Chemical Constituents and Medicinal Uses - Hibiscus, Adadodai, Thoothuvalai - Chemical Constituents and Medicinal Uses - Nochi, Thulasi, Aloe Vera - Chemical Constituents and Medicinal Uses.

UNIT – V (6h)

First Aid and Safety - Treatment of Shock, Haemorrhage, Cuts and Wounds - Burns - Classification- First Aid - Asbestos, Silica, Lead Paints, Cement, Welding fumes and Gases - Hazard alert and Precautions for Safety.

Reference Books

1. Applied Chemistry, Jayashree Ghosh - S. Chand and Company Ltd., 2006
2. Biochemistry, S. C. Rastogi - Tata McGraw Hill Publishing Co., 1993.
3. Medicinal Plants of India, Rasheeduz Zafar - CBS Publishers and Distributors, 2000.
4. Hawk's Physiological Chemistry, B. L. Oser - Tata-McGraw Hill Publishing Co. Ltd.
5. Practical Pharmaceutical Chemistry, A. H. Beckett and J. B. Stenlake - Vol. I - CBS Publishers and Distributors, 2000.

Course materials

1. <https://ncert.nic.in/textbook/pdf/iehp112.pdf>
2. http://gbpihedenviis.nic.in/PDFs/Glossary_Medicinal_Plants_Springer.pdf
3. <http://kdsap.org/KDSAP-BKHS/2015%20bkhs/BP%20and%20Blood%20Glucose%20-%20David%20Dupee.pdf>

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	S	S	M	S	M
CO2	M	S	M	S	M	S	M	S	M	S
CO3	S	M	S	S	S	M	M	S	S	S
CO4	M	S	M	S	S	M	S	M	M	M
CO5	M	M	S	M	M	M	M	S	S	M

SEMESTER - IV

CORE PAPER - 4 GENERAL CHEMISTRY - IV

OBJECTIVE:

Noble gases, Carboxylic Acids, Amines, Alcohols, Phenols, Naphthols, Important Name Reactions, Mechanism, Thermodynamics, Derivation of Equations, Partial Molar Properties, Chemical Potential, Related Problems and Applications are to be taught for IV semester.

Course Outcomes:

Upon completion of this course, the students will be able to understand

- 1) The chemistry of noble gases and structure and properties of their compounds.
- 2) Preparation and properties of monocarboxylic and dicarboxylic acids.
- 3) Preparation and properties of alcohols and phenols..
- 4) Thermodynamic Equation of State and Free energy and Work function.
- 5) Third law of thermodynamics and its applications.

Total No. of hours : 75

UNIT – I (15h)

Noble gases - Electronic Configurations - Position of Noble Gases in the Periodic Table - Chemical inertness of Noble gases – Reason - Compounds of Xenon - Hybridization and Geometry of XeF_2 , XeF_4 , XeF_6 , XeOF_2 , XeO_3 and XeOF_4 (Preparation, Properties - Not necessary) - Clathrates - Definition and Applications - Uses of Noble gases.

UNIT – II (15h)

Monocarboxylic acids - Acetic acid and Benzoic acid - Preparation by Grignard method - Conversion of Acids to their derivatives - Amide, Ester, Anhydride and Acid Chloride - Strength of Carboxylic Acids - Effect of Substituents on the Strength of Acids - Dicarboxylic acids - Oxalic acid, Malonic acid, Succinic acid, Glutaric acid and Adipic acid - Preparation - Properties - Action of Heat on Dicarboxylic acids - Amines - Ethylamine and Aniline - Preparation - Basicity of Amines - Effect of Substituents on Basicity - Reactivity of Amines - Distinction between Primary, Secondary and Tertiary Amines.

UNIT – III (15h)

Alcohols - Preparation by Grignard method - Oxidation of alcohols - Difference between Primary, Secondary and Tertiary alcohols - Preparation and Properties of Allyl alcohol - Phenols - Acidic character of phenols - Kolbe's reaction, Reimer-Tiemann reaction,

Gattermann , Lederer-Manasse, Houben-Hoesh, Friedel-Crafts, Schotten-Baumann and Liebermann's Nitroso Reaction - Preparation, Properties and Uses of Alpha- and Beta- Naphthols.

UNIT – IV (15h)

Free energy and Work function - Gibbs free energy - Helmholtz free energy - Relationship between Gibbs free energy and Helmholtz free energy - Their variations with Temperature, Pressure and Volume - Free energy change as criteria for Equilibrium and Spontaneity. Difference between Free Energy and standard Free Energy - Maxwell's Relations - Thermodynamic Equation of State - Gibbs-Helmholtz equation - Derivation and Applications - Clausius-Clapeyron equation - Derivation and Applications.

UNIT – V (15h)

Third Law of Thermodynamics - Entropy at Absolute Zero - Nernst Heat Theorem - Statement of III law of thermodynamics - Planck's formulation of III law of thermodynamic - Evaluation of Absolute Entropy from Heat Capacity Measurements - Exceptions to III law - Applications of III law - Partial molar properties - Chemical Potential - Definition - Effect of Temperature and Pressure on Chemical Potential - Gibbs-Duhem equation. Fugacity- Variation with Temperature and Pressure.

Text Books/Reference Books

1. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons (1988).
2. Text Book of Inorganic Chemistry - R. Gopalan - Universities Press - 2012.
3. Modern Inorganic Chemistry - R. D. Madan - S. Chand Publications, Reprint, 2014.
3. Inorganic Chemistry: Principles of Structure and Reactivity - J. E. Huheey, E. A. Keiter, R. I. Keiter and O. K. Medhi - 2006.
4. Concise Inorganic Chemistry - J. D. Lee - III edition - Von Nostrand.
5. Organic Chemistry - R. T. Morrison and Boyd - Pearson - 2010.
6. Organic Chemistry - I. L. Finar - Volume I and II - Pearson Education.
7. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishnal Publishing Co., - 2013.
8. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., - 2006.

Course materials:

- a. http://beta.chem.uw.edu.pl/people/WGrochala/NG_chemistry.pdf
- b. <https://www.sciencedirect.com/science/article/abs/pii/S0031942296006>

- c. <https://ncert.nic.in/ncerts/l/lech202.pdf>
- d. <https://ncert.nic.in/textbook/pdf/kech106.pdf>

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	S	M	S	S	M	S	M
CO2	M	S	S	M	M	S	M	S	M	S
CO3	S	S	M	S	S	M	M	S	M	S
CO4	M	S	M	S	S	M	S	M	S	M
CO5	M	M	S	M	M	M	M	S	M	S

CORE PRACTICAL

PAPER - 2

INORGANIC QUALITATIVE ANALYSIS AND PREPARATION

Analysis of mixture containing two cations and two anions (One will be an interfering anion). Semi micro methods using the conventional scheme are to be adopted.

Total no. of hours : 45

Cations to be studied

Lead, Copper, Bismuth, Cadmium, Iron, Aluminium, Zinc, Manganese, Cobalt, Nickel, Barium, Calcium, Strontium, Magnesium and Ammonium.

Anions to be studied

Carbonate, Sulphide, Sulphate, Nitrate, Chloride, Bromide, Fluoride, Borate, Oxalate and Phosphate.

Preparation of Inorganic compounds

- Tetraamminecopper(II) Sulphate
- Tris(thiourea)copper(I) Chloride
- Potassium trioxalatoferrate(II)
- Ferrous Ammonium Sulphate
- Microcosmic Salt
- Manganese(II) Sulphate

References

- Vogel's Text Book of Quantitative Chemical Analysis, 5th Edition, ELBS/Longman, England, 1989.
- Inorganic Semimicro Qualitative Analysis, V. V. Ramanujam.

ALLIED - 2

Paper - 4

(to choose one out of 5)

1. PHYSICS II

Total No. of hours : 45

UNIT - I

WAVE MECHANICS (9h)

Wave Mechanics - De Broglie Waves - Dual Nature - Experimental Study of Matter Waves - Davission and Germer's Experiment - G.P. Thomson's Experiment - Heisenberg's uncertainty Principle - The position and moment of a particle.

UNIT - II

NUCLEAR PHYSICS (9h)

Particle accelerators - cyclotron, particle detectors - GM Counter Artificial Transmutation - Rutherford's Experiment - The Q value equation for nuclear reaction - Threshold energy - Nuclear Reactions - Conservation Laws: Conservation of Charge - Conservation of Nucleons - Conservation of Mass - Energy - Conservation of Parity - Quantities conserved and quantities not conserved in a nuclear reaction.

UNIT - III

ENERGY PHYSICS (9h)

Sources of conventional energy - Need for non-conventional energy resources - solar energy utilization - solar water heater - solar drier - conversion of light into electrical energy - solar cell - merits and demerits of solar energy - wind energy - its conversion systems - energy from Bio mass - Bio gas generation - Industrial and space application.

UNIT - IV

CRYSTALLOGRAPHY (9h)

Crystallography : The crystal structure - Unit Cell -Bravais lattice- structures of simple cubic-BCC and FCC- co ordination number, packing factor calculation for the above structures -Hexogonal closed packed(HCP) structure -Miller indices - concept of Reciprocal Vectors.

UNIT - V

ELECTRONICS (9h)

Electronics: Transistor characteristics in common base and common emitter mode- Transistor single stage amplifier- Expression for input impedance, output impedance and current gain.

Digital Electronics : NAND and NOR as universal building blocks- De Morgan's theorem -statement and proof- Fabrication of diodes and transistors using Monolithic technology-limitations.

Books for Study & Reference

1. Allied Physics - R. Murugesan S. Chand & Co. First Edition (2005).
2. Allied Physics - Dr. K. Thangaraj, Dr. D. Jayaraman Popular Book Department, Chennai.
3. Allied Physics - Prof. Dhanalakshmi and others.
4. Elements of Properties of Matter - D.S. Mathur, S. Chand & Co. (1999).
5. Heat and Thermodynamics - N. Brijlal and Subramaniam S. Chand & Co.
6. A text book of Sound - by M. Narayanamoorthy and other National Publishing Companies (1986).
7. Modern Physics - R. Murugesan S. Chand & Co. (2004).
8. Electronic Principles and Applications - A.B. Bhattacharya, New Central Book Agency, Calcutta.
9. Introduction to Solid State Physics - C. Kittel, 5th Edition Wiley Eastern Ltd.
10. Renewable & Sustainable energy sources - Agarwal.

ALLIED - 2
Paper - 4
2. BOTANY – II

Total No. of hours: 45

UNIT-I: Taxonomy (9h)

General outline of Bentham and Hooker's system of classification. Study of the range of characters and economic importance of the following families: Annonaceae, cucurbitaceae, Apocynaceae, Euphorbiaceae and Liliaceae.

UNIT-II: Embryology (9h)

Structure of mature anther. Structure of mature ovule and its types. Fertilization.

UNIT-III: Plant Physiology & Plant Tissue Culture (9h)

Physiological role of micro and macro elements their deficiency symptoms
Photosynthesis - light reaction - Calvin cycle
Respiration - Glycolysis - Krebs's cycle - electron transport system. Growth hormones – Auxins. Tissue culture and its principles.

UNIT-IV: Ecology (9h)

Ecosystem - fresh water ecosystem. Environmental pollution. Major pollutants - types of pollution - Air pollution, water pollution, soil pollution - control measures.

UNIT-V: Genetics & Evolution (9h)

Mendelism - Monohybrid and dihybrid crosses. Theories of evolution - Lamarckism, Darwinism.

Books Suggested:

1. Sharma, O.P (2011). Algae, Tata McGraw Hill Education Private limited, New Delhi.
2. Sharma, P.D (2003). The Fungi. Rastogi Publications, Meerut
3. H.C. Dube (2007) A Text Book of fungi, bacteria and viruses, Student Edition, New Delhi.
4. Pandey, B.P. (2001). College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.
5. Vashishta, P.C, Sinha and Anilkumar (2010). Pteridophytes, S. Chand & company Ltd, New Delhi.
6. Johri, R.M, Lata S, Tyagi K (2005), A text book of Gymnosperms, Dominate Pub and Distributer, New Delhi.
7. Verma, P.S and Agarwal, V.K. 2007. Cytology. S. Chand & Co. Chennai.

- Lawrence, GHM. (1995). The Taxonomy of vascular Plants (Vol I-IV)
,Central Book, Dept., Allahabad.
8. Gupta, P.K, 2000. Genetics.Rasatogi publications, Meerut.
 9. Gupta, N.K and Gupta, S. 2005. Plant Physiology. Oxford &IBH Publishing Co.
Ltd., New Delhi.
 - 10.Shukla, R.S. &P.S. Chandel (1991) : Plant Ecology & Soil Science S.Chand
& Co., New Delhi.
 11. Pandey, B.P. 2007 Botany for Degree Students. S. Chand & Co. New Delhi

ALLIED - 2

Paper - 4

3. ZOOLOGY II

Total No. of Hours 45

UNIT – I (9 h)

Cell Biology - structure of animal cell, **Genetics**: molecular structure of gene - gene function, sex linked inheritance. Genetic Engineering and its application.

UNIT - II (9 h)

Embryology - cleavage and gastrulation of Amphioxus - **Human Physiology**: Digestion, Circulation - blood components, structure of heart, heart function.

UNIT - III (9 h)

Diseases of Circulatory system - blood pressure, heart disease - Ischemia, Myocardial Infarction, Rheumatic heart disease, stroke - **Excretion** - structure of kidney and mechanism of urine formation.

UNIT - IV (9 h)

Environmental Biology - Biotic factors and Abiotic factors, food chain and food web. Pollution - Environmental degradation, (Air, Water and Land) - Green house effect - Bioremediation, Biodegradation - Global warming - acid rain.

UNIT - V (9 h)

Evolution: Theories of Lamarkism & Darwinism.

REFERENCES:

1. Ekambaranatha Ayyar, and Ananthakrishnan, T.N. 1993. Outlines of Zoology, Vol I & II, Viswanathan and Co, Madras.
2. Sambasiviah, I, Kamalakara Rao, A.P., Augustine Chellappa, S. 1983. Text book of Animal Physiology, S. Chand & Co., New Delhi.
3. Verma and Agarwal. 1983. Text book of animal Ecology, S. Chand & Co., New Delhi.
4. Verma and Agarwal and Tyagi. 1991. Chordate Embryology, S. Chand & Co., New Delhi.
5. Rastogi and Jayaraj. 2000. Text book of Genetics. Rastogi publications, Meerut.
6. Verma and Agarwal. 2000. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S. Chand & Co., New Delhi.

ALLIED - 2

Paper - 4

4. BIOCHEMISTRY II

Total No. of Hours 45

UNIT - I

METABOLISM (9h)

Glycolysis, TCA cycle and its energetics, HMP shunt pathway. Deamination, transamination reaction, transaminase enzymes, Urea cycle.

UNIT - II

METABOLIC DISORDERS (9h)

Diabetes mellitus, Glycogen storage diseases, Glycosuria, Ketosis, Jaundice, Phenyl ketonuria, Alkaptonuria. Dehydration: definition, causes, symptom and prevention.

UNIT - III

ENZYMES (9h)

Definition, classification of enzymes with one example. Mechanism of enzyme action - Lock and key mechanism, Induced Fit theory. Michaelis-Menten equation. Enzyme inhibition: competitive, uncompetitive and non competitive. Biological functions of enzymes.

UNIT - IV

MOLECULAR BIOLOGY (9h)

Central dogma of molecular biology. DNA and RNA act as genetic material. Replication: Definition, types, mode of action of replication, mechanism of replication. General mechanism of transcription and translation. Genetic code.

UNIT - V

VITAMINS (9h)

A brief outline of source, requirement, biological function and deficiency of Vitamins (fat soluble and water soluble vitamins).

References:

1. Lehninger Principles of Biochemistry-David L. Nelson, Michael M. Cox, Macmillan worth Publishers.
2. Harper's Biochemistry-Robert K. Murray, Daryl K. Grammer, McGraw Hill, and Lange Medical Books. 25th edition.

3. Fundamentals of Biochemistry-J.L. Jain, Sunjay Jain, Nitin Jain, S. Chand & Company.
4. Biochemistry-Dr. Amit Krishna De, S. Chand & Co., Ltd.
5. Biochemistry-Dr. Ambika Shanmugam, Published by Author.
6. Biomolecules-C. Kannan, MJP Publishers, Chennai-5.

ALLIED - 2
Paper - 4
5. MATHEMATICS - II*

Total No. of Hours 45

UNIT - I

APPLICATION OF INTEGRATION (9h)

Evaluation of double, triple integrals - Simple applications to area, volume -Fourier series for functions in $(0, 2\pi)$ and $\square \square \square \square \square \square \square \square$

UNIT - II

PARTIAL DIFFERENTIAL EQUATIONS (9h)

Formation, complete integrals and general integrals - Four standard types, Lagrange's equations.

UNIT - III

LAPLACE TRANSFORMS (9h)

Laplace Transformations of standard functions and simple properties - Inverse Laplace transforms - Applications to solutions of linear differential equations of order 1 and 2-simple problems

UNIT - IV

VECTOR ANALYSIS (9h)

Scalar point functions - Vector point functions - Gradient, divergence, curl - Directional derivatives - Unit to normal to a surface.

UNIT - V

VECTOR ANALYSIS (CONTINUED) (9h)

Line and surface integrals - Gauss, Stoke's and Green's theorems (without proofs) - Simple problem based on these Theorems.

Recommended Text

P.Duraipandian and S.Udayabaskaran,(1997) *Allied Mathematics*, Vol. I & II.Muhil Publishers, Chennai

Reference Books:

1. P.Balasubramanian and K.G.Subramanian,(1997)*Ancillary Mathematics*. Vol.I & II.Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan,(2005) *Allied Mathematics* .Vol. I & II.Vikas Publications, New Delhi.
3. P.R.Vittal(2003). *Allied Mathematics* .Marghan Publications, Chennai.
4. P.Kandasamy, K.Thilagavathy (2003) *Allied Mathematics* Vol-I, II S.Chand& company Ltd., New Delhi-55.
5. Isaac, *Allied Mathematics*. New Gamma Publishing House, Palayamkottai

ALLIED PRACTICAL - 2

1. PHYSICS

(Any 15 Experiments)

Total No. of hours: 45

1. Young's modulus - non uniform bending - pin and microscope.
2. Rigidity modulus - Static Torsion Method Using Scale and Telescope.
3. Rigidity modulus - Torsional oscillation method (without symmetric masses).
4. Determination of Co-efficient of Viscosity - Graduated Burette.
5. Surface Tension and Interfacial Tension - By drop weight method.
6. Specific Heat Capacity of a liquid - by Newton's Law of Cooling.
7. Sonometer - Determining A.C. Frequency. (Screw Gauge is given).
8. Sonometer - frequency of tuning fork.
9. Newton's Rings - Radius of Curvature.
10. Air Wedge - Determination of thickness of thin wire.
11. Spectrometer Grating - Minimum Deviation - Mercury Lines.
12. Spectrometer - Refractive Index of a liquid - Hollow Prism.
13. Potentiometer - Calibration of High Range Ammeter.
14. Potentiometer - Calibration of Low Range Voltmeter.
15. Determination of M and B_H using Deflection Magnetometer in Tan C position and vibration magnetometer.
16. Figure of merit and voltage sensitiveness of table galvanometer.
17. Construction of AND, OR gates using diodes and NOT by transistors.
18. Zener diode - Voltage Regulation.
19. NAND / NOR as universal gate.
20. Demorgan's theorem verification.

ALLIED PRACTICAL

2. BOTANY – I & II

Total No. of hours: 45

Description of plants in technical terms belonging to the families mentioned in the theory part.

To study the internal structure of Anatomy material, Pteridophytes and Gymnosperms. Identification and Description of Micro Preparation materials mentioned in the theory part.

Description of experimental setup of plant physiology.

BOOKS SUGGESTED

Ashok Bendre, A.K. and Pandey P.C. (1975) Introductory Botany. Rastogi Publication Meerut.

Ganguly, A.K. and Kumar.N.C. (1971) General Botany Vol.I & Vol. II, Emkay Publication, Delhi.

Rev. Fr. Ignacimuthu, S.J. (1975) Basic Biotechnology – Tata Mcraw till publication co., New Delhi.

Rao, K.N. Krishnamoorthy, K.V. and Rao.G. (1975) Ancillary Botany. S. Viswanathan Private. Ltd., Chennai.

ALLIED PRACTICAL

3. ZOOLOGY

Total No. of hours: 45

I - MAJOR PRACTICAL

DISSECTIONS

Cockroach: Digestive and nervous system

Prawn: Nervous system

II - MINOR PRACTICAL

MOUNTING

1. Mouth parts of **Mosquito** and **Honey bee**
2. **Earthworm** - Body setae
3. Placoid scales of **shark**

III - SPOTTERS

Entamoeba, Sycon, Obelia, Taenia solium (entire, scolex) earthworm (entire, Pineal setae) Prawn (entire), Fresh water mussel, Sea star, Amphioxus - Entire, Amphioxus - T.S. through pharynx, Shark, Frog, Calotes, Pigeon, feathers of pigeon and Rabbit.

Sphygmomanometer, Stethoscope, Rain gauge.

REFERENCES:

1. Verma. P.S. 2011. A manual of practical Zoology - INVERTEBRATES. Chand & Co., Ltd., Ram Nagar, New Delhi.
2. Verma. P.S. 2011. A manual of practical Zoology - CHORDATES. Chand & Co., Ltd., Ram Nagar, New Delhi.

ALLIED PRACTICAL
4. BIOCHEMISTRY I & II

Total No. of hours: 45

PRACTICAL I

Volumetric Estimation

1. Estimation of HCl using Na_2CO_3 as link and NaOH as primary standard.
2. Estimation of Iron in Ferrous Ammonium Sulphate using potassium permanganate as link solution and oxalic acid as primary standard.
3. Estimation of Glucose by Benedict's method.
4. Estimation of Glycine by formal titration.
5. Estimation of Ascorbic acid.

SKILL BASED SUBJECT

PAPER - 2

FOOD CHEMISTRY

Objective:

- To impart knowledge about Different Foods, Their Nutritive Values and Food Preservation.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Describe the structures and nutritive values of cereals, Pulses and sugar and their medicinal values.
- 2) Illustrate the composition and nutritive values of Vegetables, Fruits, Milk, Egg and soya beans.
- 3) Define and classify Beverages and functions of appetizers.
- 4) Explain the methods of preservation of foods.
- 5) Discuss about Food Additives and their functions.

Total No. of hours: 30

UNIT – I (6h)

Cereals - Definition - Classification - Processing - Structure of Cereals - Composition and Nutritive value - Pulses - Definition - Classification - Processing - Structure of Pulses - Composition and Nutritive Value - Toxic Constituents in Pulses - Medicinal value of Cereals and Pulses - Sugar - Structure and Properties - Nutritive value - Sugar composition in different food items - Sugar related products - Classification and Nutritive value - Artificial sweeteners - Examples - Saccharin and Cyclamate - Advantages and Disadvantages.

UNIT - II (6h)

Vegetables and Fruits - Classification - Composition and Nutritive values - Fungi and Algae as food - Enzymatic Browning and Non- enzymatic Browning - Nutritive value of some common foods - Milk, Egg and Soyabeans.

UNIT-III (6h)

Beverages - Definition - Examples - Classification - Fruit Beverages - Milk Based Beverages - Malted Beverages - Examples - Alcoholic and Non-Alcoholic Beverages - Examples - Appetizers - Definition - Classification - Examples - Water - Functions and Deficiency.

UNIT-IV (6h)

Food Preservatives - Definition - Classification - Food Spoilage - Definition - Prevention - Methods of Preservation - Classification - Low and High temperature - Preservatives – Examples - Dehydration - Osmotic pressure - Food irradiation.

UNIT-V (6h)

Food Additives - Definition - Artificial sweeteners - Saccharin and Cyclamate - Classification - Their functions - Chemical substances - Packaging of Foods - Classification - Materials used for Packaging - Food Colours - Restricted use - Spurious Colours - Taste Enhancers - MSG - Vinegar.

Reference Books

- Food Science - B. Srilakshmi, III Edition, New Age International Publishers, 2005.
- Food Chemistry - Lilian Hoagland Meyer, CBS Publishers & Distributors, 2004.
- Food Science, Nutrition and Health - Brian A. Fox, Allan G. Cameron, Edward Arnold, London.
- Fundamentals of Foods and Nutrition - Mudambi R. Sumathi, and Rajagopal, M. V., - Wiley Eastern Ltd., Madras.
- Handbook of Food and Nutrition - M. Swaminathan - Bangalore Printing and Publishing Co. Ltd., Bangalore.

Course materials

1. <https://ipa-pasca.unpak.ac.id/pdf/Food%20Chemistry%20by%20Fennema%203rd%20Ed.pdf>
2. http://www.uprtou.ac.in/other_pdf/dvapfv_block_3.pdf
3. <http://154.68.126.6/library/Food%20Science%20books/batch1/Principles%20of%20Food%20Chemistry%203rd%20Edition.pdf>

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	S	S	M	S	M
CO2	M	S	M	M	S	S	M	S	M	S
CO3	M	S	M	S	M	S	M	S	M	S
CO4	M	S	M	S	S	M	S	M	S	M
CO5	S	M	S	M	M	M	M	S	M	S

NON - MAJOR ELECTIVE
PAPER - 2
CHEMISTRY IN EVERY DAY LIFE

Objectives:

- To know the basics of Chemistry in our life
- To know about the Food Colours, Plastics, Drugs etc.,

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Explain the preparations of cosmetics, soaps and detergents and the Hazards of Cosmetics used in everyday life.
- 2) Identify Adulterants in various food items.
- 3) Define and classify Vitamins and understand their physiological importance.
- 4) Describe Food preservative methods.
- 5) Define Antipyretics, Analgesics, Anesthetics and Sedatives.
- 6) Discuss the preparation and applications of plastics, Resins, Rubbers.
- 7) Classify fertilizers and describe their uses and Hazards.
- 8) Explain advantages and disadvantages of natural and artificial sweetening agents.

Total No. of hours: 30

UNIT – I (6h)

General Survey of Chemicals used in everyday life - Cosmetics - Talcum Powder, Tooth pastes, Shampoos, Nail Polish and Perfumes - General formulation - Preparation - Hazards of Cosmetic use - Soaps and Detergents - Types - Preparation and Uses.

UNIT – II (6h)

Food and Nutrition - Carbohydrates, Proteins, Fats and Minerals - Examples - Vitamins Definitions - Classification - Sources and their Physiological importance - Balanced diet. Adulterants in Milk, Ghee, Oil, Coffee Powder, Tea, Asafoetida, Chilli Powder, Pulses and Turmeric Powder - Identification.

UNIT – III (6h)

Food colours used in food - Soft drinks and its Health hazards - Food Preservatives - Definition - Examples - Methods of preservation - Low and High temperature -

Dehydration - Osmotic pressure - Food irradiation.

UNIT – IV (6h)

Plastics, Polythene, PVC, Bakelite, Polyesters, Resins and their Applications - Natural Rubber - Synthetic rubbers - Vulcanisation - Preparation and its Applications - Antipyretics, Analgesics, Anaesthetics, Sedatives - Definition - Examples and Uses.

UNIT – V (6h)

Gobar gas - Production - Feasibility and Importance of Biogas with special reference to Rural India - Fertilizers - Definition - Classification - Urea, NPK and Super phosphates - Need - Uses and Hazards - Sweetening agents - Sucrose and Glucose - Artificial Sweetening agents - Saccharin - Cyclamate - Advantages and Disadvantages.

Reference Books

1. Chemical Process Industries - Norris Shreve Joseph A. Brine .Jr.
2. Perfumes, Cosmetics and Soaps - W. A. Poucher (Vol 3).
3. Environmental Chemistry - A. K. DE.
4. Industrial Chemistry, B. K. Sharma- Goel publishing house Meerut.
5. Food Science - B. Srilakshmi - III Edition - New Age International Publishers, 2005.
6. Food Chemistry, Lillian Hoagland Meyer - CBS publishers & distributors, 2004.
7. Fundamental Concepts of Applied Chemistry - Jayashree Ghosh, S. Chand & Co Ltd., New Delhi - 2010.
8. Applied chemistry - K. Bagavathi Sundari - MJP Publishers (2006).

Course Materials

1. <https://ncert.nic.in/ncerts/l/lech207.pdf>
2. http://www.bspublications.net/downloads/0537db29d5dac8_Cosmetics%20A%20Practical%20manual_ch-1.pdf
3. https://www.researchgate.net/publication/244480193_An_Introduction_to_Toothpaste_-_Its_Purpose_History_and_Ingredients
4. https://www.academia.edu/29067197/Plastic_pdf
5. https://www.susana.org/_resources/documents/default/2-1799-biogasplants.pdf

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	S	M	M	S	M	S	M
CO2	M	S	S	M	S	M	M	S	M	S
CO3	S	S	M	S	M	S	M	S	M	S
CO4	M	M	M	S	S	M	S	M	S	M
CO5	S	M	S	M	M	M	M	S	M	S

SEMESTER - V

CORE PAPER - 5 INORGANIC CHEMISTRY - I

Objectives:

- To study about the Halogens and Related compounds.
- To give students a firm grounding in Co-ordination chemistry and Solid state Chemistry.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Compare the properties of Halogens and their Compounds.
- 2) Recollect the basic concepts and nomenclature of Co-ordination Compounds.
- 3) Explain the theories of Co-ordination Compounds.
- 4) Compare VBT with MOT and apply Complexes in qualitative and quantitative analyses.
- 5) Calculate the CFSE Values of Octahedral and Tetrahedral Complexes.
- 6) Analyze the bonding and structure of metallic carbonyls.
- 7) Draw the structures of ionic crystals and explain the defects in solids.

Total No. of hours: 75

UNIT - I (15h)

Halogens - Group discussion - Comparative study of F, Cl, Br, I and At - Reactivities, hydrides, and oxides- Oxyacids of Halogens (Structure only) - Classification of Halides - Comparison of Fluorine with Oxygen-Fluorides of oxygen-Exceptional properties of Fluorine - Interhalogen compounds - Preparation, Properties and Geometry of AX, AX₃, AX₅ and AX₇ type of Compounds - Pseudohalogens and pseudohalides - Cyanogen and Thiocyanogen - Comparison of Pseudohalogens and Halogens - Basic Properties of Iodine - Evidences.

UNIT - II (15h)

Coordination compounds - Definition of terms used - Classification of Ligands - Chelation and Effect of Chelation - Applications of Complexes - Coordination Number and Stereochemistry of Complexes - IUPAC Nomenclature of Complexes -

Isomerism in Complexes - Ionisation isomerism, Hydrate Isomerism, Linkage Isomerism, Ligand Isomerism, Coordination Isomerism, Coordination position Isomerism and Polymerisation Isomerism - Geometrical and Optical Isomerism in 4- and 6- Coordinated Complexes.

UNIT - III (15h)

Werner's theory of Coordination Compounds-Sidgwick's Theory - EAN rule - Theory of Bonding - Valence Bond Theory - Postulates of VBT - Hybridisation, Geometry and Magnetic properties - Failure of VBT - Crystal field theory - Spectrochemical series - Splitting of d - orbitals in Octahedral, Tetrahedral and Square Planar Complexes - Factors affecting crystal field splitting energy-Crystal Field Stabilisation Energy - Calculation of CFSE In Octahedral and Tetrahedral Complexes - Low Spin and High Spin Complexes - Explanation of Magnetic Properties, Colour and Geometry Using CFT.

UNIT - IV (15h)

Comparison of VBT and CFT - Applications of Coordination Compounds in Qualitative and Quantitative Analysis - Estimation of Nickel using DMG and Aluminium using Oxine - Detection of Potassium ion, S^{2-} ion, Fe^{2+} ion and Fe^{3+} ion - Separation of Copper and Cadmium ions in the second group-Separation of Pb^{2+} and Ag^+ ions in the first group - Bonding, Hybridization and Structure of Carbonyls of Ni, Cr, Fe, Co, Mn, W and V.

UNIT – V(15h)

The nature of the Solid State - Amorphous and Crystalline - Differences - Close Packing in Crystals - Examples for Cubic, BCC and FCC Lattices - Bragg's law - Application of XRD to Crystal studies - Structure of NaCl, CsCl, CaF_2 and ZnS - Metallic bond-Free electron, Valence bond and Band theory of Solids, Metals, Semiconductors and Insulators - Defects in solids - Scottky Defect and Frenkel Defect - Metal Excess and Metal Deficiency Defects - Conductors in Ionic Solids - Electrical and Magnetic properties.

REFERENCE BOOKS

INORGANIC CHEMISTRY

1. **Inorganic Chemistry - P. L. Soni - Sultan Chand (2006).**
2. Principles of Inorganic Chemistry - B. R. Puri, L. R. Sharma and K. C. Kallia - Milestone Publications (2013).
3. Selected Topics in Inorganic Chemistry - W. U. Malik, G. D. Tuli and R. D. Madan - S. Chand Publications (2008).
4. Inorganic Chemistry: Principles of Structure and Reactivity - J. E. Huheey, E. A. Keiter, R. I. Keiter and O. K. Medhi - 2006.
5. Concise Inorganic Chemistry - J. D. Lee - III edition - Von Nostrand.
6. Industrial Chemistry - B. K. Sharma - Goel Publications (1983).

7. Industrial Chemistry R. K. Das - Kalyani Publications, New Delhi (1982).
8. Coordination Chemistry - S. F. A. Kettle - ELBS (1973).
9. Coordination Chemistry - K. Burger - Butterworthy (1973).
10. Vogel's Handbook of Quantitative Inorganic Analysis - Longman.
11. Text Book of Qualitative Inorganic Analysis - A. I. Vogel - III edition (1976).
12. Source Book on Atomic Energy - S. Glasstone- East-West Press Pvt. Ltd. (1967).
13. Nuclear and Radiochemistry - John Wiley and Sons (1964).
14. Nuclear Chemistry - H. J. Arnikar - Wiley Eastern Co., - II edition (1987).
15. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons (1988)
16. Text Book of Inorganic Chemistry - R. Gopalan - Universities Press - 2012.
17. Modern Inorganic Chemistry - R. D. Madan - S. Chand Publications, Reprint, 2014.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	M	M	S	S	M	S	M
CO2	S	M	M	M	S	S	M	S	M	S
CO3	M	S	S	S	M	S	M	S	M	S
CO4	M	S	M	S	S	M	S	M	S	M
CO5	S	M	S	M	M	M	M	S	M	S

CORE PAPER - 6

ORGANIC CHEMISTRY - I

Objectives:

- To effectively impart knowledge about Carbohydrates, Stereochemistry, Conformational Analysis, Nitroalkanes and Heterocyclic chemistry.
- To make the students more inquisitive in learning the Mechanistic details in Organic Chemistry through the teaching of the named reactions.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Elucidate the structures of saccharides.
- 2) Assign the stereo configuration of Organic Compounds.
- 3) Compare the Conformation and Configuration of cyclohexanes and substituted cyclohexanes.
- 4) Explain the preparation, properties and uses of Nitro alkanes.
- 5) Apply different reagents in studying various Organic reactions.
- 6) Explain the mechanism of Organic named reactions.
- 7) Explain the synthesis and properties of five and six membered heterocyclic compounds and condensed heterocyclic compounds.
- 8) Compare the basicity of heterocyclic Compounds.

Total No. of hours: 75

UNIT - I (15h)

Carbohydrates - Classification - Aldoses and Ketoses, Reducing and Non-reducing Sugars - Reactions of Glucose and Fructose - Osazone formation, Mutarotation and their Mechanism - Structural elucidation of Glucose and Fructose - Pyranose and Furanose forms - Haworth's method - Determination of Ring Size- Haworth Projection Formula - Configuration of Glucose and Fructose - Epimerization - Chain lengthening and chain shortening of Aldoses - Inter conversion of Aldoses and Ketoses - Uses of Glucose - Disaccharides and Polysaccharides -Reactions and Structural elucidation of Sucrose and Maltose - Properties, Structure and Uses of Starch and Cellulose.

UNIT - II (15h)

Stereoisomerism -Definition - Classification into Optical and Geometrical isomerism. Conditions for Optical Activity - Asymmetric centre - Chirality - Achiral molecules - Meaning of (+) and (-) and D- and L- notations - Elements of symmetry - Projection formulae - Fischer, Flying Wedge, Sawhorse and Newmann projection formulae - Notation of optical isomers - Cahn - Ingold - Prelog rules - R, S notation of Optical isomers with one Asymmetric carbon atoms - Erythro and Threo representations -

Optical activities in Compounds not containing Asymmetric Carbon Atoms - Biphenyl, Allenes and Spiranes - Racemisation - Methods of Racemisation (By substitution and Tautomerism) - Resolution - Methods of Resolution (Mechanical, Biochemical and Conversion To Diastereomers) - Asymmetric Synthesis (Partial and Absolute Synthesis) - Walden inversion - Geometrical isomerism - Cis - Trans, Syn - Anti and E-Z Notations - Geometrical Isomerism In Maleic and Fumaric Acids and Unsymmetrical Ketoximes - Methods of Distinguishing Geometrical Isomers using Melting Points, Dipole Moment, Dehydration, Cyclisation, Heat of Hydrogenation and Combustion.

UNIT - III (15h)

Conformational analysis - Introduction of terms - Conformations, Configuration, Dihedral Angle, Torsional Strain - Differences between Conformational isomers and Configurational isomers - Conformational analysis of Ethane and n-Butane including energy diagrams - Conformations of Cyclohexane (Chair, Boat and Twist-Boat forms) - Axial and Equatorial bonds - Ring flipping showing Axial and Equatorial bonds Interconversions - Conformations of Methyl Cyclohexane, Dimethyl Cyclohexane and their stability - 1,2 and 1,3 - Interactions.

UNIT - IV (15h)

Nitroalkanes - Preparation - Properties - Structure - Nitro-Acinitro Tautomerism - Uses of Nitroalkanes - Differences between Primary, Secondary and Tertiary Nitroalkanes. Diazomethane, Diazoacetic ester, alkyl azides - Preparation and synthetic uses - Reagents and their Applications in Organic Chemistry - Anhydrous AlCl_3 , P_2O_5 , H_2/Pd - BaSO_4 , Zn/Hg - HCl and Ag_2O - Mechanism of Aldol, Perkin and Benzoin condensations - Knoevenagel, Claisen, Wittig, Cannizzaro, Reformatsky and Michael addition reactions.

UNIT - V (15h)

Heterocyclic compounds - Huckel's rule - Aromaticity of Heterocyclic compounds - Preparation, Properties, Structure and Uses of Furan, Pyrrole and Thiophene - Preparation and properties of Pyridine and Piperidine - Comparative study of Basicity of Pyrrole, Pyridine and Piperidine with Amines - Nucleophilic and Electrophilic substitution reactions of Pyridine - Condensed Five and Six Membered Heterocyclic Compounds - Preparation of Indole, Quinoline and Isoquinoline - Fischer-Indole synthesis, Skraup Quinoline synthesis and Bischler-Napieralski synthesis - Electrophilic substitution reactions.

ORGANIC CHEMISTRY

1. Organic Chemistry - R. T. Morrison and Boyd - Pearson - 2010.
2. Organic Chemistry - I. L. Finar - Volume I and II - Pearson Education.

3. Text Book of Organic Chemistry - P. L. Soni - Sultan Chand & Sons - 2007.
4. Advanced Organic Chemistry - Bahl and Arun Bahl - S. Chand and Co. Ltd. - 2012.
5. Stereochemistry, Conformations and Mechanisms - Kalsi - 2nd Edition, Wiley Eastern Ltd., Chennai - 1993.
6. Organic Chemistry of Natural Products - Volume I and II - O. P. Agarwal - Goel Publishing House
7. A Guide Book to Mechanisms in Organic Chemistry - Peter Sykes - Pearson Education - 2006.
8. Stereochemistry of Organic Compounds - D. Nasipuri - New Age International Publishers..
9. Chemistry of Natural Products - Gurdeep Chatwal- Himalaya Publishing House.
10. Reactions and Reagents - O. P. Agarwal- Goel Publishing House.
11. Organic Reaction Mechanisms - Gurdeep Chatwal- Himalaya Publishing House.
12. A Text Book of Organic Chemistry, K. S. Tewari, N. K. Vishnoi, S. N. Mehrotra - Vikas Publishing House - 2011.
13. Modern Organic Chemistry- M. K. Jain and S. C. Sharma- Vishnoi Publications, 2014.
14. Reaction, Mechanism and Structure - Jerry March - John Wiley and Sons, NY - 1992.
15. Organic Chemistry - Bruice - Pearson Education.
16. Text Book of Organic Chemistry - C. N. Pillai - Universities Press - 2009.
17. Organic Reaction Mechanisms - Parmar and Chawla - S. Chand & Co.
18. Organic Chemistry - I. L. Finar - 6th Edition, Pearson Education, 2008.
19. A Guide Book to Mechanisms in Organic Chemistry - Peter Sykes - Pearson Education, 2006
20. Stereochemistry of Carbon Compounds- E. I. Eliel - Tata Mcgrow Hill Education - 2000.
21. Organic Chemistry - T. W. Graham Solomon, C. B. Fryhle - S. A. Snyder - John Wiley & Sons - 2014.
22. Advanced Organic Reaction Mechanism (Problems and Solutions) - N. Tewari - Books and Allied (P) Ltd - 2005.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	S	S	M	S	M
CO2	M	M	S	M	S	S	M	S	M	S
CO3	S	S	M	S	M	S	M	S	S	S
CO4	S	M	M	S	S	M	S	M	S	M
CO5	M	S	S	M	M	M	M	S	M	S

CORE PAPER- 7
PHYSICAL CHEMISTRY - I

Objectives:

- To impart knowledge about the Solutions, Phase Rule and its Applications, Colligative properties, Chemical Equilibrium, Phase Rule and its Applications, Electrochemistry and its Applications.

Course Outcomes:

Upon completion of this course, the students will be able to

- Explain the Thermodynamics of ideal and Non-ideal solutions, Nernst distribution law and its applications.
- Draw and explain phase diagrams of one Component and two Component systems having congruent and incongruent melting points.
- Derive law of Chemical equilibrium and Van't Hoff isotherm.
- Determine molar mass from the colligative properties.
- Explain variation of conductivity with dilution, measurement of conductivity and concept of Transport Number and its determination.
- Explain Debye-Huckel Theory of strong electrolytes.
- Apply conductivity measurements and explain conductometric titrations.
- Explain buffer action and derive Henderson equation and pH of aqueous salt solutions.

Total No. of hours: 75

UNIT - I

SOLUTIONS (15h)

Solutions of liquids in liquids - Ideal Solution and Raoult's law - Vapour pressure of ideal solutions. Vapour Pressure-Composition and Temperature-Composition Curves of Ideal and Non-ideal Solutions. Thermodynamics of Solutions. Gibbs-Duhem-Margules equation - Vapour pressure of Non-ideal solutions - Fractional distillation of Binary liquid solutions - Lever rule- Azeotropic mixtures - Partially miscible liquids. CST and effect of impurity on CST. Phenol - Water, Triethylamine - Water and Nicotine - Water systems - Immiscible Liquids- Steam Distillation. Nernst distribution law - Definition - Thermodynamic derivation - Applications.

UNIT - II

PHASE RULE (15h)

Definition of the terms - Phase, Components and Degrees of freedom - Derivation of Gibbs phase rule - Applications of phase rule - One component system - Water and

Sulphur system - Thermal Analysis and Cooling Curves- Reduced phase rule - Two components system - Simple eutectic system - Lead-silver system. Compound formation with congruent and incongruent melting points. Zn-Mg, Na-K, FeCl₃-H₂O, KI-H₂O systems. Freezing Mixtures.

UNIT - III

COLLIGATIVE PROPERTIES AND CHEMICAL EQUILIBRIUM (15h)

Colligative properties - Lowering of vapour pressure - Osmosis and osmotic pressure - Thermodynamic Derivation of Elevation of boiling point and Depression of freezing point - Determination of molar mass - Van't Hoff factor - Chemical Equilibrium - Law of Chemical Equilibrium - Thermodynamic derivation of Law of Chemical Equilibrium. Relationship between K_p, K_c and K_x for reactions involving Ideal Gases - Van't Hoff Reaction Isotherm - Temperature Dependence of Equilibrium Constant - Van't Hoff Isochore - Le Chatelier's Principle and Its Applications.

UNIT - IV

ELECTROCHEMISTRY - I (15h)

Metallic and Electrolytic Conductors-Faraday's Laws-Electro plating Specific conductance and Equivalent conductance - Measurement of equivalent conductance - Variation of Equivalent Conductance and Specific Conductance with Dilution Kohlrausch Law and its applications - Ostwald's Dilution Law and its Limitations - Debye-Huckel's theory of Strong Electrolytes - Onsager equation (No derivation) - Verification and Limitations Wien effect, Falkenhagen effect. Ionic Strength - Migration of ions - Ionic Mobility - Ionic Conductance - Transport Number and its determination - Hittorff's method and Moving Boundary method. Effect of Temperature and Concentration on Conductance.

UNIT - V

ELECTROCHEMISTRY - II (15h)

Applications of Conductometric Measurements - Determination of Degree of Dissociation of Weak Electrolytes, Ionic Product of water - Solubility Product of sparingly soluble salt - Conductometric Titrations - Concept of pH - Buffer solutions, Buffer action - Henderson equation - Applications of Buffer Solutions - Hydrolysis of Salts - Expressions for Hydrolysis Constant, Degree of Hydrolysis and pH of aqueous salt solutions.

Reference Books

PHYSICAL CHEMISTRY

1. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania,

Vishnal Publishing Co., - 2013.

2. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., - 2006.
3. Physical Chemistry - Negi and Anand - Eastern Wiley Pvt.Ltd..
4. Physical Chemistry - Negi and Anand - Eastern Wiley Pvt.Ltd..
5. Physical Chemistry - Kundu and Jain - S. Chand & Co.
6. Physical Chemistry - K. L. Kapoor - Macmillan - 4 volumes.
7. Elements of Physical Chemistry - Glasstone and Lewis - Macmillan.
8. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd.
9. Fundamentals of Physical Chemistry - Maron and Landor - Colier - Macmillan.
10. Physical Chemistry - G. W. Castellan - Narosa publishing house - 2004.
11. Physical Chemistry - Walter J. Moore - Orient Longman - 1972.
12. Numerical Problems on Physical Chemistry, Gashal - Books and Allied (P) Ltd.,
13. Universal General Chemistry, C.N.R. Rao, Macmillan.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	S	S	M	S	S	M	S	S
CO2	M	M	S	M	M	S	M	S	S	M
CO3	S	S	M	S	S	M	M	M	M	S
CO4	S	M	M	S	S	S	S	M	S	M
CO5	M	S	S	M	M	M	M	S	M	S

INTERNAL ELECTIVE

PAPER - 1

(to choose one out of 3)

A. ANALYTICAL CHEMISTRY - 1

Objective:

- To impart knowledge about Data Analysis, Purification of organic compounds, Different Spectroscopic Techniques and their Application.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Analyze Data and explain the methods of purification of solids.
- 2) Purify solid and liquid Organic Compounds.
- 3) Explain the concept of Gravimetric Analysis.
- 4) Describe the principles, Instrumentation and applications of UV, Visible, Microwave, IR and Raman Spectroscopy.
- 5) Determine the structure of Organic Compounds using various spectral techniques.

Total No. of hours: 45

UNIT – I (9h)

Data analysis - Types of errors - Correction of determinate errors - Idea of Significant Figures and their Importance with examples - Precision and Accuracy - Methods of expressing Accuracy - Error analysis - Minimising errors - Methods of expressing Precision - Average deviation - Standard Deviation and Confidence Limit - Purification of Solid Organic Compounds - Solvent extraction - Recrystallisation - Use of immiscible solvents - Soxhlet extraction - Crystallisation - Use of miscible solvents - Fractional Crystallisation and Sublimation.

UNIT - II (9h)

Purification of liquids - Experimental Techniques of Distillation - Fractional Distillation - Vacuum Distillation - Steam Distillation - Tests of Purity - Gravimetric Analysis - Characteristics of Precipitating Agents - Condition of Precipitation - Types of Precipitants - Purity of Precipitate - Co-precipitation and Post precipitation - Precipitation from Homogeneous Solution - Digestion and Washing of precipitate - Ignition of precipitate - Uses of Sequestering Agents - Definition of spectrum - Electromagnetic radiation - Quantization of different forms of energies in molecules (Translational, Rotational, Vibrational and Electronic) - Born- Oppenheimer approximation - Condition of energy of absorption of various types of spectra.

UNIT - III (9h)

Microwave Spectroscopy - Theory of Microwave Spectroscopy - Selection Rule Calculation of Moment of Inertia and Bond Lengths of Diatomic molecules - Effect of Isotopic Substitution - UV - Visible Spectroscopy - Absorption laws - Calculations involving Beer- Lambert's law - Instrumentation - Photocalorimeter and Spectrophotometer - Block diagrams with description of components - Theory of Electronic Spectroscopy - Types of Electronic Transitions - Chromophore and Auxochromes - Absorption bands and Intensity - Factors influencing Position and Intensity of Absorption Bands - Frank- Condon Principle - Applications.

UNIT - IV (9h)

IR Spectroscopy - Principle - Theory of IR spectra - Vibrational Degrees of Freedom - Modes of Vibration of Diatomic Molecules -Triatomic linear (CO_2) and Non-linear Molecules (H_2O) - Stretching and Bending vibrations - Symmetric and Asymmetric Stretching vibrations - Selection rules - Expression for Vibrational Frequency (Derivation not needed) - Calculation of Force constant - Factors influencing Vibrational Frequencies - IR Spectrophotometer - Instrumentation - Source, Monochromator, Cell, Detectors, Recorders and Sampling Techniques - Applications of IR Spectroscopy - Identification of Functional Groups - Interpretation of the spectra of Alcohols, Aldehydes, Ketones and Esters (Aliphatic and Aromatic) - Hydrogen bonding.

UNIT - V (9h)

Raman Spectroscopy - Rayleigh and Raman scattering - Selection rule - Raman shift - Stokes and Anti-stokes lines - Differences between Raman and IR Spectroscopy - Raman Spectrophotometer - Instrumentation - Block diagram - Components and their Functions - Advantages of using Laser in Raman Spectroscopy - Applications - Structural elucidation in the study of Inorganic and Organic Compounds - Rotational-Raman spectra of Non - Centrosymmetric molecules - Mutual exclusion principle (CO_2 and N_2O) - Applications - Structural diagnosis.

Reference Books

- Elements of Analytical Chemistry - R. Gopalan, P. S. Subramanian, K. Rengarajan - S. Chand and sons (1997).
- Fundamentals of Analytical Chemistry - D. A. Skoog and D. M. West, Holt Reinhard and Winston Publications - IV Edition (1982).
- Principles of Instrumental Methods of Analysis - D. A. Skoog and Saunders, College Publications, III Edition (1985).
- Analytical Chemistry - S. M. Khopkar - New age International Publishers.

- Instrumental Methods of Chemical Analysis - Chatwal - Anand, Himalaya Publishing House (2000).
- Analytical Chemistry - R. Gopalan, Sultan Chand.
- Analytical Chemistry - S. Usharani, Macmillan.
- Instrumental Methods of Analysis - 7th Edition - H. H. Willard, L. L. Merit. J. Dean and F. A. Settle - Wadsworth Publishing Company Limited, Belmont, California, USA, 1988.
- Physico- Chemical Techniques of Analysis - P. B. Janarthanan - Vol. I & II - Asian Publishing.
- Instrumental Methods of Chemical Analysis - B. K. Sharma - Goel Publications.
- Applications of Absorption Spectroscopy of Organic Compounds - Prentice Hall, John R. Dyer.
- Spectroscopic Identification of Organic Compounds - R. M. Silverstein, G. C. Bassler and T. C. Morill - John Wiley and Sons.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO2	S	M	S	M	S	S	M	S	M	M
CO3	S	S	M	S	M	S	M	M	S	S
CO4	S	M	S	S	S	M	S	M	S	M
CO5	M	S	M	M	M	M	M	S	M	M

INTERNAL ELECTIVE

PAPER - 1

B. BASICS OF COMPUTER PROGRAMMING IN C AND ITS APPLICATIONS IN CHEMISTRY

Total No. of hours: 45

UNIT – I(9h)

Basic Computer Organisation, Processor and Memory - Main Memory, Secondary Storage Devices and Storage Hierarchy - Software - Relationship between Hardware and Software - Types of Software - Planning the Computer Program - Algorithm and Flowcharts - Basics of Operating Systems.

UNIT - II(9h)

Computer Languages - Machine Language, Assembly Language, Assembler, Compiler, Interpreter and Programming Languages - C language - Introduction - C Compiler - Operating Systems and Preprocessor Directives - Variables, Constants, Operators, Input and Output Functions.

UNIT – III(9h)

Control Structures - Conditional, Looping, Goto, Break, Switch and Continue Statements, Functions, Arrays And Pointers.

UNIT – IV(9h)

Applications in Chemistry - Calculation of the Radius of the first Bohr orbit for an Electron.

Calculation of Half-life Time for an integral order reaction - Calculation of Molarity, Molality and Normality of a solution - Calculation of Pressure of Ideal Gases and Van der Waal's gases - Calculation of Electronegativity of an Element using Pauling's relation.

UNIT – V(9h)

Applications in Chemistry - Calculation of Empirical Formulae of Hydrocarbons - Calculation of Reduced Mass of a few Diatomic Molecules - Determination of the Wave Numbers of Spectral lines of Hydrogen atom - Calculation of Work of Expansion in Adiabatic Process - Calculation of pH, Solubility Product and Bond Energy using Born-Landé equation - Calculation of Standard Deviation and Correlation Coefficient.

Reference Books

- Computers in Chemistry, K. V. Raman, 8th Edition, Tata McGraw Hill Publishers,

2005.

- Programming with C, Venugopal and Prasad, 11th Edition, 1971. .
- Programming in C, E. Balaguruswamy, 2nd Edition, 1989.

INTERNAL ELECTIVE
PAPER - 1
C. ORGANIC SYNTHESIS

Objectives

- To know the Basics of Retrosynthesis.
- To impart knowledge about the Ring Synthesis.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Analyze the importance of Organic synthesis.
- 2) Explain various disconnection approaches in Organic synthesis.
- 3) Explain the role of protecting groups in Organic synthesis.
- 4) Apply Ring synthesis in the synthesis of Camphor, Longifolene, Cortisone and Reserpine.

Total No. of hours: 45

UNIT - I

DISCONNECTION APPROACH (9h)

An introduction to Synthons and Synthetic Equivalent - Disconnection Approach - Functional Group Interconversions - The importance of the Order of Events in Organic Synthesis - One group C-X and Two group C-X disconnections - Chemoselectivity - Reversal of Polarity.

UNIT - II

PROTECTING GROUPS (9h)

Principle of Protection of Alcoholic group and Amino group - Principle of Protection of Carbonyl group and Carboxyl group - Activation of Functional Groups.

UNIT - III

ONE GROUP C-C DISCONNECTIONS (9h)

Alcohols and Carbonyl Compounds - Regioselectivity and Alkene Synthesis - Uses of Acetylenes and Aliphatic Nitro Compounds in Organic Synthesis.

UNIT - IV

TWO GROUP C-C DISCONNECTIONS(9h)

Diels-Alder Reaction - 1, 3 - Difunctionalised Compounds - α , β - Unsaturated Carbonyl Compounds - Control in Carbonyl Condensations - 1,5-Difunctionalised Compounds - Michael Addition and Robinson Annulation reactions.

UNIT - V

RING SYNTHESIS^(9h)

Saturated Heterocyclic Compounds - Synthesis of 3-, 4- and 6- Membered Rings
Aromatic Heterocycles in Organic Synthesis - Application of the above in the Synthesis of Camphor, Longifoline, Cortisone and Reserpine.

Reference Books

- Some Modern Methods of Organic Synthesis, W. Carruthers, Cambridge University Press, UK.
- Advanced Organic Chemistry, F. A. Carey and R. J. Sundberg, Part- B, Plenum Press.
- Modern Synthetic Reactions. H. O. House and W. A. Benjamin,

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	S	S	M	S	S
CO2	M	S	M	M	S	S	M	S	M	M
CO3	S	S	S	M	M	S	M	S	S	M
CO4	S	M	M	S	S	M	S	M	S	S
CO5	M	M	S	M	M	M	M	S	M	M

SKILL BASED SUBJECT

PAPER - 3

APPLIED CHEMISTRY

Objective:

- To impart Knowledge about Petrochemicals, Paper Technology, Sugar Industry, Explosives, Photography and Dairy Chemistry,

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Explain the refining process of petroleum and differentiate between Thermal and Catalytic Cracking.
- 2) Explain the various processes involved in paper technology.
- 3) Recover glucose from molasses and estimate sugar.
- 4) Prepare alcohol from molasses.
- 5) Explain the Proximate and Ultimate analysis of Coal.
- 6) Describe Chemical changes occurring in Milk during processing.
- 7) Define the principle involved in photography.
- 8) Explain the need for making milk powder and principle involved in drying process.

Total No. of hours: 45

UNIT – I (9h)

Petroleum - Origin - Composition of Petroleum - Inorganic, Engler and Modern theories - Classification - Refining (Simple Refinery) - Cracking - Thermal and Catalytic - Knocking - Octane Rating - Antiknock Compounds - Cetane Rating - Synthetic Petrol - LPG - Gobar Gas - Production - Feasibility and Importance of Biogas with special reference to Rural India - Petrochemicals - Elementary study - Definition - Chemicals from Natural Gas, Petroleum, Light naphtha and Kerosene - Origin - Composition - Synthetic Gasoline.

UNIT - II (9h)

Paper technology - Introduction - Manufacture of pulp - Various raw materials used for the preparation of pulp - Preparation of Sulphite pulp, Soda pulp and Rag pulp - Various processes - Beating, Refining, Filling, Sizing and Colouring - Manufacture of Paper - Calendering - Uses.

UNIT - III (9h)

Sugar industry - Sugar industries in India - Sugarcane and sugar beet - Manufacture of cane sugar - Extraction of juice - Concentration - Separation of crystals - Recovery of Glucose from Molasses - Defection - Sulphitation - Carbonation - Testing and Estimation of Sugar - Double Sulphitation Process - Preparation of Bagasse - Use of

Bagasse for Manufacture of Paper and Electricity - Preparation of Alcohol from Molasses - Preparation of Absolute Alcohol - Manufacture of Wine, Beer, Methylated Spirit and Power Alcohol.

UNIT - IV (9h)

Explosives - Primary, Low and High Explosives - Single compound explosives - Binary explosives - Plastic explosives - Dynamites - Blasting explosives - Preparation and Uses of Lead Azide, Nitroglycerine, Nitrocellulose, TNT, Cordite, Picric Acid and Gun Powder - Introduction to Rocket Propellants - Photography - Chemical Principle - Preparation of Sensitive Emulsion - Exposure - Developing - Fixing and Printing - Colour photography - Xerographic copying - Coal - Classification by rank - Proximate and Ultimate analysis - Low and High Temperature Carbonisation - Otto-Hoffmann's by-product - Distillation of Coal Tar.

UNIT - V (9h)

Milk - Definition - Physico-Chemical properties of milk - Constituents of milk and Their Physico-chemical Properties - Chemical change taking place in Milk due to Processing Parameters - Boiling, Pasteurisation, Sterilisation and Homogenisation - Definition and Composition of Creams, Butter, Ghee and Ice Creams - Milk Powder - Definition, Need for making powder - Principles involved in Drying process - Spray drying and Drum drying.

Reference Books

1. Fundamental Concepts of Applied Chemistry - Jayashree Ghosh - 1st Edition, S. Chand & Co. Ltd, New Delhi, 2006.
2. Milk and Milk Products - Clarence Henry Eckles, Willes Barnes Combs, Harold Macy - 4th Edition, Tata McGraw Hill Publishing Company Ltd, Reprint 2002.
3. Industrial Chemistry - B. K. Sharma - 13th Edition, Goel Publishing House, 2008.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	M	S	S	M	S	M
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CO3	S	M	S	M	M	M	M	S	S	M
CO4	S	M	M	S	S	S	S	M	S	M
CO5	M	M	S	M	M	M	M	S	M	S

SEMESTER - VI

CORE PAPER - 8

INORGANIC CHEMISTRY - II

Objectives:

To impart knowledge about Nuclear chemistry, Radioactivity, Metallurgy, Chemistry of f- Block Elements, Organometallic Compounds and Bio-inorganic Chemistry.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Explain the stability of nuclides in terms of N/P ratio, mass defect, binding energy and packing fraction.
- 2) Describe natural and artificial radioactivity and compare high energy nuclear reactions.
- 3) Describe the various processes involved in Metallurgy.
- 4) Compare the properties of d-block elements.
- 5) Compare the properties of lanthanides and actinides.
- 6) Classify Organometallic Compounds and discuss the biological importance of Fe, Cu and Zn.

Total No. of hours: 75

UNIT - I

NUCLEAR CHEMISTRY (15h)

Introduction - Composition of Nucleus - Fundamental Particles of Nucleus - Nuclear Forces operating between the Nucleons - N/P ratio - Nuclear Stability - The whole number rule and Packing fraction - Isotopes, Isobars, Isotones, mirror nuclei and Nuclear isomers - Detection and Separation of isotopes - Nuclear Binding Energy - Mass defect - Simple calculations involving Mass Defect and Binding Energy per Nucleon - Magic Numbers - Liquid drop model - Shell model.

UNIT - II

RADIOACTIVITY (15h)

Natural Radioactivity - Properties of Alpha, Beta and Gamma rays - Detection and measurement of Radioactivity - Radioactive series including Neptunium series - Soddy's Group Displacement Law - Rate of disintegration and Half - Life period - Derivation - Average life period - Artificial Radioactivity - Induced Radioactivity - Q-value of nuclear reactions - Uses of Radioisotopes - Hazards of radiations - Nuclear fission - Nuclear energy - Nuclear reactors, Breeder reactors - Nuclear fusion - Thermonuclear reactions - Energy source of the Sun and Stars - Atom bomb and Hydrogen bomb - Comparison of Nuclear Fission and Nuclear Fusion.

UNIT - III

METALLURGY (15h)

General metallurgy and Metallurgical processes - Methods of Concentration - Gravity separation, Froth floatation process, Magnetic separation, Roasting - Reduction methods - Smelting, Calcination, Goldschmidt Aluminothermic process, Reduction by active metals, Electrolytic reduction - Purification methods - Liquation, Zone refining, Van Arkel method, Carbonyl process and Electrolytic refining - Characteristic properties of d-block elements- Comparative study of Ti, V, Cr, Mn and Fe group elements with special reference to Occurrence, Oxidation States, Magnetic Properties, complexes, coordination number and Colour - Occurrence and Extraction of Ti, Mo, W and Co - Preparation and Uses of Ammonium Molybdate and V_2O_5 .

UNIT - IV

INNER TRANSITION ELEMENTS (15h)

General Characteristics of f- Block elements - Position of Lanthanides in the periodic table - Separation of Lanthanides (Ion exchange method) - Comparative study of Lanthanides and Actinides - Occurrence, Oxidation states, Magnetic properties, Colour and Spectra and complex formation - Lanthanide Contraction - Causes and Consequences - Comparison between Lanthanides and Actinides - Position of Actinides in the periodic table - Extraction of Thorium and Uranium

UNIT - V (15h)

ORGANOMETALLIC COMPOUNDS AND BIOINORGANIC CHEMISTRY

Organometallic Compounds - Definition - Nomenclature - Classification - Organo-Lithium and Organo-Boron Compounds - Preparation, Properties, Structure and Uses. - Biological Functions of Iron, Copper and Zinc - Biologically Important Compounds - Myoglobin, Cytochrome, Haemoglobin and Ferritin - Binary Metallic Compounds - Hydrides, Borides, Carbides and Nitrides - Classification - Preparation, Properties, Structure and Uses.

REFERENCE BOOKS

1. **Inorganic Chemistry - P. L. Soni - Sultan Chand (2006).**
2. Principles of Inorganic Chemistry - B. R. Puri, L. R. Sharma and K. C. Kallia - Milestone Publications (2013).
4. Selected Topics in Inorganic Chemistry - W. U. Malik, G. D. Tuli and R. D. Madan - S. Chand Publications (2008).
5. Inorganic Chemistry: Principles of Structure and Reactivity - J. E. Huheey, E. A. Keiter, R. I. Keiter and O. K. Medhi - 2006.
6. Concise Inorganic Chemistry - J. D. Lee - III edition - Von Nostrand.

7. Industrial Chemistry - B. K. Sharma - Goel Publications (1983).
8. Industrial Chemistry R. K. Das - Kalyani Publications, New Delhi (1982).
9. Coordination Chemistry - S. F. A. Kettle - ELBS (1973).
10. Coordination Chemistry - K. Burger - Butterworthy (1973).
11. Vogel's Handbook of Quantitative Inorganic Analysis - Longman.
12. Text Book of Qualitative Inorganic Analysis - A. I. Vogel - III edition (1976).
13. Source Book on Atomic Energy - S. Glasstone- East-West Press Pvt. Ltd. (1967).
14. Nuclear and Radiochemistry - John Wiley and Sons (1964).
15. Nuclear Chemistry - H. J. Arnikar - Wiley Eastern Co., - II edition (1987).
16. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons (1988)
16. Text Book of Inorganic Chemistry - R. Gopalan - Universities Press - 2012.
17. Modern Inorganic Chemistry - R. D. Madan - S. Chand Publications, Reprint, 2014.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
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CO3	S	M	S	M	M	S	M	M	S	M
CO4	M	M	M	S	S	M	S	M	M	S
CO5	M	S	S	M	M	M	M	S	M	M

CORE PRACTICAL
PAPER - 3
GRAVIMETRIC ESTIMATION

Total No. of hours: 45

1. Estimation of Sulphate as Barium Sulphate.
2. Estimation of Barium as Barium Sulphate.
3. Estimation of Barium as Barium Chromate.
4. Estimation of Lead as Lead Chromate.
5. Estimation of Calcium as Calcium Oxalate Monohydrate.

References

- Qualitative Inorganic Analysis, A.I. Vogel - 7th Edition, Prentice Hall.
- Quantitative Chemical Analysis, A.I. Vogel - 6th Edition, Prentice Hall.

CORE PAPER - 9
ORGANIC CHEMISTRY - II

Objectives:

- To kindle interest in students in learning Bio-organic chemistry through the introduction of topics such as Proteins, Nucleic acids, Terpenes, Alkaloids etc.
- To generate Keen Interest and Thinking in Understanding the Mechanisms of Molecular Rearrangements and Synthetic Applications of Acetoacetic Ester, Benzene Diazonium Chloride, Grignard Reagents and Diazomethane.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Explain the mechanisms of inter and intra molecular rearrangements.
- 2) Classify amino acids and explain their preparation and properties and synthesis of Peptides.
- 3) Differentiate between DNA and RNA.
- 4) Explain primary and secondary structures of proteins.
- 5) Elucidate the structures of Antibiotics, Alkaloids and Terpenoids.

Total No. of hours: 75

UNIT - I

MOLECULAR REARRANGEMENTS (15h)

Rearrangements - Classification - Anionotropic, Cationotropic and Free Radical Rearrangements - Intermolecular and Intramolecular Rearrangements - Examples - Cross over experiment - Differences between Intermolecular and Intramolecular rearrangements - Mechanisms, Evidences, Migratory Aptitude, Intermolecular or Intramolecular nature of the following rearrangements - Pinacol-Pinacolone, Benzil-Benzilic acid and Beckmann rearrangement - Mechanism of Hoffmann, Curtius, Baeyer-Villiger, Claisen (Sigmatropic), Fries rearrangement, Cope and Oxy-Cope rearrangements.

UNIT - II

AMINO ACIDS AND POLYPEPTIDES (15h)

Amino acids - Classification - Essential and Non-Essential amino acids - Acidic, Basic and Neutral Amino Acids - Alpha, Beta and Gamma- Amino acids - Preparation of alpha amino acids - Gabriel's Phthalimide synthesis, Strecker synthesis and Erlenmeyer Azlactone synthesis - Glycine, Alanine and Tryptophan - General properties of Amino acids - Reactions of Amino acids due to Amino group and Carboxyl group - Zwitterions - Isoelectric point - Peptides - Synthesis - Bergmann Method - Structural Determination of Polypeptides - End Group Analysis - N-Terminal and C-Terminal Amino Acids Determination.

UNIT - III PROTEINS AND NUCLEIC ACIDS(15h)

Proteins - Definition - Classification based on Physical Properties, Chemical Properties and Physiological Functions - Primary and Secondary Structure of Proteins - Helical and Beta Sheet Structures (Elementary Treatment Only) - Denaturation of Proteins - Nucleic acids - Nucleoproteins - Definition - Types of Nucleic Acids - RNA and DNA - Nucleoside, Nucleotide, Degradation of Nucleotide Chain - Components of RNA and DNA - Differences between DNA and RNA - Structures of Ribose and 2-Deoxyribose - Double Helical Structure of DNA - Biological functions of Nucleic Acids - Elementary ideas on Replication and Protein Synthesis.

UNIT - IV CHEMISTRY OF NATURAL PRODUCTS(15h)

Antibiotics - Definition - Structural elucidation of Penicillin and Chloramphenicol - Uses of Penicillin and Chloramphenicol - Alkaloids - Classification - Isolation of alkaloids - General methods of Determination of structure of Alkaloids - Synthesis and Structural Elucidation of Piperine, Coniine and Nicotine - Terpenoids - Definition - Classification - Isoprene rule - Synthesis and Structural elucidation of Citral, Menthol and Alpha-pinene.

UNIT - V (15h)

ORGANOSULPHUR COMPOUNDS AND AROMATIC SULPHANIC ACIDS.

Thioalcohols-Structure-Nomenclature-methods of preparation-Physical and Chemical properties - Thioethers-Structure-Nomenclature-Physical and Chemical properties - dimethyl sulphoxide - uses.Mustard gas-Preparation-Properties and uses - Aromatic sulphanic acid - structure-Nomenclature-benzene sulphanic acid,benzene sulphonyl chloride, benzene disulphanic acids,Toluene sulphanic acids,Chloramine-T,Saccharin and sulphanilic acid-Chemical properties and uses.

REFERENCE BOOKS

1. Organic Chemistry - R. T. Morrison and Boyd - Pearson - 2010.
2. Organic Chemistry - I. L. Finar - Volume I and II - Pearson Education.
3. Text Book of Organic Chemistry - P. L. Soni - Sultan Chand & Sons - 2007.
4. Advanced Organic Chemistry - Bahl and Arun Bahl - S. Chand and Co. Ltd. - 2012.
5. Stereochemistry, Conformations and Mechanisms - Kalsi - 2nd Edition, Wiley Eastern Ltd., Chennai - 1993.
6. Organic Chemistry of Natural Products - Volume I and II - O. P. Agarwal - Goel Publishing House
7. A Guide Book to Mechanisms in Organic Chemistry - Peter Sykes - Pearson Education - 2006.

8. Stereochemistry of Organic Compounds - D. Nasipuri - New Age International Publishers..
23. Chemistry of Natural Products - Gurdeep Chatwal- Himalaya Publishing House.
24. Reactions and Reagents - O. P. Agarwal- Goel Publishing House.
25. Organic Reaction Mechanisms - Gurdeep Chatwal- Himalaya Publishing House.
26. A Text Book of Organic Chemistry, K. S. Tewari, N. K. Vishnoi, S. N. Mehrotra - Vikas Publishing House - 2011.
27. Modern Organic Chemistry- M. K. Jain and S. C. Sharma- Vishnoi Publications, 2014.
28. Reaction, Mechanism and Structure - Jerry March - John Wiley and Sons, NY - 1992.
29. Organic Chemistry - Bruice - Pearson Education.
30. Text Book of Organic Chemistry - C. N. Pillai - Universities Press - 2009.
31. Organic Reaction Mechanisms - Parmar and Chawla - S. Chand & Co.
32. Organic Chemistry - I. L. Finar - 6th Edition, Pearson Education, 2008.
33. A Guide Book to Mechanisms in Organic Chemistry - Peter Sykes - Pearson Education, 2006
34. Stereochemistry of Carbon Compounds- E. I. Eliel - Tata Mcgrow Hill Education - 2000.
35. Organic Chemistry - T. W. Graham Solomon, C. B. Fryhle - S. A. Snyder - John Wiley & Sons - 2014.
36. Advanced Organic Reaction Mechanism (Problems and Solutions) - N. Tewari - Books and Allied (P) Ltd - 2005.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
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5	YES	YES	YES	YES	YES	YES

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CO2	S	S	M	M	S	S	M	S	M	M
CO3	M	M	S	M	M	S	M	M	S	S
CO4	S	M	M	S	S	M	S	M	M	S
CO5	M	S	S	M	M	M	M	S	M	M

CORE PRACTICAL

PAPER - 4

ORGANIC QUALITATIVE ANALYSIS AND PREPARATIONS

Analysis of organic compounds containing one functional group and characterisation with a derivative.

Total No. of hours: 45

Reactions of the following Functional Groups:

Aldehyde, Ketone, Carboxylic Acid (Mono and Di), Ester, Carbohydrate (Reducing and Non-Reducing), Phenol, Aromatic Primary Amine, Amide, Nitro Compounds, Diamide and Anilide.

Organic Preparations

Acylation

1. Acetylation of Salicylic acid or Aniline.
2. Benzoylation of Aniline or Phenol.

Nitration

3. Preparation of m- Dinitrobenzene
4. Preparation of p- Nitroacetanilide

Halogenation

5. Preparation of p- Bromoacetanilide
6. Preparation of 2,4,6-Tribromophenol

Diazotisation /Coupling

7. Preparation of Methyl Orange

Oxidation

8. Preparation of Benzoic Acid from Toluene or Benzaldehyde.

Hydrolysis

9. Hydrolysis of Ethyl Benzoate (Or) Methyl Salicylate (Or) Benzamide.

Reference Books

- ❖ Vogel's Text Book of Chemical Analysis
- ❖ Practical Chemistry - A. O. Thomas - Scientific Book Center, Cannanore.
- ❖ Practical Chemistry - 3 Volumes - S. Sundaram and others.
- ❖ Text Book of Practical Organic Chemistry - A. I. Vogel, A. R. Tatchell, B. S. Furnis, A. J. Hannaford and P.W. G. Smith - 5th Edition - 1996.
- ❖ Comprehensive Practical Organic Chemistry - Preparation and Quantitative Analysis - V. K. Ahluwalia, Renu Agarwal - Universities Press - 2013.

CORE PAPER - 10
PHYSICAL CHEMISTRY - II

Objectives:

- To impart Knowledge about Electrochemistry, Surface Chemistry, Photochemistry, Chemical Kinetics and Theories of reaction rates.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Derive Nernst equation and explain Cell reactions.
- 2) Explain Concentration Cells and polarization.
- 3) Derive rate constant expressions for zero, first, second and third order reactions and determine the order of a reaction.
- 4) Compare Collision theory and ARRT.
- 5) Explain Lindemann's theory of unimolecular reactions.
- 6) Explain Langmuir Theory of Adsorption.
- 7) Derive Michaelis-Menten equation for enzyme catalyzed reactions.
- 8) State laws of photochemistry and explain the kinetics of photo chemical reactions.
- 9) Explain various Photo physical processes and Photosensitized reactions.

Total No. of hours: 75

UNIT - I

ELECTROCHEMISTRY – III (15h)

Galvanic cells - Daniel cell - Reversible and Irreversible Cells - EMF of a Cell and its Measurement - Standard Weston Cadmium Cell - Evaluation of Thermodynamic Quantities- ΔG , ΔH and ΔS from emf data - Derivation of Nernst equation for Electrode Potential and Cell emf -Types of reversible electrodes - Electrode reactions - Electrode potentials - Reference electrodes - Standard Hydrogen Electrode - Standard Electrode Potential - Sign conventions - Electrochemical Series and its Applications.

UNIT - II

ELECTROCHEMISTRY - IV (15h)

Liquid Junction Potential - Concentration cells With Transference and Without Transference - Applications of Concentration cells - Valency of ions, Solubility and Solubility Product - Activity Coefficient of electrolytes - Determination of pH using Hydrogen, Quinhydrone and Glass electrodes - Potentiometric titrations - Polarisation -

Overvoltage - Decomposition potential - Storage Cells- Lead Storage Battery- Mechanism of Charging and Discharging- Fuel Cells ($\text{H}_2\text{-O}_2$ Cell).

UNIT - III

CHEMICAL KINETICS (15h)

Definitions of the terms - Order and Molecularity - Rate of the reaction - Derivations of expressions for Zero, First, Second (for equal and unequal concentrations of reactants) and Third order rate equations - Study of kinetics - Methods of Determination of Order of a reaction - Effect of Temperature on reaction rate - Arrhenius equation - Theories of reaction rates - Bimolecular Collision Theory - Lindmann's theory of Unimolecular Reactions - ARRT - Thermodynamic treatment of ARRT - Eyring equation - Comparison of Collision Theory and ARRT.

UNIT - IV

SURFACE CHEMISTRY (15h)

Adsorption - Characteristics of adsorption - Physisorption and Chemisorption - Differences between Physical and Chemical Adsorption - Applications of Adsorption - Adsorption of Gases by Solids - Different Types of Isotherms - Freundlich adsorption isotherm - Langmuir theory of adsorption - Derivation. BET Theory (no derivation) - Catalysis - Definition - General Characteristics of Catalytic Reactions - Acid-Base catalysis - Enzyme catalysis - Michaelis-Menton Equation - Effect of Temperature and pH on Enzyme Catalysis. Enzyme Inhibition - Homogeneous catalysis - Function of a catalyst in terms of Gibbs free energy of activation - Heterogeneous catalysis - Kinetics of Unicellular Surface Reactions.

UNIT - V

PHOTOCHEMISTRY (15h)

Difference between Thermal and Photo chemical reactions - Laws of photochemistry - Grothus-Draper law, Stark-Einstein's law - Primary and Secondary processes - Quantum yield and its determination - Qualitative description of Fluorescence, Phosphorescence-Jablonski diagram - Photosensitized Reactions. Luminescence, Chemiluminescence and Bioluminescence - Kinetics of Photochemical Reactions - $\text{H}_2\text{-Cl}_2$ and $\text{H}_2\text{-Br}_2$ reactions - Photodimerisation of Anthracene.

REFERENCE BOOKS

1. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishal Publishing Co., - 2013.
2. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., - 2006.

3. Physical Chemistry - Negi and Anand - Eastern Wiley Pvt.Ltd..
4. Physical Chemistry - Kundu and Jain - S. Chand & Co.
5. Physical Chemistry - K. L. Kapoor - Macmillan - 4 volumes.
6. Elements of Physical Chemistry - Glasstone and Lewis - Macmillan.
7. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd.
8. Fundamentals of Physical Chemistry - Maron and Landor - Colier - Macmillan.
9. Physical Chemistry - G. W. Castellan - Narosa publishing house - 2004.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
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CO3	S	M	M	S	M	S	M	M	S	M
CO4	M	S	M	S	S	M	S	M	M	S
CO5	S	S	M	S	M	M	M	S	M	M

REFERENCE BOOKS

INORGANIC CHEMISTRY

1. Inorganic Chemistry - P. L. Soni - Sultan Chand (2006).
2. Principles of Inorganic Chemistry - B. R. Puri, L. R. Sharma and K. C. Kallia - Milestone Publications (2013).
3. Selected Topics in Inorganic Chemistry - W. U. Malik, G. D. Tuli and R. D. Madan - S. Chand Publications (2008).
4. Inorganic Chemistry: Principles of Structure and Reactivity - J. E. Huheey, E. A. Keiter, R. I. Keiter and O. K. Medhi - 2006.
5. Concise Inorganic Chemistry - J. D. Lee - III edition - Von Nostrand.
6. Industrial Chemistry - B. K. Sharma - Goel Publications (1983).
7. Industrial Chemistry R. K. Das - Kalyani Publications, New Delhi (1982).
8. Coordination Chemistry - S. F. A. Kettle - ELBS (1973).
9. Coordination Chemistry - K. Burger - Butterworthy (1973).
10. Vogel's Handbook of Quantitative Inorganic Analysis - Longman.
11. Text Book of Qualitative Inorganic Analysis - A. I. Vogel - III edition (1976).
12. Source Book on Atomic Energy - S. Glasstone- East-West Press Pvt. Ltd. (1967).
13. Nuclear and Radiochemistry - John Wiley and Sons (1964).
14. Nuclear Chemistry - H. J. Arnikar - Wiley Eastern Co., - II edition (1987).
15. Advanced Inorganic Chemistry - Cotton and Wilkinson - V Edition - Wiley and Sons (1988)
16. Text Book of Inorganic Chemistry - R. Gopalan - Universities Press - 2012.
17. Modern Inorganic Chemistry - R. D. Madan - S. Chand Publications, Reprint, 2014.

ORGANIC CHEMISTRY

1. Organic Chemistry - R. T. Morrison and Boyd - Pearson - 2010.
2. Organic Chemistry - I. L. Finar - Volume I and II - Pearson Education.
3. Text Book of Organic Chemistry - P. L. Soni - Sultan Chand & Sons - 2007.
4. Advanced Organic Chemistry - Bahl and Arun Bahl - S. Chand and Co. Ltd. - 2012.
5. Stereochemistry, Conformations and Mechanisms - Kalsi - 2nd Edition, Wiley Eastern Ltd., Chennai - 1993.
6. Organic Chemistry of Natural Products - Volume I and II - O. P. Agarwal - Goel Publishing House
7. A Guide Book to Mechanisms in Organic Chemistry - Peter Sykes - Pearson Education - 2006.
8. Stereochemistry of Organic Compounds - D. Nasipuri - New Age International

Publishers..

9. Chemistry of Natural Products - Gurdeep Chatwal- Himalaya Publishing House.
10. Reactions and Reagents - O. P. Agarwal- Goel Publishing House.
11. Organic Reaction Mechanisms - Gurdeep Chatwal- Himalaya Publishing House.
12. A Text Book of Organic Chemistry, K. S. Tewari, N. K. Vishnoi, S. N. Mehrotra - Vikas Publishing House - 2011.
13. Modern Organic Chemistry- M. K. Jain and S. C. Sharma- Vishnoi Publications, 2014.
14. Reaction, Mechanism and Structure - Jerry March - John Wiley and Sons, NY - 1992.
15. Organic Chemistry - Bruice - Pearson Education.
16. Text Book of Organic Chemistry - C. N. Pillai - Universities Press - 2009.
17. Organic Reaction Mechanisms - Parmar and Chawla - S. Chand & Co.
18. Organic Chemistry - I. L. Finar - 6th Edition, Pearson Education, 2008.
19. A Guide Book to Mechanisms in Organic Chemistry - Peter Sykes - Pearson Education, 2006
20. Stereochemistry of Carbon Compounds- E. I. Eliel - Tata Mcgrow Hill Education - 2000.
21. Organic Chemistry - T. W. Graham Solomon, C. B. Fryhle - S. A. Snyder - John Wiley & Sons - 2014.
22. Advanced Organic Reaction Mechanism (Problems and Solutions) - N. Tewari - Books and Allied (P) Ltd - 2005.
23. Advanced Organic Stereochemistry (Problems and Solutions) - N Tewari - Books and Allied (P) Ltd - 2010.

PHYSICAL CHEMISTRY

24. Principles of Physical Chemistry - B. R. Puri, Sharma and Madan S. Pathania, Vishnal Publishing Co., - 2013.
25. Text Book of Physical Chemistry - P. L. Soni, O. P. Dharmarha and U. N Dash - Sultan Chand & Co., - 2006.
26. Physical Chemistry - Negi and Anand - Eastern Wiley Pvt.Ltd..

27. Physical Chemistry - Kundu and Jain - S. Chand & Co.
28. Physical Chemistry - K. L. Kapoor - Macmillan - 4 volumes.
29. Elements of Physical Chemistry - Glasstone and Lewis - Macmillan.
30. Text book of Physical Chemistry - S. Glasstone - Macmillan (India) Ltd.
31. Fundamentals of Physical Chemistry - Maron and Landor - Colier - Macmillan.
32. Physical Chemistry - G. W. Castellan - Narosa publishing house - 2004.
33. Physical Chemistry - Walter J. Moore - Orient Longman - 1972.
34. Numerical Problems on Physical Chemistry, Gashal - Books and Allied (P) Ltd.,
35. Universal General Chemistry, C.N.R. Rao, Macmillan.
36. Group Theory and its Chemical Applications - P. K. Bhattacharya - Himalaya Publishing House.
37. Text book of Physical Chemistry - M. V. Sangaranarayanan, V. Mahadevan, Universities Press - 2011.
38. General and Physical Chemistry - Dr. A. Arunabhasan, Books of Allied (P) Ltd., - Ghosal - 2009.

CORE PRACTICAL
PAPER - 5
PHYSICAL CHEMISTRY EXPERIMENTS

Total No. of hours : 45

1. Kinetics

Determination of the Order of the following reactions

- a) Acid catalysed Hydrolysis of an Ester (Methyl or Ethyl acetate)
- b) Saponification of an Ester (Methyl or Ethyl Acetate)
- c) Iodination of Acetone.

2. Molecular weight of a solute - Rast's method using Naphthalene or Diphenyl as Solvents.

3. Heterogeneous equilibria

- a) *Phenol-Water system - CST
 - b) Effect of impurity - 2 % NaCl or Succinic acid solutions on Phenol -Water system - Determination of the Concentration of the given solution
- 4. Determination of the Transition Temperature** of the given salt hydrate.
 $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$, $\text{CH}_3\text{COONa} \cdot 3\text{H}_2\text{O}$, $\text{SrCl}_2 \cdot 6\text{H}_2\text{O}$, $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$

5. Electrochemistry

Conductivity

- a) Determination of Cell Constant and Equivalent Conductivities of the solutions of two different concentrations.
 - b) Conductometric titration of a Strong Acid against a Strong Base.
- 6. Potentiometric titration** of a Strong Acid against a Strong Base.
7. Colorimetry- Determination of unknown concentration using Photoelectric colorimeter.
8. Determination of pK_a of acetic acid using pH Meter.

***Need not be given in examination.**

Students must write Short Procedure / Formula with explanation in Ten Minutes for evaluation during the university practical examination.

INTERNAL ELECTIVE

PAPER - 2

(to choose one out of 3)

A. ANALYTICAL CHEMISTRY - II

Objective:

- To impart knowledge about Different Chromatographic and Spectroscopic Techniques.

Outcome:

The Students will be able to

- 1) Explain the principles and techniques of column, paper and thin layer chromatography, ion-exchange, high - pressure liquid and gas chromatography
- 2) Elucidate the structure of organic compounds using NMR, Mass and ESR spectroscopy .
- 3) Discuss the principle and applications of TGA, DTA and thermometric titrations.
- 4) Explain the principle of polarography and amperometric titrations .

Total No. of hours : 30

UNIT – I(6h)

Chromatography - Principles and Techniques of Column, Paper and Thin Layer Chromatography - Column Chromatography - Preparation of Column - Adsorption - Adsorbents - Elution - Recovery of Substances - TLC - Choice of Adsorbent and Solvents - Preparation of Chromatogram and Applications - R_f value - Paper Chromatography - Solvents used - Factors affecting R_f value - Separation of Amino Acid Mixtures - Radial Paper Chromatography - Applications - ion exchange chromatography - Principle - Experimental Techniques - Types of Resins - Requirement of a Good Resin - Action of Ion Exchange Resins - Experimental Techniques and Applications - Separation of Zinc- Magnesium, Cobalt - Nickel and Cadmium - Zinc ions.

UNIT - II (6h)

High Pressure Liquid Chromatography and Gas Chromatography - Principle and Applications - Gas Chromatography - Mass Spectrophotometer (GC-MS) - Liquid Chromatography - Mass Spectrophotometer (LC-MS) - Principle and Applications -

Polarography - Principle - DME - Advantages and Disadvantages - Ilkovic equation and its significance (No Derivation) - Polarography as an Analytical tool in Quantitative and Qualitative Analysis - Amperometric Titrations.

UNIT – III(6h)

NMR Spectroscopy - Principle of Nuclear Magnetic Resonance - Basic Instrumentation - Number of Signals - Chemical Shift - Shielding and Deshielding - Factors influencing Chemical Shift - Spin-Spin Coupling and Coupling constants - TMS as NMR standard - Splitting of Signals - NMR Spectra of simple Organic Molecules - Applications in Structural Elucidation.

UNIT – IV(6h)

Mass Spectroscopy - Basic principles of Mass Spectrum - Instrumentation - Molecular ion peak- Base peak - Metastable peak - Isotopic peak and their Uses - Fragmentation - Factors affecting Cleavage Patterns - Nitrogen rule - Ring rule - McLafferty rearrangement - Determination of Molecular Formulae with examples - Mass spectrum of simple organic compounds - Identification - Alcohols, Aldehydes and Aromatic hydrocarbons.

UNIT – V (6h)

ESR Spectroscopy - Condition - Selection Rule for Transition - Theory of ESR Spectra - Basic Instrumentation - ESR Spectrometer - Components and their Functions - Hyperfine splitting - ESR Spectra of simple radicals - CH_3 , CD_3 , Naphthalene radical ions only - Applications in structural elucidation - Thermoanalytical methods - Principle involved in Thermogravimetric analysis (TGA) and Differential Thermal Analysis (DTA) - Instrumentation- Discussion of Various Components with Block Diagram - Characteristics of TGA ($\text{CaC}_2\text{O}_4 \cdot \text{H}_2\text{O}$, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) and DTA curves - Factors Affecting TGA and DTA Curves - Thermometric Titrations - Principle and Applications.

Reference Books

1. Analytical Chemistry - S. M. Khopkar - New Age International Publishers - 1998.
2. Analytical Chemistry - R. Gopalan - Sultan Chand & Sons - 2002.
3. Chemical Analysis: An Instrumental Approach - A. K. Srivastava and P. C. Jain.
4. Spectroscopic Identification of Organic Compounds - R. M. Silverstein, G. C. Basseler & T. C. Morill.
5. Organic Spectroscopy - W. Kemp.
6. Spectroscopic Methods in Organic Chemistry - D. Williams & I. Fleming.
7. Fundamentals of Molecular Spectroscopy - 4th Edition, C. N. Banwell and E. M. McCash - Tata McGraw Hill Publishers, New Delhi - 2006.
8. Applications of Absorption Spectroscopy of Organic Compounds - John R. Dyer.
9. Introduction to Molecular Spectroscopy - Barrow.
10. Spectroscopy of Organic Compounds - P. S. Kalsi.

11. Instrumental Methods of Chemical Analysis - B. K. Sharma - Goel Publications - 2000.
12. Fundamentals of Analytical Chemistry: An introduction - D. A. Skoog, D. M. West - Thomson - 2004.
13. Analytical Chemistry: Theory and Practice - U. N. Dash.
14. Vibrational Spectroscopy - D. N. Sathyanarayanan - New Age International Publishers - 2000.
15. Fundamentals of Spectroscopy - Y. R. Sharma - S. Chand - 2008.
16. Fundamentals of Molecular Spectroscopy - 4th Edition - C. N. Banwell and E. M. McCash - Tata McGraw Hill, New Delhi - 2006.
17. Elementary Organic Spectroscopy - Principles and Chemical Applications - Y. R. Sharma, S. Chand & Company Private Limited, V Revised Edition - 2013.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	S	S	M	S	S
CO2	S	S	M	S	S	S	M	S	M	M
CO3	M	M	S	S	M	S	M	M	S	S
CO4	M	S	M	S	S	M	S	M	M	S
CO5	S	M	S	M	M	M	M	S	M	S

INTERNAL ELECTIVE

PAPER - 2

B. TEXTILE CHEMISTRY

Objective:

- To impart knowledge about the Production, Properties and Applications of Natural and Synthetic Fibres, Colour and Constitution, Classification of Dyes and Concept of Dyeing in Textile Industry.

Outcome:

The Students will be able to

- 1) Understand the chemical structure of fibres.
- 2) Identify natural and synthetic fibres through identification tests.
- 3) Explain Scouring and Bleaching methods used in textile industries .
- 4) Classify dye and explain the concept of dyeing in textile industries.
- 5) Explain the methods used in the process of mercerizing in textile industries.

Total No. of hours: 30

UNIT – I (6h)

General Classification of Fibres - Chemical structure - Production - Properties - Count, Denier, Tex, Staple Length, Spinning Properties, Strength, Elasticity and Creep - Applications of the following Natural Cellulose Fibres (Cotton and Jute) - Natural Protein Fibres (Wool and Silk) - General characteristics.

UNIT – II (6h)

Chemical Structure, Production and properties of the following Synthetic Fibres - Man- made Cellulose Fibres (Rayon and Modified cellulose fibres) - Polyamide Fibres (Different types of Nylons) - Preparation - Nylon degradation - Polyester Fibres - Preparation - Degradation - Polyacrylonitrile fibre - Preparation and Properties - Viscose fibre - Preparation and Properties - Identification tests for Cellulose, Cotton, Wool, Silk, Rayon, Acrylic, Viscose, Polyamide and Polyester Fibres.

UNIT – III (6h)

Impurities in Raw Cotton and Grey Cloth, Wool and Silk - General principles of the Removal, Scouring - Purpose, Alkali Scouring and Acid Scouring - Bleaching (Methods - Hypochlorite, Peroxide and Bleaching Powder) - Desizing (Hydrolytic and Enzymatic), Kier Boiling and Chemicking - Dyeing of Polyester and Blends - Functions of Dispersing agents - Fibre swelling - Carrier dyeing - High temperature dyeing - Selection of dyestuff.

UNIT – IV (6h)

Colour and Constitution - A general treatment - Chromophores - Auxochromes - Bathochromes and Hypsochromes - Classification of dyes - Acidic, Basic, Direct, Mordant, Azoic, Ingrain, Vat and Reactive Dyes - Classification as per Chemical constitution - Azo dyes - Triphenyl Methane Dyes, Phthalein Dyes, Indigo and Anthraquinone Dyes - Structure, Preparation and Uses - Methyl Orange, Phenolphthalein and Malachite Green.

UNIT – V (6h)

Dyeing - Dyeing of Wool and Silk - Fastness properties of dyed materials - Dyeing of Nylon, Terylene and other Synthetic Fibres - Finishing - Finishes given to Fabrics - Mechanical finishes on Cotton, Wool and Silk - Method used in process of Mercerizing - Anticrease and Antishrink finishes - Water Proofing.

References

- Chemical Technology of Fibrous Materials - F. Sadov, M. Horchagin and A. Matetshy, Mir Publishers.
- The Identification of Textile Fibres - Bruno Nuntak.
- Introduction to Textile Science - 3rd edition, Maryory L. Joseph.
- Textile Chemistry - Vol. II, R. H. Peters, Elsevier, Amsterdam.
- Dyeing and Chemical Technology of Textile Fibres - 5th Edition, E. R. Trotman, Charles Griffin & Co Ltd.
- Chemistry of dyes & Principles of Dyeing - V. A. Shenai, Sevak Publications.
- Scouring and Bleaching, E. R. Trotman, Charles Griffin & Co Ltd.
- Text Book of Applied Chemistry - K. Kapur.
- A Students Text Book of Textile Science - A. J. Hall.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	S	M	S	M
CO2	M	S	M	S	S	M	M	S	M	S
CO3	S	M	S	M	M	S	M	M	S	S
CO4	S	M	M	S	S	M	S	M	M	M
CO5	M	S	S	S	M	M	M	S	M	M

INTERNAL ELECTIVE

PAPER - 2

C. NANO CHEMISTRY

Objectives:

- To introduce the Basics of Nanotechnology.
- To learn the Instrumental Techniques used in Characterisation of Nanomaterials.

Outcome:

The Students will be able to

- 1) Understand the basics of Nanotechnology .
- 2) Explain the preparation ,properties and uses of Nano particles.
- 3) Discuss the techniques used to synthesise Nano particles.
- 4) Understand the role of Electron microscopes- SEM ,TEM,SPM,AFN, and STEN in Nano technology.

Total No of hours : 30

UNIT - I

BASICS OF NANO CHEMISTRY (6h)

Introduction - Definition - Length scales - Importance of Nanoscale and its Technology - Self Assembly of Materials - Self Assembly of Molecules - Porous solids, Nanowires, Nanomachines and Quantum Dots.

UNIT - II(6h)

NANOPARTICLES

Introduction - Types of Nanoparticles - Preparation, Properties and Uses of Gold, Silicon, Silver, Zinc Oxide, Iron Oxide, Alumina and Titania Nanoparticles.

UNIT – III (6h)

SYNTHETIC TECHNIQUES

Techniques to Synthesise Nanoparticles - Top down and Bottom up Approaches - Common Growth Methods - Characterisation of Nanoparticles - Applications and Toxic effects of Nanomaterials.

UNIT - IV

NANOMATERIALS (6h)

Preparation, Properties and Applications of Carbon Nanotubes, Nanorods, Nanofibres and Nanoclays.

UNIT - V

INSTRUMENTAL TECHNIQUES (6h)

Electron Microscopes - Scanning Electron Microscopes (SEM) - Transmission Electron Microscopes (TEM) - Scanning Probe Microscopy - Atomic Force Microscopy (AFM) - Scanning Tunneling Electron Microscope (STEM) - Basic Principles only.

Books for Study

- Nanotechnology, S. Shanmugam, MJP Publishers, Chennai (2010).
- A Handbook on Nanochemistry, Patrick Salomon, Dominant Publishers and Distributors, New Delhi.
- Nanobiotechnology, S. Balaji, MJP Publishers, Chennai (2010).

Books for Reference

- The Chemistry of Nanomaterials: Synthesis, Properties and Applications, Vol. I and II, CNR Rao, Springer (2006).
- Nanotechnology: Basic Science and Emerging Technologies, Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, Overseas Press (2005).
- Nanochemistry, G. B. Segreev, Elsevier, Science, New York, (2006).
- Nano: The Essentials, T. Pradeep, Tata Mc-Graw Hil Publishers, New Delhi (2007).
- Text Book of Nanoscience and NanoTechnology, P. Shankar Baldev Raj, B. B. Rath and James Murday - 2014.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	v Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	M	S	S
CO2	S	S	M	S	S	M	M	S	M	S
CO3	M	M	S	M	M	S	M	M	S	M
CO4	S	M	M	S	S	M	S	M	M	S
CO5	M	S	M	S	M	M	M	S	M	M

INTERNAL ELECTIVE

PAPER - 3

(to choose one out of 3)

A. PHARMACEUTICAL CHEMISTRY

Objective:

- To effectively impart knowledge about Various Diseases and Their Treatment, Importance of Indian Medicinal Plants and Different Types of Drugs. Preparation, Synthesis and Structural Determination are not required for the Compounds mentioned.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Define the terms involved in pharmaceutical chemistry.
- 2) Explain the causes, symptoms and treatment of common diseases.
- 3) Explain the composition of blood.
- 4) Explain the role of antibacterial, antiseptics, vitamins, analgesics and anesthetics.
- 5) Apply the therapeutic importance of Indian medicinal plants.
- 6) Classify hormones and explain their functions.

Total No of hours : 30

UNIT - I (6h)

Definition of the following terms - Drug, Pharmacophore, Pharmacology, Pharmacopoeia, Bacteria, Virus, Chemotherapy and Vaccine - Causes, Symptoms and Treatment for Jaundice, Cholera, Malaria and Filaria - First Aid for Accidents - Antidotes for Poisoning - Organic Pharmaceutical Aids - Their Role as Preservatives, Antioxidants, Colouring, Flavouring and Sweetening agents - Examples.

UNIT - II (6h)

Causes, Detection and Control of Anaemia and Diabetes - Diagnostic tests for Sugar, Salt and Cholesterol in Serum and Urine - Blood - Composition of Blood and Blood Plasma - RBC - Structure and Functions - Functions of Haemoglobin - WBC - Structure and Functions - Rh Factor - Blood Coagulation - Identification and Estimation of Cholesterol in Blood - Blood Pressure - Hypertension and Hypotension - Normal, High and Low to Control - Indian Medicinal Plants and Their Uses - Tulasi, Neem, Kizhanelli, Mango, Semparuthi, Adadodai and Thoothuvelai.

UNIT - III (6h)

Antibacterials - Sulpha drugs - Sulphanilamide Derivatives - Mode of action of Sulpha drugs - Examples - Prontosil, Sulphathiazole and Sulphafurazole - Uses - Antibiotics - Definition - Gram positive and Gram negative bacteria - Uses of

Ampicillin, Streptomycin and Tetracyclines - Antiseptics and Disinfectants - Definition and Distinction - Phenolic compounds, Chloro compounds and Cationic surfactants - Vitamins - Definition - Classification of Vitamins - Sources and Uses - Deficiency Diseases caused by Vitamins.

UNIT - IV (6h)

Analgesics - Definition - Classification - Narcotic and Non- narcotic - Antipyretic analgesics - Mechanism of action - Morphine and its derivatives - Pethedine and Methadone - Salicylic acid derivatives - Antipyretics and Antiinflammatory Agents - Definition and Actions - Aspirin, Paracetamol, Ibuprofen - Disadvantages and Uses - Anaesthetics - Definition - Classification - Local and General - Volatile - Uses of volatile liquids as Inhalation Anaesthetics - Chloroform - Gaseous Anaesthetics - Nitrous Oxide, Ether and Cyclopropane - Uses and Disadvantages - Intravenous Anaesthetic Agents - Thiopental sodium, Methohexitol and Propanidid - Drugs affecting CNS - Definition, Distinction and Examples for Tranquilizers, Sedatives (Phenobarbital, Diazepam) - Hypnotics, Psychedelic Drugs - LSD, Hashish- Their effects.

UNIT –V (6h)

Antineoplastic Drugs - Causes and Types of Cancer - Treatment of Cancer - Antineoplastic Agents - Antimetabolites - AIDS - AZT, DDC - Hormones - Definition - Classification - Physiological Functions of Insulin, Adrenaline, Thyroxin and Oxytacin - Sex hormones - Androsterone, Testosterone, Progesterone and Estrogen - Biological functions - Disorders of Hyposecretion and Hypersecretion of Hormones.

Reference Books

1. A Text Book of Pharmaceutical Chemistry - Jayashree Ghosh - S. Chand Company Ltd, 2015.
2. Pharmaceutical Chemistry - S. Lakshmi - Sultan Chand, 2011.
3. Pharmacology and Pharmatherapeutics - R. S. Satoskar - Popular Prakashan - Vol.I and Vol. II.
4. Medicinal Chemistry - Asuthosh Kar - New Age International Publishers, 2007.
5. A Text Book of Synthetic Drugs - O. D. Tyagi - Ammol Publications.
6. Introduction to Biological Chemistry - J. Awapara, Prentice Hall.
7. A Text Book of Biochemistry - Ambika.S.
8. Biochemistry - A. L. Leninger, II Edition, Kalyani Publishers, Ludhiana, 1998.
9. Essentials of Biological Chemistry - James Fanley - East West Press.
10. Medicinal Chemistry - Gurdeep Chatwal - Himalaya Publishers House, 2012.
11. Medicinal Chemistry - Ahluwalia - Ane Books, 2008.
12. A Text Book of Pharmaceutical Chemistry - Viva Books Private Ltd., New Delhi, 2009.
13. Medicinal Plants of India - Rasheeduz Zafar - CBS Publishers and Distributors, 2000.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	S	M	S	S
CO2	M	M	S	S	S	M	M	S	M	M
CO3	M	M	S	M	M	S	M	M	S	S
CO4	S	S	M	S	S	M	S	M	M	M
CO5	S	S	S	S	M	M	M	S	M	S

INTERNAL ELECTIVE

PAPER - 3

B. POLYMER CHEMISTRY

Objective:

- To impart Knowledge about the Types of Polymers, Polymerization Techniques, Commercial Polymers and their Applications.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Classify polymers and explain the various types of polymerization techniques.
- 2) Explain various methods of determining molecular weights of polymers.
- 3) Describe the chemistry of plastics and resins.
- 4) Explain the preparation of commercial, natural and synthetic polymers.
- 5) Enumerate the importance of Biopolymers, Conducting polymers and Acrylic polymers.

Total No. of hours : 30

UNIT – I (6h)

Introduction to Polymers - Monomers, Oligomers, Polymers and their Characteristics - Classification of Polymers - Addition and Condensation Polymers - Natural and synthetic - Linear, Branched, Cross-Linked and Network - Plastics - Elastomers - Fibres - Homopolymers and Copolymers - Bonding in Polymers - Primary and Secondary bond forces in Polymers - Cohesive energy and Decomposition of Polymers - Chain Growth Polymerisation - Cationic, Anionic and Free radical polymerisation - Stereoregular polymers - Ziegler Natta polymers - Step Growth Polymers.

UNIT - II (6h)

Polymerization Techniques - Bulk, Solution, Suspension and Emulsion Polymerisation - Melt Polycondensation - Polymer Processing - Calendering - Die Casting and Rotational Casting - Molecular weight of polymers - Number average - Weight average - Sedimentation and Viscosity - Average molecular weight - Molecular weight and Degree of Polymerisation - Methods of determination of Molecular Weight - Gel permeation chromatography – Ultracentrifugation - Reactions - Hydrolysis - Hydrogenation - Addition - Substitution - Cross linking - Vulcanisation - Cyclisation.

UNIT - III (6h)

Plastics and Resins - Definitions - Thermoplastic and Thermosetting Resins - Constituents of Plastic Fibres - Dyes, Pigments, Plasticisers, Lubricants and Catalysts - Important Thermoplastic Resins - Acrylics, Polyvinyl and Cellulose Derivatives -

Important Thermosetting Resins - Phenolic resins - Epoxy resins - Adhesives - Shellac resins - Vegetable glues and Animal glues.

UNIT –IV (6h)

Chemistry of Commercial Polymers - General methods of Preparation and Uses of the following - Teflon, Polyethylene, PTFE, Polystyrene, Polycarbonates and PVC - Textile fibres - Definition and Polymer requirement for fibres - Polyamides - Nylon 66 -Nylon 6 - Polyesters - Terylene - Cellulose acetate - Viscose rayon - Natural and Synthetic Rubber - Constitution of Natural rubber - Natural Rubber - Isoprene - Synthetic Rubber - Butyl, Buna, Buna- S, SBR, Thiocol, Neoprene, Polyurethane and Silicone Rubber - Ebonite.

UNIT - V (6h)

Advances in Polymers - Biopolymers, Biomaterials, Polymers in Medical Field, High temperature and Fire Resistant Polymers - Applications of Silicones - Conducting Polymers - Elementary idea - Examples - Polysulphur Nitriles, Polyparaphenylene, Polypyrrole, Polythiophene, Polyaniline and Polyacetylene - Acrylic polymers - Polymers of Acrylic Acid, Methacrylic Acid and Polyacrylates.

Reference Books

1. Text Book of Polymer Science, F. W. Bill Meyer, Jr. John, Wiley & Sons - 1984.
2. Polymer Science - V, R. Gowarikar, N. V. Viswanathan, Jayadev Sreedhar - Wiley Eastern Ltd., New Delhi - 2005
3. Polymer Chemistry, B. K. Sharma - Goel Publishing House, Meerut - 1989.
5. Polymer Chemistry - M. G. Arora, M. S. Vadar - Anmol Publications (p) Ltd., New Delhi -1998.
6. Polymer Chemistry - An introduction - M. P. Stevens, Oxford - 2002.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	M
CO2	S	S	M	S	M	M	M	S	M	S
CO3	M	M	S	M	M	S	M	M	S	M
CO4	S	M	M	M	S	M	S	M	M	S
CO5	M	S	M	S	M	M	M	S	M	M

INTERNAL ELECTIVE

PAPER - 3

C. GREEN CHEMISTRY

Objective:

- To impart knowledge about Green Solvents, Green Techniques, Green Catalysts and Green Reactions.

Course Outcomes:

Upon completion of this course, the students will be able to

- 1) Summarize the importance of green chemistry.
- 2) Select green solvents for various synthetic processes.
- 3) Describe the various techniques to prepare nanoparticles.
- 4) Explain the importance of green catalysis.
- 5) Explain the rearrangement and aromatic substitution reactions with the help of green chemistry.

Total No. of hours: 30

UNIT - I

GREEN CHEMISTRY – INTRODUCTION (6h)

Need for Green Chemistry - Principles of Green Chemistry - Atom economy - Definition with example (Ibuprofen synthesis) - Green oxidants - Hydrogen peroxide - Green synthesis - Evaluation of the type of the reaction - Rearrangements (100 % Atom economic) - Addition reaction (100 % Atom economic) - Organic reactions by Sonication method - Apparatus required - Examples of Sonochemical Reactions (Heck, Hunsdiecker and Wittig reactions).

UNIT - II

GREEN SOLVENTS (6h)

Selection of Solvents - Aqueous Phase Reactions - Diels-Alder reaction in water - Catalysis in water (Aerobic Oxidation of Alcohols catalysed by Pd (II) / Bathophenanthroline) - Reactions in ionic liquids - Simple preparation - Types - Properties and Applications - Ionic liquids in Organic Reactions (Heck reaction, Suzuki reactions, Epoxidation), Industrial (Battery) and Analytical Chemistry (Matrices for MALDI-TOF MS, Gas Chromatography Stationary Phases) - Advantages and Disadvantages - Solid Supported Synthesis - Supercritical CO₂ - Preparation, Properties and Applications (Decaffeination, Dry cleaning) - Environmental impact.

UNIT - III (6h)

GREEN TECHNIQUES

Microwave and Ultrasound Assisted Green Synthesis - Apparatus required - Examples

of MAOS (Synthesis of Fused Anthroquinones, Leukart reductive Amination of Ketones) - Advantages and Disadvantages of MAOS - Aldol condensation - Cannizzaro condensation - Diel's-Alder reaction - Strecker's synthesis - Photochemical reactions using Sunlight - Photoreduction of Benzophenone to Benzopinacol using Sunlight - Photochemical alternative to Friedel- Crafts reaction - Nanoparticles - Introduction - Types of Nanoparticles - Techniques to prepare Nanoparticles - Top down and Bottom up approaches - Common growth methods.

UNIT - IV

GREEN CATALYSIS (6h)

Green Catalysis - Heterogeneous catalysis - Uses of Zeolites, Silica, Alumina, Clay supported catalysis - Biocatalysis - Enzymes and Microbes - Phase Transfer Catalysis (PTC) - Principles, Catalysts and Lipophilicity of ions - Two phase systems - Solid-Liquid, Liquid-Liquid, Gas-Liquid - Triphase systems - Inverted PTC - Applications in Synthesis - Micellar Catalysis, Surfactants and Synthesis in water - Principles, Materials and Synthetic Applications.

UNIT- V

GREEN REACTIONS(6h)

Acetylation of Primary Amine, Base catalysed Aldol condensation (Synthesis of Dibenzalpropanone), Halogen addition to C = C bond (Bromination of Trans-Stilbene), [4+2] Cycloaddition reaction (Diels-Alder reaction between Furan and Maleic acid) - Rearrangement reaction (Benzil- Benzilic acid rearrangement), Coenzyme catalyzed Benzoin condensation (Thiamine hydrochloride catalysed synthesis of Benzoin), Pechmann condensation for Coumarin synthesis (Clay catalysed Solid State Synthesis of 7- Hydroxy- 4- methylcoumarin) - Electrophilic Aromatic Substitution Reactions (Nitration of phenol, Bromination of Acetanilide) - Green oxidation reactions (Synthesis of adipic acid, Preparation of Manganese (III) acetylacetonate) - Zeolite catalyzed Friedel-Crafts acylation.

Books for Study

- Green Chemistry: Environmental Friendly Alternatives, Rs. Sanghi and M. M. Srinivatava, Narosa Publishing House, New Delhi.
- Green Chemistry, V. Ahluwalia, Narosa, New Delhi (2011).
- Nanotechnology, S. Shanmugam, MJP Publishers, Chennai. (2010).
- A Handbook on Nanochemistry, Patrick Salomon, Dominant Publishers and Distributers, New Delhi.
- Nanobiotechnology, S. Balaji, MJP Publishers, Chennai (2010).

- Nano: The Essentials, T. Pradeep, Tata Mc-Graw Hill, New Delhi (2007).

Books for Reference

- Methods and Reagents for Green Chemistry, P. Tundo, A. Perosa and F. Zechini, John Wiley & Sons Inc., New Jersey, (2007).
- The Chemistry of Nanomaterials: Synthesis, Properties and Applications, Vol. I and II, CNR Rao, Springer (2006).
- Nanotechnology: Basic Science and Emerging Technologies, Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, Overseas Press (2005).
- Nanochemistry, G. B. Segreew, Elsevier, Science, New York, (2006)

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	M	S	S
CO2	M	S	M	S	S	M	M	S	M	M
CO3	M	M	S	M	M	S	M	M	S	S
CO4	S	M	M	S	S	M	S	M	M	S
CO5	M	S	S	S	M	M	M	S	M	M

SKILL BASED SUBJECT
PAPER - 4
AGRICULTURE AND LEATHER CHEMISTRY

OBJECTIVE:

- To learn about Soil fertility and Productivity, Soil Chemistry, Insecticides, Leather Industry and Treatment of Tannery Effluents.

Outcome:

The Students will be able to

- 1) Explain the structure Texture and Chemical properties of soil
- 2) Define and classify fertilizers and illustrate the requirements of a good fertilizer.
- 3) Control the pollution caused by fertilizers.
- 4) Define and classify insecticides.
- 5) Discuss leather tanning methods.
- 6) Control pollution caused by tannery effluents.

Total No. of hours: 30

UNIT - I

SOIL CHEMISTRY(6h)

Soil - Introduction - Classification - Properties of Soil - Physical properties - Components - Structure and Texture - Soil-Water, Soil-Air and Soil-Temperature - Chemical properties - Soil Minerals, Soil Colloids, Soil Reaction and Buffering - Analysis of Soil - Soil pH - Determination of Soil pH - Effect of pH on Plants - Buffering of soil - Soil acidity, Soil salinity and Soil alkalinity - Soil Fertility - Carbon and Nitrogen cycle - Acid, Alkaline and Saline soils - Their Formation - Reclamation - Liming agents.

UNIT - II

FERTILISERS AND MANURES(6h)

Fertilisers - Definition - Classification - Requirements of a Good fertiliser - Nitrogen fertiliser - Urea - Preparation and Uses - Potash fertiliser - KCl, K₂SO₄ and KNO₂ - Preparation and Uses - Phosphorus fertiliser - Phosphatic slag, Superphosphate of lime and Triple Superphosphate - Preparation and Uses- NPK fertiliser - Advantages- Role of Micronutrients - Manures - Compost - Composting - Methods of Composting - Farmyard Manure, Vermicompost, Composted Coconut Coir Pith, Press mud and Poultry manure –Applications - Types of pollutions caused by Fertilisers - Ill effects of Fertilisers and their

Control.

UNIT - III

INSECTICIDES AND FUNGICIDES(6h)

Insecticides - Definition - Classification of Insecticides - Stomach poisons - Contact poisons and Fumigants - Insecticides - Organic Insecticides - DDT - Gammexane - Malathion - Parathion - Fungicides - Inorganic Fungicides - Sulphur compounds - Copper compounds - Mercuric compounds - Organic Fungicides - Dithiocarbamates - Dithane M - Bordeaux mixture - Herbicides - Rodenticides - Pesticides in India - Adverse Environmental Effects of Pesticides.

UNIT - IV

LEATHER CHEMISTRY (6h)

Introduction - Constituents of Animal Skin - Preparing Skins and Hides - Leather processing - Process before Tannage - Flaying, Curing, Drying, Pickling, Cleaning and Soaking - Liming and Degreasing - Manufacture of Leather - Leather Tanning methods - Vegetable Tanning - Chemistry of Chrome Tanning and Mineral Tanning - Deliming - Dyeing of Leather and Fat Liquoring - Leather Finishing - Oil Tanning - By products.

UNIT - V

TANNERY EFFLUENTS(6h)

Tannery effluents - Pollution and its control - Water pollution and Air pollution - Waste Management - Treatment of Tannery Effluents - Primary, Secondary and Tertiary treatment - Pollution Prevention - Effect of Tannery Effluents on Agriculture - Organic Amendments - Reclamation of Tannery Effluents Affected Soil.

Reference Books

- Industrial Chemistry by B. K. Sharma - Goel Publishing House, Meerut.
- Applied Chemistry by K. Bagavathi Sundari, MJP Publishers, 2006.
- Fundamental Concept of Applied Chemistry by Jayashree Ghosh, S. Chand & Company Ltd.,
- The Nature and Properties of Soils - IX Edition - Nyle. C. Bready - S. Chand.
- Soils and Soil Fertility - Louis M. Thompson - and Frederick. R. Troch - Tata Mc Graw Hill Publishing Co.
- Text Book of Soil Science - T. D. Biswas and S. K. Mukerjee - II Edition.
- Soil Science - A. Sankara.
- Fundamentals of Leather Science - Wood roffe Publications of CLRI - Chennai.
- Nature and Properties of Soils - Harry, O. Buckman.

Outcome: The Students will be able to

Explain the structure Texture and Chemical properties.

- 7) Define and classify fertilizers and illustrate the requirements of a good fertilizers.
- 8) Control the pollution caused by fertilizers.
- 9) Define and classify insecticides.
- 10) Discuss leather tanning methods.
- 11) Control pollution caused by tanning effluents.

Unit	i. Remembering	ii. Understanding	iii Applying	iv Analyzing	V Evaluating	vi Creating
1	YES	YES	YES	YES	YES	YES
2	YES	YES	YES	YES	YES	YES
3	YES	YES	YES	YES	YES	YES
4	YES	YES	YES	YES	YES	YES
5	YES	YES	YES	YES	YES	YES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	M	S	M	S	M
CO2	S	M	M	S	S	M	M	S	M	S
CO3	M	M	S	M	S	S	M	M	S	S
CO4	S	M	M	S	M	M	S	M	M	S
CO5	M	S	S	S	M	M	M	S	M	M

SCHEME OF VALUATION FOR PRACTICAL EXAMINATIONS

PRACTICAL - I

VOLUMETRIC ANALYSIS

Internal assessment: 25 Marks

External assessment: 75 Marks

Total: 100 marks

Record: 15 Marks

Procedure: 10 Marks

Error upto 2 % : 50

 2.1 - 3 % : 40

 3.1 - 4 % : 30

 4.1 - 5 % : 20

 >5 % : 10

For incomplete or wrong calculation deduct 20 % of total marks scored.

For no calculation deduct 40 % of total marks scored.

For each arithmetic error deduct 1 mark.

CORE PRACTICAL - II

INORGANIC QUALITATIVE ANALYSIS AND PREPARATION

Internal assessment: 25 Marks

External assessment: 75 Marks

Total: 100 marks

Record: 15 Marks

Preparation: 20 (Quantity- 15 Marks; Quality- 5 marks)

Analysis: 40 Marks.

Each radical with procedure: 10 Marks

(Spotting for each radical - 5 Marks; Fixing the group - 5 Marks)

PRACTICAL - III
GRAVIMETRIC ANALYSIS

Internal assessment: 25 Marks

External assessment: 75 Marks

Total: 100 marks

Record: 15 Marks

Procedure: 10 Marks

Error upto 2 % : 50

 2.1 - 3 % : 40

 3.1 - 4 % : 30

 4.1 - 5 % : 20

 >5 % : 10

- a. Among the duplicate results, the value more favorable to the candidate must be taken.
- b. When no duplicate result is given deduct 5 marks.
- c. If the two results differ by more than 2 % deduct 5 marks.
- d. For each independent arithmetical error deduct 1 mark.
- e. For incomplete or wrong calculation deduct 20 %.
- f. For no calculation deduct 40 %.
- g. If the experiment is not completed due to an accident, award 5 marks.

PRACTICAL - IV

ORGANIC ANALYSIS

Internal assessment: 25 Marks

External assessment: 75 marks

Total: 100 marks

Record: 15 Marks

Preparation: 15 (quantity: 10 & quality: 5)

Analysis: 45

Preliminary reaction: 4

Aliphatic/ Aromatic: 4

Saturated/ Unsaturated: 4

Tests for elements: 9

Functional groups: 10

Confirmatory tests: 10

Derivative/Coloured reaction: 4

PHYSICAL CHEMISTRY PRACTICALS

Internal assessment: 25 Marks

External assessment: 75 Marks

Total: 100 Marks

Record: 15 Marks

Experiment: 45 Marks

Manipulation, Tabulation and Calculation: 15 Marks

1) Kinetics

Graph : 10 Marks

Below a factor of 10 : 35

By a factor of 10 : 25

More than a factor of 10 : 15

2) Molecular weight

Error upto 10 %: 45

20 %: 35

30 %: 25

> 30 %: 15

3) Effect of electrolyte on CST

Graph: 10

Error upto 10 %: 35

20 %: 25

30 %: 15

> 30: 10

4) Transition temperature

Graph: 10

Error upto 2°C difference: 35

7°C difference: 25

> 7°C difference: 15

5) Conductance

Equivalent conductance: 25 marks

Error upto 10 % : 25

Upto 15 % : 15

>15 % : 10

Cell constant : 20 marks

Error upto 10 % : 20

Upto 15 % : 15

>15 % : 10

6) Conductometric titration

Graph: 10

Upto 2 % : 35

2.1 to 3 % : 30

3.1 to 4 % : 25

4.1 to 5 % : 20

> 5% : 15

THIRUVALLUVARUNIVERSITY

B.Sc. COMPUTER SCIENCE

CBCS PATTERN

(With effect from 2022-2023)

[illegible]

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title							
SEMESTER III							CIA	Uni. Exam	Total
16.	I	Language	Paper-3	6	4	Tamil/ OtherLanguages	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-3	3	3	Programming in JAVA	25	75	100
19.	III	Core Practical	Practical-3	3	3	Programming in JAVA Lab	25	75	100
20.	III	Allied II	Paper-3	4	3	(Choose any one) 1. Physics I 2. Statistical Methods and Their Applications I	25	75	100
	III	Allied II	Practical	3	0	Physics/Statistics Practical	0	0	0
21.	IV	Skill Based Subject	Paper-1	3	2	Digital Logic Design and Computer Organization	25	75	100
22.	IV	Non-Major Elective	Paper-1	2	2	Introduction to Information Technology	25	75	100
		Sem. Total		30	21		175	525	700
SEMESTER IV							CIA	Uni. Exam	Total
23.	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
24.	II	English	Paper-4	6	4	English	25	75	100
25.	III	Core Theory	Paper-4	3	3	Relational Database Management Systems	25	75	100
26.	III	Core Practical	Practical-4	3	3	RDBMS Lab	25	75	100
27.	III	Allied II	Paper-4	4	3	(to choose any one) 1. Physics II 2. Statistical Methods and their Applications II	25	75	100
28.	III	Allied II	Practical	3	2	Physics/Statistics Practical	25	75	100
29.	IV	Skill Based Subject	Paper-2	3	2	Wireless Data Communication	25	75	100
30.	IV	Non-Major Elective	Paper-2	2	2	Internet Technology	25	75	100
		Sem. Total		30	23		200	600	800

S.NO.	Part	Study Components		Ins. hrs /week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER V									
31.	III	Core Theory	Paper-5	6	4	Mobile Application Development	25	75	100
32.	III	Core Theory	Paper-6	6	4	Operating System	25	75	100
33.	III	Core Theory	Paper-7	4	3	Design and Analysis of Algorithms	25	75	100
34.	III	Core Practical	Practical-5	4	3	Mobile Applications Development-Lab	25	75	100
35.	III	Core Practical	Practical-6	4	3	Operating System-Lab	25	75	100
36.	III	Internal Elective	Paper-1	3	3	(tochooseanyone) 1. Data Mining 2. Information Security 3. Software Testing	25	75	100
37.	IV	Skill Based Subject	Paper-3	3	2	Software Engineering	25	75	100
				30	22		175	525	700
SEMESTER VI									
38.	III	Core Theory	Paper-8	4	4	Open Source Software	25	75	100
39.	III	Core Theory	Paper-9	4	4	Python Programming	25	75	100
40.	III	Core Practical	Practical-7	4	3	Python Programming Lab	25	75	100
41.	III	Core Practical	Practical-8	4	2	Open Source Programming Lab	25	75	100
42.	III	Project		5	5	Project Work (Group/Individual Project)	25	75	100
43.	III	Internal Elective	Paper - 2	3	3	(tochooseanyone) 1. Big Data Analytics 2. Cryptography 3. Digital Image Processing	25	75	100
44.	III	Internal Elective	Paper - 3	3	3	(tochooseanyone) 1. Artificial Intelligence 2. System Software 3. Cloud Computing	25	75	100
45.	IV	Skill Based Subject	Paper - 4	3	2	Internet Of Things	25	75	100

46.	V	Extension Activities		0	1		100	0	100
		Sem. Total		30	27		300	600	900
					140				4600

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Allied Practical	1			100	100
	Electives	3	3	9	100	300
	Core	9	(3-5)	33	100	900
	Core practical	8	(2-3)	21	100	800
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	46		140		4600

ANNEXURE - I
THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc., Computer Science) – 2022-2023 onwards

Programme Objectives:

1. Graduates will be able to comprehend the concepts learnt and apply in real life situations with analytical skills.
2. Graduates with acquired skills and enhanced knowledge will be employable/ become entrepreneurs or will pursue higher Education.
3. Graduates with acquired knowledge of modern tools, communicative skills and will be able to contribute effectively as team members.
4. Graduates are able to read the signs of the time analyze and provide practical solutions.
5. Graduates imbued with ethical values and social concern will be able to understand and appreciate social harmony, cultural diversity ensure sustainable environment

Programme Outcomes:

1. Having clear understanding of subject related concepts and apply the same to identify, formulate and analyze Complex problems.
2. Confident enough to act as a productive contributor for both self and team growth.
3. Able to adapt work environment easily.
4. Clear understanding on Professional and ethical responsibility.
5. Able to work effectively by managing time and provide innovative solutions.
6. Help to understand the market's demand and ability to provide Quality and timely services.
7. Help to Provide Infinite Solutions to same problem.
8. Able to clear any competitive exams for higher education.
9. Able to identify and grab global opportunities.
10. Help to develop Problem solving and to analyze Critical data.

Programme Educational Objectives:

1. To equip the students with World class skills and knowledge about Software and how it rules the IT And ITES industry by providing requisite technical education.
2. To gather business requirement, analyze, and design software which helps to reduce manual errors and ensure to deliver quality Product.
3. To help the individuals/students to identify or create opportunity to grow as Professionals in the competitive environment.
4. To motivate them to fly high for higher education in renowned universities across the globe.
5. To help the Professionals to go above and beyond to satisfy Company/Clients.

Programme Specific Outcomes:

On Completion of B.Sc. Computer Science Programme, graduates will be able to

1. Understand the technical aspects of Hardware and Software of Computer Science domain and the art of programming.
2. Ability to understand the different programming languages and can be able to apply the same for effective results.
3. Ability to use emerging software techniques of computer science to provide innovative and quick solution on time.
4. Ability to understand, adjust and adapt with the dynamic technical environment for the growth of individual career and IT industry.
5. Ability to utilize social media effectively for learning and use productively.
6. Ability to make the world a better place by developing new software/ languages to support AI.
7. Able to understand the concepts of Niche skills like Python, Big Data, MDM.
8. Able to enter different streams of Computer Science like System engineer, IT Manager, Architect, Game developer, Mobile Application developer, R&D.
9. Able to adapt the ongoing technical developments.
10. Able to enter any industry as each industry is dependent on Computer Science for design and develop their ideology.

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-2023 onwards

Semester: I **Paper type: Core Theory – Paper 1**

Paper code: **Name of the Paper: Programming in C**

Credit: 4

Total Hours per Week: 6 Hrs. Lecture Hours: 78 Hrs. Tutorial Hours: -

Practical Hours: -

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Course Objectives

1. To understand simple algorithms,
2. To understand language constructs
3. To understand and develop programming skills in C.
4. To understand the basic concepts of decision making and looping statements.
5. To understand the concepts of arrays, structures, union, pointers and files.

Course Outcomes

1. After studied unit-1, the student will be able to understand the concepts of Constants, Variables, and Data Types, Operators and Expressions
2. After studied unit-2, the student will be able to understand the concepts of Managing Input and Output Operations, Decision Making and Branching, Decision Making and Looping.
3. After studied unit-3, the student will be able to understand the concepts of Arrays, Character Arrays and Strings, User Defined Functions.
4. After studied unit-4, the student will be able to understand the concepts of Structure and Unions, Pointers, File Management in C.
5. After studied unit-5, the student will be able to understand the concepts of Fundamental Algorithms, Factoring Methods.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:OVERVIEWOFC

TeachingHours:15Hrs.

History–Importance–SamplePrograms–BasicStructure–ProgrammingStyle

–Executing–UnixSystem–MS-DOSSystem–**Constants,Variables,andDataTypes:**Character Set – C Token – Keyword and Identifiers – Constants – Variables – Data Types –Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants –Declaration–OverflowandUnderflowofData-

OperatorsandExpressions:Arithmetic,Relational,Logical,Assignment,IncrementandDecrement,C onditional,Bitwise,SpecialOperators–ArithmeticExpressions,EvaluationofExpressions– PrecedenceofArithmeticOperators–SomeComputationalProblems–TypeConversionsinExpressions– OperatorPrecedence andAssociativity–MathematicalFunctions.

Unit-2:MANAGING INPUT AND OUTPUTOPERATIONS

TeachingHours:15Hrs.

Reading,Writing a Character– Formatted Input,Output–**DecisionMakingand Branching:**Decision Makingwith If statement–SimpleIfStatement – The If...Else Statement – Nesting of If...Else Statements – The Else If Ladder – TheSwitch Statement- The ?: Operator – The Goto Statement - **Decision Making and Looping:** Thewhile Statement– The do Statement– The for Statement– Jumps in Loops – Concise TestExpressions.

Unit-3: ARRAYS

TeachingHours:16Hrs.

One-Dimensional Arrays - Declaration, Initialization of One-Dimensional Arrays – Two-DimensionalArrays-InitializingTwo-DimensionalArrays–Multi-DimensionalArrays–Dynamic Arrays - **Character Arrays and Strings:** Declaring and Initializing String Variables – ReadingStringsfromTerminal–WritingStringstoScreen–ArithmeticOperationsonCharacters – Putting String Together – Comparison of Two Strings –String-Handling Functions – Table ofStrings – Other Features of Strings - **User Defined Functions:** Need for User-Defined Functions –A Multi-Function Program – Elements of User-Defined Functions – Definition of Functions – Return Values and Their Types – Function Calls – Function Declaration – Category of Functions – No Arguments and No Return Values – Arguments but no return values – Arguments with ReturnValues – No Arguments but Returns a value – Functions that Return Multiple Values – Nesting ofFunctions – Recursion – Passing Arrays, Strings to Functions – The Scope, Visibility and LifetimeofVariables–MultifilePrograms.

Unit-4: STRUCTURE AND UNIONS

TeachingHours:16Hrs.

Defining a Structure – Declaring Structure Variables – Accessing StructureMembers – Structure Initialization and Copying and Comparing Structure Variable – Operations onIndividualMembers– ArraysofStructures–ArrayswithinStructures–StructureswithinStructures–StructuresandFunctions– Unions–SizeofStructures–BitFields**Pointers:**Understanding Pointers – Accessing the Address of Variable – Declaring, Initialization of PointerVariables – Accessing a Variable through its pointer – Chain of Pointers – Pointer Expression –Pointer Increments and Scale Factor– Pointers andArrays – Pointers and Character Strings–Array of Pointers – Pointers as Function Arguments – Functions Returning Pointers – Pointers toFunctions – Pointers and Structures – Troubles with Pointers **File Management in C:** Defining andOpening a File – Closing a File – Input/Output Operations on File – Error Handling During I/OOperations –RandomAccesstoFiles–CommandLineArguments.

Unit-5: FUNDAMENTAL ALGORITHMS:**Teaching Hours: 16 Hrs.**

Exchanging the values of Two Variables- Counting- Summation of a Set of Numbers-Factorial Computation -Sine Function Computation –Generation of the Fibonacci Sequence-Reversing the Digits of an Integer-Base Conversion–Character to Number Conversion

- Factoring Methods: Finding the square Root of a Number –The Smallest Divisor of an Integer- The Greatest Common Divisor of the two integers-Generating Prime Numbers- Computing the Prime Factors of an integer –Generation of Pseudo-random Numbers-Raising a Number to a Large Power-Computing the nth Fibonacci Number (Chapters: 2 & 3)

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from textbooks and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Programming in ANSIC, E. Balagurusamy, Tata McGrawhill Education, 6th Edition, 2013. (Unit I to IV)
2. How to Solve it by Computer, R.G. Dromey, PHI International (Unit V)

Reference Books:

1. The C Programming Language (ANSIC), Kernighan, B.W. and Ritchie, D.M., PHI.
2. C by Discovery, Foster & Foster, Penram International Publishers, Mumbai.

CourseMaterial:**E-References**

1. NPTEL,IntroductiontoCProgramming,Prof.SatyadevNandakumar,IIT,ComputerScienceandEngineeringKanpur.
2. NPTEL,IntroductiontoProblemSolving&Programming,byProf.DeepakGuptaDepartmentofComputerScienceandEngineeringIITKanpur.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	S	M	S
CO2	S	M	M	S	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S	S
CO4	S	M	M	M	M	M	S	S	S	S
CO5	S	S	M	M	S	S	S	S	S	S

PO–ProgrammeOutcome,CO – Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science) – 2022-2023 onwards

Semester: I Papertype: Core Practical – 1

Papercode: Name of the Paper: Programming in C Lab Credit:

2 Total Hours per Week: 3 Hrs. Lecture Hours: ... Tutorial Hours: Practical Hours: 39 Hrs.

.....

Course Objectives

1. To understand concepts of for/while loop and switch.
2. To understand language Functions and recursions.
3. To understand and develop String Manipulations.
4. To understand the basic concepts of searching and sorting.
5. To understand the concepts of structures.

Course Outcomes

1. After studied, the student will be able to Enhance the analyzing and problem solving skills and use the same for writing programs in C
2. After studied, the student will be able to Write diversified solutions, draw flowcharts and develop a well-documented and indented program according to coding standards
3. After studied, the student will be able to Learn to debug a given program and execute the C program
4. After studied, the student will be able to have enough practice the use of conditional and looping statements
5. After studied, the student will be able to implement arrays, functions and pointers.

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

Control Statements:

1. Print Fibonacci numbers—(using for)
2. Print n Prime numbers—(using while)
3. Simple arithmetic on two numbers—(using switch/case)

Functions:

4. Swap two values using call by value/call by reference.

Recursion:

5. To compute NcR and NpR
6. To Compute GCD and LCM

String Manipulation.

7. Operations on strings such as length, concatenation, reverse, counting, and copy of a string to another.

Matrices:

8. Matrix Addition, Subtraction, Multiplication, Transpose of nxm matrices.
9. Inverse of a square matrix.

Searching:

10. Binary Search.

Sorting:

11. Bubble Sort
12. Insertion Sort

Structures:

13. Student's Mark statement

Pointers:

14. Arithmetic operations on pointers.

Files

15. Creating/Reading/Writing text/binary file.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment for a new work)

- a) Book review and research paper review, syllabus and curriculum review.
- b) Data collection and paper writing practices: book level, field study level. Using the course study for society and nature development—exercise
- c) Workshops, preparing technical term dictionaries from text books and reference books.
- d) Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e) Forming digital library: collecting text and reference books, course material.

- f) Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g) Extracurricular and cultural activities may be framed through the syllabus content.
- h) Grouping students for self discussion, self learning process.
- i) Following institution and intellectual and writing reports in the course field.
- j) Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k) For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l) Extracurricular activities may be framed through their syllabus content.
- m) Bring the industries to the campus. Bring the students to the industry.
- n) Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Reference Book:

1. Programming in ANSIC, E. Balagurusamy, Tata McGrawhill Education, 6th Edition, 2013.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	M	S	M	M	S	S	S	S
CO5	S	M	M	S	S	S	S	S	S	S

PO–Programme Outcome, CO – Course outcome

S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE– 632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: I **Paper type: Allied**

Paper code: **Name of the Paper: Mathematics–1** **Credit: 3**

Total Hours per Week: 7 Hrs. Lecture Hours: 91 Hrs. Tutorial Hours: Practical Hours:

.....
Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:ALGEBRA**TeachingHours:19Hrs.**

PartialFractions-Binomial,ExponentialandlogarithmicSeries(withoutProof)-Summation-Simpleproblems

Unit-2:THEORYOFEQUATIONS**Teaching Hours: 18 Hrs.**

Polynomial Equations with real Coefficients - Irrational roots - Complex roots- Transformation ofequation by increasing or decreasing roots by a constant - Reciprocal equations - Newton's methodtofindarootapproximately-Simple problems

Unit-3:MATRICES**TeachingHours:18Hrs.**

Symmetric - Skew-Symmetric - Orthogonal and Unitary matrices - Eigen roots and eigenvectors – Cayley - Hamilton theorem (without proof)-Verification and computation of inversematrix

Unit-4:TRIGONOMETRY**TeachingHours:18Hrs.**

Expansionsofsinⁿθ,cosⁿθ,sinnθ,cosnθ,tannθ-Expansionsofsinθ,cosθ,tanθinterms ofθ.

Unit-5:DIFFERENTIALCALCULUS**TeachingHours:18Hrs.**

Successivedifferentiationuptothirdorder, Jacobians-Conceptsofpolarco-ordinates-Curvature andradius ofcurvatureinCartesianco-ordinatesandinpolarco-ordinates.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentfor amework)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:bookslevel,fieldstudy level.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops,preparingtechnicaltermdictionariesfromtext booksand referencebooks.
- d. Preparingquestionpaperbythecandidates:objectivetype,descriptivetype,trainingcanbegivenby theteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfordocumentation, further discussionandresearch.
- g. Extracurricularandculturalactivitiesmaybeframedthroughthesyllabuscontent.
- h. Groupingstudentsforselfdiscussion,selflearningprocess.
- i. Followinginstitutionandintellectualandwritingreportsinthecoursefield.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process withinthe frameworkofquestionsettingpatternandinternalassessmentpattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adoptedby the departments of the colleges for practicing their theoretical study. Innovative methodsmay be implemented in the practices and report can be written for documentation, furtherdiscussionandresearch.
- l. Extracurricularactivitiesmaybeframedthroughtheirsyllabuscontent.
- m. Bringtheindustriestothecampus. Bringthestudentstotheindustry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of researchreportslike assignment,seminarpapers,casestudyreports,etc.

Textbook:

1. P.Duraipandian and S.Udayabaskaran, (1997) *Allied Mathematics*, Vol.I & II. Muhil Publishers, Chennai.

Reference Books:

1. P.Balasubramanian and K.G.Subramanian, (1997) *Ancillary Mathematics*. Vol.I & II. Tata McGraw Hill, New Delhi.
2. S.P.Rajagopalan and R.Sattanathan, (2005) *Allied Mathematics*. Vol. I & II. Vikas Publications, New Delhi.
3. P.R.Vittal (2003) *Allied Mathematics*. Marghan Publications, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) *Allied Mathematics Vol-I*, IIS. Chand & company Ltd., New Delhi-55.
5. Isaac, *Allied Mathematics*. New Gamma Publishing House, Palayamkottai.

Course Material: website links, e-Books and e-journals Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	M	M	S	S	M	S	S	S	S
CO3	S	S	S	M	M	M	S	S	S	S
CO4	S	M	M	S	S	S	S	S	M	S
CO5	S	M	M	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE– 632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester:I **Paper type:**Allied

Paper code: **Name of the Paper:**Mathematical Foundations–1 **Credit:**

3 Total Hours per Week:7Hrs.**Lecture Hours:**91 Hrs.**Tutorial Hours:**.....**Practical Hours:**.....

.....

Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: SYMBOLIC LOGIC**Teaching Hours: 18**

Hrs. Proposition, Logical operators, conjunction, disjunction, negation, conditional and biconditional operators, converse, Inverse, Contra Positive, logically equivalent, tautology and contradiction. Arguments and validity of arguments.

Unit-2: SET THEORY**Teaching Hours: 18 Hrs.**

Sets, set operations, Venn diagram, Properties of sets, number of elements in a set, Cartesian product, relations & functions,

Unit-3: BINARY OPERATIONS**Teaching Hours: 18 Hrs.**

Types of Binary Operations: Commutative, Associative, Distributive and identity, Boolean algebra: simple properties. Permutations and Combinations.

Unit-4: DIFFERENTIATION**Teaching Hours: 19 Hrs.**

Simple problems using standard limits,

$$\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}, \lim_{x \rightarrow 0} \frac{\sin x}{x}, \lim_{x \rightarrow 0} \frac{\tan x}{x}, \lim_{x \rightarrow 0} \frac{e^x - 1}{x}, \lim_{n \rightarrow \infty} (1 + \frac{1}{n})^n, \lim_{n \rightarrow 0} (1 + n)^{1/n}$$

Differentiation, successive differentiation, Leibnitz theorem, partial differentiation, Applications of differentiation, Tangent and normal, angle between two curves.

Unit-5: TWO DIMENSIONAL ANALYTICAL GEOMETRY**Teaching Hours: 18 Hrs.**

Straight Lines - Pair of Straight Lines

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment for a week)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development - exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self-discussion, self-learning process.
- Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

1. P.R. Vittal, Mathematical Foundations– Maragham Publication, Chennai.

Reference Books:

1. U. Rizwan, Mathematical Foundation-SciTech, Chennai
2. V. Sundaram & Others, Discrete Mathematical Foundation - A.P. Publication, Sirkali.
3. P. Duraipandian & Others, Analytical Geometry 2 Dimension- Emerald publication 1992 Reprint.
4. Manicavachagompillay & Natarajan. Analytical Geometry part I- Two Dimension- S. Viswanathan (printers & publication) Put Ltd., 1991.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	M	S
CO2	S	S	M	M	S	S	M	M	S	S
CO3	S	M	M	S	S	S	S	S	S	S
CO4	S	S	M	S	S	M	M	S	S	S
CO5	S	S	S	S	M	M	S	S	S	S

PO–Programme Outcome, CO – Course outcome
 S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)–2022-2023 onwards

Semester: II **Paper type: Core Theory–Paper 1**

Paper code: **Name of the Paper: C++ & Data Structures** **Credit: 4**

Total Hours per Week: 5 Hrs. Lecture Hours: 65 Hrs. Tutorial Hours: **Practical Hours: ..**

Course Objectives

1. To understand the concepts of object-oriented programming and master OOP using C++.
2. To understand the concepts of Inheritance, polymorphism and templates.
3. To understand the concepts of different view of data, stack and queues.
4. To understand the concepts of Programming with Recursion, Binary Search Tree and graphs.
5. To understand the concepts of Sorting and Searching Algorithms

Course Outcomes

1. After studied unit-1, the student will be able to understand the concepts of object oriented programming Apply structure and inline functions.
2. After studied unit-2, the student will be able to understand the concepts of the types of inheritance and Applying various levels of Inheritance for real time problems Apply the OOPs concepts class and object. Understand Explain the file concept and exception handling in C++
3. After studied unit-3, the student will be able to understand the concepts of Stacks and Queue using array and pointers.
4. After studied unit-4, the student will be able to understand the concepts of Recursion, Binary Search Tree and graphs.
5. After studied unit-5, the student will be able to understand the concepts of Sorting and Searching Algorithms

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION**Teaching Hours: 13 Hrs.**

Principles of Object Oriented Programming – Beginning with C++ – Token, Expressions and Control Structures – Functions in C++ – Classes and Objects – Constructors and Destructors.

Unit-2: CONCEPTS OF OOP**Teaching Hours: 13 Hrs.**

Operator Overloading and Type Conversions – Inheritance : Extending Classes – Pointers, Virtual Functions and Polymorphism – Managing Console I/O Operations. Working with Files – Templates – Exception Handling – Manipulating Strings.

Unit-3: DATA DESIGN & IMPLEMENTATIONS**Teaching Hours: 13**

Hrs. Different views of data – Abstraction and Built-in Types –

Arrays ADTs Stacks and Queue (Linear and Linked), Stack (Array and Pointer) – Applications – Infix to

Postfix Conversions – Queue (Array and Pointer)

– List (Array and Pointer) – Applications: (Polynomial Addition) – Doubly Linked Lists.

Unit-4: PROGRAMMING WITH RECURSION**Teaching Hours: 13 Hrs.**

Recursion – Verifying and Writing Recursive Functions – **Binary Search Tree** : Implementation – Tree Traversal – **Graphs**: Implementations – BFS – DFS – Dijkstras Shortest Path Algorithm. (Chapter 7: Section 7.1, 7.47.5, Chapter 8: Section 8.1, 8.4, Chapter 9: Section 9.3)

Unit-5: SORTING AND SEARCHING ALGORITHMS**Teaching Hours: 13 Hrs.**

Sorting – Searching – Hashing (Chapter 10: Section 10.1, 10.2, 10.3)

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self discussion, self learning process.
- Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular activities may be framed through their syllabus content.
- Bring the industries to the campus. Bring the students to the industry.

- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Object Oriented Programming with C++, E Balagurusamy, Tata McGraw Hill, 6th Edition, 2014. (Units I, II)
2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers, 4th Edition, 2010. (Units III, VI & V)

Reference Books:

1. C++ The Complete Reference, Herbert Schildt, Tata McGraw Hill, 4th Edition, 2003.
2. OOP in ANSI C and Turbo C, Ashok N. Kamthane, Pearson Education, 6th Edition, 2008.
3. Data Structures and Algorithms, Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft, Addison Wesley Longman Inc., 2nd Edition, 1999.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	M	S	S	S	S
CO2	S	M	M	S	S	M	S	M	S	S
CO3	S	M	S	S	M	S	S	S	S	M
CO4	S	S	M	S	M	S	S	S	M	S
CO5	S	S	S	M	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (maybe avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-2023 onwards

Semester: II

Paper type: Core Practical- 2

Paper code:

Name of the Paper: C++ & Data Structures Lab

Credit:

2 Total Hours per Week: 2 Hrs. Lecture Hours: Tutorial Hours: Practical Hours: 26 Hrs.

Course Objectives

1. To develop C++ programming skills in design
2. To understand the basic concepts of different abstract types and structure of data.
3. To understand the concepts of Function Overloading
4. To understand the concepts of Stack, Queue, List, Doubly Linked List - using Pointers - using Arrays.
5. To understand the concepts of Searching and Sorting Algorithms.

Course Outcomes

1. Understand the Creating and Deleting the Objects with the Concepts of Constructors and Destructors.
2. Demonstrate the Polymorphism Concepts and Operator Overloading.
3. Understand basic Data Structures such as Arrays, Linked Lists, Stacks, Queues, Doubly Linked List and Infix to Postfix Conversion.
4. Apply Algorithm for solving problems like Sorting and Searching.
5. Apply Algorithms and use Graphs and Trees as tools to visualize and simplify Problems

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Constructors & Destructors, Copy Constructor.
2. Friend Function & Friend Class.
3. Inheritance.
4. Polymorphism & Function Overloading.
5. Virtual Functions.
6. Overload Unary & Binary Operators Both as Member Function & Non Member Function.
7. Class Templates & Function Templates.
8. Exception Handling Mechanism.
9. Standard Template Library concept.
10. FileStream classes.
11. Array implementation of Stack, Queue: Infix to postfix
12. Implementation of Stack, Queue, List, Doubly Linked List - using Pointers - Polynomial Addition
13. Implementation of Binary Search Tree, Traversal
14. Implementation of Searching and Sorting Algorithms.
15. Graph Implementation of shortest path (Dijkstra's)

Reference Books:

1. Object Oriented Programming with C++, E Balagurusamy, Tata McGraw Hill, 6th Edition, 2014.
2. C++ Plus Data Structure, Nell Dale, Jones & Bartlett Publishers, 4th Edition, 2010

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development - exercise
- c. Workshops, preparing technical term dictionaries from textbooks and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.

- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Reference Book:

1. Programming in ANSIC, E. Balagurusamy, Tata McGrawhill Education, 6th Edition, 2013.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	S	S	S
CO2	S	M	M	M	S	S	S	M	S	S
CO3	S	M	M	M	M	S	S	S	S	S
CO4	S	M	M	S	M	S	M	M	S	S
CO5	S	S	S	M	M	S	S	S	S	S

PO–Programme Outcome, CO – Course outcome

S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-2023 onwards

Semester: II

Paper type: Allied

Paper code:

Name of the Paper: Mathematics-2

Credit: 5

Total Hours per Week: 7 Hrs. Lecture Hours: 91 Hrs. Tutorial Hours:

Practical Hours: ..

Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1: Application of Integration

Teaching Hours: 18 Hrs.

Evaluation of double, triple integrals - Simple applications to area, volume -
Fourier series for functions in $(0, 2\pi)$ and $\square\square\square\square$

UNIT-2: Partial Differential Equations

Teaching Hours: 18 Hrs.

Formation, complete integrals and general integrals - Four standard types, Lagrange's equations.

UNIT-3:LaplaceTransforms**TeachingHours:19 Hrs.**

Laplace Transformations of standard functions and simple properties- Inverse Laplacetransforms - Applications to solutions of linear differential equations of order 1 and 2-simpleproblems

UNIT-4 :VectorAnalysis**TeachingHours:18Hrs.**

Scalar point functions - Vector point functions - Gradient, divergence, curl - Directionalderivatives -Unittonormaltoasurface.

UNIT-5:VectorAnalysis(continued)**TeachingHours:18Hrs.**

Line and surface integrals - Guass, Stoke's and Green's theorems (without proofs) - SimpleproblembasedontheseTheorems.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentfr amework)

- a. Bookreviewandresearchpaper review,syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:bookslevel,fieldstudy level.Usingthecoursestudyforsocietyandnaturedevelopment-exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparingquestionpaperbythecandidates:objectivetype,descriptivetype,trainingcanbegivenby theteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfordocumentation,furtherdiscussionandresearch.
- g. Extracurricular andculturalactivitiesmaybeframedthroughthesyllabuscontent.
- h. Groupingstudentsforselfdiscussion,selflearningprocess.
- i. Followinginstitutionandintellectualandwritingreportsinthecoursefield.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process withinthe frameworkofquestionsettingpatternandinternalassessmentpattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adoptedby the departments of the colleges for practicing their theoretical study. Innovative methodsmay be implemented in the practices and report can be written for documentation, furtherdiscussionandresearch.
- l. Extracurricularactivitiesmaybeframedthroughtheirsyllabuscontent.
- m. Bringtheindustriestohecampus.Bringthestudentstotheindustry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of researchreportslike assignment,seminarpapers,casestudyreports,etc.

Textbook:

P.DuraipandianandS.Udayabaskaran,(1997)*AlliedMathematics*,Vol.I&II.MuhilPublish ers,Chennai

ReferenceBooks:

1. P.BalasubramanianandK.G.Subramanian,(1997)*AncillaryMathematics*.Vol. I&II.TataMcGrawHill,NewDelhi.
2. S.P.RajagopalanandR.Sattanathan,(2005)*AlliedMathematics*.Vol.I&II.Vikas

Publications, New Delhi.

3. P.R.Vittal(2003).*AlliedMathematics*.MarghanPublications, Chennai.
4. P.Kandasamy,K.Thilagavathy(2003)AlliedMathematicsVol-I,IIS.Chand&company Ltd.,NewDelhi-55.
5. Isaac, AlliedMathematics. NewGammaPublishingHouse,Palayamkottai

Mappingwith ProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	M	S	M
CO2	S	S	S	M	M	S	S	S	S	S
CO3	M	M	M	S	S	M	M	S	M	S
CO4	M	S	M	S	S	M	M	M	M	M
CO5	M	M	S	S	S	S	S	S	M	S

PO–ProgrammeOutcome,CO – Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVARUNIVERSITY,VELLORE–632 115
(BachelorofComputerScience)–2022-2023onwards

Semester:II

Papertype:Allied-Paper2

Papercode:

NameofthePaper: MathematicalFoundations– 2

Credit:

5TotalHoursperWeek:7Hrs.LectureHours:91Hrs.TutorialHours:.....

PracticalHours:..

Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

MatchingTable

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I:MATRICES

TeachingHours:18Hrs.

Multiplication of matrices, Singular and Non-Singular matrices, Adjoint of a Matrix, Inverse of a matrix Symmetric and Skew-Symmetric, Hermitian and Skew-Hermitian, Orthogonal and unitary matrices, Rank of a matrix, Solution of Simultaneous Linear equations by

- i. Cramer's rule.
- ii. Matrix Inversion Method.

UNIT-II: MATRICES

Teaching Hours: 18 Hrs.

Test for Consistency and Inconsistency of linear equations, (Rank Method), characteristic roots and characteristic vectors, Cayley - Hamilton theorem, matrix of linear transformations: reflection about the x, y axes and the line $y=x$, rotation about the origin through an angle, expansion or compression, shears, translation.

UNIT-III

Teaching Hours: 19 Hrs.

Integration

Simple problems, integration of rational function involving algebraic expressions of the form

$$\frac{1}{ax^2+bx+c}, \frac{1}{\sqrt{ax^2+bx+c}}, \frac{px+q}{ax^2+bx+c}, \frac{px+q}{\sqrt{ax^2+bx+c}}$$

integrations using simple substitutions integrations involving trigonometric functions of the form

$$\frac{1}{a+b\cos x}, \frac{1}{a^2\sin^2 x + b^2\cos^2 x}$$

Integration by parts.

UNIT-IV

Teaching Hours: 18 Hrs.

Properties of definite integrals. Reduction formulae for

$\int x^n e^{ax} dx$, $\int \sin^n x dx$, $\int \cos^n x dx$, $\int x^m (1-x)^n dx$, applications of integration for (i) Area under plane curves, (ii) Volume of solid of revolution.

UNIT-V: ANALYTICAL GEOMETRY OF THREE DIMENSION

Teaching Hours: 18 Hrs.

Planes, straight lines.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development-exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.

- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

P.R.Vittal, Mathematical Foundations - Margham Publication, Chennai.

Reference Books:

1. U.Rizwan, Mathematical Foundation - SciTech, Chennai
2. V.Sundaram & Others, Discrete Mathematical Foundation - A.P. Publication, Sirkali.
3. P.Duraipandian & Others, Analytical Geometry 3 Dimension - Emerald publication 1992 Reprint.
4. Manicavachagompillay & Natarajan. Analytical Geometry part II - three Dimension - S. Viswanathan (printers & publication) Put Ltd., 1991.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	S	S	S
CO2	S	M	M	M	M	S	S	S	S	S
CO3	S	S	S	M	M	S	S	M	S	S
CO4	S	M	M	M	S	S	S	M	S	S
CO5	S	S	M	M	M	S	S	S	S	S

PO - Programme Outcome, CO - Course outcome

S - Strong, M - Medium, L - Low (may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE– 632115
(Bachelor of Computer Science)–2022-2023 onwards

Semester: III

Paper type: Core–Paper 3

Paper code:

Name of the Paper: Programming in Java

Credit:

3 Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: .. Practical Hours:

Course Objectives

1. To know about a General-purpose and Purely object-oriented programming language including data types.
2. To understand the concept of garbage collection and operators
3. To know about the concept of Array and string
4. To know about the concept of Files
5. To understand the concept of Applets

Course Outcomes

1. After studied unit-1, the student will be able to understand the concept of General-purpose and Purely object-oriented programming language including data types and classes
2. After studied unit-2, the student will be able to understand the concept of loops
3. After studied unit-3, the student will be able to understand the concept of Arrays
4. After studied unit-4, the student will be able to understand the concept of Files
5. After studied unit-5, the student will be able to understand the concept of internet programming using applets and GUI-based

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION

Teaching Hours: 7 Hrs.

Declarations and Access Control: Identifiers and Keywords: Oracle's Java Code Conventions. Define Classes: Import Statements and the Java API - Static Import Statements. Use Interfaces: Declaring an Interface-

DeclaringInterfaceConstants.DeclareClassMembers:AccessModifiers
 -NonaccessMemberModifiers-ConstructorDeclarations-VariableDeclarations. Declare
 and Use enums:Declaring enums.Object Orientation:Encapsulation -
 InheritanceandPolymorphism- Polymorphism - Overriding / Overloading: Overridden
 Methods -OverloadedMethods.

Unit-2:CONCEPTS OF OOP

TeachingHours: 8Hrs.

ObjectOrientation:Casting- Implementingan Interface-Legal Return
 Types:ReturnTypeDeclarations - Returning a Value. Constructors and Instantiation:Overloaded
 Constructors -Initialization Blocks.Statics: Static Variables and Methods. Assignments: Stack and
 Heap-Literals, Assignments, and Variables: Literal Values for All Primitive Types. Scope -
 VariableInitialization - Passing Variables into Methods: Passing Object Reference Variables -
 PassingPrimitiveVariables.GarbageCollection.Operators:JavaOperators-AssignmentOperators
 - Relational Operators - instance of Comparison - Arithmetic Operators -
 ConditionalOperator-LogicalOperators.

Unit-3:ARRAYS AND LOOPING

TeachingHours: 8Hrs.

Working with Strings, Arrays, and Array Lists: Using String and StringBuilder: The
 StringClass - The StringBuilder Class - Important Methods in the StringBuilder Class. Using
 Arrays:DeclaringanArray-ConstructinganArray-InitializinganArray.
 UsingArrayList:ArrayListMethods>Action-ImportantMethodsIntheArrayListClass.FlowControl
 and Exceptions: Using if and switch Statements -CreatingLoopsConstructs -HandlingExceptions -
 Catchingan Exception Using try and catch - Using finally. String Processing,
 DataFormattingResourceBundles:String,StringBuilder,andStringBuffer-
 Dates,Numbers,Currencies,andLocales.

Unit-4:FILES AND THREADS

TeachingHours: 8Hrs.

I/O and NIO: File Navigation and I/O: Creating Files Using the
 FileClass-UsingFileWriterandFileReader.FileandDirectoryAttributes-DirectoryStream-
 Serialization.GenericsandCollections:toString(),hashCode(),andequals():ThetoString()Method-
 Generic Types-GenericMethods-GenericDeclarations.InnerClasses:Method-Local. InnerClasses -
 Static NestedClasses -Threads:Defining, Instantiating,and StartingThreads-
 ThreadStatesandTransitions-SynchronizingCode,ThreadProblems-
 ThreadInteraction.Concurrency:Concurrency with thejava.util.concurrentPackage-
 ApplyAtomicVariablesandLocks-Usejava.util.concurrentCollections-
 UseExecutorsandThreadPools.

Unit5:APPLETS

TeachingHours:8Hrs.

Applets: Applet fundamentals - Applet class - Applet life cycle - Steps for developing an
 appletprogram - Passing values through parameters - Graphics in an applet- Event-handling.
 GUIApplications - Part 1: Graphical user interface - Creating windows - Dialog boxes -
 Layoutmanagers -AWT componentclasses - Swing component classes.GUIApplications - Part
 2:Event handling-OtherAWTcomponents-AWTgraphicsclasses-Otherswingcontrols.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Kathy Sierra, Bert Bates—OCA/OCP Java SE 7 Programmer I & II Study Guide, Oracle Press. (Unit I, II, III, IV).
2. Sagayaraj, Denis, Karthik and Gajalakshmi, 2018, Java Programming- For Core and Advanced Learners, University Press (India) Private Limited, Hyderabad. (Unit V).

Reference Books:

1. Hebert Schild, 2002, The Complete Reference Java 2, [Fifth Edition]. Tata McGraw-Hill, New Delhi.
2. John Hubbard, R. 2004. Programming with Java. [Second Edition]. Tata McGraw-Hill, New Delhi.
3. Debasish Jana. 2005. Java and Object-Oriented Programming Paradigm, [Second Printing]. Prentice-Hall of India, New Delhi.
4. Sagayaraj, Denis, Karthik and Gajalakshmi 2018, Java Programming for core and advanced Learners, University Press India Pvt. Ltd., Hyderabad.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	M	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	M	M	M	M	S	S	S	M	S
CO4	S	M	M	M	M	S	S	S	S	S
CO5	S	S	M	M	M	S	S	S	M	S

PO–ProgrammeOutcome,CO – Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALUVAR UNIVERSITY, VELLORE – 632115
(Bachelor of Computer Science) – 2022-2023 onwards

Semester: III

Paper type: Core – Practical-3

Paper code:

Name of the Paper: Programming in Java Lab

Credit:

3 Total Hours per Week: 3 Hrs. Lecture Hours:

Tutorial Hours: .. Practical Hours: 39 Hrs.

Course Objectives

1. To understand the concepts of classes and objects.
2. To know about layout managers.
3. To gain knowledge of frames and menus.
4. To understand the concept of RMI.
5. To learn how to handle exceptions.

Course Outcomes

1. After studying unit-1, the student will be able to understand the concept of purely object-oriented programming language including data types and classes.
2. After studying unit-2, the student will be able to implement layout managers.
3. After studying unit-3, the student will be able to develop an application using frames.
4. After studying unit-4, the student will be able to understand the concepts of RMI.
5. After studying unit-5, the student will be able to handle exceptions in program.

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Implementation of Classes and Objects
2. Implementation of Inheritance and Polymorphism
3. Implementation of Interface and Package concepts

4. Implementation of Flow, Border, Grid Layouts
5. Implementation of Tic-Tac-Toe Application Using Applets
6. Implementation of Frames, Menus, Dialog
7. Implementation of Swing concepts
8. Implementation of Exception Handling
9. Implementation of Multi Threading
10. Implementation of I/O Streams
11. Implementation of Java Networking concepts
12. Implementation of Java Servlets (Connecting Database)
13. Implementation of RMI
14. Implementation of Java Beans

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: book level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	S	S	S	S
CO2	S	M	M	M	M	M	S	M	S	M
CO3	S	M	S	M	M	S	S	M	S	S
CO4	S	M	S	M	M	M	S	M	S	M
CO5	S	M	M	M	M	M	S	S	S	S

PO–ProgrammeOutcome,CO –Courseoutcome
S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLOVAR UNIVERSITY, VELLORE – 632115
(Bachelor of Computer Science) – 2022-2023 onwards

Semester: III

Paper type: Allied II – Paper 3

Paper code:

Name of the Paper: Physics - I

Credit: 3

Total Hours per Week: 4 Hrs. Lecture Hours: 52 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Properties of Matter**Teaching Hours: 11 Hrs.**

Gravitation: Acceleration due to gravity - Determination of 'g' by Simple pendulum - Drawbacks of simple pendulum - Determination of time period of compound pendulum - 'g' by compound pendulum - Centre of Oscillation and Centre of Suspension are interchangeable - Determination of 'g' by Bar/compound pendulum.

Elasticity: Bending of beams - Expression for bending moment - Cantilever Depression at the loaded end of a cantilever - Expression for Young's modulus - non-uniform bending - Pin and microscope method.

Torsion : Torsion couple - Potential energy in a twisted wire - Torsional pendulum - Time period - Determination of rigidity modulus by Torsional oscillation (without masses).

Viscosity: Viscosity of a liquid - Viscous force - Co-efficient of viscosity of a liquid - Poiseuille's formula - Experimental method using Burette - Effect of temperature and pressure on viscosity - applications.

Surface Tension: Surface tension of a liquid - Surface Tension and interfacial surface tension by the method of drops - applications.

Unit-2: Thermo Electricity**Teaching Hours: 10 Hrs.**

Seebeck, Peltier and Thomson effects - laws of thermoelectric circuits - Peltier coefficient - Thomson coefficient - application of thermodynamics to a thermocouple and expressions for Peltier and Thomson coefficients - thermoelectric power and thermoelectric diagrams.

Unit-3: Transient Current and Magnetism**Teaching Hours: 10 Hrs.**

Growth and decay of current in a circuit containing resistance and inductance - Growth and decay of charge in circuit containing resistance and capacitor - growth and decay of charge in a LCR circuit - condition for the discharge to be oscillatory - frequency of oscillation.

Magnetism - Magnetic moment and pole strength of a magnet - Deflection magnetometer - Tan C Position - Vibration magnetometer - Theory - Period of Oscillation - Determination of M and B_H using the deflection magnetometer and the vibration magnetometer.

Unit-4: Acoustics**Teaching Hours: 10 Hrs.**

Sound: Transverse vibration of strings - Velocity and frequency of vibrations of a stretched string - laws - Sonometer - A.C. Frequency - Steel wire - Brass wire.

Introduction to Ultrasonics - Piezoelectric effect - production by Piezoelectric method - properties - applications - Acoustics of buildings - reverberation time - derivation of Sabine's formula - determination of absorption coefficient - Acoustical aspects of halls and auditoria.

Unit-5: Lasers and Fibre Optics**Teaching Hours: 11 Hrs.**

Laser: Introduction - Principles of laser - Einstein's explanation for stimulated emission - Differences between stimulated and spontaneous emission - Population inversion - Properties of laser - Types of lasers - He-Ne Laser - Semiconductor Laser - Applications of laser.

Fibre optics: Basic principle of an optical fibre - Total internal reflection - Basic structure of an optical fibre - Numerical aperture - Coherent bundle - Attenuation and dispersion - classification of optical fibres - step index and graded index fibers - single mode and multi mode fibers - Fibre optic communications system block diagram - applications.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

Unit 1 and Unit 4

1. R. Murugesan and Kiruthiga Sivaprasath, Properties of Matter and Acoustics, S. Chand & Co. New Delhi, Kindle edition.

Unit 2 and Unit 3

1. R. Murugesan, Electricity & Magnetism, S. Chand & Co. New Delhi, 2019.

Unit 5

1. N. Subrahmanyam, Brij Lal and M. N. Avadhanulu, A Text Book of Optics, S. Chand & Co. New Delhi, Revised Edition as per UGC model syllabus.

Reference Books:

1. Brij Lal and N. Subrahmanyam, Electricity and Magnetism, S. Chand & Company Pvt Ltd, New Delhi, 2000.
2. D. C. Tayal, Electricity and Magnetism, Himalaya Publishing House, Bombay, 2014.
3. Brij Lal and N. Subrahmanyam, A Text Book of Sound, Vikas Publications, New Delhi (2 Edition)
4. C. L. Arora, Physics for Degree Students B. Sc First Year, S. Chand Publishing, 2013.
5. K. Thyagarajan and Ajay Ghatak, Introduction to Fibre Optics-, Cambridge University.

6. AjayGhatakandK.Thyagarajan,FiberopticsandLasers-
Thetworevolutions,Macmillan,2006.
7. K.ThyagarajanandAjayGhatak,Lasers;Fundamentalsandapplications, Springer.
8. ModernPhysics–
R,Murugesan,KiruthigaSivaprasath,S.Chand&Co,NewDelhi,2016.

CourseMaterial:

E-MATERIALS

1. <https://courses.lumenlearning.com/physics/chapter/16-4-the-simple-pendulum/>
2. https://www.youtube.com/watch?v=aw0_seEt4v0
3. https://en.wikipedia.org/wiki/Thermoelectric_effect
4. https://www.youtube.com/watch?v=S0I37M2sx_0
5. <https://physicscatalyst.com/electromagnetism/growth-and-delay-charge-R-C-circuit.php>
6. <https://www.youtube.com/watch?v=PLQQPXot6vE>
7. https://www.youtube.com/watch?v=d0_Eff4MXwM
8. <https://www.techglads.com/cse/sem1/production-of-ultrasonics-by-piezoelectric-methods/>
9. https://thefactfactor.com/facts/pure_science/physics/optical-fibre/5159/
10. <https://www.youtube.com/watch?v=auk1OS0SVWc> (Tamil video)

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	S	S	M	S
CO2	S	M	M	S	M	M	S	S	S	S
CO3	S	M	M	S	S	M	S	S	M	S
CO4	S	M	M	M	M	M	S	S	S	S
CO5	S	M	M	M	M	M	S	S	M	S

PO–ProgrammeOutcome,CO – Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLOVAR UNIVERSITY, VELLORE – 632115
(Bachelor of Computer Science) – 2022-2023 onwards

Semester: III

Paper type: Allied III – Paper 3

Paper code: Name of the Paper: Statistical Methods and their Applications-1

Credit:

3 Total Hours per Week: 4 Hrs. Lecture Hours: 52 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:**TeachingHours:11Hrs.**

Introduction - scope and limitations of statistical methods - classification of data -Tabulation of data-Diagrammatic and Graphical representation of data - Graphical determination ofQuartiles ,Deciles andPercentiles.

Unit-2:**TeachingHours: 10Hrs.**

Measuresoflocation:Arithmeticmean,median,mode,geometricmeanandHarmonicmeanandtheirproperties.

Unit-3:**TeachingHours: 10Hrs.**

Measuresofdispersion:Range,Quartiledeviation,meandeviation,Standarddeviation,combinedStandarddeviation,andtheirrelativemeasures.

Unit-4:**TeachingHours:10Hrs.**

Measures of Skewness: Karl Pearson's, Bowley's, and kelly's and co-efficient ofSkewness and kurtosisbasedonmoments.

Unit-5:**TeachingHours: 11Hrs.**

Correlation - Karl Pearson - Spearman's Rank correlation - concurrent deviation methods.RegressionAnalysis:SimpleRegressionEquations.

Note:Theproportionbetween theoryandproblemsshallbe20:80

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentframework)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:bookslevel,fieldstudy level.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparingquestionpaperbythecandidates:objectivetype,descriptivetype,trainingcanbegivenby theteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfordocumentation,furtherdiscussionandresearch.
- g. Extracurricularandculturalactivitiesmaybeframedthroughthesyllabuscontent.
- h. Groupingstudentsforselfdiscussion,selflearningprocess.
- i. Followinginstitutionandintellectualandwritingreportsinthecoursefield.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process withinthe frameworkofquestionsettingpatternandinternalassessmentpattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adoptedby the departments of the colleges for practicing their theoretical study. Innovative methodsmay be implemented in the practices and report can be written for documentation, furtherdiscussionandresearch.
- l. Extracurricularactivitiesmaybeframedthroughtheirsyllabuscontent.

- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Reference Book:

1. Fundamental of Mathematical Statistics-S.C.Gupta & V.K.Kapoor-Sultan Chand
2. Statistical Methods-Snedecor G.W. & Cochran W.G. Oxford & DII
3. Elements of Statistics -Mode.E.B.-Prentice Hall
4. Statistical Methods-Dr.S.P.Gupta-Sultan Chand & Sons

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	M	S	S	S	S	S
CO2	M	M	M	M	M	M	S	S	M	S
CO3	S	M	M	M	M	M	S	S	S	M
CO4	M	S	S	M	M	M	M	S	S	S
CO5	S	S	M	M	M	M	S	S	S	S

PO–Programme Outcome, CO – Course outcome
 S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE– 632115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: III Papertype: Skill based Subject– Paper 1

Paper code: Name of the Paper: Digital Logic Design and Computer Organization Credit: 2

Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To understand the basics of Number System.
2. To understand the concept of Simplification of Boolean expressions using K-map and arithmetic circuits.
3. To understand the concept of Combinational Logic Circuits
4. To understand the concept of Basic Structure of Computers
5. To understand the basic concepts of Input Output and Memory Organization

Course Outcomes

1. After studied unit-1, the student will be able to understand Boolean algebra and basic gates.
2. After studied unit-2, the student will be able to understand how to simplify expression using K-Map.
3. After studied unit-3, the student will be able to understand how to build combinational circuits.
4. After studied unit-4, the student will be able to know about registers and addressing modes
5. After studied unit-5, the student will be able to understand types of memories.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: BINARY NUMBER SYSTEM**Teaching Hours: 8 Hrs.**

Number system and its conversions-. Digital Computers and Digital Systems - Binary Number System – Binary Addition – Binary Subtraction- Binary Multiplication and Division- Number Base Conversion: decimal, binary, octal, hexadecimal. The Basic Gates - Boolean Algebra - Universal Gates - Boolean Laws and Theorem.

Unit-2: SIMPLIFICATION**Teaching Hours: 8 Hrs.**

Sum of products-Product of Sums-K-map simplifications-Don't care conditions-Quine McClusky tabulation method. Combinational Arithmetic Circuits: Adders-Subtractors-full adder-subtractor-BCD Adder.

Unit-3: COMBINATIONAL LOGIC CIRCUITS**Teaching Hours: 8 Hrs.**

Multiplexers-De-Multiplexers- Decoders : -Encoders- Decoders-Sequential Logic Circuit: Flip-Flops -RS Flip flop- JK Flip flop- D Flip flop-T Flip flop and Master Slave. Counters- Synchronous and Asynchronous-Shift Registers and its types.

Unit-4: BASIC STRUCTURE OF COMPUTERS**Teaching Hours: 7 Hrs.**

Basic Operational Concepts, Bus Structures-Central Processing Unit: General Register and stack Organization-Instruction Formats Addressing Modes-Data Transfer and manipulation

Unit-5: INPUT OUTPUT AND MEMORY ORGANIZATION**Teaching Hours: 8 Hrs.**

Peripheral Devices-I/O Interface-Asynchronous Data Transfer--Priority Interrupt--Direct Memory Access--I/O Processor Memory Organization--Main Memory-Auxiliary Memory--Associative Cache and Virtual Memory.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development-exercise
- Workshops, preparing technical term dictionaries from textbooks and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self discussion, self learning process.
- Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods

maybe implemented in the practices and report can be written for documentation, further discussion and research.

- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. M.Morris Mano-Digital Logic and Computer Design- PHI.
2. M.Morris Mano, Computer System Architecture, Pearson Education.

Reference Books:

1. Thomas C. Bartee Digital Computer Fundamentals- McGraw Hill Pub.
2. Malvino & Leach-Digital Principles and Applications-McGraw Hill Pub.
3. S.Ramalatha-Digital Computer Fundamentals, Meenakshi Agency.
4. V.Carl Hamacher, Zvonko G. Vranesic, Safwat G. Zaky, Computer Organization, McGraw Hill Higher Education.
5. John P. Hayes, Computer System Architecture, McGraw Hill Higher Education

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	S	S	M	S
CO2	S	M	M	S	S	M	S	S	M	S
CO3	S	M	M	S	S	M	M	S	M	S
CO4	S	M	M	S	M	M	M	S	M	S
CO5	S	M	M	S	M	M	M	S	M	S

PO-Programme Outcome, CO – Course outcome

S –Strong ,M–Medium,L– Low(maybe avoided)

THIRUVALUVAR UNIVERSITY, VELLORE – 632115
(Bachelor of Computer Science) – 2022-2023 onwards

Semester: III Papertype: Non Major Elective - Paper 1

Paper code: Name of the Paper: Introduction to Information Technology Credit:

2 Total Hours per Week: 2 Hrs. Lecture Hours: 26 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

The subject aims to build the concepts regarding:

1. Major components of Computer System and its working principles.
2. Role of an Operating System and basic terminologies of networks.
3. How the Information Technology aids for the Current Scenario.
4. To understand the Computer Software.
5. To understand internet applications

Course Outcomes

1. After studied unit-1, the student will be able to understand the Major components of Computer System and its working principles.
2. After studied unit-2, the student will be able to know the Role of an Operating System and basic terminologies of networks.
3. After studied unit-3, the student will be able to know How the Information Technology aids for the Current Scenario.
4. After studied unit-4, the student will be able to understand the Computer Software
5. After studied unit-5, the student will be able to understand internet applications

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTION

TeachingHours:6Hrs.

CharacteristicsofComputers-TechnologicalEvolutionofComputers-TheComputerGenerations- Categories of Computer.**Data and Information:**Introduction-Typesof Data- ASimpleModelofaComputer-DataProcessingUsingaComputer-DesktopComputer.**Acquisition of Number and Textual Data:** Introduction- Input Units-Internal Representation ofNumericData- RepresentationofCharactersinComputers–Error-DetectingCodes.

Unit-2:DATA STORAGE

TeachingHours:5Hrs.

Introduction-Memory Cell-Physical Devices Used as Memory Cells-Random Access Memory- ReadOnlyMemory-SecondaryMemory-FloppyDiskDrive-CompactDiskReadOnlyMemory (CDROM)-Archival Memory. **Central Processing Unit:** The Structure of a CentralProcessingUnit-Specificationofa CPU-InterconnectionofCPUwithMemoryandI/OUnits.

Unit-3:COMPUTER NETWORKS

TeachingHours:5Hrs.

Introduction-Local Area Network (LAN)- Applications of LAN-Wide Area Network (WAN)– TheFuture of Internet Technology. **Output Devices:** Introduction- Video Display Devices-Flat PanelDisplays–Printers.

Unit-4:COMPUTER SOFTWARE

TeachingHours:5Hrs.

Introduction-OperatingSystem-ProgrammingLanguages– AClassificationofProgrammingLanguages. **Data Organization:** Introduction-Organizing a Database-Structure of a Database-Database ManagementSystem-Example ofDatabase Design.

Unit-5:SOME INTERNET APPLICATIONS

TeachingHours:5Hrs.

Introduction-E-mail-InformationBrowsingService-TheWorldWideWeb-InformationRetrieval from the World WideWeb-Other FacilitiesProvidedby Browsers -AudioontheInternet. **SocietalImpacts ofInformation Technology:**CareersinInformationTechnology.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentfor a network)

- Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- Datacollectionandpaperwritingpractices:bookslevel,fieldstudy level.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- Workshops,preparingtechnicalterm dictionariesfromtextbooksandreferencebooks.
- Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher
- Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfor documentation,further discussionandresearch.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Rajaraman, V. 2008. Introduction to Information Technology. [Sixth Printing]. Prentice Hall of India Pvt. Limited, New Delhi. (UNIT I to V)
2. Nagpal, D.P. 2010. Computer Fundamentals. [First Edition, Revised]. S. Chand & Company Ltd, New Delhi. (UNIT I (Introduction: Characteristics of Computers to Categories of Computer))

Reference Books:

1. ITL Educations Solution Limited. 2009. **Introduction to Computer Science**. [Fourth Impression]. Pearson Education, New Delhi.
2. Alexis Leon and Mathews Leon. 1999. **Fundamentals of Information Technology**. [First Edition]. Leon TECH World, New Delhi.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	M	M	S
CO2	S	S	S	M	S	S	M	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science) –2022-

2023 onwards Semester: IV Paper type: Core Theory- Paper 4

Paper code: Name of the Paper: Relational Database Management Systems Credit:

3 Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. The students are able to understand database concepts and database management system software and have a high-level understanding of major DBMS components and their function.
2. The students are able to understand the ER model and relational model.
3. The students are able to be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.
4. The students are able to Understand Functional Dependency and Functional Decomposition.
5. The students are able to understand the architecture of database management system and also understand the various different architecture such as server system architecture, parallel systems and distributed database systems.

Course Outcomes

1. Describe the database architecture and its applications Sketch the ER diagram for real world applications Uses various ER diagram for similar concepts from various sources.
2. Discuss about the relational algebra and calculus Construct various queries in SQL and PL/SQL Compiles various queries in SQL, Relational Calculus and Algebra.
3. Describe the various normalization forms Apply the normalization concepts for a table of data Practices a table and implement the normalization concepts.
4. Explain the storage and accessing of data.
5. Illustrate the query processing in database management. Define the concurrency control and deadlock concept

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: DATABASE ARCHITECTURE AND ER DIAGRAM**Teaching Hours: 8Hrs.**

Database system applications - Purpose of database systems - View of data- Database languages - Database architecture - Database users and administrators - History of database systems- Entity relationship modeling: entity types, entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, sub classes; superclasses, inheritance, specialization and generalization

Unit-2: RELATIONAL DATA MODEL**Teaching Hours: 8Hrs.**

Relational model concepts, Relational constraints, Relational Languages: Relational Algebra, The Tuple Relational Calculus- The Domain Relational Calculus- SQL: Basic Structure- Set Operations- Aggregate Functions- Null Value- Nested Sub Queries- Views Complex Queries Modification Of Database- Joined Relations- DDL- Embedded SQL- Dynamic SQL- Other SQL Functions-- Integrity and Security.

Unit-3: DATA NORMALIZATION**Teaching Hours: 8Hrs.**

Pitfalls in relational database design- Decomposition- Functional dependencies- Normalization – First normal form – Second normal form – Third normal form – Boyce-codd normal form – Fourth normal form- Fifth normal form.

Unit-4: STORAGE AND FILE ORGANIZATION**Teaching Hours: 7Hrs.**

Disks - RAID - Tertiary storage - Storage Access - File Organization – organization of files - Data Dictionary storage

Unit-5: QUERY PROCESSING AND TRANSACTION MANAGEMENT**Teaching Hours: 8Hrs.**

Query Processing- Transaction Concept- Concurrency Control- Locks based protocol Deadlock Handling- Recovery Systems.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development-exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, Database Systems Concepts, Sixth Edition, McGraw Hill, 2010.
2. Raghuram Krishnan and Johannes Gehrke, Database management systems, Third Edition, 2002

Reference Books:

1. Bipin Desai, An Introduction to database systems, Galgotia Publications, 2010.
2. Ramez Elmasri, Shankar B-Navathe, Fundamentals of Database Systems, Pearson, 7th Edition, 2015

E- REFERENCES

1. NPTEL, Introduction to database design, Dr. P. Sreenivasa Kumar Professor CS&E, Department, IIT Madras
2. NPTEL, Indexing and Searching Techniques in Databases Dr. Arnab Bhattacharya, IIT Kanpur

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	S	S	S	M	M	S	S	M	S
CO4	S	M	M	M	S	M	S	S	S	S
CO5	S	S	M	M	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science) –2022-

2023 onwards Semester: IV Paper type: Core Practical-4

Paper code: Name of the Paper: RDBMS Lab

Credit: 3

Total Hours per Week: 3 Hrs. Lecture Hours: Tutorial Hours: Practical Hours: 39 Hrs.

Course Objectives

1. To understand the concepts of DDL/DML/DCL/TCL commands.
2. To understand the concepts of Join queries.
3. To understand the concepts of exception handling.
4. To understand the concepts of cursors.
5. To understand the concepts of packages.

Course Outcomes

1. Design and Implement a database schema for a given problem domain.
2. Populate and Query a database using SQL DDL/DML Commands.
3. Build well formed in String Date/Aggregate Functions.
4. Design and Implement a database query using Joins, Sub-Queries and Set Operations.
5. Program in SQL including Objects (Functions, Procedures, Triggers)

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Execute a single line query and group functions.
2. Execute DDL Commands.
3. Execute DML Commands
4. Execute DCL and TCL Commands.
5. Implement the Nested Queries.
6. Implement Join operations in SQL

7. Create views for a particular table
8. Implement Locks for a particular table.
9. Develop a PL/SQL procedure for an application using exception handling.
10. Develop a PL/SQL procedure for an application using cursors.
11. Develop a PL/SQL procedure for an application using functions
12. Develop a PL/SQL procedure for an application using package

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Reference Book:

1. Abraham Silberschatz, Henry Korth, S. Sudarshan, Database Systems Concepts, Sixth Edition, McGraw Hill, 2010.
2. Raghuram Krishnan and Johannes Gehrke, Database management systems, Third Edition, 2002

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	S	S	S
CO2	S	S	M	S	M	S	S	S	S	S
CO3	S	M	M	M	M	S	M	S	S	S
CO4	S	M	S	M	S	S	S	S	S	S
CO5	S	M	M	M	M	S	M	M	M	M

PO–ProgrammeOutcome,CO – Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVARUNIVERSITY,VELLORE– 632115
(BachelorofComputerScience)– 2022-2023 onwards

Semester:IV

Papertype:AlliedII–Paper4

Papercode:

NameofthePaper:Physics- II

Credit:3

TotalHoursperWeek:4Hrs.LectureHours:52Hrs.TutorialHours:.....PracticalHours:.....

.....

CourseObjectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

MatchingTable

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:SpecialTheory ofRelativity**TeachingHours:11Hrs.**

Frames of reference-inertial frames and non-inertial frames -Galilean transformations -Michelson-Morley experiment-interpretation of results-postulates of special theory of relativity Lorentztransformation equations -length contraction - time dilation - transformation of velocities - variationofmass withvelocity-Mass-energyequation.

Unit-2:AtomicPhysics**TeachingHours:11Hrs.**

Bohr atom model – Critical Potentials - Experimental determination of critical potentials - Franckand Hertz’s experiment -Sommerfield’s Relativistic atom model The vector atom model – spatialquantization–spinning of an electron –quantum numbers associated with the vector atom model –couplingschemes–LSandjj coupling–the Pauli's exclusion principle–Stern andGerlachexperiment

Unit-3:NuclearPhysics**TeachingHours: 10Hrs.**

Bindingenergy-Bindingenergypernucleon-Packingfraction-Nuclearmodels–liquiddropmodel – semi empirical mass formula – merits and demerits -shell model -evidences for shell model – nuclear radiation detectors –ionization chamber – G.M Counter-Wilson cloud chamber- Particleaccelerators-Cyclotron-Betatron.

Unit-4:DigitalElectronics**TeachingHours:10Hrs.**

Number systems -Decimal, Binary, Octal and Hexadecimal system – Conversion from one numbersystem to another- Binary Arithmetic -Addition –Subtraction- 1’s and 2’s complement - Binarycodes- BCD code – Excess 3 code, Gray code. NAND, NOR and EXOR – functions and truthtables. NAND & NOR as universal gates-Half adder and Full adder - Half subtractor and FullsubtractorusingNANDgateonly.

Unit-5:Nanomaterial**TeachingHours:10Hrs.**

Introduction-Nanomaterial- Properties of nanomaterial (size dependent) -synthesis of nanomaterial-solgel-hydrothermalmethod-ScanningElectronMicroscope(SEM)-PrincipleandInstrumentation- Fullerenes- Carbon nanotubes- Fabrication and structure of carbon nanotubes - Propertiesofcarbonnanotubes(MechanicalandElectrical)-ApplicationsofCNT’s.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentfr amework)

- Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- Datacollectionandpaperwritingpractices:bookslevel,fieldstudylevel.Usingthecoursestudyfors ocietyandnaturedevelopment–exercise
- Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- Preparingquestionpaperbythecandidates:objectivetype,descriptivetype,trainingcanbegivenby theteacher

- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
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- i. Following institution and intellectual and writing reports in the course field.
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- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

Unit 1 to Unit 3

1. Modern Physics – R. Murugesan, Kiruthiga Sivaprasath, S. Chand & Co, New Delhi, 2016

Unit 4

1. V. Vijayendran, Introduction to Integrated Electronics (Digital & Analog), S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007

Unit 5

1. V. Raghavan, *Material Science and Engineering*, Printice Hall India., 2004.

Reference Books:

1. Allied Physics – R. Murugesan S. Chand & Co. New Delhi, 2005.
2. A Textbook of Digital electronics – R.S. Sedha, S. Chand & Co, 2013
3. Malvino and Leech, Digital Principles and Application, 4th Edition, Tata McGraw Hill, New Delhi, 2000.
4. Dr. M.N. Avadhanulu, *Material science*, S. Chand & Company, New Delhi, 2014.
5. M. Arumugam, *Material science*, Anuradha publishers, 1990.
6. V. Rajendran, *Material Science*, Tata McGraw Hill Ltd, New Delhi, 2001.
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E-Materials

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2. https://www.youtube.com/watch?v=NH3_IkSB9s
3. <https://www.youtube.com/watch?v=EEWuUst2GK4>
4. https://en.wikipedia.org/wiki/Vector_model_of_the_atom
5. <https://www.tutorialspoint.com/what-is-a-geiger-muller-counter>
6. <https://www.youtube.com/watch?v=jxY6RC52Cf0>
7. https://www.tutorialspoint.com/digital_circuits/digital_circuits_number_systems.htm

8. <https://www.youtube.com/watch?v=4ae9sJBBkvw>
9. <https://en.wikipedia.org/wiki/Nanomaterials>
10. <https://www.youtube.com/watch?v=mPx0Jz6treE>(Tamilvideo)

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	S	S	S	S
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	M	M	S	M	M	S	S	S	S
CO4	S	M	S	M	M	S	M	S	S	S
CO5	S	M	M	M	M	M	S	S	S	S

PO–ProgrammeOutcome,CO – Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVARUNIVERSITY,VELLORE– 632115
(BachelorofComputerScience)–2022-2023onwards

Semester:IV **Papertype:AlliedII –Practical**

Papercode: **NameofthePaper: Physics** **Credit: 2**

TotalHoursperWeek: 3Hrs. LectureHours:.....TutorialHours:.....PracticalHours:39Hrs.

.....

CourseObjectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

MatchingTable

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES (Any 12 Experiments only)

1. Determination of g using Compound pendulum.
2. Young's modulus-Non-Uniform bending-Pin & microscope
3. Rigidity Modulus-Torsional oscillation method (without masses).
4. Rigidity Modulus-Static Torsion method using Scale and Telescope.
5. Surface tension and Interfacial Surface tension by Drop Weight method.
6. Sonometer- Frequency of a Tuning fork.
7. Sonometer-Determination of A.C. frequency-using steel and brass wire
8. Air Wedge -Determination of thickness of a thin wire
9. Newton's Rings - Radius of Curvature of a convex lens.
10. Spectrometer -Refractive index of a liquid-Hollow prism.
11. Spectrometer grating-Minimum Deviation-Wavelength of Mercury lines.
12. Potentiometer-Calibration of Low range voltmeter.
13. Deflection magnetometer and Vibration magnetometer-Tan C Position-Determination of μ and B_H .
14. Figure of merit-Table Galvanometer.
15. Construction of AND, OR gates using diodes and NOT gate using a transistor.
16. NAND/NOR as universal gate.
17. Half adder and Full adder using NAND gate.
18. Half subtractor and Full subtractor using NAND gate.
19. Lasers: Study of laser beam parameters.
20. Measurement of Numerical aperture (NA) of a telecommunication graded index optical fiber.
21. Fiber attenuation of a given optical fiber.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development-exercise
- c. Workshops, preparing technical term dictionaries from textbooks and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2018.
2. M.N. Srinivasan, S. Balasubramanian, R. Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015.

Reference Books:

1. Dr. S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirapalli, 2012.
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi, 2011.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	S	S	S	S
CO2	S	S	M	M	M	M	S	S	S	S
CO3	S	S	S	M	M	S	S	S	S	S
CO4	S	M	M	M	M	M	S	S	S	S
CO5	S	M	M	S	M	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVARUNIVERSITY,VELLORE– 632115
(BachelorofComputerScience)–2022-2023onwards

Semester:IV Papertype:AlliedII–Paper4

Papercode:NameofthePaper:StatisticalMethodsandtheirApplications-II

Credit:3Total

HoursperWeek: 4Hrs.LectureHours:52Hrs.TutorialHours:.....PracticalHours:.....

Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

MatchingTable

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:

TeachingHours: 10Hrs.

Curvefittingbythemethodsofleastsquares-

$$Y = ax + b, Y = ax^2 + bx + c, Y = ax^b, Y = a e^{bx} \text{ and } Y = ab^x$$

Unit-2:**TeachingHours:11Hrs.**

SampleSpace-events-probability-AdditionandMultiplicationTheorem-conditionalprobability - Baye's Theorem. Mathematical expectation Addition and Multiplication theorem,Chebychev's Inequality.

Unit-3:**TeachingHours: 10Hrs.**

Standarddistributions-Binomial, Poisson, Normaldistributionandfittingofthesedistributions.

Unit-4:**TeachingHours: 10Hrs.**

TestofSignificance-smallsampleandlargesampletestbasedonmean,S.D.correlationandproportion-confidenceinterval.

Unit-5:**TeachingHours: 11Hrs.**

Analysisofvariance-OneandTwowayclassifications-BasicprincipleofdesignofExperiments-Randomisation,Replicationand Localcontrol-C.R.D.,R.B.D.and L.S.D.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentfor a network)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:bookslevel,fieldstudy level.Usingthecoursestudyforsocietyandnaturedevelopment-exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparingquestionpaperbythecandidates:objectivetype,descriptivetype,trainingcanbegivenby theteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfordocumentation, further discussionandresearch.
- g. Extracurricularandculturalactivitiesmaybeframedthroughthesyllabuscontent.
- h. Groupingstudentsforselfdiscussion,selflearningprocess.
- i. Followinginstitutionandintellectualandwritingreportsinthecoursefield.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process withinthe frameworkofquestionsettingpatternandinternalassessmentpattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adoptedby the departments of the colleges for practicing their theoretical study. Innovative methodsmay be implemented in the practices and report can be written for documentation, furtherdiscussionandresearch.
- l. Extracurricularactivitiesmaybeframedthroughtheirsyllabuscontent.
- m. Bringtheindustriestothecampus. Bringthestudentstotheindustry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of researchreportslike assignment,seminarpapers,casestudyreports,etc.

ReferenceBook:

1. FundamentalofMathematicalStatistics-S.C.Gupta&V.K.Kapoor-SultanChand
2. FundamentalofApplied Statistics-S.C.Gupta&V.K.Kapoor–SultanChand
3. StatisticalMethods-SnedecorG.W.&Cochran W.G.oxford &+DII
4. ElementsofStatistics -Mode.E.B.–Prentice Hall

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	S	S	S
CO2	S	S	S	M	M	M	S	S	S	S
CO3	S	M	M	S	M	S	S	S	S	S
CO4	S	M	S	M	M	M	S	S	S	S
CO5	S	M	M	M	M	S	M	S	S	S

PO–ProgrammeOutcome,CO – Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-2023 onwards

Semester: IV

Paper type: Allied II-Practical

Paper code:

Name of the Paper: Statistical Methods and their applications

Credit:

2 Total Hours per Week: 3 Hrs. Lecture Hours: Tutorial Hours: ... Practical Hours: 39 Hrs.

.....

Course Objectives

- 1.
- 2.
- 3.
- 4.
- 5.

Course Outcomes

- 1.
- 2.
- 3.
- 4.
- 5.

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Formation of uni-variate and bi-variate frequency distribution
2. Diagrams and Graphs
3. Measures of Location
4. Measures of Dispersion
5. Skewness and Kurtosis
6. Correlation and Regression
7. Curve Fitting: $y = ax + b$, $y = ax^2 + bx + c$, $y = ax^b$, $y = ae^{bx}$
8. Fitting of distributions - Binomial, Poisson, Normal
9. Tests of significance - small sample and large sample tests
10. Analysis of Variance: one way classification, Two way classification and Design of Experiments - C.R.D, R.B.D & L.S.D

Note: Use of Scientific Calculator shall be permitted for Practical Examination.
Statistical Table may be provided to the students at the Examination Hall.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Reference Books:

1. Statistical Methods by S.P. Gupta, Sultanchand & Sons
2. Fundamental of Applied Statistics - S.C. Gupta & V.K. Kapoor

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	S	S	S
CO2	S	M	M	M	M	M	M	M	M	S
CO3	S	S	S	M	M	S	S	S	S	S
CO4	S	M	M	M	M	S	S	S	S	S
CO5	S	M	M	S	M	M	M	S	S	S

PO–ProgrammeOutcome,CO –Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-

2023 onwards Semester: IV Papertype: Skill Based Subject-Paper 2

Paper code: Name of the Paper: Wireless Data Communication Credit:

2 Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: .. Practical Hours:

Course Objectives

1. This course introduces the concepts and theories of networking
2. To apply them to various situations, classifying networks, analyzing performance and implementing new technologies.
3. To implement the various new wireless technologies.
4. To implement the various TCP/IP protocols.
5. To implement the various security threads.

Course Outcomes

1. After studying unit-1, the student will be able to understand the concepts of basic OSI layers.
2. After studying unit-2, the student will be able to understand the concepts of signals and transmission media.
3. After studying unit-3, the student will be able to understand the basic concepts of error detection and DLC.
4. After studying unit-4, the student will be able to understand the Characterize of wireless transmission technologies
5. After studying unit-5, the student will be able to understand the concepts of Security.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: BASIC CONCEPTS OF OSI LAYERS**Teaching Hours: 7Hrs.**

Data Communication – Networks – Protocol and Standards – Line Configuration – Topology – Transmission Modes – Categories of Networks – Internet networks – OSI Models – Functions of OSI Layers.

Unit-2: SIGNALS AND TRANSMISSION MEDIA**Teaching Hours: 8Hrs.**

Analog and digital – Periodic and Non Periodic signals – Analog Signals – Time And Frequency Domain - Composite Signals- Digital signals – Guided Media – Unguided Media – Transmission Impairment – Performance.

Unit-3: ERROR DETECTION, CORRECTION AND DATA LINK CONTROL**Teaching Hours: 8Hrs.**

Type of errors – Detection – Vertical Redundancy Check (VRC) – Longitudinal Redundancy Check (LRC) – Cyclic Redundancy Check (CRC) – check sum – Error Corrections – Flow Control – Error Control.) **SWITCHING & NETWORK DEVICES:** Circuit Switching – Packet Switching – Message Switching – Repeater – Bridges – Routers – Gateways – other Devices – Routing Algorithms – Distance Vectors Routing – Link State Routing.

Unit-4: WIRELESS NETWORKS**Teaching Hours: 8Hrs.**

Wireless LAN: Advantages and Disadvantages – Infrared Vs Radio Transmission – Infrastructure Networks – Ad hoc Networks – Bluetooth – Wireless ATM: Working Group Services – Reference Model – Functions – Radio Access Layer – Handover – Handover reference model – Requirements and Types.

Unit-5: TCP/IP PROTOCOL SUITE: PART I, PROTOCOLS & NETWORK SECURITY**Teaching Hours: 8Hrs.**

Overview Of TCP/IP – Network Layer – Addressing – Subnetting – Other Protocols In The Network Layer – Transport Layer – Client/Server Model – Bootstrap Protocol and DHCP – Domain Name System (DNS) – TelNet – File Transmission Protocol (FTP) – Simple Mail Transfer Protocol (SMTP) – SNMP Protocol – Hyper Text Transmission Protocol (HTTP) – World Wide Web (WWW) – Four Aspects of Security – Privacy – Digital Signature – PGP – Access Authorization.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Data Communication and Networking 2nd Edition Behrouz A. Forouzan, McGraw Hill Education 2014.
2. Stojmenovic and Cacute, Handbook of Wireless Networks and Mobile Computing, Wiley, 2002, ISBN 0471419028.

Reference Books:

1. Data and Communication Network, William Stallings PHI 2014.
2. Computer Networks, Andrew S. Tanenbaum, David J. Wetherall, 5th Edition, Prentice Hall. 2010

REFERENCES

1. <http://nptel.ac.in/video.php?subjectId=117102062>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	M	S	S	M
CO2	S	M	M	S	M	S	M	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	M	S	S	M	S	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S

PO–Programme Outcome, CO –Course outcome

S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-2023 onwards

Semester: IV Papertype: Non Major Elective – Paper 2

Paper code: Name of the Paper: Internet Technology Credit: 2

Total Hours per Week: 2 Hrs. Lecture Hours: 26 Hrs. Tutorial Hours: ... Practical Hours:

Course Objectives

1. Aims to build the concepts regarding Fundamentals of Internet, Connectivity and its Resource Requirements.
2. To understand the Internet Technology and its applications
3. To Understand WWW and Web Browsers.
4. To Understand Mailing system and applications of Internet.
5. To Understand relay chat

Course Outcomes

1. After studied unit-1, the student will be able to understand the Fundamentals of Internet, Connectivity and its Resource Requirements.
2. After studied unit-2, the student will be able to understand the Internet Technology and its applications
3. After studied unit-3, the student will be able to understand the basis of WWW and Web Browsers.
4. After studied unit-4, the student will be able to learn how to Mailing system and applications of Internet.
5. After studied unit-5, the student will be able to Understand relay chat that is how to read e-contents.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTION TO INTERNET:**TeachingHours: 5Hrs.**

What is Internet? Evolution and History of Internet- Growth ofInternet-Owners of Internet- Internet Services- How does the Internet Works?-Anatomy ofInternet-InternetAddressing- InternetvsIntranet-ImpactofInternet-GovernanceofInternet.

Unit-2:INTERNETTECHNOLOGYANDPROTOCOL:**TeachingHours: 5Hrs.**

ISO-OSIReferenceModel-**InternetConnectivity:**GettingConnected- Different Types of Connections- Levels of Internet Connectivity- Internet ServiceProvider.**Internet Toolsand Multimedia:**CurrentTrendsonInternet-MultimediaandAnimation.

Unit-3:WWWANDWEBBROWSER:**TeachingHours: 5Hrs.**

WWW-EvolutionofWeb-BasicElementsofWWW-WebBrowsers-SearchEngines- SearchCriteria.**WebPublishing:**WebPublishing-WebPageDesign.

Unit-4: EMAIL:**TeachingHours: 5Hrs.**

E-Mail Basics- E-Mail System-E-Mail Protocol-E-Mail Addresses-Structure of an E-MailMessage-E-MailClients&Servers-MailingList-E-MailSecurity.

Unit-5: USERNETANDINTERNETRELAYCHAT:**TeachingHours: 6Hrs.**

WhatisUsenet?-NewsgroupHierarchies-WhatisaNewsreader?- How do you ReadNewsgroups?- Who Administers Usenet?- Common Newsreading Tasks- How to Read Articles from Network News?- Relationship between Netnews andE-Mail-WhatisIRC?-Channels-Nicknames-MicrosoftNetMeeting.**InternetandWebSecurity:**Overviewof InternetSecurity- AspectsandNeedof Security-E-MailThreatsandSecure E-mail-WebSecurityandPrivacyConcepts-Firewall.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentframework)

- Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher
- Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

1. ISRD Group. 2012. **Internet Technology and Web Design**. [Fourth reprint]. Tata McGraw-Hill Education Private Limited., New Delhi.

Reference Books:

1. Deitel, H. M. Dietel, P. J. and Goldberg A. B. 2008. **Internet & Worldwide Web-How to Program**. [Third Edition]. PHL, New Delhi.
2. Comdex. 2000. **Teach yourself computers and the internet visually**. [First Edition]. IDG Book India (p) Ltd.
2. Ramachandran, T. M. Nambissan. 2003. **An Overview of internet and web development**. [First Edition]. TM-Dhruv Publications.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	S	M	S	S	S	S	S	M	S
CO5	S	S	M	M	M	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)–2022-2023 onwards

Semester: V

Paper type: Core Theory – Paper 5

Paper code:

Name of the Paper: Mobile Application Development

Credit:

4 Total Hours per Week: 6 Hrs. Lecture Hours: 7 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To understand the basics of smartphones and android platforms.
2. To understand the basic concepts of user interface related to app development.
3. To understand the importance of data persistence in mobile environment.
4. To understand the various services and network facilities provided by android platform.
5. To understand the various apps deployed and developed on mobile platform.

Course Outcomes

1. After studied unit-1, the student will be able to understand android basics.
2. After studied unit-2, the student will be able to gain knowledge of GUI for android.
3. After studied unit-3, the student will be able to understand SQLite database.
4. After studied unit-4, the student will be able to understand android services
5. After studied unit-5, the student will be able to develop simple mobile application using android

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTIONTOANDROIDPLATFORM**TeachingHours: 15Hrs.**

Introduction to Mobile Application Development – Various platforms – Smart phones – Androidplatform: features – Architecture – Versions – ART (Android Runtime) – ADB (Android DebugBridge) – Development environment/IDE: Android studio and its working environment – Emulatorsetup–Applicationframeworkbasics–XMLrepresentationandAndroidmanifestfile– Creatinga simpleapplication.

Unit-2:ANDROID UIDESIGN**TeachingHours:16Hrs.**

GUI for Android: activities lifecycle – Android v7 support library – Intent: Intent object – Intentfilters–Addingcategories–Linkingactivities–UserInterfacedesigncomponents –BasicViews – Picker Views – List View – Specialized Fragment – Gallery and Image View – Image Switcher – Grid View,OptionsMenu– ContextMenu – ClockView –Webview– RecyclerView

Unit-3:DATAPERSISTENCE**TeachingHours: 15Hrs.**

Different Data Persistence schemes: Shared preferences – File Handling – Managing data usingSQLiteDatabase–Contentproviders:usercontentprovider–Androidinbuildcontentproviders.

Unit-4:ANDROIDSERVICES& NETWORKENVIRONMENT**TeachingHours:16Hrs.**

Services:Introduction toservices–Local service–Remote service–Binding the service– Communication between service and activity – IntentService – Multi-Threading: Handlers – AsyncTask– Android network programming: HttpURLConnection– Connecting to REST–based – SOAP based Web services – Broad cast receivers: LocalBroadcastManager– Dynamic broadcastreceiver– SystemBroadcast–TelephonyManager:Sending SMSandmaking calls.

Unit-5:ADVANCEDAPPLICATIONS**TeachingHours: 16Hrs.**

Location based services: Google maps V2 services using Google API – Animations and Graphics:PropertyAnimation–ViewAnimations–DrawableAnimations– MediaandCameraAPI:Working with video and audio inputs – camera API – Sensor programming: Motion sensors –Position sensors – Environmental sensors – Publishing Android Apps: Guide lines – policies andprocessofuploadingApps toGoogleplay.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignment framework)

- Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher
- Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Head First: Android Development”, Dawn Griffiths, David Griffiths, OReilly, 1st Edition, 2015.
2. Barry Burd, “Android Application Development – All-in-one for Dummies”, 2nd Edition, Wiley India, 2016.

Reference Books:

1. “Professional Android™ Sensor Programming”, Greg Milette, Adam Stroud, John Wiley and Sons, Inc 2012.
2. “Android 6 for Programmers, App Driven approach”, Paul Deitel, Harvey Deitel, Alexander Wald, Prentice Hall, 2015.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	S	S	S	S
CO2	S	S	S	M	M	M	M	S	S	S
CO3	S	M	M	S	M	S	M	S	S	S
CO4	M	S	M	M	S	S	M	S	S	S
CO5	S	M	M	M	S	M	S	S	S	S

PO–Programme Outcome, CO –Course outcome
 S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLOVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: V **Paper type: Core Theory– Paper 6**

Paper code: **Name of the Paper: Operating System** **Credit: 4**

Total Hours per Week: 6 Hrs. Lecture Hours: 78 Hrs. Tutorial Hours: Practical Hours:

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Course Objectives

1. To understand the structure and functions of operating systems.
2. To understand the principles of scheduler, scheduling algorithms and Deadlock.
3. To learn various memory management schemes.
4. To study I/O management, File system and Mass Storage Structure.
5. To learn the basics of UNIX, LINUX systems and perform administrative tasks on LINUX servers.

Course Outcomes

1. After studying unit-1, the student will be able to learn operating system structure and services.
2. After studying unit-2, the student will be able to enrich the process scheduling skills.
3. After studying unit-3, the student will be able to know about memory allocation.
4. After studying unit-4, the student will be able to understand disk structure and allocation methods.
5. After studying unit-5, the student will be able to understand LINUX system.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: OPERATING SYSTEM BASICS**Teaching Hours: 16Hrs.**

Basic Concepts of Operating System – Services of Operating System – Operating System Types – Computer System Operation – I/O Structure – Storage Structure – Memory Hierarchy – System Components – System Calls – System Programs – System Design and Implementation – Introduction to Process – Process State – Process Control Block – Process Scheduling – Operation on Process – Interprocess Communication – Communication in Client/Server Systems – Threads.

Unit-2: CPU SCHEDULING ALGORITHM AND PREVENTION**Teaching Hours: 16Hrs.**

Introduction – Types of CPU Scheduler – Scheduling Criteria – Scheduling Algorithms – Semaphores – Classic Problems of Synchronization – Basic Concept of Deadlocks – Deadlock Characterization – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery of Deadlock.

Unit-3: STORAGE MANAGEMENT**Teaching Hours: 15Hrs.**

Memory Management – Basics Concept of Memory – Address Binding – Logical and Physical Address Space – Memory Partitioning – Memory Allocation – Paging – Segmentation – Segmentation and Paging – Protection – Fragmentation – Compaction – Demand Paging – Page Replacement Algorithm – Classification of Page Replacement Algorithm.

Unit-4: I/O SYSTEMS**Teaching Hours: 16Hrs.**

File System Storage – File Concept – File Access Methods – Directory Structure – File Sharing – File Protection – File System Implementation – File System Structure – Allocation Methods – Free Space Management – Mass Storage Structure – Disk Structure – Disk Scheduling and Management – RAID Levels.

Unit-5: CASE STUDIES**Teaching Hours: 15Hrs.**

UNIX System – A Case Study – LINUX System – Case Study – Design Principles – Process Management – Scheduling – Memory Management – File Systems – Security.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development – exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Operating System Concepts” – Abraham Silberschatz, Peter B. Galvin, G. Gagne, Sixth Edition, Addison Wesley Publishing Co., 2003.
2. “Operating System” – William Stallings, Fourth Edition, Pearson Education, 2003.

Reference Books:

1. “Operating systems – Internal and Design Principles”, W. Stallings, 6th Edition, Pearson.
2. “Modern Operating Systems”, Andrew S. Tanenbaum, Second Edition, Addison Wesley Publishing Co., 2001.
3. “Fundamentals of Operating System”, Prof. R. Sriddhar, Dynaram Publication, Bangalore Company.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	M	M	S
CO2	S	M	M	M	S	M	M	S	M	S
CO3	S	M	M	S	M	S	S	S	S	S
CO4	S	M	M	S	M	S	M	M	S	S
CO5	S	S	M	M	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester:III **Paper type:Core Theory – Paper7**

Paper code: **Name of the Paper:Design and Analysis of Algorithm** **Credit:**

3 Total Hours per Week:4 Hrs. Lecture Hours:52 Hrs.Tutorial Hours:....Practical Hours:.....

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Course Objectives

1. To understand various algorithm design techniques
2. This technique is the basis of efficient algorithms for all kinds of problems.
3. This is a simple approach which tries to find the best solution at every step.
4. Providing a general insight into the dynamic programming approach.
5. Algorithm design paradigm for discrete and combinatorial optimization problems.

Course Outcomes

1. After studied unit-1, the student will be able to gain experience with space and time complexity
2. After studied unit-2, the student will be able to understand the concepts of divide and conquer
3. After studied unit-3, the student will be able to understand the concepts of greedy method
4. After studied unit-4, the student will be able to understand the concepts of multi-stage graph
5. After studied unit-5, the student will be able to understand the concepts of backtracking

Matching Table

Unit	i.Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:ALGORITHMANDANALYSIS**TeachingHours:10Hrs.**

Elementary Data Structures: Stack – Queues – Trees – Priority Queue – Graphs – What is an Algorithm?–Algorithm Specification–Performance Analysis:Space Complexity–Time Complexity–Asymptotic Notation–Randomized Algorithms.

Unit-2:DIVIDEAND CONQUER**TeachingHours:10Hrs.**

General Method – Binary Search –Recurrence Equation for Divide and Conquer – Finding the Maximum and Minimum— Merge Sort – Quick Sort – Performance Measurement – Randomized Sorting Algorithm – Selection Sort – A Worst Case Optimal Algorithm – Implementation of Select2–Stassen’s Matrix Multiplications.

Unit-3:THEGREEDY METHOD**TeachingHours:11Hrs.**

The General Method – Container Loading – Knapsack Problem – Tree Vertex Splitting – Job Sequencing with Deadlines – Minimum Cost Spanning Trees – Prim’s Algorithm – Kruskal’s Algorithm – An optimal Randomized Algorithm – Optimal Storage on Tapes – Optimal Merge Pattern–Single Source Shortest Paths.

Unit-4:DYNAMICPROGRAMMING, TRAVERSAL& SEARCHING**TeachingHours:11Hrs.**

The General Method–Multistage Graphs–All Pair Shortest Path–Optimal Binary Search Trees – String Editing – 0/1 Knapsack – Reliability Design – The Traveling Salesperson Problem. Techniques for Binary Trees–Techniques for Graphs–BFS–DFS.

Unit-5:BACKTRACKING&BRANCHANDBOUND**TeachingHours:10Hrs.**

The General Method – The 8– Queens Problem – Sum of Subsets– Graph Coloring – Hamiltonian Cycles– Branch and Bound: General Method– LC Branch and Bound–FIFO Branch and Bound.

Internal Assessment Methods:(The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development–exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self discussion, self learning process.

- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Fundamentals of Computer Algorithms”, Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Galgotia Publications, Second Edition 2015.
2. “Introduction to Algorithms”, Cormen T.H., Leiserson C.E. and Rivest R.L., PHI Publications, Third Edition, 1998.

Reference Books:

1. “Introduction to the Design and Analysis of Algorithms”, Anany Levitin, Pearson Education, 2nd Edition.
2. “Introduction to Algorithms” Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Prentice Hall of India, New Delhi, Second Edition, 2007.
3. “Computer Algorithms – Introduction to Design & Analysis” Sara Baase and Allen Van Gelder, Pearson Education New Delhi, Third Edition, 2000.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	M	S	M	M	S	M	S	S
CO4	S	S	M	S	M	M	M	S	S	S
CO5	S	S	M	M	M	S	M	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: V Papertype: Core Practical-5

Papercode: Name of the Paper: Mobile Applications Development Lab Credit:

3 Total Hours per Week: 4 Hrs. Lecture Hours: Tutorial Hours: Practical Hours: 52 Hrs.

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Course Objectives

1. To understand how to change fonts.
2. To understand how to change colors.
3. To know about layout managers.
4. To understand drawing methods.
5. To understand database connectivity.

Course Outcomes

1. After studied unit-1, the student will be able to build application to change fonts and colors.
2. After studied unit-2, the student will be able to implement multithreading.
3. After studied unit-3, the student will be able to develop GUI application with drawing methods.
4. After studied unit-4, the student will be able to build application to create alarm clock.
5. After studied unit-5, the student will be able to implement layout managers.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Intent and Activity.
3. Develop an application that uses Layout Managers and event listeners.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of RSS Feed.
6. Implement an application that implements Multi-threading.
7. Develop an application that creates an alarm clock.
8. Develop an application Using Widgets.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Develop an application that makes use of database.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.

- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	S	S	S	S
CO2	S	M	S	S	M	M	M	M	S	S
CO3	S	M	M	S	S	M	M	S	S	S
CO4	S	S	S	M	S	S	S	S	M	S
CO5	S	S	M	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)- 2022-2023 onwards

Semester: V Papertype: Core Practical-6

Papercode: Name of the Paper: Operating System Lab Credit: 3

Total Hours per Week: 4 Hrs. Lecture Hours: Tutorial Hours: Practical Hours: 52 Hrs.

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Course Objectives

1. To know about UNIX commands.
2. To understand the concept of shell programming.
3. To learn how to use vi editor.
4. To understand the concept of semaphores.
5. To understand the concept of synchronization.

Course Outcomes (five outcomes for each unit should be mentioned)

1. After studying unit-1, the student will be able to understand UNIX commands.
2. After studying unit-2, the student will be able to write a program using shell commands.
3. After studying unit-3, the student will be able to build an application for semaphores.
4. After studying unit-4, the student will be able to implement synchronization applications.
5. After studying unit-5, the student will be able to develop a program for file allocation strategies.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Basics of UNIX commands.
2. Shell Programming.
3. Implement the following CPU scheduling algorithms
 - a) Round Robin
 - b) SJF
 - c) FCFS
 - d) Priority
4. Implement all file allocation strategies
 - a) Sequential
 - b) Indexed
 - c) Linked
5. Implement Semaphores
6. Implement all File Organization Techniques
 - a) Single level directory
 - b) Two level
 - c) Hierarchical
 - d) DAG
7. Implement Banker's Algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection
9. Implement all page replacement algorithms
 - a) FIFO
 - b) LRU
 - c) LFU
10. Implement Shared memory and IPC
11. Implement Paging Technique of memory management.
12. Implement Threading & Synchronization Applications.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- o. Book review and research paper review, syllabus and curriculum review.
- p. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- q. Workshops, preparing technical term dictionaries from text books and reference books.
- r. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- s. Forming digital library: collecting text and reference books, course material.
- t. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- u. Extracurricular and cultural activities may be framed through the syllabus content.
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- w. Following institution and intellectual and writing reports in the course field.
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- y. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- z. Extracurricular activities may be framed through their syllabus content.
- aa. Bring the industries to the campus. Bring the students to the industry.
- bb. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S	S
CO3	S	S	M	M	M	M	M	S	S	M
CO4	S	S	M	M	M	S	M	S	S	M
CO5	S	S	M	M	M	M	S	S	S	M

PO–Programme Outcome, CO –Course outcome
 S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)–2022-2023 onwards

Semester: V **Paper type: Internal Elective – Paper 1**

Paper code: **Name of the Paper: Data Mining** **Credit: 3**

Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To understand about the basics of Data Mining and Data
2. To understand about the methods of Data Warehousing
3. To understand about the techniques of Data Mining
4. To understand about the importance of Cluster and outlier detection
5. To improve the student's knowledge with recent trends and tools

Course Outcomes

1. After studied unit-1, the student will be able to Understand the functionality of various data mining components.
2. After studied unit-2, the student will be able to Describe the different methodologies used in data
3. After studied unit-3, the student will be able to Characterize the kinds of patterns
4. After studied unit-4, the student will be able to Enrich the concept of clustering
5. After studied unit-5, the student will be able to Discuss and compare various approaches with other techniques in data mining.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: DATA MINING BASICS**Teaching Hours: 8 Hrs.**

What is Data Mining – Kinds of Data – Kinds of patterns – Technologies used for Data Mining – Major Issues in Data Mining – Data – Data Objects and Attribute types – Data Visualization – Measuring Data Similarity and Dissimilarity – Data Preprocessing – overview – Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization.

Unit-2: DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING**Teaching Hours: 8 Hrs.**

Data Warehouse – Basic concepts – Data Warehouse Modeling: Data Cube and OLAP – Data Warehouse Design and Usage – Data Warehouse Implementation – Data Generalization by Attribute – Oriented Induction – Data Cube Technology – Data Cube Computation Methods – Exploring Cube Technology – Multidimensional Data Analysis in cube space.

Unit-3: PATTERNS AND CLASSIFICATION**Teaching Hours: 8 Hrs.**

Patterns – Basic concepts – Pattern Evaluation Methods – Pattern Mining: Pattern Mining in Multilevel – Multidimensional space – Constraint – Based Frequent Pattern Mining – Mining High Dimensional Data and Colossal patterns – Mining compressed or Approximate patterns – Pattern Exploration and Application. Classification – Decision tree Induction – Bayes Classification methods – Rule based Classification – Model Evaluation and selection – Techniques to Improve Classification Accuracy – Other Classification methods.

Unit-4: CLUSTERING AND OUTLIER DETECTION**Teaching Hours: 8 Hrs.**

Cluster Analysis – Partitioning Methods – Hierarchical Methods – Density – Based Methods – Grid – Based Methods – Evaluation of Clustering – Clustering High – Dimensional Data – Clustering Graph and Network Data – Clustering with Constraints – Web Mining – Spatial Mining. Outlier Detection – Outliers and Outliers Analysis – Outlier Detection Methods – Outlier Approaches – Statistical – Proximity – Based – Clustering – Based – Classification Based – High – Dimensional Data.

Unit-5: RECENT TRENDS IN DATA MINING AND TOOLS**Teaching Hours: 7 Hrs.**

Other Methodologies of Data Mining – Data Mining Applications – Data Mining Trends – Recent Data Mining Tools – Rapid miner – Orange – Weka – Knime – Sisense – SsdT (SQL Server Data Tools) – Oracle – Rattle – DataMelt – Apache Mahout.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
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- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Data Warehousing Fundamentals”, Paulraj Ponnaiah, Wiley Publishers, 2001.
2. “Data Mining: Concepts and Techniques”, Jiawei Han, Micheline Kamber, Morgan Kaufman Publishers, 2006.
3. “Introduction to Data Mining with case studies”, G.K. Gupta, PHI Private Limited, New Delhi, 2008. 2nd Edition, PHI, 2011

Reference Books:

1. “Advances in Knowledge Discovery and Data Mining”, Usama M. Fayyad, Gregory Piatetsky Shapira, Padhraí Smyth, Ramasamy Uthurusamy, the M.I.T. Press, 2007.
2. “The Data Warehouse Toolkit”, Ralph Kimball, Margy Ross, John Wiley and Sons Inc., 2002
3. “Building Data Mining Applications for CRM”, Alex Berson, Stephen Smith, Kurt Thearling, Tata McGraw Hill, 2000.

4. “Data Mining: Introductory and Advanced Topics”, Margaret Dunham, Prentice Hall, 2002.
5. “Discovering Knowledge in Data: An Introduction to Data Mining”, Daniel T. Larose John Wiley & Sons, Hoboken, New Jersey, 2004

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	M	S	S	S
CO2	S	M	M	S	M	S	S	M	S	S
CO3	S	M	S	S	S	M	S	S	S	S
CO4	S	S	S	S	M	M	S	S	M	S
CO5	S	M	M	S	M	M	M	S	S	S

PO–Programme Outcome, CO –Course outcome
 S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: V **Paper type: Internal Elective –Paper1**

Paper code: **Name of the Paper: Information Security** **Credit: 3**

Total Hours per Week: 3Hrs. Lecture Hours: 39Hrs. Tutorial Hours: Practical Hours:

.....

Course Objectives

1. To understand the basic concepts of Information Security
2. To understand the legal, ethical and professional issues in Information Security
3. To know about risk management
4. To understand the technological aspects of Information Security
5. To understand the concepts of Cryptography and Hacking methods

Course Outcomes

1. After studied unit-1, the student will be able to define and relate the concepts and terms of security
2. After studied unit-2, the student will be able to classify and outline existing attacks and security measures
3. After studied unit-3, the student will be able to understand risk management
4. After studied unit-4, the student will be able to build security models
5. After studied unit-5, the student will be able to criticize and propose solutions for protecting the system from hacking

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INFORMATIONSECURITYBASICS**TeachingHours:7Hrs.**

Introduction – History – What is Information Security?– Critical Characteristics of Information–
NSTISSC Security Model– Components of an Information System– Securing the Components–
BalancingSecurityandAccess–The SDLC–TheSecuritySDLC.

Unit-2:SECURITYINVESTIGATION**TeachingHours:8Hrs.**

Objective: Security– Business Needs– Threats– Attacks– Legal– Ethical and Professional Issues–
Relevant U.S. Laws – International Laws and Legal Bodies – Ethics and Information Security –
CodesofEthics andProfessionalOrganizations

Unit-3:SECURITYANALYSIS**TeachingHours:8Hrs.**

Risk Management – Introduction – An Overview of Risk Management – Risk Identification –
RiskAssessment – Risk Control Strategies – Selecting a Risk Control Strategy – Quantitative
versusQualitative RiskControlPractices–RiskManagementDiscussionPoints

Unit-4:SECURITY MODELS**TeachingHours: 8Hrs.**

LOGICALDESIGN–BlueprintforSecurity–InformationSecurityPolicy–StandardsandPractices–
ISO 17799/BS 7799– NIST Models– VISA International Security Model– Design ofSecurity
Architecture– Planning for Continuity – Security Physical Design –Firewalls –
SecurityTechnology– IDS–IPS–Honey Pots– Honey Nets–Padded cell Systems Scanning and
AnalysisTools–AccessControlDevices.

Unit-5:CRYPTOGRAPHY ANDETHICALHACKING**TeachingHours:8Hrs.**

Ciphermethods–CryptographicAlgorithmsandTools–AttacksonCryptosystems–Hacking–
EffectsofHacking–Hacker–TypesofHacker–EthicalHacker–Hacktivism–
Networking&ComputerAttacks–MaliciousSoftware(Malware)–ProtectionAgainstMalware–
IntruderAttacks on Networks and Computers – Wireless Hacking– Windows Hacking– Linux
HackingSession.

InternalAssessmentMethods:(Thefollowing
itemsmaybebroughtundertest,seminarandassignmentframework)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:books
level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can
begivenbytheteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. "Principles of Information Security", Michael E Whitman and Herbert J Mattord, 5th Edition, Vikas Publishing House, New Delhi, 2003.
2. "Fundamentals of Information Systems Security", David Kim, Michael G. Solomon, 3rd Edition, Jones & Bartlett Learning, October 2016.
3. "The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy", Patrick Engebretson, 2nd Edition, Syngress Basics Series–Elsevier, 2011.
4. "Hands- On Ethical Hacking and Network Defense", Michael T. Simpson, Kent Backman, James E. Corley, Second Edition, CENGAGE Learning, 2010.

Reference Books:

1. "Handbook of Information Security Management", Micki Krause, Harold F. Tipton, sixth Edition, CRC Press LLC, 2004.
2. "Hacking Exposed", Stuart McClure, Joel Scrambray, George Kurtz, Tata McGraw–Hill, 2003.
3. "Computer Security Art and Science", Matt Bishop, 2nd Edition, Pearson/PHI, 2002.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	M	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	M	M	S	M	M	M	S	S	S
CO4	S	M	S	M	S	M	M	S	S	S
CO5	S	M	M	M	M	M	S	S	S	S

PO–ProgrammeOutcome,CO –Courseoutcome

S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVARUNIVERSITY, VELLORE–632 115
(Bachelor of Computer Science)–2022-2023 onwards

Semester: V

Paper type: Internal Elective –Paper1

Paper code:

Name of the Paper: Software Testing

Credit:

3 Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To understand the concept of software testing, and software quality
2. To learn to inspect and detect errors by going through each and every code segment
3. To gain knowledge of various functional and structural testing techniques
4. To understand basic concept of Software Management tools and object oriented testing
5. To understand basic concept of Software quality and software quality assurance

Course Outcomes

1. After studied unit-1, the student will be able to understand the knowledge and comparison of various testing strategies.
2. After studied unit-2, the student will be able to analyze various testing methods
3. After studied unit-3, the student will be able to Apply the software testing techniques in commercial environments
4. After studied unit-4, the student will be able to Build the role of management in a software development..
5. After studied unit-5, the student will be able to attain the attributes and assessment of quality, reliability.

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTIONTOSOFTWARETESTING**TeachingHours:7Hrs.**

Fundamentals of software testing – need for software testing– Psychology of testing – various approaches – characteristics of testing – principles of testing – testing strategies – verification and validation–DefectandPreventionstrategies.

Unit-2:SOFTWAREDEVELOPMENTMODELANDTESTING**TeachingHours:8Hrs.**

Water fall model– V–model– Spiral model– Agile model – Life cycle of testing– Static Testing – dynamic testing–Whiteboxtesting–Blockboxtesting–Regressiontesting–IntegrationTesting – SystemandPerformanceTesting–UsabilityTesting

Unit-3:FUNCTIONALANDSTRUCTURALTESTING**TeachingHours:8Hrs.**

Boundary Value Analysis – Equivalence Class Testing – Decision Table – Based Testing – CauseEffect Graphing Technique – Path testing –Cyclomatic Complexity –Graph Metrics – Data FlowTesting–Slicebasedtesting

Unit-4:TESTMANAGEMENTANDTOOLS**TeachingHours:8Hrs.**

Test planning – cost–benefit analysis of testing – monitoring and control–Test reporting – Testcontrol – Specialized testing – Object Oriented Testing – Automated Tools for Testing – ToolSelectionandImplementation–Challengesintestautomation –GUITesting

Unit-5:SOFTWAREQUALITYANDSOFTWAREQUALITYASSURANCE**TeachingHours: 8Hrs.**

Introductiontosoftwarequalityandsoftwarequalityassurance–basicprinciplesaboutthesoftware quality and software quality assurance – Planning for SQA – various models for softwareproductqualityandprocess quality–SCM–RAD–SystemDocumentation

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignment framework)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparingquestionpaperbythecandidates:objectivetype,descriptivetype,training canbegivenbytheteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfordocumentation, further discussionandresearch.
- g. Extracurricularandculturalactivitiesmaybeframedthroughthesyllabuscontent.

- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Software Testing– A Craftsman’s Approach”– Paul C.Jorgensen – Second Edition – CRC Press 2008
2. “Software Testing”,–Ron Patton, Second Edition–Sams Publishing, Pearson Education, 2007.
3. “Software Testing–A Craftsman’s Approach”–Paul C.Jorgensen, Second Edition–CRC Press, 2008

Reference Books:

1. “Software Testing and Analysis: Process, Principles and Techniques”– Mauro Pezze, Michal Young–Wiley India, 2008
2. “Software Engineering”–K.K. Aggarwal & Yogesh Singh–New Age International Publishers – New Delhi, 2003.
3. “Software Testing–Principles and Practices”– Srinivasan Desikan and Gopalaswamy Ramesh, Pearson Education, 2006.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	M	M	M	S	S	S	M	M	S
CO5	S	S	M	M	M	S	S	S	S	S

PO–Programme Outcome, CO –Course outcome

S –Strong ,M–Medium, L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)- 2022-2023 onwards

Semester: V **Paper type: Skill Based Subject – Paper 3**

Paper code: **Name of the Paper: Software Engineering** **Credit:**

2 Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. Introduce the concepts and methods required for the construction of large software intensive systems.
2. Get the idea of choosing the Requirements in Software Engineering.
3. Give an understanding the concept of Data Engineering.
4. To impart knowledge on Testing and Debugging.
5. To enable the students to learn the basic of Project Management & Scheduling.

Course Outcomes

1. After studied unit-1, the student will be able to recall the various techniques of software process models
2. After studied unit-2, the student will be able to understand the requirements for a software project
3. After studied unit-3, the student will be able to create architectural design
4. After studied unit-4, the student will be able to understand testing strategies
5. After studied unit-5, the student will be able to understand software project management

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTIONTOEVOLVINGSOFTWARE**TeachingHours:8Hrs.**

EvolvingRoleof Software–Nature of Software–SoftwareEngineering–TheSoftwareProcess–SoftwareEngineeringPractices–SoftwareMyths–AGenericViewofProcessModel
– Process Assessmentand Improvement– Process Models : Waterfall Model – IncrementalProcessModels–EvolutionaryProcessModels–ConcurrentModels.

Unit-2:REQUIREMENTSENGINEERING**TeachingHours:8Hrs.**

RequirementsEngineering:EstablishingtheGroundwork–InitiatingtheRequirementsEngineering Process – Eliciting Requirements – Collaborative Requirements Gathering – QualityFunction Deployment – Usage Scenarios – Elicitation work Products – Building the RequirementsModel – Elements of Requirements Model – Analysis Pattern – Requirements Analysis – DataModelingConcepts.

Unit-3:DATAENGINEERING**TeachingHours:7Hrs.**

Data Engineering: Design Process and Design Quality – Design Concepts – The Design Model– Creating an Architectural Design – Software Architecture – Data Design – Architectural style – Architectural Design –Architectural MappingUsingData Flow–PerformingUserInterfaceDesign– GoldenRules.

Unit-4:TESTINGSTRATEGIES**Teaching Hours: 8**

Hrs.TestingStrategies:StrategicApproachtoSoftwareTesting–StrategicIssues– TestStrategiesforConventionalandObjectOrientedSoftware–ValidationTesting–SystemTesting– ArtofDebugging.Software Testing Fundamentals– White Box Testing– Basis Path Testing– ControlStructureTesting–BlackBoxTesting–ModelBasedTesting.

Unit-5:PROJECT MANAGEMENT**TeachingHours:8Hrs.**

Project Management: Management Spectrum – People – Product – Process – Project – CriticalPractices –Estimation: Project Planning Process – Software Scope and Feasibility – Resources –SoftwareProjectEstimation–ProjectScheduling–QualityConcepts– SoftwareQualityAssurance–ElementsofSoftware QualityAssurance–FormalTechnicalReviews.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignment framework)

- Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher
- Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

1. "Software Engineering – A Practitioner's Approach", Roger S Pressman, McGraw Hill International Edition, New York :2005, Seventh Edition
2. "Software Engineering", Mall Rajib, PHI Learning, 2009, 3rd Edition.

Reference Book:

1. "Software Engineering", Ian Somerville, Pearson Education, 2006, 7th Edition.
2. "Software Engineering Concepts" Richard Fairley, Tata McGraw–Hill Education, 2011.
3. "Software Engineering: Theory and Practice", Pfleeger and Lawrence, Pearson Education, 2001, Second Edition.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	S	S	M	S
CO2	S	S	S	M	M	S	M	S	S	S
CO3	S	M	M	S	M	M	M	S	S	S
CO4	S	S	M	M	S	S	S	M	M	M
CO5	S	M	M	S	M	M	M	M	S	S

PO–Programme Outcome, CO –Course outcome
 S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: VI **Paper type: Core Theory – Paper 8**

Paper code: **Name of the Paper: Open Source Software**

Credit: 4 Total Hours per Week: 4 Hrs. Lecture Hours: 52

Hrs. Tutorial Hours: Practical Hours:

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Course Objectives

1. To understand the concept of HTML, HTML5 and CSS.
2. To learn to inspect and detect errors by going through each and every code segment.
3. To understand basic concept of JavaScript and MySQL.
4. To understand basic concept of PHP
5. To understand basic concept of PERL

Course Outcomes

1. After studied unit-1, the student will be able to build static web pages using HTML and CSS.
2. After studied unit-2, the student will be able to understand Linux File system.
3. After studied unit-3, the student will be able to build validation coding using Javascript.
4. After studied unit-4, the student will be able to build dynamic pages using PHP.
5. After studied unit-5, the student will be able to understand PERL basics.

Matching Table (Put Yes/No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO HTML, CSS

Teaching Hours: 11 Hrs.

Need of Open Source – Advantages of Open source – Application of Open Source – HTML – HTML tags – Dynamic Web content – HTTP Request and Response Procedure – Introduction to HTML5 – HTML5 Canvas – HTML5 Audio and Video – Introduction to CSS – CSS Rules – Style Types – CSS Selectors – CSS Colors.

Unit-2:LINUX

TeachingHours: 10Hrs.

Introduction:LinuxEssentialCommands–KernelModeandusermode–FilesystemConcept–StandardFiles–TheLinuxSecurity Model–ViEditor–PartitionsCreation–ShellIntroduction–StringProcessing–InvestigationandManagingProcesses–NetworkClients–InstallingApplication.

Unit-3:JAVA SCRIPT AND MYSQL

TeachingHours:10Hrs.

Java script :Advantages of JavaScript –JavaScript Syntax–Data type– Variable– Array – Operatorsand Expressions– Loops– functions – Dialog box– MySQL – The show Databases and Table –The USE command –Create Database and Tables – Describe Table – Select, Insert, Update, andDelete statement.

Unit-4:PHP

TeachingHours:11Hrs.

PHPIntroduction–General SyntacticCharacteristics–PHPScripting–Commentingyourcode–Primitives,OperationsandExpressions–PHPVariables–OperationsandExpressionsControlStatement–Array–Functions–BasicFormProcessing–FileandFolderAccess–Cooking–Sessions–DatabaseAccesswithPHO.

Unit-5:PERL

TeachingHours:10Hrs.

PERL : Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – StatementsandControlstructures–Subroutines,Packages,andModules–WorkingwithFiles–DataManipulation.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentframework)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of thecolleges for practicing their theoretical study. Innovative methods may be implemented inthepracticesandreportcanbewrittenfordocumentation, further discussionandresearch.
- g. Extracurricularandculturalactivities maybeframedthroughthesyllabuscontent.
- h. Groupingstudentsforselfdiscussion,selflearningprocess.
- i. Followinginstitutionandintellectualandwritingreportsinthecoursefield.
- j. BloomTaxonomymaybeintroducedforteaching,learningandevaluationprocesswithinthe frameworkofquestionsettingpatternandinternalassessmentspattern.
- k. Forapplicationorientedstudy:Villages,Institutions,variouspeoplegroupsmaybeadoptedbythe departmentsofthe collegesforpracticingtheirtheoreticalstudy.Innovative

methods may be implemented in the practices and report can be written for documentation, further discussion and research.

- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “The Complete Reference Linux”, Peterson, Tata McGraw HILL–2010
2. “Perl: The Complete Reference”, Martin C. Brown, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
3. “MySQL: The Complete Reference”, Vikram Vaswani, 2nd Edition, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009
4. “PHP: The Complete Reference”, Steven Holzner, 2nd Edition, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2009.
5. “Complete Reference HTML”, T.A. Powell, 3rd Edition, Tata McGraw Hill Publishing Company Limited, Indian Reprint 2002.
6. “Mastering Javascript”–J. Jaworski, BPB Publications, 1999

Reference Books:

1. “Fundamentals of Open Source Software”, by M.N. Rao, PHI publishers.
2. “MySQL Bible”, Steve Suchring, John Wiley, 2002
3. “The Linux Kernel Book”, Remy Card, Eric Dumas and Frank Mevel, Wiley Publications, 2003
4. Ivan Byross, HTML, DHTML, Javascript, Perl, BPB Publication

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	S	S	S	S
CO2	S	S	M	S	S	M	S	S	S	S
CO3	S	M	M	S	S	M	S	M	S	S
CO4	S	S	M	S	M	M	S	M	S	S
CO5	S	M	M	S	M	M	S	S	S	S

PO–Programme Outcome, CO –Course outcome

S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE–632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: VI Papertype: Core Theory– Paper 9

Paper code: Name of the Paper: Python Programming Credit: 4

Total Hours per Week: 4 Hrs. Lecture Hours: 52 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To understand the tokens of Python.
2. To learn control statements in Python.
3. To know about built-in functions.
4. To learn about the concept of List.
5. To understand how to handle exception.

Course Outcomes

1. After studying unit-1, the student will be able to write simple Python programs giving basic knowledge.
2. After studying unit-2, the student will be able to understand control structures.
3. After studying unit-3, the student will be able to create functions.
4. After studying unit-4, the student will be able to arrange elements through sorting.
5. After studying unit-5, the student will be able to handle exception.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION

Teaching Hours: 11 Hrs.

Identifiers– Keywords –Statements and Expressions–Variables–Operators–Arithmetic operators–
Assignment operators–Comparison operators–Logical operators–Bitwise operators

- Precedence and Associativity – Data types- Number – Booleans – Strings -Indentation – Comments – Single line comment – Multiline comments - Reading Input – Print Output – TypeConversions – int function – float function – str() function – chr() function – complex() function –ord() function – hex() function – oct() function -type() function and Is operator – Dynamic andStronglytypedlanguage.

Unit-2: STATEMENTS EXCEPTION AND STRING OPERATIONS

]

TeachingHours: 10Hrs.

Control Flow Statements – If statement – If else statement – If elif else statement – nested ifstatement - while loop – for loop – continue and break statements – catching exceptions using tryand except statement – syntax errors – exceptions – exception handling – Strings – str() function-Basicstringoperations–Stringcomparison–Builtinfunctionsusingstrings– Accessingcharactersinstring–String slicing–Stringjoining– split()method– stringtraversing.

Unit-3:FUNCTIONS

TeachingHours: 11Hrs.

Functions – Built in functions – function definition and calling -return statement – void function – scope and lifetime of variables – args and kwargs – command line arguments - Tuples – creation – basic tuple operations – tuple() function – indexing – slicing – built-in functions used on tuples – tuple methods – packing – unpacking – traversing of tuples – populating tuples – zip()function-Sets –Traversingofsets–setmethods –frozenset.

Unit-4: LISTS

TeachingHours: 10Hrs.

Lists: Using List- List Assignment and Equivalence – List Bounds- Slicing - Lists and Functions- Prime Generation with a List.List Processing: Sorting-Flexible Sorting- Search- List Permutations- RandomlyPermutingaList-ReversingaList.

Unit-5:OBJECTS

TeachingHours: 10Hrs.

Objects: Using Objects- String Objects- List Objects. Custom Types: Geometric Points- Methods- Custom Type Examples- Class Inheritance. Handling Exceptions: Motivation- ExceptionExamples-UsingExceptions-CustomExceptions.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentframework)

- Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- Workshops,preparingtechnicaltermdictionariesfromtextbooksandreferencebooks.
- Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher
- Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. Gowrishankar S, Veena A, "Introduction to Python programming", 1st Edition, CRC Press/Taylor & Francis, 2008. (Units 1-3)
2. Learn to Program with Python, 3rd Edition, Richard L. Halterman, Southern Adventist University. (Units 4-5)

Reference Books:

1. Core Python Programming, 2nd Edition, Wesley J. Chun, Prentice Hall.
2. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for working with Data", 1st edition, O'Reilly Media, 2016.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	S	S	S	S
CO2	S	M	M	M	M	M	S	M	M	S
CO3	S	M	S	S	S	S	S	M	S	S
CO4	S	M	M	S	M	S	M	M	M	S
CO5	S	S	S	S	M	M	M	M	S	S

PO–Programme Outcome, CO –Course outcome
 S –Strong, M–Medium, L– Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-2023 onwards

Semester: VI

Paper type: Core-Practical-7

Paper code:

Name of the Paper: Python Programming Lab

Credit:

3 Total Hours per Week: 4 Hrs. Lecture Hours:.. Tutorial Hours:..... Practical Hours: 52 Hrs.

.....

Course Objectives

1. To know about basic data types, operators in Python.
2. To understand Loops in Python.
3. To understand the concepts of Arrays.
4. To understand how to handle string.
5. To know about functions.

Course Outcomes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to write a program using operators.
2. After studied unit-2, the student will be able to develop a program using loops.
3. After studied unit-3, the student will be able to implement a program using Arrays.
4. After studied unit-4, the student will be able to implement the concept of String functions.
5. After studied unit-5, the student will be able to build an application with basic expressions.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Develop a Python program to find the area and perimeter of a circle.
2. Develop a Python program to generate Fibonacci series.
3. Develop a Python program to compute the GCD of two numbers.
4. Develop a Python program to generate first n prime numbers.
5. Develop a Python program to find the sum of squares of n natural numbers.
6. Develop a Python program to find the sum of the elements in an array.
7. Develop a Python program to find the largest element in the array.
8. Develop a Python program to check if the given string is a palindrome or not.
9. Develop a Python program to store strings in a list and print them.
10. Develop a Python program to find the length of a list, reverse it, copy it and then clear it.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

MappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	S
CO2	S	S	M	M	S	M	S	M	S	S
CO3	S	M	M	M	S	M	S	M	S	S
CO4	S	S	S	M	S	S	S	S	M	S
CO5	S	M	S	S	S	S	S	S	M	S

PO–ProgrammeOutcome,CO –Courseoutcome
S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVARUNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)-2022-2023 onwards

Semester: VI

Paper type: Core -Practical-8

Paper code:

Name of the Paper: Open Source Programming Lab

Credit:

2 Total Hours per Week: 4 Hrs. Lecture Hours:.....Tutorial Hours:..Practical Hours:52 Hrs.

.....

Course Objectives

1. To understand the basic HTML Tags.
2. To understand the types of CSS.
3. To learn Javascript functions.
4. To know about PHP form elements.
5. To learn PHP with MySQL database connectivity.

Course Outcomes

1. After studied unit-1, the student will be able to design static web pages.
2. After studied unit-2, the student will be able to link common style to the web pages using CSS.
3. After studied unit-3, the student will be able to validate form controls using javascript.
4. After studied unit-4, the student will be able to design dynamic web pages using PHP.
5. After studied unit-5, the student will be able to develop PHP program with MySQL database connection.

Matching Table

Unit	i.Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

LIST OF PRACTICAL EXERCISES

1. Create a web page with Frames and Tables.
2. Create a web page incorporating CSS (Cascading Style Sheets).
3. Develop a shell program to find the factorial of an integer positive number.
4. Develop a shell program to find the details of a user session.
5. Create a simple calculator in JavaScript.
6. Develop a JavaScript program to scroll your name in the scrollbar.
7. Develop a program and check message passing mechanism between pages.
8. Application for Email Registration and Login using PHP and MySQL.
9. Program to Create a File and write the Data into it using PHP.
10. Program to perform the String Operation using Perl.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self-discussion, self-learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.

- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	S
CO2	S	S	M	S	S	S	M	M	S	S
CO3	S	M	M	S	M	M	S	M	M	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	S	S	M	M	S	S	S	S

PO–Programme Outcome, CO –Course outcome
 S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: VI Papertype: Internal Elective–Paper 2

Papercode: Name of the Paper: Big Data Analytics Credit: 3

Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To explore the fundamental concepts of big data analytics.
2. To learn to use various techniques for mining data stream.
3. To learn the Big data Business Perspective
4. To understand the applications using MapReduce Concepts.
5. To introduce programming tools HIVE in Hadoop ecosystem.

Course Outcomes

1. After studied unit-1, the student will be able to understand the key issues in big data management.
2. After studied unit-2, the student will be able to outline big data planning, processing.
3. After studied unit-3, the student will be able to Acquire fundamental enabling techniques and scalable.
4. After studied unit-4, the student will be able to examine various big data tools and techniques.
5. After studied unit-5, the student will be able to achieve adequate perspectives of Big Data Analytics in various Applications like recommender system, Social Media Applications and etc.

Matching Table

Unit	i.Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTIONTO BIGDATA**TeachingHours:7Hrs.**

Introductiontobigdata:IntroductiontoBigDataPlatform–ChallengesofConventionalSystems

– Intelligent data analysis – Nature of Data –.Characteristics of Data – Evolution of Big Data – DefinitionofBigData–ChallengeswithBigData–Volume,Velocity,Variety– OtherCharacteristicsofData–NeedforBigData–AnalyticProcessesandTools–Analysisvs.Reporting.

Unit-2:MININGDATA STREAMS**TeachingHours:8Hrs.**

Mining data streams: Introduction To Streams Concepts – Stream Data Model and Architecture – Stream Computing – Sampling Data in a Stream – Filtering Streams – Counting Distinct Elementsin a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window – Realtime Analytics Platform(RTAP) Applications – Case Studies – Real Time Sentiment Analysis–StockMarketPredictions.

Unit-3:BIGDATAFROMDIFFERENTPERSPECTIVES**TeachingHours:8Hrs.**

BigdatafrombusinessPerspective:Introductionofbigdata–Characteristicsof bigdata–Datainthe warehouse and data in Hadoop– Importance of Big data– Big data Use cases– Patterns for Bigdata deployment. Big data from Technology Perspective– Application Development in Hadoop– GettingyourdatainHadoop.

Unit-4:HADOOP ANDMAPREDUCE**TeachingHours:8Hrs.**

Hadoop: The Hadoop Distributed File System – Components of HadoopAnalysing the Data withHadoop– Scaling Out–Hadoop Streaming– Design of HDFS–Java interfaces to HDFS Basics– Developing a Map Reduce Application–How Map Reduce Works–Anatomy of a Map Reduce Jobrun–Failures–JobScheduling–ShuffleandSort–Taskexecution–MapReduceTypesandFormats– MapReduceFeatures–Hadoopenvironment.

Unit-5:FRAMEWORKS**TeachingHours:8Hrs.**

Frameworks: Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive – fundamentals of HBase and ZooKeeper– IBMInfoSphereBigInsightsandStreams.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentframework)

- a. Bookreviewandresearchpaper review, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops,preparingtechnicalterm dictionariesfromtextbooksandreferencebooks.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. "Intelligent Data Analysis", Michael Berthold, David J. Hand, Springer, 2007.
2. "Hadoop: The Definitive Guide", Tom White Third Edition, O'Reilly Media, 2012.

Reference Books:

1. "Big Data and Analytics" Seema Acharya, Subhasini Chellappan, Wiley 2015.
2. "Mining of Massive Datasets", Anand Rajaraman and Jeffrey David Ullman, CUP, 2012.
3. "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data" .Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, McGraw Hill Publishing, 2012.
4. "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", Bill Franks, John Wiley & sons, 2012.
5. "Making Sense of Data", Glenn J. Myatt, John Wiley & Sons, 2007.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	M	S	S	S
CO2	S	S	S	S	M	S	M	M	S	S
CO3	S	S	S	S	S	S	M	M	S	S
CO4	S	M	M	S	M	S	M	M	S	S
CO5	S	M	M	M	M	S	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE–632 115

(Bachelor of Computer Science)–2022-2023 onwards

Semester: VI

Paper type: Internal Elective– Paper 2

Paper code:

Name of the Paper: Cryptography

Credit: 3

Total Hours per Week: 3Hrs. Lecture Hours: 39Hrs. Tutorial Hours:..... Practical Hours:.....

Course Objectives

1. Understand OS security architecture and classical encryption techniques.
2. Understand the different cryptographic operations of symmetric cryptographic algorithms.
3. Understand the different cryptographic operations of Public key cryptographic algorithms.
4. To make use of application protocols to design and manage a secure system.
5. To learn the configuration and manage E-mail and WLAN Security.

Course Outcomes

1. After studying unit-1, the student will be able to know the security attacks and services.
2. After studying unit-2, the student will be able to understand the concept of Encryption Standards.
3. After studying unit-3, the student will be able to understand public key cryptographic algorithms.
4. After studying unit-4, the student will be able to learn the concept of hash functions.
5. After studying unit-5, the student will be able to understand the Email security.

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:COMPUTERANDNETWORKSECURITY**TeachingHours:7Hrs.**

Computer Security Concepts – OSI security architecture –Security trends – Security attacks – Security Services – Security Mechanisms – Fundamental Security Design Principles– AttackSurfacesandAttackTrees–ModelforNetworkSecurity–NetworkStandards.

Unit-2:SYMMETRICCRYPTOGRAPHYTeachingHours:8Hrs.

Symmetric Cipher– Classical Encryption Technique – Symmetric Cipher Model – SubstitutionTechniques, Transposition Technique – Steganography – Block Cipher and the Data EncryptionStandard – The Data Encryption Standard – Differential and Linear Cryptanalysis – Block CipherPrinciples.AdvancedEncryptionStandard– AESStructure – AESTransformationFunction.

Unit-3:PUBLCKEYCRYPTOGRAPHY**TeachingHours:8Hrs.**

Public Key Cryptography and RSA Principles– RSA Algorithm, Key ManagementandotherPublicKeyCryptosystemsKeyManagement,Diffie– HellmanKeyExchange,EllipticCurveArithmetic–EllipticCurve Cryptography– PsedorandomNumberGeneration.

Unit-4:HASHFUNCTIONSANDDIGITALSIGNATURES**TeachingHours:8Hrs.**

CryptographicHashFunctions – ApplicationofHashFunctions –TwoSimpleHashFunctions –Secure Hash Algorithm(SHA) –Message Authentication Codes –Authentication requirement – Authentication function – MAC – HMAC – CMAC – Digital signature and authenticationprotocols – Digital Signature Standards –Digital Signatures Schemes– Digital Certificate – KeyManagementandDistribution.

Unit-5:SECURITYAPPLICATIONS**Teaching Hours: 8**

Hrs.IntrusionDetectionSystem–PasswordManagement–IntroductiontoFirewall– FirewallGenerations– Web Security – Wireless network Security – Electronic Mail Security– Internet MailArchitecture–S/MIME–PrettyGoodPrivacy(PGP).

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentf
ramework)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:books
level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can
begivenbytheteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of
thecolleges for practicing their theoretical study. Innovative methods may be implemented
inthepacticesandreportcanbewrittenfordocumentation, further discussionandresearch.
- g. Extracurricularandculturalactivitiesmaybeframedthroughthesyllabuscontent.
- h. Groupingstudentsforselldiscussion,selflearningprocess.

- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
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- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Cryptography and Network Security Principles and Practices”, William Stallings, Pearson/PHI, Seventh Edition, 2017.
2. “CRYPTOGRAPHY & NETWORK SECURITY” – Principles and Practices, William Stallings, Pearson Education, Third Edition.

Reference Books:

1. “Modern Cryptography Theory and Practice”, Wenbo Mao, Pearson Education, 2004.
2. “Cryptography and Network Security”, Behrouz Forouzan, Debdeep Mukhopadhyay, Tata McGraw Hill Education Pvt. Ltd, New Delhi, 2010.
3. “Quantum Cryptography and Secret–Key Distillation”, Gilles van Assche, Cambridge University Press, 2010.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	M	S	S	S
CO2	S	S	S	M	M	M	M	S	M	S
CO3	S	M	M	M	M	M	M	S	S	S
CO4	S	S	M	M	M	S	S	S	M	S
CO5	S	S	S	M	M	M	M	M	S	M

PO–Programme Outcome, CO –Course outcome

S –Strong ,M–Medium,L– Low(may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE–632 115
(Bachelor of Computer Science)–2022-2023 onwards

Semester: VI **Paper type: Internal Elective– Paper 2**

Paper code: **Name of the Paper: Digital Image Processing**

Credit: 3 Total Hours per Week: 3 Hrs. Lecture Hours: 39

Hrs. Tutorial Hours: .. Practical Hours:

Course Objectives

1. To know the basics of Digital image and techniques.
2. To understand various Image enhancement ideas.
3. To understand Image restoration techniques.
4. To understand degrees of image resolution and compression methods.
5. To understand concepts of image representation and recognition.

Course Outcomes

1. After studying unit-1, the student will be able to understand the concepts like MatLab, DIP, electromagnetic spectrum and etc.
2. After studying unit-2, the student will be able to analyze smoothing and sharpening techniques.
3. After studying unit-3, the student will be able to know about image filters.
4. After studying unit-4, the student will be able to gain knowledge about compression techniques.
5. After studying unit-5, the student will be able to know about image representation.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:FUNDAMENTALS**TeachingHours:7Hrs.**

Introduction – Origin – Steps in Digital Image Processing – Components – Applications of DIP – Elements of Visual Perception – Light and Electro Magnetic Spectrum – Image Sensing and Acquisition – Image Sampling and Quantization – Images in Matlab– Pixels – Color models – Digital Image Processing in Multimedia.

Unit-2:IMAGE ENHANCEMENT**TeachingHours:8Hrs.**

Spatial Domain – Gray level transformations – Histogram Quantization – Histogram matching and processing– Basics of Spatial Filtering– Smoothing and Sharpening Spatial Filtering– Introduction to Fourier Series – Fourier Transform – Smoothing and Sharpening frequency domain filters – Ideal– Butterworth and Gaussian filters.

Unit-3:IMAGE RESTORATION AND SEGMENTATION**TeachingHours:8Hrs.**

Noise models – Mean Filters – Order Statistics – Adaptive filters – Band reject Filters – Band pass Filters– Notch Filters– Optimum Notch Filtering– Inverse Filtering– Wiener filtering Segmentation: Detection of Discontinuities– Edge Linking and Boundary detection – Region based segmentation– Active Contour Models– Snakes– Fuzzy Connectivity– Morphological processing– erosion and dilation.

Unit-4:WAVELETS AND IMAGE COMPRESSION**TeachingHours:8Hrs.**

Wavelets – Subband coding – Multi resolution expansions – Compression: Fundamentals – Image Compression models – Error Free Compression– Predictive Compression Methods– Vector Quantization – Variable Length Coding – Bit–Plane Coding – Lossless Predictive Coding – Lossy Compression– Lossy Predictive Coding– Compression Standards.

Unit-5:IMAGE REPRESENTATION AND RECOGNITION**TeachingHours:8Hrs.**

Knowledge Representation – Statistical Pattern Recognition – Neural Nets – Fuzzy Systems – Chain Code – Polygonal approximation, signature, boundary segments – Shape number – Fourier Descriptor moments– Regional Descriptors – Topological feature, Texture – Patterns and Pattern classes – Recognition based on matching.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development– exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.

- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
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- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

1. "Digital Image Processing," Rafael C. Gonzalez, Richard E. Woods, Prentice Hall, Third Edition, 2008.
2. "Digital Image Processing and Computer Vision," Sonka, Hlavac, Boyle, Cengage Learning, 2009
3. "Fundamentals of Digital Image Processing", Anil Jain K, PHI Learning Pvt. Ltd., 2011.

Reference Book:

1. "Digital Image Processing", S. Sridhar, Oxford University Press; Second edition, 2016.
2. "Digital Image Processing", Gonzalez & Woods, Pearson Education India, 2016.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	M	M	S	S
CO2	S	S	M	M	M	M	S	M	S	S
CO3	S	S	M	M	M	S	S	S	M	S
CO4	S	M	S	M	S	M	M	S	S	S
CO5	S	M	M	M	S	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE–632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: VI

Papertype: Internal Elective– Paper 3

Papercode:

Name of the Paper: Artificial Intelligence

Credit: 3

Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To know the basics of Artificial Intelligence.
2. To Understand the Methods and algorithms in AI.
3. To learn to represent knowledge in solving AI problems.
4. To Understand Statistical logics and know about Software agents.
5. To learn how Machine learning is related to AI.

Course Outcomes

1. After studied unit-1, the student will be able to recall the fundamentals of artificial intelligence
2. After studied unit-2, the student will be able to understand the techniques used for AI
3. After studied unit-3, the student will be able to know about knowledge representation.
4. After studied unit-4, the student will be able to gain knowledge about fuzzy logic.
5. After studied unit-5, the student will be able to evaluate the design of new artificial intelligence and machine learning applications

Matching Table (Put Yes/No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTIONTOARTIFICIALINTELLIGENCE**TeachingHours:7Hrs.**

History of AI – Artificial Narrow Intelligence (ANI) – Artificial General Intelligence (AGI) – Artificial Super Intelligence (ASI) – Characteristics – Types of AI – Domains – ProgrammingLanguagesofAI–Applications ofAI–FutureofAI.

Unit-2:AI–PROBLEM SOLVINGMETHODS**TeachingHours:8Hrs.**

Problem solving Methods – Search Strategies: Uninformed – Informed – Heuristics – Generate andtest–hill climbing–Bestfirstsearch –problem reduction –Local SearchAlgorithms andOptimization – Game Playing mini–max procedure – Optimal Decisions in Games – Alpha – BetaPruning–StochasticGames

Unit-3:AI–KNOWLEDGEREPRESENTATION**TeachingHours:8Hrs.**

ProceduralVersusdeclarativeknowledge–logicprogramming–ForwardVersusbackwardreasoning – Matching – Control knowledge – Ontological Engineering– Categories and Objects –Events – Mental Events and Mental Objects – Reasoning Systems for Categories –Reasoning withDefaultInformation.

Unit-4:STATISTICALREASONINGANDAGENTS**TeachingHours:8Hrs.**

Probability and Bayes Theorem – Certainty factors – Probabilistic Graphical Models – BayesianNetworks–MarkovNetworks–FuzzyLogic.ArchitectureforIntelligentAgents– Agentcommunication–NegotiationandBargaining–ArgumentationamongAgents– TrustandReputationinMulti–agentsystems.

Unit-5:MACHINELEARNING ANDAPPLICATIONS**TeachingHours:8Hrs.**

Types of Machine Learning – Neural Networks – Deep Learning – Natural Language Processing – MachineTranslation–SpeechRecognition–Robot–Hardware–Perception–Planning–Moving.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentframework)

- a. Bookreviewandresearchpaperreview, syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:books level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops,preparingtechnicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can begivenbytheteacher

- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbook:

1. "Artificial Intelligence", Elaine Rich, Kevin Knight, Tata McGraw Hill, II Edition.
2. "Artificial Intelligence: A Modern Approach", Stuart Russell, Peter Norvig, Third Edition, Prentice Hall of India, New Delhi, 2010.
3. "Prolog: Programming for Artificial Intelligence", I. Bratko, Addison-Wesley Educational Publishers Inc., Fourth edition 2011.

Reference Book:

1. "Machine Learning for Beginners 2019", Matt Henderson, This Is Charlotte, 2019
2. "Introduction to Artificial Intelligence and Expert Systems", Dan W. Patterson, Pearson, 2015

Course Material: website links, e-Books and e-journals Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	M	S	S
CO2	S	M	S	S	M	M	S	M	S	S
CO3	S	S	M	M	S	M	M	S	S	S
CO4	S	M	S	M	M	M	M	S	S	S
CO5	S	S	M	M	S	S	M	M	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVARUNIVERSITY,VELLORE–632 115

(Bachelor of Computer Science)– 2022-2023 onwards

Semester:VI Papertype:Internal Elective–Paper3

Papercode: Name of the Paper: System Software Credit:3

Total Hours per Week: 3Hrs. Lecture Hours:39Hrs. Tutorial Hours:..... Practical Hours:.....

Course Objectives

1. To understand the basic concepts of system software
2. Ability to trace the path of a source code to object code and to executable file
3. To design and implementation of loaders and linkers
4. To understand the concepts of macro processor
5. Ability to analyze the functions of compilers

Course Outcomes (five outcomes for each unit should be mentioned)

1. After studied unit-1, the student will be able to analyze CISC and RISC machines.
2. After studied unit-2, the student will be able to know how assemblers are working.
3. After studied unit-3, the student will be able to distinguish Linker and Loader.
4. After studied unit-4, the student will be able to learn macro processor.
5. After studied unit-5, the student will be able to understand the functions of compilers.

Matching Table

Unit	i.Remembering	ii.Understanding	iii.Applying	iv.Analyzing	v.Evaluating	vi.Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:INTRODUCTIONTOSYSTEMSOFTWARE

TeachingHours:7Hrs.

System software vs. Application software – Different types of system software – SIC & SIC/XE Architecture–traditional(CISC)machines–RISC machines.

Unit-2:ASSEMBLERS

TeachingHours:8Hrs.

Basic assembler functions– Machine dependent and independent assembler features– Assembler design options–One pass assemblers–Multipass assemblers–MASM assembler.

Unit-3:LOADERSAND

LINKERS

TeachingHours:8Hrs.Ba

Basic loader functions–Simple bootstrap loaders – Machine dependent and independent loader features–Linkage editors–Dynamic linking.

Unit-4:MACROPROCESSOR

TeachingHours:8Hrs.Ba

Basic macro processor functions–Machine dependent and independent macro processor features–Macro processor design options.

Unit-5:COMPILERS

TeachingHours:8Hrs.Ba

Basic compiler functions–Machine dependent compiler features–Machine independent compiler features–Compiler design options the YACC compiler–Compiler.

Internal Assessment Methods:(The following items may be brought under test, seminar and assignment framework)

- Book review and research paper review, syllabus and curriculum review.
- Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development–exercise
- Workshops, preparing technical term dictionaries from text books and reference books.
- Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- Forming digital library: collecting text and reference books, course material.
- Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular and cultural activities may be framed through the syllabus content.
- Grouping students for self discussion, self learning process.
- Following institution and intellectual and writing reports in the course field.
- Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- Extracurricular activities may be framed through their syllabus content.

m. Bringtheindustriestothecampus. Bringthestudentstotheindustry.

- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “System Software—An introduction to system programming”, Leland L. Beck & D. Manjula, Pearson Education, 3rd edition, 2007.
2. “Compilers—Principles, techniques and tools”, A. V. Aho, Ravi Sethi, J. D. Ullman, 2nd Edition, Pearson Education, 2011.

Reference Books:

1. “Systems Programming and Operating Systems”, D. M. Dhamdhare, Second Revised Edition, Tata McGraw Hill, 2000.
2. “Systems Programming”, John J. Donovan, Tata McGraw Hill Edition, 2000.
3. “Systems Programming”, Srimanta Pal, Oxford University Press, 2011.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	M	M	S
CO2	S	S	M	M	S	M	S	M	S	S
CO3	S	M	M	S	M	S	M	M	S	S
CO4	S	M	S	S	M	S	M	S	S	S
CO5	S	M	M	M	M	M	M	S	S	S

PO—Programme Outcome, CO –Course outcome
S –Strong ,M–Medium, L– Low (may be avoided)

THIRUVALLUVARUNIVERSITY, VELLORE–632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: VI **Paper type: Internal Elective– Paper 3**

Paper code: **Name of the Paper: Cloud Computing** **Credit: 3**

Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

.....

Course Objectives

1. To understand the concepts in Cloud Computing.
2. To understand the concepts of Cloud Computing Services.
3. To enable the Students to learn Programming Models in Cloud Computing and its Environments.
4. The students should be made to learn the basics of Software Development in Cloud.
5. At the end of the course, the student should be able to learn Security Aspects of Cloud Computing.

Course Outcomes

1. After studied unit-1, the student will be able to recall the fundamental concepts of cloud computing technology.
2. After studied unit-2, the student will be able to compare and interpret the various cloud services.
3. After studied unit-3, the student will be able to analyze cloud architecture and examine the applications.
4. After studied unit-4, the student will be able to understand networking for cloud computing.
5. After studied unit-5, the student will be able to assess and elaborate the cloud security considerations and models.

Matching Table (Put Yes/No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: UNDERSTANDING CLOUD COMPUTING**Teaching Hours: 7 Hrs.**

Computing Paradigms – Cloud Computing Fundamentals – History of Cloud Computing – Cloud Computing Architecture & Management – Cloud Computing Deployment Models – Cloud Storage – Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Cloud Services.

Unit-2: DEVELOPING CLOUD SERVICES**Teaching Hours: 8 Hrs.**

Cloud Service Models – SOA & Cloud – Multicore Technology – Memory and Storage Technologies – Networking Technologies – Web 2.0 – 3.0 – Software Process Models for Cloud – Agile SDLC for Cloud Computing – Pervasive Computing – Application Environment – Virtualization.

Unit-3: PROGRAMMING MODELS FOR CLOUD COMPUTING**Teaching Hours: 8 Hrs.**

Parallel and Distributed Programming Paradigms – Map Reduce, Twister and Iterative Map Reduce – CGL – Map Reduce – Programming models for Aneka – Hadoop Library from Apache – Mapping Applications – Programming Support – Google App Engine, Amazon AWS – Cloud Software Environments – Eucalyptus, Open Nebula, Open Stack, CloudSim – SAP Labs – EMC – Salesforce – VMware.

Unit-4: SOFTWARE DEVELOPMENT IN CLOUD**Teaching Hours: 8 Hrs.**

Different Perspectives on SaaS Development – New Challenges in Cloud – Cloud Aware Software Development Using PaaS Technology – Networking for Cloud Computing – Networking Issues in Data Centers – Transport Layer Issues in DCNs – TCP Enhancements for DCNs – Open Source Support for Cloud – Open Source Tools for IaaS – Open Source Tools for IaaS – Open Source Tools for PaaS – Open Source Tools for Research.

Unit-5: SECURITY IN CLOUD COMPUTING**Teaching Hours: 8 Hrs.**

Security Aspects – Platform Related Security – Audit and Compliance – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security – Identity Management and Access Control – Autonomic Security – Advance Concepts in Cloud Computing.

Internal Assessment Methods: (The following items may be brought under test, seminar and assignment framework)

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course study for society and nature development—exercise
- c. Workshops, preparing technical term dictionaries from textbooks and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can be given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Villages, institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- g. Extracurricular and cultural activities may be framed through the syllabus content.
- h. Grouping students for self discussion, self learning process.
- i. Following institution and intellectual and writing reports in the course field.
- j. Bloom Taxonomy may be introduced for teaching, learning and evaluation process within the framework of question setting pattern and internal assessment pattern.
- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. “Essentials of Cloud Computing” – K. CHANDRASEKARAN – CRC Press Taylor and Francis Group in Informal Business – 2015.
2. Cloud Computing – A Practical Approach for Learning and Implementation, A. Srinivasan and J. Suresh, Pearson India Publications, 2014

Reference Books:

1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, From Parallel Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012.
2. John W. Rittinghouse and James F. Ransome, “Cloud Computing: Implementation, Management, and Security”, CRC Press, 2010.
3. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A Practical Approach”, TMH, 2009.
4. Kumar Saurabh, “Cloud Computing – insights into New – Era Infrastructure”, Wiley India, 2011.
5. George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in the Cloud” O'Reilly.

CourseMaterial:websitelinks,e-Booksande-journalsMappingwithProgrammeOutcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	M	S	S	S
CO2	S	S	M	S	S	M	S	S	S	S
CO3	S	S	M	S	M	S	M	S	S	S
CO4	S	S	S	M	M	S	M	S	S	S
CO5	S	S	M	M	S	M	M	M	S	S

PO–ProgrammeOutcome,CO–Courseoutcome
S –Strong ,M–Medium,L– Low(maybeavoided)

THIRUVALLUVAR UNIVERSITY, VELLORE-632 115
(Bachelor of Computer Science)– 2022-2023 onwards

Semester: VI **Paper type: Skill Based subject – Paper 4**

Paper code: **Name of the Paper: Internet of Things** **Credit: 2**

Total Hours per Week: 3 Hrs. Lecture Hours: 39 Hrs. Tutorial Hours: Practical Hours:

Course Objectives

1. To understand the fundamentals of Internet of Things.
2. To understand the M2M and IoT Architecture
3. To understand the IoT Model And Views
4. To learn about the basics of IOT protocols.
5. Analyze application of IoT in real time scenario.

Course Outcomes

1. After studied unit-1, the student will be able to find the characteristics and enabling technologies of IoT
2. After studied unit-2, the student will be able to know about IoT architecture.
3. After studied unit-3, the student will be able to compare and analyze IoT models.
4. After studied unit-4, the student will be able to select appropriate transport protocols, addressing and identification techniques suitable for IoT Domain
5. After studied unit-5, the student will be able to select appropriate IoT based smart services for real time applications

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	No	No	No	No	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: INTRODUCTION TO IoT Teaching Hours: 7 Hrs. Introduction to Internet of Things – Definition and Characteristics of IoT – Physical Design – Logical Design – IoT Enabling Technologies – IoT Levels & Deployment Templates – Domain Specific IoTs – Home – City – Environment – Energy – Retail – Logistics – Agriculture – Industry – health and Lifestyle.

Unit-2:M2MandIoT ARCHITECTURETeaching Hours: 8 Hrs.IoTandM2M–
DifferencebetweenIoTandM2M–SDN–IoTSystemManagementwithNETCONF–YANG–IoT
Platforms Design Methodology – M2M high–level ETSI architecture –IETF architecture for IoT–
OGC architecture–Service Oriented Architecture– IoT referencearchitecture

Unit-3:IoTMODELAND VIEWS Teaching Hours: 8 Hrs.IoT
reference model – Domain model – information model – functional model – communicationmodel
– Functional View – Information View – Deployment and operational View – other
relevantarchitecturalviews–datarepresentationandvisualization.

Unit-4:IoTPROTOCOLS Teaching Hours: 8 Hrs.Protocol
Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFIDProtocols –
Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet Protocol – Modbus–Zigbee
Architecture–Networklayer–6LowPAN–CoAP–Security

Unit-5:REAL–WORLDAPPLICATIONS Teaching Hours: 8 Hrs.Real
world design constraints – Applications – Asset management, Industrial automation, smartgrid,
Commercial building automation, Smart cities – participatory sensing – Data Analytics forIoT –
Software & Management Tools for IoT Cloud Storage Models & Communication APIs –
CloudforIoT–AmazonWebServicesforIoT.

InternalAssessmentMethods:(Thefollowingitemsmaybebroughtundertest,seminarandassignmentf
ramework)

- a. Bookreviewandresearchpaper review,syllabusandcurriculumreview.
- b. Datacollectionandpaperwritingpractices:books
level,fieldstudylevel.Usingthecoursestudyforsocietyandnaturedevelopment–exercise
- c. Workshops, preparing technicaltermdictionariesfromtextbooksandreferencebooks.
- d. Preparing question paper by the candidates: objective type, descriptive type, training can
begivenbytheteacher
- e. Formingdigitallibrary:collectingtextandreferencebooks,coursematerial.
- f. Villages, institutions, various people groups may be adopted by the departments of
thecolleges for practicing their theoretical study. Innovative methods may be implemented
inthepacticesandreportcanbewrittenfordocumentation, further discussionandresearch.
- g. Extracurricularandculturalactivitiesmaybeframedthroughthesyllabuscontent.
- h. Groupingstudentsforselldiscussion,selflearningprocess.
- i. Followinginstitutionandintellectualandwritingreportsinthecoursefield.
- j. BloomTaxonomymaybeintroducedforteaching,learningandevaluationprocesswithinthe
frameworkofquestionsettingpatternandinternalassessmentspattern.

- k. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- l. Extracurricular activities may be framed through their syllabus content.
- m. Bring the industries to the campus. Bring the students to the industry.
- n. Ph.D. Research Methodology is applicable to write project report and any kind of research reports like assignment, seminar papers, case study reports, etc.

Textbooks:

1. "Interconnecting Smart Objects with IP: The Next Internet", Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann, 2010.
2. Internet of Things – A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015.
3. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014.

Reference Books:

1. "Internet of Things – A hands-on approach", Arshdeep Bahga, Vijay Madisetti, Universities Press, 2015
2. "Architecting the Internet of Things", Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), Springer, 2011.
3. "The Internet of Things in the Cloud: A Middleware Perspective", Honbo Zhou, CRC Press, 2012.
4. "From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence", Jan Höller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand, David Boyle, Elsevier, 2014.
5. "The Internet of Things – Key applications and Protocols", Olivier Hersent, David Boswarthick, Omar Elloumi, Wiley, 2012.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	S	S	S	S
CO2	S	S	S	S	M	M	M	S	S	S
CO3	S	S	S	S	M	M	S	S	S	S
CO4	S	M	S	M	S	M	S	S	S	S
CO5	S	S	S	S	S	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVARUNIVERSITY
SERKKADU
VELLORE- 632115

M.Sc. Mathematics –2022-2023 onwards

Programme Objectives:

1. Develop the student with critical thinking and analytical skills.
2. Enhance the knowledge of students for pursuing higher studies.
3. Provide in-depth knowledge to design the mathematical models in real life problems.
4. Expertise the students to excel in their professional career.
5. Provide the students to understand the mathematical concepts visually.

Programme Educational Objectives:

1. Provide a strong foundation in pure and applied Mathematics.
2. Motivate the students to pursue higher studies.
3. Prepare the students to work effectively in a group or individually.
4. Enrich the student to follow the ethical and professional values to serve the community.
5. Encourage the student for lifelong learning.

Programme Specific Outcomes:

1. Understand the theoretical knowledge of Mathematical concepts.
2. Develop the problem-solving skills.
3. Collaborate with the multi-disciplinary areas.
4. Creatively applying the knowledge of Mathematics in selected real life situations.
5. Appreciate the emphasis given on teaching the mathematical concepts through counter examples.
6. Get the knowledge of inter-disciplinary approach of learning.
7. Develop the skill to solve problems which appear in the various examinations like CSIR-NET, SET, IAS, etc
8. Inculcate the creative and develop research level thinking in the field of pure and applied Mathematics.
9. Encourage to go for higher learning in research.
10. Understand the ethical values and human values to appreciate the cultural diversity and promote the social harmony.

Programme Outcomes:

1. Acquire in-depth knowledge of Mathematics both in theory and application.
2. Identify mathematical and computational methods in order to solve comprehensive problems.
3. Recognize the various specialized areas of advanced mathematics and its applications.
4. Analyze and interpret data to create and design new knowledge for complex problems.
5. Develop mathematical models for the applications of mathematics in real-life situations.
6. Exhibit the potential to effectively accomplish tasks independently and as a member or leader in diverse teams, and in multidisciplinary settings.
7. Develop the skills to crack the various competitive examinations.
8. Ability to engage in life-long learning in the context of the rapid developments in the field.
9. Demonstrate the ability to write dissertations, reports, make effective presentations and documentation.
10. Commitment to professional ethics and social responsibilities.

THIRUVALLOVAR UNIVERSITY
MASTER OF SCIENCE
(With effect from 2022–2023)

The Course of Study and the Scheme of Examination

@Compulsory Courses don't change this category. Number of core papers & Practical may be changed

Sl. No.	Study Components		ins. hrs / week	Credit	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
SEMESTER I								
	Core		6	5	Algebra-I	25	75	100
			6	5	Real Analysis –I	25	75	100
			6	4	Ordinary Differential Equations	25	75	100
Internal Elective for same major students (Choose any one)								
	@ Core Elective	Paper-1	6	3	A. Probability Theory B. Mechanics C. Graph Theory	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
	@ Open Elective	Paper-1	6	3	A. Basic Mathematics B. Mathematical Foundations C. Mathematical Modeling	25	75	100
			30	20				
SEMESTER II						CIA	Uni. Exam	Total
	Core		6	5	Algebra-II	25	75	100
			6	5	Real Analysis –II	25	75	100
			6	4	Partial Differential Equations	25	75	100
Internal Elective for same major students (Choose any one)								
	@ Core Elective	Paper-2	5	3	A.Mathematical Statistics B. Fuzzy Set Theory C. Difference Equations	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
	@ Open Elective	Paper-2	5	3	A. Fundamentals of Insurance B. Numerical Methods C. Fundamentals of Business Statistics	25	75	100
	@ Compulsory Paper		2	2	Human Rights & Duties	25	75	100
			30	22				

Sl. No.	Study Components		ins. hrs / week	Credit	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
SEMESTER III								
	Core		6	6	Complex Analysis –I	25	75	100
			6	5	Topology	25	75	100
			6	5	Differential Geometry	25	75	100
Internal Elective for same major students (Choose any one)								
	@ Core Elective	Paper-3	6	3	A. LaTeX B. Discrete Mathematics C. Operations Research	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
	@ Open Elective	Paper-3	6	3	A. Mathematical Biology B. Quantitative Techniques C. SCILAB	25	75	100
	@MOOC Courses		-	2				100
	@Field Study			2		100		100
			30	26				
SEMESTER IV						CIA	Uni. Exam	Total
	Core		5	4	Complex Analysis –II	25	75	100
			5	4	Fluid Dynamics	25	75	100
			5	5	Functional Analysis	25	75	100
	@ Core	Project Compulsory	5	5	Project with <i>viva voce</i>	100 (75 Project +25 viva)		100
Internal Elective for same major students (Choose any one)								
	@Core Elective	Paper-4	5	3	A. Number Theory and Cryptography B. Advanced Numerical Analysis C. Calculus of Variations and Integral Equations	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
	@ Open Elective (Non-Major)	Paper-4	5	3	A. Mathematical Economics B. Entrepreneurial Development C. Programming in C++	25	75	100
			30	24				
			120	92				

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : Core

Credit : 5

Paper code :

Name of the Paper : Algebra-I

Hours of Teaching:90 hrs

Course Objectives:

The objective of this course are to:

1. Study and develop the concept of group action and learn Sylow's theorem and its applications.
2. Introducing structure theorem on abelian group and studying its applications.
3. Get the knowledge on algebraic structure Modules and its properties
4. Understand canonical forms of linear transformations.
5. Demonstrate insight into Linear algebra with focus on properties of matrix of transformations.

Course Outcomes:

After successful completion on the course the student will be able to

- CO1** Demonstrate ability to think group actions critically by Cayley's theorem and apply the Sylow's theorems to describe the structure of certain finite abelian groups
- CO2** Understand the concept of the internal and external direct product of groups. Also, apply the structure theorem on abelian groups to find the non-isomorphic abelian groups of certain orders.
- CO3** Check the irreducibility of given polynomial in the defined Field
- CO4** Know about Module and, difference between the Algebraic structures, Vector space and Module.
- CO5** Acquire the knowledge of the Linear transformation in canonical forms. Also, the matrix form of linear transformation and its properties.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	No	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1	Group Theory	18 hours
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Another counting principle - class equation for finite groups and its applications - Sylow's theorems (For theorem 2.12.1, Only First proof)

Chapter 2: Sections 2.11 and 2.12

Unit – 2	Group Theory (Continuation)	18 hours
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Direct products - Finite abelian groups

Chapter 2: Sections 2.13 and 2.14 (Only Theorem 2.14.1))

Unit – 3	Ring Theory	18 hours
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Polynomial Rings – Polynomials over the Rational Field

Chapter 3: Sections 3.9 to 3.10

Unit – 4 Modules and Linear Transformations 18 hours

Modules –LinearTransformations: Nilpotent transformations - Jordan form - rational canonical form.

Chapter 4: Section 4.5

Chapter 6: Sections 6.5to 6.7

Unit – 5 Linear Transformations 18 hours

Hermitian, unitary, normal transformations, real quadratic form.

Chapter 6: Sections 6.10 and 6.11

Text book:

I.N. Herstein, Topics in Algebra, 2nd Edition. Wiley.1975

Reference Books:

1. D.S.Dummit and R.M.Foote. Abstract Algebra. Wiley 2003
2. M. Artin, Algebra, Prentice Hall of India, 1991
3. J.A. Gallian. Contemporary Abstract Algebra. 4th Edition. Narosa Publishing 2011
4. P.B.Battacharya, S.K.Jain, and S.R.Nagpaul, Basic Abstract Algebra(II Edition) Cambridge University Press, 1997.(Indian Edition)
5. I.S. Luther and I.B.S. Passi, Algebra, Vol.I – Groups(1996), Vol. II Rings, Narosa Publishing House, New Delhi, 1999.
6. L. Smith, Linear transformation: Example and Applications. In: Linear Algebra, Undergraduate texts in Mathematics, Springer, New york. NY, 1998.

E-Materials:

<https://nptel.ac.in/courses/111108098/>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	M	S	S	S
CO2	S	S	M	M	M	S	M	S	S	S
CO3	S	S	M	M	S	S	M	S	S	S
CO4	S	S	M	M	S	S	M	S	S	S
CO5	S	S	M	M	S	S	M	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : Core

Credit : 5

Paper code :

Name of the Paper : Real Analysis– I

Hours of Teaching: 90 hrs

Course Objectives:

The objectives of the course is to

1. Work comfortably with functions of bounded variation
2. Study the Riemann-Stieltjes Integration
3. Expertise the students to excel in integration under integral sign.
4. Get the knowledge about the convergence of infinite series, infinite product and uniform convergence and its interplay between various limiting operations.
5. Provide the students to understand uniform convergence and continuity of functions.

Course Outcomes:

After successful completion on the course the student will be able to

- CO1** Understand the concept of functions of bounded variation.
- CO2** Acquires knowledge on Riemann Stieltjes integration and to solve its related problems.
- CO3** Work effectively in integration under integral sign.
- CO4** Provide a strong foundation in the study of the convergence of infinite series, infinite product and uniform convergence and its interplay between various limiting operations.
- CO5** Know about the convergence of sequences of functions.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1	FunctionsofBoundedVariation	18 hours
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Introduction-Properties of monotonic functions-Functions of bounded variation–Total variation-Additive property of total variation-Total variation on $[a, x]$ as a function of x -Function of bounded variation expressed as the difference of two increasing functions-Continuous functions of bounded variation.

Chapter6 : Sections 6.1to 6.8

Unit – 2	The Riemann-Stieltjes Integral	18 hours
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Introduction-Notation-The definition of the Riemann-Stieltjes integral-Linear Properties-
Integration by parts-Change of variable in a Riemann-Stieltjes integral-Reduction to a Riemann Integral-
Euler's summation formula-Monotonically increasing integrators, Upper and lower integrals-
Additive and linearity properties of upper and lower integrals -Riemann's condition-Comparison
Theorems

Chapter 7 : Sections 7.1 to7.14

Unit – 3	The Riemann-Stieltjes Integral (Contd.)	18 hours
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Integrators of bounded variation - Sufficient conditions for the existence of Riemann-Stieltjes integrals - Necessary conditions for the existence of Riemann-Stieltjes integrals - Mean value theorems for Riemann-Stieltjes integrals - The integrals as a function of the interval - Second fundamental theorem of integral calculus - Change of variable in a Riemann integral - Second Mean Value Theorem for Riemann integral - Riemann-Stieltjes integrals depending on a parameter - Differentiation under the integral sign.

Chapter 7: Sections 7.15 to 7.24

Unit – 4	InfiniteSeriesandInfiniteProducts	18 hours
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Absolute and conditional convergence—Dirichlet's test and Abel's test—Rearrangement of series—Riemann's theorem on conditionally convergent series. Double sequences—Double series—Rearrangement theorem for double series—A sufficient condition for equality of iterated series—Multiplication of series—Cesàro summability—Infinite products.

Chapter8: Sections 8.8,8.15, 8.17, 8.18, 8.20,8.21 to 8.26

Unit – 5 Sequence of Functions**18 hours**

Pointwise convergence of sequences of functions - Examples of sequences of real-valued functions - Definition of uniform convergence - Uniform convergence and continuity - The Cauchy condition for uniform convergence - Uniform convergence of infinite series of functions - Uniform convergence and Riemann - Stieltjes integration - Uniform convergence and differentiation - Sufficient condition for uniform convergence of a series - Mean convergence. **Chapter 9** : Sections 9.1 to 9.6, 9.8, 9.10, 9.11, 9.13

Text Book:

Tom M. Apostol: Mathematical Analysis, 2nd Edition, Addison-Wesley Publishing Company Inc. New York, (1997).

Reference Books:

1. R.G. Bartle, Real Analysis, (1976), John Wiley and Sons Inc.
2. W. Rudin, Principle of Mathematical Analysis (1976), McGraw Hill Company, New York.
3. S.C. Malik and Savita Arora, Mathematical Analysis (1991), Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansilal, Introduction to Real Analysis (1991), Satya Prakashan, New Delhi.
5. A.L. Gupta and N.R. Gupta, Principle of Real Analysis (2003), Pearson Education.

E-Materials

<https://mathworld.wolfram.com/>

https://onlinecourses.nptel.ac.in/noc21_ma63/preview

<https://ocw.mit.edu/courses/mathematics/18-100a-introduction-to-analysis-fall-2012/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	M
CO2	S	S	M	M	S	M	S	S	S	M
CO3	S	S	M	M	S	M	S	S	S	M
CO4	S	S	M	M	S	M	S	S	S	M
CO5	S	S	M	M	S	M	S	S	S	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : Core

Credit : 4

Paper code :

Name of the Paper : Ordinary Differential Equations

Hours of Teaching:90 hrs

Course Objectives:

The main objectives of this course are to:

1. Understand the theory and methods of Ordinary Differential Equations (ODEs).
2. Apply and solve ODEs applications from various emerging technologies.
3. Know about the concepts and solving methods of Second and n^{th} order linear differential equations.
4. Study the concepts and solving methods of differential equations with variable coefficients and regular singular point.
5. Examine the existence and uniqueness of solutions of differential equations.

Course Outcomes:

After successful completion of the course the student will be able to

- CO1** Analyze the methods of second order homogeneous and non-homogeneous equations.
- CO2** Apply and solve the higher order homogeneous and non-homogeneous equations.
- CO3** Define the methods to solve linear equations with variable coefficients.
- CO4** Discuss the linear equations with regular singular points.
- CO5** Construct the solutions for first order equations.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1	Linear Equations with Constant Coefficients	18 hours
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Second order homogeneous equations - Initial value problems for second order - Linear dependence and independence - A formula for the Wronskian - The non - homogeneous equation of order two.

Chapter 2: Sections 1 to 6

Unit – 2 Linear Equations with Constant Coefficients (Continuation) 18 hours

Homogeneous equations of order n - Initial value problems for order n - equations with real constants - Non-homogeneous equations of order n - Annihilator method - Algebra of constant coefficient operators.

Chapter 2: Sections 7 to 12

Unit – 3 Linear Equations with Variable Coefficients 18 hours

Initial value problems - Existence and Uniqueness theorems - Solutions to solve a non-homogeneous equation – The Wronskian and linear independence - Reduction of the order of homogeneous equations - Homogeneous equation with analytic coefficients – The Legendre-Equation.

Chapter 3: Sections 1 to 8

Unit – 4 Linear Equations with Regular Singular Points 18 hours

Euler equation - Second order equations with regular singular points - general and exceptional cases - Bessel equation.

Chapter 4: Sections 1 to 4 and 6 to 8

Unit – 5	Existence and Uniqueness of Solutions to First Order Equations	18 hours
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Equation with variables separated - Exact equations - The method of successive approximations - The Lipschitz condition - Convergence of the successive approximations.

Chapter 5: Sections 1 to 6

Text Book:

Earl A. Coddington, An introduction to ordinary differential equations (Indian Reprint),
Prentice- Hall of India Ltd., New Delhi, 2009.

Reference Books:

1. Williams E. Boyce and Richard C. DI Prima, Elementary differential equations and boundary value problems, John Wiley and sons, New York, 1967.
2. George F Simmons, Differential equations with applications and historical notes, Tata McGraw Hill, New Delhi, 1974.
3. W.T.Reid, Ordinary differential equations, John Wiley and sons, New York, 1971.
4. M.D.Raisinghania, Advanced differential equations, S.Chand & Company Ltd.,New Delhi, 2001.
5. N.N. Lebedev, Special functions and their applications, Prentice Hall of India, New Delhi, 1965.

E-Materials:

1. <https://nptel.ac.in/courses/111104031>
2. <https://nptel.ac.in/courses/122107037>
3. <https://ocw.mit.edu/courses/mathematics/18-03-differential-equations-spring-2010/>
4. <https://nptel.ac.in/courses/111108081/>
5. <https://ocw.mit.edu/courses/mathematics/18-034-honors-differential-equations-spring-2009/syllabus/>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	M	L
CO2	S	S	M	L	S	M	S	S	M	M
CO3	S	S	M	S	M	S	M	M	M	S
CO4	S	S	M	M	M	S	M	M	M	S
CO5	S	S	M	L	S	S	S	S	M	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Probability Theory

Hours of Teaching:90 hrs

Course Objectives:

The main objectives of this course are to:

1. Study basic notions of experiments, events, probability, random variables and probability distributions.
2. Acquire knowledge on various parameters and measures of the probability distributions.
3. Educate the characteristic functions and its properties.
4. Inculcate the special types of discrete and continuous probability distributions.
5. Learn the strong theoretical background about the limit theorems and its consequences

Course Outcomes:

After successful completion of the course the student will be able to

- CO1** Analyze the basics of probability and random variables.
- CO2** Understand to handle parameters of the distribution.
- CO3** Define the properties and functionalities of characteristic functions.
- CO4** Discuss the various special probability distributions.
- CO5** Construct the solutions for real time applications using limits theorem.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	Yes	Yes
2	Yes	Yes	Yes	No	Yes	No
3	No	Yes	Yes	Yes	Yes	No
4	No	Yes	Yes	Yes	Yes	No
5	No	Yes	Yes	Yes	Yes	Yes

Unit – 1 Probability and Random Variables**18 hours**

Random Experiments – Sample Space – Random Events – Probability Axioms – Conditional Probability – Mutual Exclusive Events – Independent Events – Addition and Product Theorems on Probability – Theorem of Total Probability – Baye's Theorem – Random Variables – Probability Mass and Density Functions – Distribution Function – Joint Distribution – Marginal Distribution – Conditional Distribution – Independent Random Variables – Functions of Random Variables.

Chapter 1 : Sections 1.1 to 1.7**Chapter 2 :** Sections 2.1 to 2.9**Unit – 2 Parameters of the Distribution****18 hours**

Mathematical Expectation – Moments – The Chebyshev Inequality – Absolute Moments – Order Parameters – Moments of Random Vectors – Regression of the First and Second Types.

Chapter 3 : Sections 3.1 to 3.8**Unit – 3 Characteristic Functions****18 hours**

Properties of Characteristic Functions – Characteristic Functions and Moments – Semi-Invariants – Characteristic Function of the Sum of the Independent Random Variables – Determination of Distribution Function by the Characteristic Function – Characteristic Function of Multidimensional Random Vectors – Probability Generating Functions.

Chapter 4 : Sections 4.1 to 4.7**Unit – 4 Special Probability Distributions****18 hours**

Discrete Probability Distributions: One Point – Two Point – Bernoulli Trials – Binomial – Poisson – Polya – Hypergeometric Distributions – Continuous Probability Distributions: Uniform – Normal – Gamma – Beta – Cauchy – Laplace Distributions.

Chapter 5 : Sections 5.1 to 5.10**Unit – 5 Limit Theorems****18 hours**

Stochastic Convergence – Bernoulli Law of Large Numbers – Convergence of Sequence of Distribution Functions – Levy-Cramer Theorems – The de Moivre-Laplace Theorem – The Lindeberg-Levy Theorem – Lapunov Theorem.

Text Book:

M.Fisz, *Probability Theory and Mathematical Statistics*, 3rd Edition, John Wiley and Sons Inc., New York, 1963.

Reference Books:

1. R.B.Ash, *Real Analysis and Probability*, Academic Press, New York, 1972.
2. K.L.Chung, *A Course in Probability*, 2nd Edition, Academic Press, New York, 1974.
3. R.Durrett, *Probability: Theory and Examples*, 5th Edition, Cambridge University Press, New York, 2019.
4. V.K.Rohatgi and A.K.Md.Ehsanes Saleh, *An Introduction to Probability Theory and Mathematical Statistics*, 2nd Edition, Wiley Eastern Ltd., New Delhi, 1988.
5. B.R.Bhat, *Modern Probability Theory – An Introductory Textbook*, 4th Edition, New Age International Pvt.Ltd., New Delhi, 2014.

E-Materials:

1. <https://ocw.mit.edu/resources/res-6-012-introduction-to-probability-spring-2018/>
2. <https://www.coursera.org/learn/introductiontoprobability>
3. https://swayam.gov.in/nd1_noc20_ma18/preview
4. https://onlinecourses.nptel.ac.in/noc21_ma24/preview

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	M	M	M
CO2	S	S	S	S	M	S	M	M	S	M
CO3	S	S	S	S	M	M	M	S	M	M
CO4	S	S	M	M	S	M	M	S	S	S
CO5	S	S	M	S	M	M	M	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Mechanics

Hours of Teaching:90 hrs

CourseObjectives:

The main objectives of this course are to:

1. Understand mechanical systems under generalized coordinate systems.
2. Apply mechanics techniques in virtual work.
3. Develop the student's ability to deal with Energy and momentum.
4. Look at the concept of Hamilton, Lagrange.
5. Discuss the Canonical Transformation.

CourseOutcomes

After the successful completion of this course the students will be able to:

- CO1** Explain the basic concepts of mechanical systems under generalized coordinate systems.
- CO2** Identify the Lagrange's equations and its application.
- CO3** Derive the Hamilton Equation.
- CO4** Analyze the Hamilton's Principle and Hamilton-Jacobi Equation and separability.
- CO5** Discuss the Lagrange and Poisson brackets.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit – 1 Mechanical Systems 18 hours

The Mechanical system- Generalized coordinates- Constraints- Virtual work- Energy and Momentum.

Chapter 1: Sections 1.1 to 1.5

Unit – 2 Lagrange's Equations 18 hours

Derivation of Lagrange's equations- Examples - Integrals of motion.

Chapter 2: Sections 2.1 to 2.3

Unit – 3 Hamilton's Equations 18 hours

Hamilton's Principle - Hamilton's Equation - Other variational principle.

Chapter 4: Sections 4.1 to 4.3

Unit – 4 Hamilton-Jacobi Theory 18 hours

Hamilton Principal function - Hamilton-Jacobi Equation – Separability.

Chapter 5: Sections 5.1 to 5.3

Unit – 5 Canonical Transformation 18 hours

Differential forms and generating functions - Lagrange and Poisson brackets.

Chapter 6: Sections 6.1 and 6.3

Text Book:

D.T.Greenwood, *Classical Dynamics*, Prentice Hall of India, New Delhi, 1985.

Reference Books:

1. H.Goldstein, *Classical Mechanics*, (2nd Edition) Narosa Publishing House, New Delhi.
2. N.C.Rane and P.S.C.Joag, *Classical Mechanics*, Tata McGraw Hill, 1991.
3. J.L.Synge and B.A.Griffith, *Principles of Mechanics* (3rd Edition) McGraw Hill Book Co., New York, 1970.

E-Materials:

<https://ocw.mit.edu/courses/physics/8-09-classical-mechanics-iii-fall-2014/>

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	L	M	S	L	S	L
CO2	M	S	M	S	S	L	M	S	L	M
CO3	S	S	M	S	M	L	S	S	M	L
CO4	M	L	M	L	S	M	M	L	L	S
CO5	S	S	M	S	L	M	M	S	L	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Graph theory

Hours of Teaching: 90 hrs

Course Objectives:

The main objective of this course are to:

1. Formally study and develop the basic concepts of Graphs.
2. Familiar with the notion and properties of varied types of graphs.
3. Understand concepts that helps to model real life situations into graphs.
4. Formulate and prove central theorems about trees, matching, connectivity, coloring and planarity of graphs.
5. Learn the proving techniques that are existing in each and every section of the unit and, motivate to do research in various fields of Graph theory.

Course Outcomes

After the successful completion of this course the students will be able to:

- CO1** Grasp features and properties of various types of graphs.
- CO2** Demonstrate capacity of illustration for mathematical reasoning through analyzing, providing and explaining concepts of Eulerian circuits and Hamiltonicity in graphs.
- CO3** Understand the definitions and properties of matching and independent sets.
- CO4** Apply the concepts of graphs to model them in real life situations.
- CO5** Explicate the applications of planarity and colorability.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit – 1 Graphs, Subgraphs And Trees **18 hours**

Graphs - Graph Isomorphism - The Incidence and Adjacency Matrices - Subgraphs - Vertex Degrees - Paths and Connection - Cycles - Trees - Cut Edges and Bonds - Cut Vertices- Cayley's formula- Application: The shortest path problem.

Chapter 1: Sections 1.1 to 1.8

Chapter 2: Sections 2.1 to 2.4

Unit – 2 Connectivity, Euler Tours and Hamilton Cycles **18 hours**

Connectivity - Blocks - Euler tours - Hamilton Cycles. Application: The travelling Salesman Problem.

Chapter 3: Sections 3.1 to 3.3

Chapter 4: Sections 4.1 to 4.2

Unit – 3 Matchings, Edge Colourings **18 hours**

Matchings - Matchings and Coverings in Bipartite Graphs –Perfect matchings- Edge Colourings: Edge Chromatic Number - Vizing's Theorem. Application: Optimal Assignment Problem.

Chapter 5: Sections 5.1 to 5.3, 5.5

Chapter 6: Sections 6.1 to 6.2

Unit – 4 Independent Sets And Cliques, Vertex Colourings **18 hours**

Independent sets - Ramsey's Theorem – Vertex Colourings: Chromatic Number - Brooks' Theorem – Hajos Conjecture- Chromoatic polynomial.

Chapter 7: Sections 7.1 to 7.2

Chapter 8: Sections 8.1 to 8.2, 8.4

Unit – 5 Planar Graphs **18 hours**

Plane and planar Graphs - Dual graphs - Euler's Formula - The Five-Colour Theorem and the Four-Colour Conjecture- Directed graphs.

Chapter 9: Sections 9.1 to 9.6 and 10.1

Text Book:

J.A.Bondy and U.S.R. Murthy, *Graph Theory and Applications*, Macmillan, London, 1976.

Reference books:

1. Narsingh Deo, *Graph Theory with applications to engineering and computerscience*, Prentice Hall of India, New Delhi, 2001
2. G.Chartrand and L.Lesniak, *Graphs and Digraphs*, Chapman and Hall, CRC, Fourth Edition, 2005
3. R.J. Wilson, *Introduction to Graph Theory*, Pearson Education, 4th Edition, 2004, Indian Print.
4. S. A. Choudum, *A First Course in Graph Theory*, MacMillan India Ltd. 1987.
5. J. Clark and D.A. Holton, *A First look at Graph Theory*, Allied Publishers, New Delhi, 1995.
6. A. Gibbons, *Algorithmic Graph Theory*, Cambridge University Press, Cambridge, 1989.

E- Materials:

<https://nptel.ac.in/courses/111106050/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	S	S	S
CO2	S	S	M	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type:OpenElective

Credit : 3

Paper code :

Name of the Paper : BasicMathematics

Hours of Teaching: 90 hrs

CourseObjectives:

The main objective of this course are to:

1. Studyexponentialandlogarithmicseries.
2. Understandaboutmatricesanditsapplications.
3. Formulateandsolvethethepartialdifferentialequations.
4. Discuss the properties of Laplace and inverse Laplace transformation.
5. Learnthe expansiontechniquesofFourierseries.

CourseOutcomes:

After successful completion of the course the student will be able to

- CO1** Evaluate the exponentialandlogarithmicseries.
- CO2** Explainaboutmatricesanditsapplications.
- CO3** Solvethethepartialdifferentialequations.
- CO4** Solvethethepartialdifferentialequations using Laplacetransform.
- CO5** Analyse the techniques of Fourierseries.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	No	No	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	No	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1 Exponential and Logarithmic series 18 hours

Exponential series – Logarithmic series

Chapter 1: Section 1.1 – 1.2

Unit – 2 Matrices 18 hours

Determinant of a matrix – Characteristic equation of a matrix – Characteristic vectors of a matrix – Cayley-Hamilton Theorem – Inverse of a matrix.

Chapter 4: Section 4.1 – 4.5

Unit – 3 Partial Differential Equations 18 hours

Elimination of arbitrary constants – Elimination of arbitrary functions – Standard forms – Lagrange's Equations.

Chapter 9: Section 9.1 – 9.4

Unit – 4 Laplace transforms 18 hours

Properties of Laplace transform – Inverse Laplace transform – Partial Fractions.

Chapter 10: Section 10.1 – 10.3

Unit – 5 Fourier Series 18 hours

Properties of Integration – Odd and Even Functions – Half Range Fourier Series.

Chapter 11: Section 11.1 – 11.3

Text Book:

G. Britto Antony Xavier, V. Balaji, S. U. Vasantha Kumar, B. Govindan, Mathematical Sciences, Jayalakshmi Publications, 2-e, 2015.

Reference Books:

1. P. Balasubramaniam, K. G. Subramanian, Ancillary Mathematics, Volume – I, Tata McGraw Hill publishing company limited, New Delhi, 1996.
2. P. Durai Pandian, S. Udaya Baskaran, Allied Mathematics, Volume – I, Muhil publishers, 1st Edition, Chennai, 1997.
3. P. Kandsamy and K. Thilagavathy, Allied Mathematics volume – I, Volume – II, S. Chand & Company, New Delhi, 2004.
4. Shanti Narayan, P. K. Mittal, Differential Calculus, S. Chand & Co, New Delhi, 2005.
5. A. Singaravelu, Allied Mathematics, Meenakshi Agency, Chennai, 2001.
6. P. R. Vittal, Allied Mathematics, Margham Publications, Chennai, 1999.

E-Materials:

http://mathforum.org/library/drmath/sets/elem_2d

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	L	S
CO2	S	S	M	M	S	S	S	S	L	S
CO3	S	S	M	M	S	S	S	S	M	S
CO4	S	S	M	M	S	S	S	S	M	S
CO5	S	S	M	M	S	S	S	S	M	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : Mathematical Foundations

Hours of Teaching: 90 hrs

Course Objectives:

The main objective of this course are to

1. Study the logical operators, Propositional function, quantifiers, rules of inference.
2. Understand about fundamental mathematical concepts such as sets, relations, functions and composition of functions
3. Know the types of binary operations and boolean algebra.
4. Formulate and solve the differentiation and applications of differentiation
5. Acquire the knowledge of two dimensional analytical geometry

Course Outcomes:

After successful completion of the course the student will be able to

CO1 Apply mathematical logical operators.

CO2 Improve knowledge in set theory, functions with some problems.

CO3 Classify the types of binary operations and know about the boolean algebra.

CO4 Solve problems on applications of differentiation

CO5 Evaluate problems on Straight lines, circles and conics.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	No	No	Yes	Yes
3	Yes	Yes	No	Yes	Yes	No
4	Yes	Yes	No	No	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1 Symbolic Logic**18 hours**

Proposition, Logical operators, conjunction, disjunction, negation, conditional and Bi-conditional operators, converse, inverse, contrapositive, logically equivalent, tautology and contradiction, Arguments and validity of argument.

Chapter 1: Sections 1.1–1.5**Unit – 2 Set Theory****18 hours**

Set, Set operations, Venn diagram, Properties of sets, number of elements in a set, Cartesian product, relation & functions, Relation: Equivalence relation. Equivalence class, Partially and Totally ordered sets, Functions: Types of Functions, Composition of Functions.

Chapter 2: Sections 2.1–2.8**Unit – 3 Binary Operations****18 hours**

Types of Binary operations: Commutative, Associative, Distributive and identity, Boolean algebra: properties, Permutations and combinations.

Chapter 3: Sections 3.1–3.3**Unit – 4 Differentiation****18 hours**

Simple problem using standard limits, $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$, $\lim_{x \rightarrow 0} \frac{\sin x}{x}$, $\lim_{x \rightarrow 0} \frac{\tan x}{x}$, $\lim_{x \rightarrow 0} e^x$, $\lim_{n \rightarrow 0} \frac{(1 + 1/n)^n}{n}$,

 $\lim_{n \rightarrow 0} (1 + n)^{1/n}$,

Differentiation,

successive differentiation, Leibnitz theorem, partial Differentiation, Applications of differentiation, Tangent and normal, angle between two curves, Maximum and minimum values [second derivative test], curvature and radius of curvature [Cartesian coordinates], Envelopes.

Chapter 4: Sections 4.1 – 4.9**Unit – 5 Two Dimensional Analytical Geometry****18 hours**

Straight lines – pair of straight lines – circles – System of Circles – Conics [parabola, Ellipse and Hyperbola].

Chapter 5: Sections 5.1 – 5.5**Text Book:**

U. Rizwan, Mathematical Foundations Volume I, Nelliappar Publications, Chennai 2017.

ReferenceBooks:

1. P.R.Vittal,MathematicalFoundations,MarghamPublication,Chennai.
2. V.Sundaram &others,DiscreteMathematicalFoundations,A.P.Publication,Sirkali
3. P.Duraipandian&Others,AnalyticalGeometryof2and3Dimensions,EmeraldPublication
1992 Reprint.

E-Materials:

<http://www.mathfoundation.com>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	L	S	S	M	S
CO2	S	S	M	M	S	M	S	M	M	S
CO3	S	S	M	M	S	S	S	S	M	S
CO4	S	S	S	L	S	S	S	S	M	S
CO5	S	S	S	S	M	S	S	S	M	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : I

Paper type : OpenElective

Credit : 3

Paper code :

Name of the Paper : MathematicalModeling

Hours of Teaching:90 hrs

Course objective:

The main objective of this course are to

1. Provide an introduction to modeling and simulation.
2. Solve and interpret real life problems using different Mathematical perspectives.
3. Apply the Mathematical Modeling through difference equations.
4. Develop the Mathematical modeling through Graphs.
5. To have a proper understanding of calculus of variations and Dynamics Programming.

Course Learning outcomes:

After the successful completion of this course, the students will be able to:

CO1 Understand concept of modeling and simulation.

CO2 Create mathematical models of real world problems.

CO3 Explain the population dynamics and genetics.

CO4 Mathematical models using mathematical techniques.

CO5 Discuss the calculus Variations and Dynamic Programming.

Matching table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

18 hours

Mathematical modelling in population dynamics, Mathematical modelling of epidemic through systems of ordinary differential equations of first order – Mathematical Models in Medicine, Arms Race, Battles and international Trade in terms of Systems of ordinary differential equations - Mathematical modelling in dynamics through systems of ordinary differential equations of first order.

Unit – 2 Mathematical Modelling through difference equations

18 hours

The need for Mathematical modelling through difference equations - some simple models - Basic theory of linear difference equations with constant coefficients - Mathematical modelling through difference equations in economics and finance.

Chapter 5: Sections 5.1 to 5.3

Unit – 3 Mathematical Modelling through difference equations (contd.)

18 hours

Mathematical modelling through difference equations in population dynamics and genetics. Mathematical Modelling through difference equations in probability theory. Miscellaneous examples of Mathematical modelling through difference equations.

Chapter 5: Sections 5.4 to 5.6

Unit – 4 Mathematical modelling through Graphs

18 hours

Situations that can be modeled through graphs - Mathematical models in terms of directedgraphs
- Mathematical models in terms of signed graphs – Mathematical models in terms
ofweightedgraphs.

Chapter7:Sections 7.1 to 7.4

Unit – 5 MathematicalModellingthroughcalculusofVariationsand DynamicProgramming

18 hours

Optimization principles and techniques - Mathematical modelling through calculus of variations - Mathematical Modelling through dynamic programming.

Chapter9:Sections 9.1to9.3

Text Book:

J.N.Kapur,MathematicalModelling,WileyEastern Limited,Reprint,2000.

Reference Books:

1. D.J.G.James and J.J.Macdonald, Case studies in Mathematical Modelling, Stanley Thames, Cheltenham.
2. M.Cross and A.O.Moscardini, The art of Mathematical Modelling, Ellis Harwood and John Wiley.
3. C.Dyson, Elvery, Principles of Mathematical Modelling, Academic Press, New York.
4. D.N.Burghes, Modelling with Difference Equations, Ellis Harwood and John Wiley.

E-Materials:

<http://www.mathfoundation.com>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	L	S	L
CO2	M	S	M	S	M	L	M	L	L	S
CO3	S	L	S	M	S	L	M	S	L	M
CO4	M	S	M	S	S	M	L	S	M	S
CO5	S	L	M	S	M	M	L	M	L	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Core

Credit : 5

Paper code :

Name of the Paper : Algebra-II

Hours of Teaching:90 hrs

Course Objective:

The main objective of this course are to :

1. Attain depth knowledge about extension field and its types.
2. Study the concepts of existence of extension fields of polynomials over polynomial rings.
3. Understand Galois theory and develop Galois groups.
4. Know more about the finite fields and solvable groups.
5. Learn the important theorems related to division rings and its application.

Course Learning Outcomes:

After successful completion on the course the student will be able to:

- CO1** Understand fundamental concepts including extension fields, Algebraic extensions and Algebraic numbers.
- CO2** Determine existence and properties of extension fields of polynomials
- CO3** Demonstrate capacity of illustration for mathematical reasoning through analyzing, proving and explaining concepts from field extensions and Galois theory
- CO4** Apply knowledge of solvability of radicals over polynomials on finite fields
- CO5** Analyze the theorems related to division rings to apply them on relevant fields

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	No	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1 Field Theory **18 hours**

Extension fields - Transcendence of 'e'.

Chapter 5: Section 5.1 and 5.2

Unit – 2 Polynomials and Roots **18 hours**

Roots of Polynomials- More about roots.

Chapter 5: Sections 5.3 and 5.5

Unit – 3 Galois theory **18 hours**

Elements of Galois theory.

Chapter 5: Section 5.6

Unit – 4 Finite Fields **18 hours**

Solvability by Radicals - Finite fields - Wedderburn's theorem on finite division rings.

Chapter 5: Section 5.7

Chapter 7: Sections 7.1 and 7.2 (Only Theorem 7.2.1)

Unit – 5 Solvability by Radicals **18 hours**

A theorem of Frobenius - Integral Quaternions and the Four -Square theorem.

Chapter 7 : Sections 7.3 and 7.4

Text Book:

I.N. Herstein, Topics in Algebra, 2nd Edition. Wiley.1975

Reference Books:

1. D.S.Dummit and R.M.Foote. Abstract Algebra. Wiley 2003.
2. M. Artin, Algebra, Prentice Hall of India, 1991.
3. J.A. Gallian. Contemporary Abstract Algebra. 4th Edition. Narosa Publishing 2011.
4. P.B.Battacharya, S.K.Jain and S.R.Nagpaul, Basic Abstract Algebra(II Edition) Cambridge University Press, 1997.(Indian Edition)
5. I.S. Luther and I.B.S.Passi, Algebra, Vol.I – Groups(1996), Vol. II Rings, Narosa Publishing House, New Delhi, 1999.
6. Rudolf Lidl and Gunter Pilz, Applied Abstract Algebra, Second Indian Reprint 2006, Springer Verlag, Newyork.
7. L. Smith(1998). Linear transformation: Example and Applications. In: Linear Algebra, Undergraduate texts in Mathematics, Springer, Newyork.

E-Materials:

1. <https://www.jmilne.org->FTe6>
2. http://www.math.iitb.ac.in/~srg/Lecnotes/galois_des.html
3. <https://www.jmilne.org>math>
4. <https://nptel.ac.in/courses/111108098/> (Video Lecture)

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	S	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	S	M	M	M	M	S	S	S	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	M	M	M	M	S	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Core

Credit : 5

Paper code :

Name of the Paper : Real Analysis-II

Hours of Teaching:90 hrs

Course Objectives:

The objectives of the course is to

1. know the Lebesgue Integral
2. understand the concept of Riesz-Fischer theorem
3. study Fourier Series and Integrals in depth
4. understand the concepts of multivariable calculus.
5. acquire knowledge about implicit functions and the extremum values of functions.

Course Outcomes:

After successful completion on the course the student will be able to

- CO1** know about the properties of Lebesgue integrals and establish the Levi monotone convergence theorem.
- CO2** develop the properties of inner products, norms and measurable functions.
- CO3** understand the concept of Fourier Series and Integrals.
- CO4** acquire the knowledge of multivariable calculus.
- CO5** enrich the students to work effectively on implicit functions and the extremum values of functions.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	No	Yes	No

Unit – 1 Lebesgue Integral**18 hours**

Introduction- The integral of a step function – Monotonic sequences of step functions – Upper functions and their integrals – Riemann-Integrable functions as examples of upper functions – The class of Lebesgue- Integrable functions on a general interval – Basic properties of the Lebesgue integral – Lebesgue integration and sets of measure zero – The Levi monotone convergence theorems-Lebesgue Dominated Convergence Theorem.

Chapter 10: Sections 10.1 to 10.10**Unit – 2 Lebesgue Integral Contd.****18 hours**

Lebesgue integrals on unbounded intervals as limits of integrals on bounded intervals –Improper Riemann integrals – Measurable functions – Continuity of functions defined by Lebesgue integrals – Differentiation under the integral sign – Inner products and norms – The set $L^2(I)$ of square-integrable functions – The set $L^2(I)$ as a semi-metric space – A convergence theorem for series of functions in $L^2(I)$ – The Riesz-Fischer theorem.

Chapter 10: Sections 10.12 to 10.16, 10.21 to 10.25**Unit – 3 Fourier Series and Fourier Integrals****18 hours**

Introduction–Orthogonal system of functions–The theorem on best approximation–
The Fourier series of a function relative to an orthonormal system–Properties of Fourier Coefficients–
The Riesz-Fischer Theorem–The convergence and representation problems for trigonometric series–
The Riemann-Lebesgue Lemma–The Dirichlet Integrals–
An integral representation for the partial sums of Fourier series–Riemann's localization theorem–
Sufficient conditions for convergence of a Fourier series at a particular point–
Cesàro summability of Fourier series–Consequences of Fejér's theorem–
The Weierstrass approximation theorem.

Chapter 11: Sections 11.1 to 11.15

Unit – 4 Multivariable Differential Calculus**18 hours**

Introduction–The Directional derivative–Directional derivative and continuity–The total derivative–The total derivative expressed in terms of partial derivatives–An Application to Complex–Valued Functions–The matrix of linear function–The Jacobian matrix–The chain rule–Matrix form of chain rule–The mean-value theorem for differentiable functions–A sufficient condition for differentiability–A sufficient condition for equality of mixed partial derivatives– Taylor’s theorem for functions of \mathbb{R}^n to \mathbb{R}^1 .

Chapter 12: Sections 12.1 to 12.14**Unit – 5 Implicit Functions and Extremum Problems****18 hours**

Introduction–Functions with non-zero Jacobian determinants–The inverse function theorem–The Implicit function Theorem–Extrema of real valued functions of one variable and several variables–Extremum problems with side conditions.

Chapter 13: Sections 13.1 to 13.7**Text Book:**

Tom M. Apostol, Mathematical Analysis (Second Edition) (1981), Addison–Wesley Publishing Company Inc. New York.

Reference Books:

1. J.C. Burkill, The Lebesgue Integral (1951), Cambridge University Press.
2. M.E. Munroe, Measure And Integration (1971), Addison–Wiley.
3. H.L. Roydon, Real Analysis (1988), Macmillan Pub. Company, New York.
4. W. Rudin, Principles of Mathematical Analysis (1979), McGraw Hill Company, New York.
5. S.C. Malik and Savita Arora, Mathematical Analysis (1991), Wiley Eastern Limited, New Delhi.
6. Sanjay Arora and Bansilal, Satya Prakashan, Introduction To Real Analysis, (1991), New Delhi.

E-Materials:

https://onlinecourses.nptel.ac.in/noc21_ma63/preview

<https://mathworld.wolfram.com/>

<https://ocw.mit.edu/courses/mathematics/18-100b-analysis-i-fall-2010/>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	M
CO2	S	S	M	M	S	M	S	S	S	M
CO3	S	S	M	M	S	M	S	S	S	M
CO4	S	S	M	M	S	M	S	S	S	M
CO5	S	S	M	M	S	M	S	S	S	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Core

Credit : 4

Paper code :

Name of the Paper : Partial Differential Equations

Hours of Teaching:90 hrs

Course Objectives:

The main objective of this course are to:

1. Understand the theory and methods of Partial Differential Equations (PDEs).
2. Apply and solve PDEs applications from various emerging technologies.
3. Provide solution for First and second order partial differential equations.
4. Introduce the concepts and solving methods of Elliptical, paraboloid, hyperbolic differential equations.
5. Examine the existence and uniqueness of solutions of differential equations.

Course Outcomes:

After successful completion of the course the student will be able to

- CO1** Analyze the methods for first order partial differential equations.
- CO2** Understand the fundamentals of second order partial differential equations.
- CO3** Define the methods to solve elliptical differential equations.
- CO4** Discuss the formation and solutions of paraboloid differential equations.
- CO5** Construct the solutions for hyperbolic differential equations and identify the research problem where PDE can be used to model the problem.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

18 hours

Chapter 0: Sections 0.4 to 0.11. (omit 0.11.1))

18 hours

Chapter 1: Sections 1.1 to 1.4

18 hours

Chapter 2: Sections 2.1, 2.2, 2.5 to 2.7, 2.11 to 2.12

18 hours

Chapter 3: Sections 3.1 to 3.7

18 hours

Chapter 4: Sections 4.1 to 4.4, 4.7 to 4.9, 4.11 and 4.12

K.Sankara Rao, Introduction to Partial differential equations (Third edition), Prentice-Hall of India Ltd., New Delhi, 2016.

Reference Books:

1. I.N. Sneddon, Elements of partial differential equations, McGraw Hill book company, Singapore, 1957
2. R. Dennemeyer, Introduction to partial differential equations and boundary value problems, McGraw Hill, New York, 1968.
3. R.C. McOwen, Partial differential equations, 2nd edition, Pearson education, New Delhi, 2005.
4. M.D.Raisinghania, Advanced differential equations, S.Chand& Company Ltd. New Delhi, 2001.
5. N.N. Lebedev, Special functions and their applications, Prentice Hall of India, New Delhi, 1965.

E-Materials:

1. <https://nptel.ac.in/courses/111103021/>
2. [onlinecourses.nptel.ac.in › noc21_ma18](https://onlinecourses.nptel.ac.in/noc21_ma18)
3. [onlinecourses.nptel.ac.in › noc22_ma28](https://onlinecourses.nptel.ac.in/noc22_ma28)
4. [onlinecourses.nptel.ac.in › noc21_ma33](https://onlinecourses.nptel.ac.in/noc21_ma33)

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	M	S	M	M
CO2	S	S	M	M	M	S	M	S	M	S
CO3	S	S	S	M	M	S	S	M	M	S
CO4	S	S	S	M	M	M	S	M	M	S
CO5	S	S	S	M	M	M	S	M	M	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Mathematical Statistics

Hours of Teaching: 75 hrs

Course Objectives:

The main objective of this course are to:

- 1 Introduce the basic notions of sample, population, sample moments and their functions.
- 2 Give an insight about the parametric and non-parametric tests for small and large samples.
- 3 Educate the various measures of estimation theory
- 4 Inculcate the concepts of ANOVA and testing of hypothesis.
- 5 Indoctrinate the strong background about the sequential analysis and its consequences.

Course Outcomes:

After successful completion on the course the student will be able to

- CO1** Know the basic notions of sample, population, sample moments and their functions.
- CO2** Comprehend the parametric and non-parametric tests for small and large samples.
- CO3** Understand the various measures of estimation theory.
- CO4** Acquire the knowledge in the concept of ANOVA and, apply them in real life situations for testing of hypothesis.
- CO5** Procure the strong background about the sequential analysis and its consequences

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	Yes	No	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Notion of a Sample and a Statistic – Distribution of the Arithmetic Mean of Independent Normally Distributed Random Variables – The Chi-Square Distribution – The Distribution of the Statistics – Student's t-Distribution – Fisher's Z-Distribution – Snedecor's F Distribution – Distribution of Sample Mean from Non-Normal Populations.

Kolmogorov Theorem – Smirnov Theorem – The Concept of a Statistical Test – Parametric Tests for Small Samples and Large Samples – Chi-Square Test – Tests of Kolmogorov and Smirnov Type – The Wald-Wolfowitz and Wilcoxon-Mann-Whitney Tests – Independence Tests by Contingency Tables.

Preliminary Notion – Consistent Estimaties – Unbiased Estimates – Sufficiency of anEstimate – Efficiency of an Estimate – Asymptotically Most Efficient Estimates – Methodsof Finding Estimates– Confidence Interval.

ANOVA Test: One-Way Classification and Two-Way Classification. Hypotheses Testing: The Power Functions and OC Function – Most Powerful Test – Uniformly Most Powerful Test – Unbiased Test.

SPRT – Auxiliary Theorem – Wald’s Fundamental Identity – OC Function and SPRT – The Expected Value of (n) – Determination of A and B – Testing a Hypothesis Concerning the Expected Value of a Zero-One Distribution – Testing a Hypothesis Concerning the Expected Value m of a Normal Population.

Text Book:

M. Fisz, Probability Theory and Mathematical Statistics, 3rd Edition, John Wiley and Sons Inc., New York, 1963.

Reference Books:

1. V.K. Rohatgi and A.K.Md.E. Saleh, An Introduction to Probability Theory and Mathematical Statistics, 2nd Edition, Wiley Eastern Ltd., New Delhi, 1988.
2. E.J. Dudewicz and S.N. Mishra, Modern Mathematical Statistics, John Wiley and Sons, New York, 1988.
3. G.G. Roussas, A First Course in Mathematical Statistics, 2nd Edition, Academic Press, USA, 1997.
4. B.L.V.D. Waerden, Mathematical Statistics, Springer-Verlag, New York, 1969.
5. R.E. Walpole, R.H. Myers, S.L. Myers and K. Ye, Probability and Statistics for Engineers and Scientists, 9th Edition, Pearson Education Inc., 2012.

E-Materials:

1. <https://ocw.mit.edu/courses/18-655-mathematical-statistics-spring-2016/>
2. <https://dspace.mit.edu/bitstream/handle/1721.1/96865/18-175-fall-2008/contents/lecture-notes/index.htm>
3. https://swayam.gov.in/nd1_noc20_ma19/preview
4. <http://mathworld.wolfram.com>

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Fuzzy Set Theory

Hours of Teaching: 75hrs

Course Objectives:

The main objective of this course are to

1. Introduce Fuzzy sets.
2. Define some operations on Fuzzy sets.
3. Understand the properties of Fuzzy sets.
4. Discuss about the operations on Fuzzy sets.
5. Calculate the arithmetic operations on Fuzzy numbers.

Course Outcomes:

After successful completion on the course the student will be able to

- CO1** Understand the basic concepts of Fuzzy Sets.
- CO2** Discuss the Fuzzy sets versus crisp sets.
- CO3** Analyze the operations on Fuzzy sets and Fuzzy complements.
- CO4** Acquire the knowledge of various combination of operations.
- CO5** Apply the concepts of Fuzzy mathematics in real life situation.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	No	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	No	Yes	Yes

Unit – 1 From Classical (Crisp) Sets to Fuzzy Sets 15 hours

Introduction – Crisp sets: An overview – Fuzzy sets – Basic types – Basic concepts – Characteristics – Significance of the paradigm shift.

Chapter 1: Sections 1.1 to 1.5

Unit – 2 Fuzzy Sets Versus Crisp Sets 15 hours

Additional properties of α - Cuts – Representation of Fuzzy sets – Extension principle for Fuzzy sets.

Chapter 2: Sections 2.1 to 2.3

Unit – 3 Operations on Fuzzy Sets 15 hours

Types of Operation – Fuzzy complements – Fuzzy intersection – t-norms

Chapter 3: Sections 3.1 to 3.3

Unit – 4 Operations on Fuzzy Sets 15 hours

Fuzzy unions – t conorms – Combinations of operations – Aggregation operations.

Chapter 3: Sections 3.4 to 3.6

Unit – 5 Fuzzy Arithmetic 15 hours

Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Arithmetic operation on Fuzzy numbers.

Chapter 4: Sections 4.1 to 4.4

Text book :

G. J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic : Theory and Applications, PHI, New Delhi, 2005.

Reference Books:

1. H. J. Zimmerman, Fuzzy Set Theory and its Applications, Allied Publishers, 1996.
2. A. Kaufman, Introduction to the theory of Fuzzy Subsets, Academic Press, 1975.
3. V. Novak, Fuzzy Sets and their Applications, Adam Hilger, Bristol, 1969.

E-Materials:

<http://nptel.ac.in/courses/105108081/module9/lecture36/lecture.pdf>

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	L	S	S	L	L
CO2	S	S	M	M	S	L	S	S	L	L
CO3	S	S	M	M	S	L	S	S	L	L
CO4	S	S	M	M	S	L	S	S	L	M
CO5	S	S	S	S	S	L	S	S	M	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Difference Equations

Hours of Teaching:75hrs

Course Objectives:

The main objectives of the course are to

1. To provide basic knowledge about the discretization process, the discrete version of difference equations.
2. Understand the Linear periodic systems.
3. Develop the students ability to difference equations using Z-transforms.
4. To enable to use of Oscillation Theory.
5. Study oscillation and asymptotic behavior of solutions of certain classes of difference equations.

Course Learning Outcomes:

After the successful completion of this course, the students will be able to:

- CO1** Solve problem on Linear Difference Equations of Higher order.
- CO2** Understand the system of Linear Difference Equations.
- CO3** Apply Z-transform techniques in difference equations.
- CO4** Explain on Oscillation Theory.
- CO5** Discuss on Asymptotic Behavior of Difference Equation.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit – 1 Linear Difference Equations of Higher order 15 hours

Difference Calculus-General Theory of Linear Difference Equations-Linear Homogeneous Equations with Constant coefficients – Non-homogeneous equations: Method of Undetermined Coefficients, the method of variation of constants - Limiting behavior of Solutions.

Chapter 2: Sections 2.1 to 2.5

Unit – 2 System of Linear Difference Equations 15 hours

Autonomous Systems - The Basic Theory - The Jordan form - Linear periodic systems.

Chapter 3: Sections 3.1 to 3.4

Unit – 3 The Z-transform Method 15 hours

Definitions and Examples, Properties of Z-transform-The Inverse Z-transform and Solutions of Difference Equations: Power series method, partial fraction method, the inverse integral method - Volterra Difference Equation of convolution type - Volterra Systems.

Chapter 6: Sections 6.1 to 6.3, 6.5

Unit – 4 Oscillation Theory 15 hours

Three-term difference Equations-Self-Adjoint Second Order Equations-Nonlinear Difference Equations.

Chapter 7: Sections 7.1 to 7.3

Unit – 5 Asymptotic Behaviour of Difference Equation 15 hours

Tools of Approximation - Poincaré's Theorem - Asymptotically Diagonal Systems – High-Order Difference Equations - Second Order Difference Equations.

Chapter 8: Sections 8.1 to 8.5

Text Book:

Saber N. Elaydi, *An Introduction to Difference Equations*, Third Edition, Springer Verlag, New York, 2005 (First Indian Reprint 2008).

Reference Books:

1. Ronald E. Mickens, *Difference Equations Theory, Applications and Advanced Topics*, Third Edition, CRC Press, New York, 2015.
2. R.P. Agarwal., *Difference Equations and Inequalities*, Marcel Dekker, 1999.
3. S. Goldberg, *Introduction to Difference Equations*, Dover Publications, 1986

4. V.Lakshmikantham and Trigiante, *Theory of Difference Equations Numerical Methods and Applications*, Second Edition, Academic Press, New York, 1988.
5. Walter G. Kelly, Allan C. Peterson, *Difference Equations, An Introduction with Applications*, Academic Press, New York, 2001 (First Indian Reprint 2006).

E-Materials:

1. <http://people.math.aau.dk/~matarne/11-imat/notes2011a.pdf>,
2. <http://pj.freefaculty.org/guides/stat/Math/DifferenceEquations/DifferenceEquations-guide.pdf>

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	L	M	S	L	S	L
CO2	M	S	M	S	S	M	M	S	L	M
CO3	S	S	L	S	L	S	S	M	L	L
CO4	M	L	M	L	S	M	M	S	M	S
CO5	S	M	S	S	M	L	M	L	L	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : Fundamentals of Insurance

Hours of Teaching:75hrs

Course Objectives:

The main objective of this course are to:

- 1 Introduce the concept of insurance.
- 2 Study about the Life Insurance and claims.
- 3 Understand the concepts of Fire and Marine insurance.
- 4 Know about motor and other insurances.
- 5 Get the knowledge of getting job in insurance companies.

Course Outcomes

After successful completion on the course the student will be able to

- CO1** understand the principles and regulations of Insurance
- CO2** analyse the benefits of life insurance policies
- CO3** discuss the fire and marine insurance and its benefits
- CO4** analyse the various insurance sectors
- CO5** Understand the duties of an insurance agent and procedure to get license.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

15 hours

Unit – 2 Life Insurance

15 hours

Unit – 3 Fire and Marine Insurance

15 hours

Unit – 4 Miscellaneous Insurance

15 hours

Unit – 5 Role of Insurance Agent

15 hours

Text book :

1. Fundamentals of Insurance - Dr. Periyasamy, Himalaya Publishing Pvt Ltd, Mumbai.
2. Insurance principles and practice - Moorthy. A , Margham publications, Chennai.
3. Fundamentals of insurance - Dr. P. K. Guptha, Margham publications, Chennai

Reference Books:

- 1 Insurance principles and practice- Periasamy. P, Margham publications, Chennai
- 2 Insurance principles and practice - Mishra. M. N, Sultan Chand & Sons, NewDelhi
- 3 Insurance principles and practice- Balu. V. &Premilan, Margham publications, Chennai

E-Materials:

- <https://ocw.mit.edu/courses/economics/14-73-the-challenge-of-world-poverty-spring-2011/video-lectures/lecture-15-risk-and-insurance/>
- <https://ocw.mit.edu/courses/economics/14-73-the-challenge-of-world-poverty-spring-2011/video-lectures/lecture-16-insurance/>

Mapping with Learning outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	L	M	S	S	S	S	L	M
CO2	M	M	M	M	S	S	S	S	L	M
CO3	M	L	L	S	S	S	S	S	L	M
CO4	M	M	L	M	S	S	S	S	L	M
CO5	S	M	M	S	S	S	S	S	L	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : NumericalMethods

Hours of Teaching: 75hrs

CourseObjectives:

Theobjectivesof the courseisto

1. Understandtheconceptof solving algebraic and transcendental equations.
2. Studythevarious methodsto obtaininterpolation withequaland unequalintervals.
3. Get knowledge about numerical differentiation.
4. Demonstrate the numerical integration.
5. Solvethe ordinary differentialequationsusingvariousnumerical methods.

Course Outcomes:

After successful completion on the course the student will be able to

- CO1** Solve algebraic and transcendental equations.
- CO2** Acquire the knowledge of interpolation for equal and unequal intervals.
- CO3** Enrich the students to work effectively on numerical differentiation.
- CO4** Providesa foundation in the study of numerical integration.
- CO5** Knows to solve ordinary differential equations using various numericalmethods.

Matching Table

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Bisection method – Iteration Method – Newton-Raphson method
Solution of simultaneous linear algebraic equations: Gauss elimination method – Gauss-Jordan elimination method – Gauss-Jacobin method – Gauss-Seidel method – Simple Problems.

Chapter4: Sections4.1, 4.2,4.2.1, 4.8, 4.9.

Introduction – Newton’s forward and backward formulae – Central differences – Gaussforward and backward formulae – Stirling’s formula – Divided differences – Properties – Relationsbetweendivideddifferencesandforwarddifferences-Newton’sdivideddifferencesformula– Lagrange’sformula.

Chapter7: Sections 7.1,7.3, 7.4, 7.5

Chapter8: Sections 8.2, 8.3,8.4, 8.5, 8.7

Newton's forward and backward formulae to compute the derivatives – Derivative using Stirling's formulae – to find maxima and minima of the function given the tabular values. **Chapter 9:** Sections 9.2, 9.3, 9.4, 9.6

Newton – Cote’s formula – Trapezoidal rule – Simpson’s 1/3rd and 3/8th rules – Weddle rule.**Chapter9:** Sections 9.8, 9.9, 9.13, 9.14, 9.15

Euler's method—Improved Euler's method—Modified Euler's method—Runge-Kutta method (Fourth order only).

Chapter11: Sections 11.9, 11.10, 11.11, 11.12, 11.13.

Kandasamy. P, Thilagavathi. K and Gunavathi. K “Numerical methods” – S. Chand and Company Ltd, New Delhi– Third Revised Edition 2016.

ReferenceBooks:

1. Venkataraman M. K., "Numerical Methods in Science and Engineering" NationalPublishingcompanyV Edition 1999.
2. Sankara Rao K., "Numerical Methods for Scientists and Engineers" 2nd EditionPrenticeHallIndia 2004.
3. GuptaB.D., NumericalAnalysis, KonarkPublishersPvt. Ltd.

E-Materials:

1. <http://nptel.ac.in/courses/122102009/>
2. <http://www.math.ust.hk/~machas/numerical-methods.pdf>
3. <https://mathworld.wolfram.com/>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	S
CO2	S	S	M	M	S	M	S	S	S	S
CO3	S	S	M	M	S	M	S	S	S	S
CO4	S	S	M	M	S	M	S	S	S	S
CO5	S	S	M	M	S	M	S	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : II

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : Fundamentals of Business Statistics

Hours of Teaching: 75hrs

Course Objectives:

The main objective of this course are to:

- 1 Provide basic knowledge of the origin and evolution of Statistics
- 2 Apply statistical techniques for interpreting and drawing conclusion for business problems.
- 3 Develop the students ability to deal with numerical and quantitative issues in business
- 4 Enable the use of statistical, graphical and algebraic techniques where ever relevant
- 5 Have a proper understanding of Statistical applications in Economics and Management.

Course Outcomes

After successful completion of the course the student will be able to

CO1 Classify about the Partial and Multiple Correlation

CO2 Explain the basic concepts of Probability and Theoretical Distributions

CO3 Identify the educated guess (hypothesis)

CO4 Analyze the statistical inferences-Test of Hypothesis, Chi square and goodness of

Fit and F-Test

CO5 Discuss and design the Analysis of Variance

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	No	No	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	No	Yes	Yes	Yes

Unit – 1 Partial and Multiple Correlation 15 hours

Introduction-Partial Correlation-Multiple Correlation-Multiple Regression Analysis-
Reliability of Estimates-Miscellaneous Illustrations

Volume-II: Chapter 9: Pages: 1109 to 1135

Unit – 2 Theory of Probability and Theoretical Distributions 15 hours

Introduction-Probability Defined-Importance of the Concept of Probability-
Calculation of Probability-Theorems of Probability-Conditional Probability-Bayes' theorem-
Probability Distribution-Binomial Distribution-Poisson Distribution.

Volume-II: Chapter 1: Pages: 751 to 770 and 774 to 788;

Chapter 2: Pages: 806 to 823, 826 to 833 and 858 to 879

Unit – 3 Statistical Inference-Test of Hypothesis 15 hours

Introduction-Sampling Error and Sampling Distribution-Estimation-
Test of Significance for Large Samples-Test of Significance for Small Samples-
Miscellaneous Illustrations.

Volume-II: Chapter 3: Pages: 882 to 951)

Unit – 4 Chi-Square and Goodness of Fit 15 hours

Introduction-Chi-Square defined-Conditions of Additive Chi-Square Test-Yate's Corrections-
Uses of Chi-Square Test-Additive Property of Chi-Square-Chi-
Square Test for Specified Value of Population Variance-Miscellaneous Illustrations.

Volume-II: Chapter 4: Pages: 953 to 1003

Unit – 5 F-Test and Analysis of Variance 15 hours

The F Test or the Variance Ratio Test-Application F Test-Analysis of Variance-
Assumptions in Analysis of Variance-Technique of Analysis of Variance-Coding data-
Analysis of Variance in Two-Way Classification Model.

Volume-II: Chapter 5: Pages: 1006 to 1038

Text Book:

S.P. Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi, 2009.

Reference Books:

1. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, 11th edition, Sultan Chand & Sons, New Delhi, 2004.
2. S.P.Gupta & M.P.Gupta, Business Statistics, 14th enlarged edition, Sultan Chand & Sons, Educational publishers, New Delhi, reprint 2007.
3. Richard I Levin and David S. Rubit, Statistics for Management, Seventh edition, Pearson Education, New Delhi, 2002.
4. P.R.Vittal, Business Mathematics and Statistics, Margham Publications, Sixth revised edition, 2011.

E-Materials:

<http://mathworld.wolfram.com>

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	L	S	S	S	M	S
CO2	S	S	M	M	S	S	S	S	M	S
CO3	S	S	M	S	S	S	S	S	M	S
CO4	S	S	S	M	M	S	S	S	M	S
CO5	S	S	M	M	S	S	S	S	M	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
M.Sc. Mathematics – 2022-2023 Onwards

Semester : III

Paper Type : Core

Credit : 6

Paper Code :

Name of the Paper : Complex Analysis – I

Hours of Teaching : 90 Hours

Course Objectives

The objectives of this course are to

- 1 Introduce the notions of differentiability, analyticity and power series.
- 2 Discuss the complex integration, Cauchy theorem and its properties.
- 3 Educate the conformal mappings and Mobius transformations.
- 4 Inculcate the concepts of maximum principle, Schwarz's lemma and Liouville's theorem.
- 5 Indoctrinate the singularities and its classification.

Course Outcomes

After the successful completion of this course, the students will be able to

CO1 Understand the notions of differentiability, analyticity, power series and its consequences.

CO2 Comprehend the complex integration, Cauchy theorem and its properties.

CO3 Know the conformal mappings and Mobius transformations.

CO4 Acquire the concepts of maximum principle, Schwarz's lemma and Liouville's theorem.

CO5 Procure the singularities and its classification.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1: Analytic Functions and Power Series**18 Hours**

Differentiability and Cauchy-Riemann Equations – Harmonic Functions – Power Series as an Analytic Function – Exponential and Trigonometric Functions – Logarithmic Functions – Inverse Functions.

Chapter 3: Sections: 3.1 to 3.6**Unit – 2: Complex Integration****18 Hours**

Curves in the Complex Plane – Properties of Complex Line Integrals – Cauchy-Goursat Theorem – Consequence of Simply Connectivity – Winding Number or Index of a Curve – Cauchy Integral Formula – Taylor's Theorem – Zeros of Analytic Functions – Laurent Series.

Chapter 4: Sections: 4.1 to 4.5, 4.7, 4.10 to 4.12**Unit – 3: Conformal Mappings and Mobius Transformations****18 Hours**

Principle of Conformal Mapping – Basic Properties of Mobius Maps – Fixed Points and Mobius Maps – Triples to Triples under Mobius Maps – The Cross-Ratio and its Invariance Property – Conformal Self-maps of Disks and Half-planes.

Chapter 5: Sections: 5.1 to 5.6**Unit – 4: Maximum Principle, Schwarz's Lemma and Liouville's Theorem****18 Hours**

Maximum Modulus Principle - Hadamard's Three Circles/Lines Theorems - Schwarz's Lemma and its Consequences - Liouville's Theorem - Doubly Periodic Entire Function - Fundamental Theorem of Algebra - Zeros of Certain Polynomials.

Chapter 6: Sections: 6.1 to 6.7**Unit – 5: Classification of Singularities****18 Hours**

Isolated and Non-isolated Singularities – Removable Singularities – Poles – Further Illustrations through Laurent's Series – Isolated Singularities at Infinity – Meromorphic Functions – Essential Singularities and Picard's theorem.

Chapter 7: Sections: 7.1 to 7.7**Text Book:**

S. Ponnusamy, *Foundations of Complex Analysis*, Second Edition, Narosa Publishing House, New Delhi, 2012.

Reference Books:

1. Lars V. Ahlfors, *Complex Analysis*, 3rd Edition, McGraw-Hill Inc., New York, 1979.
2. J.W. Brown and R.V. Churchill, *Complex Variables and Applications*, 8th Edition, McGraw-Hill Higher Education, New York, 2009.
3. J.B. Conway, *Functions of One Complex Variable*, 2nd Edition, Narosa Publishing House, New Delhi, 1996.
4. V. Karunakaran, *Complex Analysis*, 2nd Edition, Narosa Publishing House, New Delhi, 2005.
5. H.A. Priestley, *Introduction to Complex Analysis*, 2nd Edition, Oxford University Press Inc., New York, 2005.

E-Materials:

1. <https://nptel.ac.in/courses/111106141>
2. <https://ocw.mit.edu/courses/mathematics/18-04-complex-variables-with-applications-spring-2018/>
3. <https://www.coursera.org/learn/complex-analysis>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	S	M	M	M	S	S	S	S	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	M	M	M	S	S	S	S	S

*PO – Programme Outcome, CO – Course Outcome.

*S – Strong, M – Medium, L – Low.

THIRUVALUVAR UNIVERSITY, VELLORE – 632 115

M.Sc. Mathematics – 2022-2023 Onwards

Semester : III

Paper Type : Core

Credit : 5

Paper Code :

Name of the Paper : Topology

Hours of Teaching : 90 Hours

Course Objectives

The objectives of this course are to

- 1 Introduce the mathematical analysis of open and closed sets and the significance of the topological spaces.
- 2 Discuss about the continuous functions on topological spaces, product topology and topology induced by the metric.
- 3 Educate the connected spaces, connected subspaces, components and local connectedness.
- 4 Inculcate the notions of compactness, compact subspaces, limit point compactness and local compactness.
- 5 Indoctrinate the strong theoretical background about the countability axioms, the separation axioms and the consequences theorems.

Course Outcomes

After the successful completion of this course, the students will be able to

- CO1** Know the basics on open and closed sets and the significance of the topological spaces.
- CO2** Comprehend the continuous functions on topological spaces, product topology and topology induced by the metric.
- CO3** Understand the connected spaces, connected subspaces, components and local connectedness.
- CO4** Acquire the notions of compactness, compact subspaces, limit point compactness and local compactness.
- CO5** Procure the strong theoretical background about the count ability axioms, the separation axioms and the consequences theorems.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1 : Topological Spaces 18 Hours

Topological Spaces – Basis for a Topology – The Order Topology – The Product Topology on $X \times Y$ – The Subspace Topology – Closed Sets and Limit Points.

Chapter 2: Sections 12–17

Unit-2 : Continuous Functions 18 Hours

Continuous Functions – The Product Topology – The Metric Topology.

Chapter 2: Sections 18–21

Unit-3 : Connectedness 18 Hours

Connected Spaces – Connected Subspaces of the Real Line – Components and Local Connectedness.

Chapter 3: Sections 23–25

Unit-4 : Compactness 18 Hours

Compact Spaces – Compact Subspaces of the Real Line – Limit Point Compactness – Local Compactness.

Chapter 3: Sections 26–29

Unit-5 : Countability and Separation Axioms 18 Hours

The Countability Axioms – The Separation Axioms – Normal Spaces – The Urysohn Lemma – The Urysohn Metrization Theorem – The Tietz Extension Theorem.

Chapter 4: Sections 30–35

Text Books:

James R. Munkres, *Topology*, 2nd Edition, Pearson Education Pvt. Ltd., Delhi, 2002.

Reference Books:

1. J. Dugundji, *Topology*, Prentice Hall of India Pvt. Ltd., New Delhi, 1975.
2. G.F. Simmons, *Introduction to Topology and Modern Analysis*, McGraw Hill Education, New York, 1963.
3. J.L. Kelley, *General Topology*, Van Nostrand Reinhold Company, New York, 1955.
4. L.A. Steen and J.A. Seebach, *Counterexamples in Topology*, Holt, Rinehart and Winston, New York, 1970.
5. S. Willard, *General Topology*, Addison–Wesley Publishing Company, USA, 1970.

E-Materials:

1. <https://ocw.mit.edu/courses/mathematics/18-901-introduction-to-topology-fall-2004/index.htm>
2. <https://ocw.mit.edu/courses/mathematics/18-904-seminar-in-topology-spring-2011/index.htm>
3. https://swayam.gov.in/nd2_cec20_ma12/preview

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	S	M	M	M	S	S	S	S	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	M	M	M	S	S	S	S	S

*PO – Programme Outcome, CO – Course Outcome.

*S – Strong, M – Medium, L – Low.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : III

Paper type : Core

Credit : 5

Paper code :

Name of the Paper : Differential Geometry

Hours of Teaching:90 hrs

Course Objectives:

The main objective of this course are to:

- 1 Introduce space curves and its characterizations.
- 2 Study properties of curves on surfaces.
- 3 Understand the concepts of Geodesics and canonical Geodesics equations.
- 4 Teach some type of special surfaces such as Developable and Minimal surfaces.
- 5 Get the knowledge on differential geometry of surfaces.

Course Outcomes

After successful completion on the course the student will be able to

- CO1** Understand the concept of a space curve and compute its curvature and torsion.
- CO2** Acquire the knowledge of curves on a surface and its intrinsic properties.
- CO3** Analyze the geodesics and its normal properties and also familiar with Gauss Bonnet Theorem.
- CO4** Determine the second fundamental form and developable associated with space curves.
- CO5** Know Hilbert's Lemma and the fundamental existence theorem for surface theory.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	No	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Definition of a space curve – Arc length – Tangent – Normal and binormal – Curvature and torsion – Contact between curves and surfaces – Tangent surface – Involutives and evolutes – intrinsic equations – Fundamental existence theorem for space curve – Helices.

Definition of a surface – Curves on a surface – Surface of revolution – Helicoids – Metric – Direction coefficients – Families of curves – Isometric correspondence – Intrinsic properties. **Chapter 2:** Sections 1 to 9

Geodesics – Canonical geodesic equations – Normal properties of geodesics – Existence theorem – Geodesic parallels – Geodesic curvatures – Gauss Bonnet theorem – Gaussian curvature – Surface of constant curvature.

The second fundamental form – Principal curvature – Lines of curvature – Developable – Developable associated with space curves and with curves on surface – Minimal surfaces – Ruled surfaces.

Fundamental equations of surface theory – Fundamental existence theorem for surfaces – Compact surfaces whose points are umbilics– Hilbert's lemma – Compact surfaces of constant curvature – Complete surfaces.

Chapter 4: Sections 1 to 5

T.J.Willmore, An Introduction to Differential Geometry, Oxford University Press,(17th Impression) New Delhi 2002. (Indian Print)

Reference Books:

1. Struik, D.T. Lectures on Classical Differential Geometry, Addison - Wesley, Mass. 1950.
2. Kobayashi. S. and Nomizu. K. Foundations of Differential Geometry, Interscience Publishers, 1963.
3. Wilhelm Klingenberg: A course in Differential Geometry, Graduate Texts in Mathematics, Springer-Verlag 1978.
4. J.A. Thorpe Elementary topics in Differential Geometry, Under - graduate Texts in Mathematics, Springer - Verlag 1979.

E-Materials:

<http://www.math.ku.dk/noter/filer/geom1.pdf>

Mapping with Learning outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	L	M	S	L	S	S	L	M
CO2	S	S	M	L	S	L	S	S	M	M
CO3	S	S	M	M	S	L	S	S	M	M
CO4	S	S	M	M	S	L	S	S	M	M
CO5	S	S	M	M	S	L	S	S	M	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : III

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : LaTeX

Hours of Teaching: 90hrs

Course Objectives:

The main objective of this course are to:

- 1 Inculcate the computer knowledge.
- 2 Introduce the LaTeX software
- 3 Train in the Preparation of Project and dissertations using LaTeX.
- 4 Educate the Latex coding.
- 5 Understand the concepts of Cross References, Footnotes, Margin pars and Endnotes

Course Outcomes

After successful completion on the course the student will be able to

CO1 Understand the basic LaTeX document and the e-contents.

CO2 Construct the structures of contents, index, glossary and text.

CO3 Create the type setting equations

CO4 Discuss several types of boxes and floats.

CO5 Prepare the basic documentation

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	No	No	No	Yes
4	Yes	Yes	No	No	No	Yes
5	Yes	Yes	Yes	No	No	Yes

Unit - 1 Basic Document and Bibliography 18 hours

Whats is LATEX – Simple typesetting – Fonts Type size – Document class – page style – page numbering – Formatting lengths – parts of a document – Dividing the document – what next? – Introduction – natbib – The BIBTEX program – BIBTEX Style files – Creating a bibliographic database.

Chapter: 1 to 4

Unit - 2 Contents, Index, Glossary, Text, Row and Column 18 hours

Table of contents – Index – Glossary. Borrowed words – Poetry in typing – Making lists – When order matters – Description and definitions.

Chapter: 5 to 6

Unit - 3 Typesetting Equations and Theorems 18 hours

Keeping tabs – Tables – The basics – Custom commands – More on mathematics – mathematics miscellany – New operations– The many fact of mathematics – Symbols – Theory in LATEX – Designer theorem-the amsthm package – Housekeeping.

Chapter: 7 to 9

Unit - 4 Several Kinds of boxes and Floats, 18 hours

LR boxes – Paragraph boxes – Paragraph boxes with specific height – Nested boxes – Role boxes – The figure environment – The table environment.

Chapter: 10 to 11

Unit - 5 Cross References in LATEX, Footnotes, Marginpars and 18 hours

Endnotes

Why cross reference? – Let LATEX do it – Pointing to a page-the package varioref – Pointing outside-the package xr – Lost the keys? Use labels.tex – Footnotes – Marginal notes – Endnotes.

Chapter: 12 to 13

Text book :

A Primer, Latex Tutorials, Indian TEX users group, Trivandrum, India.

www.tug.org.in

Reference Books:

1. Peter Flynn, A beginner's introduction to typesetting with LATEX, Silmaril Consultants, Textual Therapy Division, 2003.
2. George Gratzer, More Math Into LATEX, 4th Edition, Springer Science (2007).
3. Frank Mittelbach, Michel Goossens, The LaTeX Companion, Second Edition, Addison-Wesley, 2004.

E-Materials:

1. <https://www.latex-tutorial.com/tutorials/>
2. <https://www.latex-tutorial.com/>
3. <http://www.tug.org.in/tutorials.html>

Mapping with Learning outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	L	L	M	S	L	S	S	M
CO2	S	M	L	M	M	L	L	S	S	M
CO3	S	L	L	M	L	L	L	S	S	M
CO4	S	L	L	L	M	L	L	S	S	M
CO5	S	L	L	M	L	L	L	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

M.Sc. Mathematics – 2022-2023 Onwards

Semester : III

Paper Type : Core Elective

Credit : 3

Paper Code :

Name of the Paper : Discrete Mathematics

Hours of Teaching : 90 Hours

Course Objectives

The objectives of this course are to

- 1 Introduce the algebraic structures of lattices and Boolean algebra.
- 2 Construct the switching circuits with applications.
- 3 Educate the finite fields and its mathematics properties.
- 4 Inculcate the polynomials over finite fields, Irreducibility and factorization of polynomials.
- 5 Indoctrinate the coding theory with the linear and cyclic codes.

Course Outcomes

After the successful completion of this course, the students will be able to

CO1 Know the algebraic structures of lattices and Boolean algebra, and sketch the minimization of Boolean polynomials.

CO2 Model the switching circuits with applications.

CO3 Understand the finite fields and its mathematics properties.

CO4 Acquire the notions of the polynomials over finite fields, Irreducibility and factorization of polynomials.

CO5 Apply the coding theory with the linear and cyclic codes in cryptography.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	No	Yes	Yes	No
4	Yes	Yes	No	Yes	Yes	No
5	Yes	Yes	Yes	No	No	No

- Unit-1: Lattices** **18 hours**
Properties and Examples of Lattices – Distributive Lattices – Boolean Algebras – Boolean Polynomials - Minimal Forms of Boolean Polynomials.
Chapter 1: Sections 1–6
- Unit-2 : Applications of Lattices** **18 hours**
Switching Circuits – Applications of Switching Circuits.
Chapter 2: Sections 7–8
- Unit-3 : Finite Fields** **18 hours**
Finite Fields.
Chapter 3: Sections 13
- Unit-4 : Polynomials** **18 hours**
Irreducible Polynomials over Finite Fields - Factorization of Polynomials over Finite Fields.
Chapter 3: Sections 14–15
- Unit -5: Coding Theory** **18 hours**
Linear Codes – Cyclic Codes.
Chapter 4: Sections 17–18

Text Books:

Rudolf Lidl and Gunter Pilz, *Applied Abstract Algebra*, 2nd Indian Reprint, Springer Verlag, New York, 2006.

Reference Books:

1. A.Gill, *Applied Algebra for Computer Science*, Prentice Hall Inc., New Jersey.
2. J.L.Gersting, *Mathematical Structures for Computer Science*, 3rd Edn., Computer Science Press, New York.
3. S.Wiitala, *Discrete Mathematics - A Unified Approach*, McGraw Hill Book Co.

E-Materials:

1. <http://www.discrete-math-hub.com/resources-and-help.html>
2. https://onlinecourses.nptel.ac.in/noc22_cs123/preview
3. https://onlinecourses.nptel.ac.in/noc22_cs85/preview

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	S	S	S
CO2	S	S	M	M	S	S	S	S	S	S
CO3	S	S	M	M	M	S	S	S	S	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	M	M	S	S	S	S	S	S

*PO – Programme Outcome, CO – Course Outcome.

*S – Strong, M – Medium, L – Low.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

M.Sc. Mathematics – 2022-2023 Onwards

Semester : III

Paper Type : Core Elective

Credit : 3

Paper Code :

Name of the Paper : Operations Research

Hours of Teaching : 90 Hours

Course Objectives

The objectives of the course is to

1. Understand the steps in decision theory and tree analysis
2. Make distinctions among various types of replacement and maintenance techniques.
3. Solve an LPP using dynamic programming approach..
4. Use differential calculus based methods to obtain the optimal solutions.
5. Derive and use Kuhn-Tucker conditions necessary for optimal value of an objective function.

Course Outcomes:

After successful completion on the course the student will be able to

CO1 Make decision under various decision-making environments.

CO2 Acquire the knowledge of replacement analysis in handling problems like staffing problem and equipment renewal problem etc.

CO3 Work effectively on Dynamic Programming models and their applications in solving Decision problem.

CO4 Provide a strong foundation in distinction between local, global and inflection extreme points.

CO5 Solve non-linear programming problems.

Matching Table :

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: Decision Theory**18 Hours**

Steps in Decision theory Approach – Types of Decision Making Environments – Decision Making Under Uncertainty – Decision Making under Risk – Posterior Probabilities and Bayesian Analysis – Decision Tree Analysis – Decision Making with Utilities.

Chapter 11: Sections 11.1 to 11.8**Unit-2: Replacement and Maintenance Models****18 Hours**

Failure Mechanism of items – Replacement of Items Deteriorates with Time – Replacement of items that fail completely – other Replacement Problems

Chapter 17: Sections 17.1 to 17.5**Unit-3: Dynamic Programming****18 Hours**

Introduction – Dynamic Programming Terminology – Developing Optimal Decision Policy – Dynamic Programming under Certainty – Dynamic Programming Approach for Solving LPP.

Chapter 22: Sections 22.1 to 22.5**Unit-4: Classical Optimization Methods****18 Hours**

Introduction - Unconstrained Optimization - Constrained multivariable Optimization with inequality constraints – Problems.

Chapter 23: Sections 23.1 to 23.4**Unit-5: Non-Linear Programming Methods****18 Hours**

Introduction - General NLPP – Graphical Solution - Quadratic Programming – Problems.

Chapter 24: Sections 24.1 to 24.4**Text Book:**

J.K.Sharma, Operations Research Theory and Applications (Sixth Edition), Trinity Press, Laxmi Publications Pvt. Ltd., New Delhi, Reprint 2017.

Reference Books:

1. F.S.Hillier and J.Lieberman, Introduction To Operations Research, (Eighth edition), Tata McGraw Hill Publishing Company, New Delhi, 2006.
2. C.Beightler, D.Phillips, and B.Wilde, Foundations of Optimization, (Second edition), Prentice Hall New York, 1979.

3. M.S.Bazaraa, J.J.Jarvis, and H.D.Sharall, John Wiley and sons, New York, 1990.
4. D.Gross and C.M.Harris, Fundamentals Of Queuing Theory [3rd Edition], Wiley and Sons, New York, 1998.
5. Hamdy A.Taha, Operations Research, (Sixth edition), Prentice–Hall of India Private Limited, New Delhi.

E-Materials:

https://onlinecourses.nptel.ac.in/noc19_ma29/prev

<https://archive.nptel.ac.in/courses/111/107/111107104/>

https://onlinecourses.nptel.ac.in/noc21_mg74/preview

<https://mathworld.wolfram.com/topics/Optimization.html>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	S
CO2	S	S	M	M	S	M	S	S	S	S
CO3	S	S	M	M	S	M	S	S	S	S
CO4	S	S	M	M	S	M	S	S	S	S
CO5	S	S	M	M	S	M	S	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : III

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : Mathematical Biology

Hours of Teaching : 90 Hours

Course Objectives:

The main objectives of the course are to

1. Understand and know the discrete population growth models.
2. Develop the Model for the Distribution of drugs in the body
3. Apply the Model for the Spread of Technological Innovations
4. Study the continuous growth models and qualitative behavior of populations
5. Know the mathematical models in epidemiology.

Course Learning Outcomes

After the successful completion of this course, the students will be able to:

- CO1** Formulate the mathematical models for real world problems
- CO2** Understanding the concepts of Discrete Population Growth Models
- CO3** Discuss the Continuous Growth Models
- CO4** Explain the Logistic Model with Harvesting
- CO5** Analyze the Qualitative behavior of Populations and Mathematical Models in Epidemiology.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:DiscretePopulationGrowthModels**18 hours**

Arithmetic Growth Model - Geometric Growth Model - Generalizations - Age Structured Populations.

Chapter2:Sections 2.2 to 2.5**Unit-2:ContinuousGrowthModels****18hours**

The Linear Model-The Exponential Model-Model for the Distribution of drugs in the body
Coalition Models.

Chapter3:Sections 3.2 to 3.5**Unit-3:ContinuousGrowthModels(contd.)****18 hours**

Environmental Resistance - A Model for the Spread of Technological Innovations -
The Gompertz Model - Bertalanffy Growth Model.

Chapter3:Sections 3.8 to 3.11**Unit-4:Qualitativebehaviorof Populations****18hours**Autonomous

Equations - Steady and Equilibrium State - Stability of Equilibrium State - Logistic Model
with Harvesting - Fixed Points and their stability - The Logistic Map.

Chapter5:Sections 5.2 to 5.7**Unit-5:MathematicalModelsinEpidemiology****18hours**

Plant Epidemics - Some features of Human Epidemics - A Simple Deterministic Epidemic Model - A
more General Epidemic: SIR Disease.

Chapter7:Sections 7.2 to 7.5**Text Book:**

C.R.Ranganathan,
A First Course in Mathematical Models of Population Growth (with MATLAB Program),
Associated Publishing Company, New Delhi, 2006.

Reference Books:

1. Pundir, BioMathematics, A Pragati Edition, 2006.
2. J.N. Kapur, Mathematical Models in Biology and Medicine, Affiliated East-West Press Pvt. Ltd., New Delhi, 1985.
3. Nicolas F. Britton, Essential Mathematical Biology, Springer International Edition, First Indian reprint, 2004.

4. Murray, Mathematical Biology, Springer
International Edition, First Indian reprint, 2004.

E-Materials:

1. <https://www.smb.org/>
2. <https://web.archive.org/web/20080827161431/http://www.biostatsresearch.com/repository/>

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	M	S	L
CO2	M	M	M	S	S	L	M	S	L	M
CO3	S	M	S	S	L	L	S	L	M	L
CO4	S	M	S	L	M	M	M	S	L	S
CO5	S	S	M	L	S	M	M	L	L	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : III

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : Quantitative Techniques

Hours of Teaching: 90hrs

Course Objectives:

The objectives of the course is to

1. Study the linear programming problem and its solving method.
2. Understand the transportation problem as a linear programming problem.
3. Understand the concept of assignment problem.
4. Understand the concept of inventory control.
5. Know about the network analysis and its solution methods, PERT and CPM.

Course Outcomes:

After successful completion on the course the student will be able to

CO1 Understand the concept of LPP and its solution.

CO2 Acquire the knowledge of transportation problems.

CO3 Work effectively on assignment models.

CO4 Provides a strong foundation in the study of the characteristics of inventory controls.

CO5 Use PERT-CPM technique for project management network problems.

Matching Table :

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1:LinearProgrammingProblem**18 hours**

Introduction–GraphicalSolutionMethod–SomeExceptionalCases–
GeneralLinearProgrammingProblem–FundamentalPropertiesofSolution–
TheComputationalProcedure-SimplexMethod.

Chapter3:Sections3.1to3.4**Chapter4:**Sections4.1 to 4.3**Unit- 2:TransportationProblem****18 hours**

Introduction -L.P Formulationof theTransportationProblem– Existence of Solution inT.P –
Transportation Table– Solution of a Transportation Problem– Finding InitialBasicFeasibleSolution-
Testforoptimality–EconomicInterpretationof u_j 'sand v_j 's–DegeneracyinTransportationProblem–
TransportationAlgorithm(ModiMethod).

Chapter10: Sections 10.1 to 10.3, 10.5, 10.8 to 10.13**Unit-3:Assignment Problem****18 hours**

Introduction-MathematicalFormulationoftheProblem-SolutionMethodsofAssignmentProblem–
SpecialCasesinAssignmentProblems–TravellingSalesmanProblem.

Chapter11:Sections 11.1 to 11.4, 11.7**Unit-4:Inventory Control****18hours**

Introduction – Types of Inventories – Reasons for Carrying Inventories – The InventoryDecisions –
Objective of Scientific Inventory Control –Costs Associated with Inventories –Factors Affecting
with Inventory Control – An inventory Control Problem - DeterministicInventoryproblem withNo
shortages.

Chapter 19:Sections 19.1 to 19.10**Unit-5:NetworkschedulingbyPERTandCPM****18 hours**

Introduction–Network:BasicComponents –LogicalSequencing-RulesofNetworkConstruction–
ConcurrentActivities–CriticalPathAnalysis–ProbabilityConsiderationsinPERT-Distinction between
PERT andCPM.

Chapter25

Text Book:

KantiSwarup,P.K.Gupta,ManMohan,OperationsResearch,SultanChand&Sons,NewDelhi, 2008.

ReferenceBooks

1. P.K.Gupta,OperationsResearch,8-e,KrishnaPrakasamMandir,Meerut,1993.
2. P.K.GuptaandD.S.Hira,OperationsResearch,S.Chand&Company,NewDelhi,2000.
3. J.K.Sharma,OperationsResearchTheoryandApplications,2-e,Mac MillianBusinessBooks, 2003.
4. HamdyA.Taha,OperationsResearch,PearsonEducation,NewDelhi,2002.

E-Materials:

<https://mathworld.wolfram.com/>

<https://nptel.ac.in/courses/112106134>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	S	S
CO2	S	S	M	M	S	M	S	S	S	S
CO3	S	S	M	M	S	M	S	S	S	S
CO4	S	S	M	M	S	M	S	S	S	S
CO5	S	S	M	M	S	M	S	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : III

Paper type : Open Elctive

Credit : 3

Paper code :

Name of the Paper : SCILAB

Hours of Teaching: 90hrs

Course Objectives:

The main objective of this course are to:

- 1 Understand the basic commands
- 2 Solve the system of equations
- 3 Construct the plotting lines and data.
- 4 Evaluate the polynomials
- 5 Solve the Ordinary differential equations.

Course Outcomes

After successful completion on the course the student will be able to

CO1 Acquire the practical knowledge of SCILAB

CO2 Understand the matrices, vectors in SCILAB

CO3 Visualize the mathematical objects in 2D and 3D

CO4 Acquire the knowledge of polynomials

CO5 Obtain the solution of Ordinary Differential equations

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	No	Yes	No

Unit-1 Introduction to SciLabB**18 hours**

Login - Talking between Scilab and the Editor - Basic Commands - Linear Algebra - Loops and Conditionals - Help in Scilab.

Chapter 1: Sections 1.1 to 1.7**Unit-2 Matrix Calculation****18 Hours**

Matrices and Vectors - Solving Equations - Creating Matrices - Systems of Equations.

Chapter 2: Section 2.2**Unit-3 Data and Function Plots****18 hours**

Plotting Lines and Data - Adding a Line - Hints for Good Graphs – Graphs - Function Plotting – Component Arithmetic - Printing Graphs - Saving Graphs.

Chapter 3: Sections 3.2, 3.3**Unit- 4 Polynomials****18 Hours**

Evaluation of Polynomials – Polynomials - Linear Least Squares (Heath Computer Problem).

Chapter 6: Sections 6.2, 6.3, 6.4**Unit-5 Differential Equation****18 Hours**

Differential Equations - Scalar ODE's - Order 2 ODE's .

Chapter 8: Sections 8.2**Text book :**

Graeme Chandler and Stephen Roberts, Scilab Tutorials for Computational Science, 2002.

Reference Books:

1. Scilab for very beginners, Scilab Enterprises, S.A.S, 143, bis rue Yves Le Coz – 78000 Versailles (France).
2. K. S. Surendran, SCILAB FOR DUMMIES, Version 2.6.
3. Some notes on SCILAB, Université de Nice Sophia-Antipolis.

E-Materials:

<https://www.scilab.org/>

Mapping with Learning Outcomes:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	L	S	S	M	L
CO2	S	S	M	L	S	L	S	S	L	M
CO3	S	S	S	S	S	L	S	S	M	L
CO4	S	S	M	M	S	L	S	S	L	L
CO5	S	S	M	S	S	L	S	S	M	L

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

M.Sc. Mathematics – 2022-2023 Onwards

Semester : IV

Paper Type : Core

Credit : 4

Paper Code :

Name of the Paper : Complex Analysis – II

Hours of Teaching : 75 Hours

Course Objectives

The objectives of this course are to

- 1 Introduce the concepts of residues and its properties.
- 2 Estimate the contour integrals and its applications.
- 3 Educate the analytic continuation and Poisson integral formula.
- 4 Inculcate the representations of meromorphic and entire functions.
- 5 Indoctrinate the applications of open mapping, Hurwitz and Riemann mapping theorems.

Course Outcomes

After the successful completion of this course, the students will be able to

CO1 Understand the concepts of residues and its properties.

CO2 Evaluate the contour integrals and its applications.

CO3 Know the analytic continuation and Poisson integral formula.

CO4 Acquire the representations of meromorphic and entire functions.

CO5 Procure the applications of open mapping, Hurwitz and Riemann mapping theorems.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit – 1: Calculus of Residues**15 hours**

Residue at a Finite Point – Residue at the Point at Infinity – Residue Theorem – Number of Zeros and Poles – Rouché's Theorem.

Chapter 7: Sections 7.1 to 7.6**Chapter 8:** Sections 8.1 to 8.5**Unit – 2: Evaluation of Certain Integrals****15 hours**

Integrals of three types - Singularities on the Real Axis - Integrals Involving Branch Points - Estimation of Sums.

Chapter 9: Sections 9.1 to 9.6**Unit – 3: Analytic Continuation****15 hours**

Direct Analytic Continuation - Monodromy Theorem - Poisson Integral Formula - Analytic Continuation via Reflection.

Chapter 10: Sections 10.1 to 10.4**Unit – 4: Representation of Meromorphic and Entire Functions****15 hours**

Infinite Sums and Meromorphic Functions - Infinite Product of Complex Numbers - Infinite Products of Analytic Functions - Factorization of Entire Functions - The Gamma Function - The Zeta Function - Jensen's Formula - The Order and the Genus of Entire Functions.

Chapter 11: Sections 11.1 to 11.8**Unit –5: Mapping Theorems****15 hours**

Open Mapping Theorem and Hurwitz' Theorem - Basic Results on Univalent Functions - Normal Families - The Riemann Mapping Theorem - Bieberbach Conjecture - The Bloch-Landau Theorems - Picard's Theorem.

Chapter 12: Sections 12.1 to 12.7**Text Books:**

S. Ponnusamy, *Foundations of Complex Analysis*, Second Edition, Narosa Publishing House, New Delhi, 2012.

Reference Books:

1. Lars V. Ahlfors, *Complex Analysis*, 3rd Edition, McGraw-Hill Inc., New York, 1979.
2. J.W. Brown and R.V. Churchill, *Complex Variables and Applications*, 8th Edition, McGraw-Hill Higher Education, New York, 2009.
3. J.B. Conway, *Functions of One Complex Variable*, 2nd Edition, Narosa Publishing House, New Delhi, 1996.
4. V. Karunakaran, *Complex Analysis*, 2nd Edition, Narosa Publishing House, New Delhi, 2005.
5. H.A. Priestley, *Introduction to Complex Analysis*, 2nd Edition, Oxford University Press Inc., New York, 2005.

E-Materials:

1. <https://nptel.ac.in/courses/111106141>
2. <https://ocw.mit.edu/courses/mathematics/18-04-complex-variables-with-applications-spring-2018/>
3. <https://www.coursera.org/learn/complex-analysis>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	S	S	S
CO2	S	S	M	M	M	S	S	S	S	S
CO3	S	S	M	M	M	S	S	S	S	S
CO4	S	S	M	M	M	S	S	S	S	S
CO5	S	S	M	M	M	S	S	S	S	S

*PO – Programme Outcome, CO – Course Outcome.

*S – Strong, M – Medium, L – Low.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : IV

Paper type : Core

Credit : 4

Paper code :

Name of the Paper : Fluid Dynamics

Hours of Teaching: 75hrs

Course Objectives:

The main objective of this course are to:

- 1 Discuss kinematics of fluids in motion
- 2 Derive the equations of motion of a fluid
- 3 Introduce Three dimensional flows
- 4 Discuss Two dimensional image system
- 5 Analysis viscous flows

Course Outcomes

After successful completion of the course the student will be able to

CO1 Understand the concepts of kinematics of fluids in motions.

CO2 Find the pressure at a point in a moving fluid.

CO3 Discuss Stokes stream function.

CO4 Analyse complex velocity potential for standard two dimensional flows.

CO5 Derive the Navier – Stokes equations of motion of a Viscous fluid.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	No	Yes	Yes	No

Unit-1: Kinematics of Fluids in Motion 15 hours

Real fluids and ideal fluids – Velocity of a fluid at a point, Stream lines, path lines, steady and unsteady flows – Velocity potential – The vorticity vector – Local and particle rates of changes – Equations of continuity – Worked examples – Acceleration of a fluid – Conditions at a rigid boundary.

Chapter 2: Sections 2.1 to 2.10

Unit-2: Equations of Motion of Fluid 15 hours

Pressure at a point in a fluid at rest – Pressure at a point in a moving fluid – Conditions at a boundary of two inviscid immiscible fluids – Euler's equation of motion – Discussion of the case of steady motion under conservative body forces.

Chapter 3: Sections 3.1 to 3.7

Unit-3: Some Three Dimensional Flows 15 hours

Introduction – Sources, sinks and doublets – Images in a rigid infinite plane – Axis symmetric flows – Stokes stream function.

Chapter 4: Sections 4.1, 4.2, 4.3, 4.5.

Unit-4: Some Two Dimensional Flows 15 hours

Meaning of two dimensional flow – Use of Cylindrical polar coordinate – The stream function – The complex potential for two dimensional, irrotational incompressible flow – Complex velocity potentials for standard two dimensional flows – Some worked examples – Two dimensional image systems – The Milne Thompson circle Theorem.

Chapter 5: Sections 5.1 to 5.8

Unit-5: Viscous Flows 15 hours

Stress components in a real fluid – Relations between Cartesian components of stress – Translational motion of fluid elements – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric – Stress analysis in fluid motion – Relation between stress and rate of strain – The co-efficient of viscosity and Laminar flow – The Navier – Stokes equations of motion of a Viscous fluid.

Chapter 8: Sections 8.1 to 8.9

Text book :

F. Chorlton, Text Book of Fluid Dynamics, CBS Publications. Delhi, 1985.

Reference Books:

1. R.W.Fox and A.T.McDonald. Introduction to Fluid Mechanics, Wiley, 1985.
2. E.Krause, Fluid Mechanics with Problems and Solutions, Springer, 2005.
3. B.S.Massey, J.W.Smith and A.J.W.Smith, Mechanics of Fluids, Taylor and Francis, New York, 2005
4. P.Orlandi, Fluid Flow Phenomena, Kluwer, New York, 2002.
4. T.Petrila, Basics of Fluid Mechanics and Introduction to Computational Fluid Dynamics, Springer, Berlin, 2004.

E-Materials:

<http://web.mit.edu/1.63/www/lecnote.html>

Mapping With Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	L	L	S	L	S	S	L	M
CO2	S	S	M	M	S	L	S	S	L	M
CO3	S	S	M	M	S	L	S	S	L	L
CO4	S	S	M	S	S	L	S	S	M	L
CO5	S	S	M	M	S	L	S	S	L	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : IV

Paper type : Core

Credit : 5

Paper code :

Name of the Paper : Functional Analysis

Hours of Teaching: 75hrs

Course Objectives:

The main objective of this course are to:

1. Study the details of Banach Spaces and Continuous linear transformations
2. Get familiar with concepts of open mapping theorem also understand the properties of orthogonal complements.
3. Provide the concept of conjugate space H^* , adjoint, self-adjoint, normal and unitary operators.
4. Learn and understand the Preliminaries of Banach algebras
5. Know about the structure of commutative Banach Algebras

Course Outcomes:

After successful completion of the course the student will be able to

CO1 Analyse the Banach space with examples and Able to work comfortably with Continuous linear transformations

CO2 Apply the conjugate operator and acquire the knowledge of open mapping theorem.

CO3 Discuss about the Hilbert spaces.

CO4 Acquire the knowledge of Banach Algebra and Outline of spectral radius.

CO5 Construct the Gelfand-Neumark theorem.

Matching table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	No	No	Yes	Yes
4	Yes	Yes	No	No	Yes	No
5	No	Yes	No	Yes	No	No

UNIT-I: Banach Spaces**15 hours**

Definition - Some examples - Continuous Linear Transformations - The Hahn - Banach Theorem.

Chapter 9: Sections 46 to 48

UNIT-II: Banach Spaces And Hilbert Spaces**15 hours**

Open mapping theorem - conjugate of an operator - Definition and some simple properties - Orthogonal complements – Orthonormal.

Chapter 9: Sections 50 and 51

Chapter 10: Sections 52, 53 and 54

UNIT-III: Hilbert Space**15 hours**

Conjugate space H^* - Adjoint of an operator - Self-adjoint operator - Normal and Unitary Operators – Projections.

Chapter 10: Sections 55, 56, 57, 58 and 59

UNIT-IV: Preliminaries of Banach Algebras**15 hours**

Definition and some examples - Regular and single elements - Topological divisors of zero - spectrum - the formula for the spectral radius - the radical and semi-simplicity.

Chapter 12: Sections 64 to 69

UNIT-V: Structure of Commutative Banach Algebras**15 hours**

Gelfand mapping - Application of the formula $r(x) = \lim_{n \rightarrow \infty} \|x^n\|^{1/n}$ - Involutions in Banach Algebras - Gelfand-Neumark Theorem.

Chapter 13: Sections 70 to 73

Text Book:

G.F. Simmons, Introduction to topology and Modern Analysis, McGraw Hill International Book Company, New York, 1963.

Reference Books:

1. W. Rudin Functional Analysis, Tata McGraw-Hill Publishing Company, New Delhi, 1973
2. G. Bachman & L. Narici, Functional Analysis Academic Press, New York, 1966.
3. H.C. Goffman and G. Fedrick, First course in Functional Analysis, Prentice Hall of India, New Delhi, 1987
4. E. Kreyszig Introductory Functional Analysis with Applications, John Wiley & Sons, New York, 1978.
5. Balmohan V. Limaye, Linear Functional Analysis for Scientists and Engineers, Springer.

E-Materials

<http://www.math.ucdavis.edu/~hunter/book/ch5.pdf>

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	M	S
CO2	S	S	M	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M	S
CO4	S	S	M	M	S	S	S	S	M	S
CO5	S	S	M	M	S	S	S	S	M	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : IV

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Number theory and Cryptography

Hours of Teaching: 75hrs

Course Objectives:

The main objective of this course are to:

1. Demonstrate ability to learn elementary ideas from number theory which will have applications in cryptography.
2. Introduce various cryptosystems and apply them in the necessary fields.
3. Understand the concepts of public key and primality
4. Learn the public key cryptography and RSA algorithm
5. Get the knowledge about Factoring concepts.

Course Outcomes:

After successful completion on the course the student will be able to

- CO1** Acquire the knowledge of elementary number theory
- CO2** Apply various cryptosystems and understand the concepts of quadratic, residues and reciprocity
- CO3** Develop the idea of public key cryptography, RSA Algorithms.
- CO4** Solve problems using the continued fraction method and the quadratic sieve method.
- CO5** Demonstrate ability to apply concepts of Fermat factorization and factor bases.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-1 Some Topics in Elementary Number Theory 15 hours

Time Estimates for doing arithmetic – Divisibility and Euclidean Algorithm – Congruence's– Some applications to Factoring.

Chapter I

UNIT-2 Cryptography 15 hours

Some simple cryptosystems – Enciphering matrices.

Chapter III

UNIT-3 Quadratic Residues 15 hours

Quadratics – Residues and reciprocity.

Chapter II

UNIT-4 Public Key 15 hours

The idea of Public key Cryptography – RSA – Discrete Log – Knapsack – Zero-Knowledge.**Chapter IV: Sections 1 to 5**

UNIT-5 Primality and Factoring 15 hours

Pseudo-primes – The rho method – Fermat factorization and factor bases – The continued fraction method – The quadratic sieve method.

Chapter V: Sections 1 to 5

Text Book:

Neal Koblitz, A Course in Number Theory And Cryptography, Springer-Verlag, New York, 1987.

Reference Books:

1. Niven and Zuckerman, An Introduction to Theory of Numbers, Third Edition, Wiley Eastern Ltd, New Delhi, 1976.
2. David M. Burton, Elementary Number Theory, Wm. C. Brown Publishers, Dubuque, Iowa, 1989.
3. K. Ireland and M. Rosen, A Classical Introduction to Modern Number Theory, Springer-Verlag, 1972.

E-Materials:

1. <http://mathworld.wolfram.com>
2. <https://ocw.mit.edu/courses/6-042j-mathematics-for-computer-science-fall-2010/resources/lecture-4-number-theory-i/>

Mapping with Learning outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	S	S	S
CO2	S	S	S	M	M	S	S	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	S	M	S	M	S	S	S	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : IV

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Advanced Numerical Analysis

Hours of Teaching: 75hrs

Course Objectives:

The main objective of this course are to:

- 1 Introduce the derivation of numerical methods with error analysis
- 2 Study the transcendental and polynomial equations
- 3 Acquire the knowledge of system of linear algebraic equations
- 4 Understand the differentiation and integration
- 5 Solve problems on interpolation and ordinary differential equations

Course Outcomes:

After successful completion of the course the student will be able to

- CO1** Examine the solutions of transcendental and polynomial equations
- CO2** Understand the system of linear algebraic equations
- CO3** Analyse the interpolation and extrapolation
- CO4** Evaluate numerical differentiation and integrations
- CO5** Solve the differential equations by single and multi step methods

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	No	Yes	No
2	Yes	Yes	No	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	No	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-1 Transcendental and Polynomial Equations 15hours
 Iteration methods based on second degree equation – Rate of convergence – Iteration methods – Methods for complex roots – Polynomial equations.

Chapter 2: Sections 2.4 to 2.8

UNIT-2 System of Linear Algebraic Equations and Eigen Value Problems 15hours

Direct methods – Triangularisation, Cholesky and Partition methods – Error analysis – Iteration methods – Eigen values and Eigenvectors – Jacobi's method, Given's method, Rutishaugh method and Power method.

Chapter 3: Sections 3.2 to 3.5

UNIT-3 Interpolation and Approximation 15hours

Hermite Interpolations – Piecewise and Spline Interpolation – Bivariate interpolation – Approximation – Least Square approximation – Uniform approximation.

Chapter 4: Sections 4.5 to 4.10

UNIT-4 Differentiation and Integration 15hours

Numerical Differentiation – Partial Differentiation – Numerical Integration methods based on undetermined coefficients – Double integration.

Chapter 5: Sections 5.2, 5.5, 5.6, 5.8, 5.11

UNIT-5 Ordinary Differential Equations 15hours

Numerical methods – Single step methods – Multistep methods – Predictor – Corrector methods.

Chapter 6: Sections 6.2 to 6.5

Text Book:

M.K.Jain, S.R.K.Iyengar and R.K.Jain, Numerical Methods For Scientific and Engineering Computation, 3rd Edition, New Age International, 1993.

Reference Books:

1. S.D.Corte and de Boor, Elementary Numerical Analysis – An Algorithmic approach, 3rd Edition, McGraw Hill International Book Company, 1980.
2. James B. Scarborough, Numerical Mathematical Analysis, Oxford & IBH Publishing Company, New Delhi.
3. F.B.Hildebrand, Introduction To Numerical Analysis, McGraw Hill, New York, 1956.

E-Materials:

1. <https://www.math.upenn.edu/~wilf/DeturckWilf.pdf>
2. <https://web.archive.org/web/20120225082123/http://kr.cs.ait.ac.th/~radok/math/mat7/stepsa.htm>
3. <https://ocw.mit.edu/courses/mechanical-engineering/2-993j-introduction-to-numerical-analysis-for-engineering-13-002j-spring-2005/>

Mapping with Learning outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	S	S	M	S
CO2	S	S	M	M	S	S	S	S	M	M
CO3	S	S	M	S	S	S	S	S	M	S
CO4	S	S	S	M	M	S	S	S	M	M
CO5	S	S	M	M	S	S	S	S	M	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Mathematics – 2022 - 2023 onwards

Semester : IV

Paper type : Core Elective

Credit : 3

Paper code :

Name of the Paper : Calculus of Variation and Integral Equations

Hours of Teaching: 75hrs

Course Objectives:

The main objectives of this course are to:

1. Understand the concept of calculus of variation and its applications.
2. Introduce the various types of integral equations.
3. Solve variational problems with fixed and moving boundaries.
4. Study the method of successive approximations and Fredholm theory.
5. Acquire knowledge on applications to Ordinary Differential Equations.

Course Outcomes:

After successful completion of the course the student will be able to

CO1 Analyze the methods for variational problems with fixed boundaries.

CO2 Apply and solve the variational problems with moving boundaries.

CO3 Define the methods to solve integral equations.

CO4 Discuss the method of successive approximation and Fredholm theory.

CO5 Identify and Construct the solutions for real time applications.

Matching table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	No	Yes	Yes	No	Yes	No
2	No	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	No
4	No	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit–I: Variational Problems with Fixed Boundaries**15 hours**

The concept of Variation and its properties – Euler's equation – Variational problems for functionals of the form – Functionals dependent on higher order derivatives – Functionals dependent on Functions of several independent variables – Variational problem in parametric form – Some applications to problems of mechanics.

Book– 1: Chapter 1: Sections 1.1 to 1.7**Unit–II: Variational Problems with Moving Boundaries****15 hours**

Variational problem with a Movable boundary for a functional dependent on two functions – One sided variations – Reflection and Refraction of extremals – Diffraction of light rays.

Book–1: Chapter 2: Sections 2.2 to 2.5**Unit–III: Integral Equations****15 hours**

Introduction – Definition – Regularity conditions – Special kinds of Kernels – Eigen values and Eigen functions – Convolution integral – Reduction to a system of algebraic equations – Examples – Fredholm alternative – Examples – An approximation method.

Book–2: Chapter 1: Sections 1.1 to 1.5**Chapter 2:** Sections 2.1 to 2.5**Unit–IV: Method of Successive Approximations and Fredholm Theory****15**

hours Method of successive approximations – Iterative scheme – Examples – Volterra integral equations – Examples – Some results about the resolvent kernel – The method of solution of Fredholm equation – Fredholm first theorem – Examples.

Book–2: Chapter 3: Sections 3.1 to 3.5**Chapter 4:** Sections: 4.1 to 4.3**Unit–V: Applications to Ordinary Differential Equations****15 hours**

Initial value problems – Boundary value problems – Examples – Singular integral equations – The Abel integral equations – Examples.

Book–2: Chapter 5: Sections 5.1 to 5.3**Chapter 8:** Sections 8.1 to 8.2**Text Books:**

1. A.S. Gupta, *Calculus of Variations with Applications*, PHI, New Delhi, 2005.
2. Ram P. Kanwal, *Linear Integral Equations*, Theory and Techniques, Academic Press, New York, 1971.

ReferenceBooks:

1. M.D.Raisinghania, *IntegralEquationsandBoundaryValueProblems*, S.Chand&Co., NewDelhi, 2007.
2. SudirK.PundirandRimplePundir, *IntegralEquationsandBoundaryValueProblems*, PragatiPrak
asam, Meerut.2005.

E–Materials:

1. <http://www.maths.ed.ac.uk/~jmf/Teaching/Lectures/CoV.pdf>
2. <https://archive.nptel.ac.in/courses/111/104/111104025/>

Mapping with Learning outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	M	M	S
CO2	S	S	S	M	S	S	S	M	M	S
CO3	S	S	M	M	M	M	S	M	S	M
CO4	S	S	S	S	S	M	S	M	S	M
CO5	S	S	S	M	S	M	S	M	S	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : IV

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : Mathematical Economics

Hours of Teaching: 75hrs

Course Objectives:

The main objectives of the course are to

1. Provide basic knowledge of the origin of theory of FIRM
2. Study the CES Production Function
3. Develop the Perfect Competition
4. understand about market equilibrium
5. Discuss the Welfare Economics

Course Learning Outcomes

After the successful completion of this course, the students will be able to

CO1 understand the knowledge of FIRM theory and perfect competition

CO2 Analyze the CES production

CO3 To acquire the knowledge of market equilibrium

CO4 To control the stability of equilibrium

CO5 Discuss the welfare economics, taxes and subsidies

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:TheTheory of FIRM**15 hours**

Basic Concepts - Optimizing Behavior - Input Demands - Cost Functions – Joint Products - Generalization to m variables.

Chapter4: Sections 4.1 to 4.6**Unit-2:CES Production****15 hours**

Homogeneous Production functions – CES Production Function.

Chapter5: Sections 5.1 and 5.2**Unit-3:Perfect Competition****15 hours**

Assumptions of Perfect Competition - Demand Functions - Supply Functions –Commodity-Market Equilibrium-An application to Taxation.

Chapter6: Sections 6.1 to 6.5**Unit-4:Market Equilibrium****15 hours**

Factor-Market Equilibrium - Existence and Uniqueness of Equilibrium - Stability of Equilibrium-Dynamic Equilibrium with Lagged Adjustment.

Chapter6: Sections 6.6 to 6.9**Unit-5:Welfare Economics****15 hours**

Pareto Optimality - the efficiency of Perfect competition - The efficiency of Imperfect competition - External Effects in consumption and Production - Taxes and Subsidies –Social Welfare functions-The theory of Second Best.

Chapter11: Sections 11.1 to 11.7**Text Book:**

James M. Henderson and Richard

E. Quandt, Micro Economic Theory A Mathematical Approach, (3rd Edn.) Tata McGraw Hill, New Delhi, 2003.

Reference Books

1. William J. Baumol. Economic Theory and Operations Analysis, Prentice Hall of India, New Delhi, 1978
2. A.C. Chiang, Fundamental Methods of Mathematical Economics, McGraw Hill, New York, 1984
3. Michael D. Intriligator, Mathematical Optimization and Economic Theory, Prentice Hall, New York, 1971.

4. A.Kautsoyiannis, Modern Microeconomics (2nd edn) MacMillan, New York, 1979

E-Materials:

1. [https://curlie.org/Science/Math/Applications/Mathematical Economics and Financial Mathematics/](https://curlie.org/Science/Math/Applications/Mathematical_Economics_and_Financial_Mathematics/)
2. http://master-economics-gem.univ-paris1.fr/about/?no_cache=1

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	M	S	M	S	L	S	L
CO2	M	L	M	S	L	S	M	S	L	M
CO3	S	S	L	S	S	L	S	S	M	L
CO4	S	S	M	L	M	M	S	M	L	S
CO5	M	L	M	S	L	M	M	S	L	M

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Mathematics – 2022 - 2023 onwards

Semester : IV

Paper type : Open Elective

Credit : 3

Paper code :

Name of the Paper : Entrepreneurial Development

Hours of Teaching: 75hrs

Course Objective:

The objectives of this course are to

- 1 Provide an understanding of basic concept in the area of entrepreneurship
- 2 Expose students to the idea generation, creating awareness of business opportunities, and familiarizing them with formal practices in effective project formation.
- 3 Understand an Project Management and Idea Generation
- 4 Develop the National Institute of Entrepreneurship and Small Business Development
- 5 Discuss the PMEGP– NEEDS– UYEGP

Course Learning Outcomes

After the successful completion of this course, the students will be able to

- CO1** Understand the knowledge of entrepreneurship
- CO2** Develop the Entrepreneurial Development
- CO3** Analyze the entrepreneurial finance and role of various government agencies
- CO4** Develop the idea generation, creating awareness of business opportunities, and familiarizing them with formal practices
- CO5** Discuss the Government Policies and benefits.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1:Introduction**15hours**

EntrepreneurandEntrepreneurship–Concept–Definition-ClassificationofEntrepreneurWomen
Entrepreneur - Functions of an Entrepreneur - Traits of successful Entrepreneur -
EntrepreneursVsProfessionalManagers–RoleofanEntrepreneurinEconomicDevelopment-Future
challenges.

Unit-2:EntrepreneurialDevelopment**15**

hoursEntrepreneurialDevelopmentProgrammes–Meaning-EvolutionandObjectivesofEDP-
InstitutionaleffortstodevelopEntrepreneurship-NationalSkillDevelopmentCorporation(NSDC)-
RoleofGovernment inOrganisingEDPs-Operational ProblemofEDPs.

Unit-3:ProjectManagementandIdeaGeneration**15**

hoursProjectManagement-ProjectIdentification-ProjectFormulation-
ProjectDesignandNetworkAnalysis–OverviewofProjectAppraisal-ProjectReport-
IdentificationandSelectionofBusinessOpportunity–IdeaGeneration–
OverviewofTechniquesusedforIdeaGeneration.-Individual creativity.

Unit-4:EntrepreneurialFinanceandDevelopmentAgencies**15**

hoursSourcesofFinance–CommercialBanksandDevelopmentBanks-
RoleofAgenciesinassistingEntrepreneurship-
DistrictIndustriesCenters(DIC),SmallIndustriesServiceInstitute(SISI),EntrepreneurshipDevelopmentI
nstituteofIndia(EDII),NationalInstituteofEntrepreneurship &Small
BusinessDevelopment(NIESBUD),NationalEntrepreneurshipDevelopment Board(NEDB).

Unit-5:Government PoliciesandBenefits**15 hours**

TaxBenefits–TaxHolidays–AllowancefordeductingDepreciation–RehabilitationAllowance–Benefits
available forMSMEs: PMEGP– NEEDS– UYEGP.

Text Books:

1. Dr.S.S.Khanka,EntrepreneurshipDevelopment- S. Chand&Co.,NewDelhi.
2. JayashreeSuresh,EntrepreneurialDevelopment, MarghamPublication,Chennai.
3. VasantDesa,Dynamics ofEntrepreneurialDevelopment–HimalayaPublication.
4. RobertD.Hisrich,MichaelP.Peters&DeanA.Shepherd,Entrepreneurship,
TataMcGraw Hill PublishingCompanyLimited, New Delhi.
5. RavindranathV.Badi&Narayana,Entrepreneurship, VrindaPublication(P)Ltd,New Delhi.

ReferencesBooks:

1. RabindraN.Kanungo,EntrepreneurshipandInnovation,SagePublications,NewDelhi.
2. HoltD.H.,EntrepreneurshipNewVentureCreation.NewDelhi:PrenticeHallofIndia.
3. HisrichR,andPeters,M.,Entrepreneurship.New Delhi:TataMcGrawHill.
4. RajkonwarA.B.,Entrepreneurship,KalyaniPublisher, Ludhiana.
5. Charantimath,Poornima,EntrepreneurshipDevelopmentandSmallBusinessEnterprises,Pearson Education, New Delhi.

E-Materials:

1. <http://www.indcom.tn.gov.in/pmegp.html>
2. <http://www.indcom.tn.gov.in/needs.html>
3. <http://www.indcom.tn.gov.in/uyegp.html>

Mapping with Learning Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	M	S	L
CO2	M	M	M	S	S	L	M	S	L	M
CO3	S	M	S	S	L	L	S	L	M	L
CO4	S	M	S	L	M	M	M	S	L	S
CO5	S	S	M	L	S	M	M	L	L	S

* PO – Programme Outcome, CO – Course Outcomes

* S – Strong, M – Medium, L – Low

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

M.Sc. Mathematics – 2022-2023 Onwards

Semester : IV

Paper Type : Open Elective

Credit : 3

Paper Code :

Name of the Paper : Programming in C++

Hours of Teaching: 75hrs

Course Objectives

The objectives of this course are to

1. Introduce the tokens expressions and control structures in C++.
2. Explore the usage of all basic functions in C++.
3. Educate the significance of various types of classes in C++.
4. Inculcate the inheritance structures in C++.
5. Indoctrinate the polymorphism concepts in C++.

Course Outcomes

After the successful completion of this course, the students will be able to

CO1 Know the tokens expressions and control structures in C++.

CO2 Understand the usage of all basic functions in C++.

CO3 Comprehend the significance of various types of classes in C++.

CO4 Acquire the knowledge about the inheritance structures in C++.

CO5 Apply the polymorphism concepts in C++.

Matching Table:

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

Unit-1 : Tokens Expressions and Control Structures**15 hours**

Tokens – Keywords – Identifiers and Constants – Basic Data Types – Uses Defined Data Types – Derived Data Types – Symbolic – Operators in C++ – Scope Resolution Operator – Manipulators – Operator Overloading – Control Structures.

Chapter 3: Sections 3.1 – 3.24**Unit-2 : Functions****15 hours**

Characteristic of OOP – Function Prototype – Default Arguments – Inline Functions – Function Overloading – Template Functions.

Chapter 4: Sections 4.2, 4.3, 4.6, 4.7, 4.9**Unit-3 : Classes in C++****15 hours**

Classes – Constructors and Destructors – Friend functions – Template Classes – New and Delete Operators – Operator Overloading.

Chapter 5: Sections 5.1 – 5.15**Chapter 6:** Sections 6.1 – 6.9**Chapter 7:** Sections 7.1 – 7.5**Unit-4 : Inheritance****15 hours**

Single Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance – Virtual Functions.

Chapter 8: Sections 8.1 – 8.8**Unit-5: Polymorphism in C++****15 hours**

Polymorphism.

Chapter 9: Sections 9.6 – 9.7**Text Books:**

E. Balagurusamy, *Object Oriented Programming with C++*, 4thEdn., Tata McGraw Hill Publishing Company Ltd., New Delhi, 2001.

Reference Books:

1. E. Balagurusamy, *Numerical Methods*, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1999.
2. John H. Mathews, *Numerical Methods for Mathematics, Science and Engineering*, 2ndEdn., Prentice Hall India Pvt. Ltd., 2003.

3. S.S. Sastry, *Introductory to Numerical Methods*, Prentice Hall India Pvt. Ltd., 2000.
4. H.C. Saxena, *Finite Differences and Numerical Analysis*, S. Chand & Company Ltd., New Delhi, 2005.

E-Materials:

1. https://onlinecourses.nptel.ac.in/noc21_cs02/preview
2. https://www.cet.edu.in/noticefiles/285_OOPS%20lecture%20notes%20Complete.pdf
3. <https://www.msuniv.ac.in/images/e-content/1.Object%20Oriented%20Programming%20with%20C%20and%20Java.pdf>

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	S	S
CO2	S	S	M	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S	S
CO4	S	S	M	M	S	S	S	S	S	S
CO5	S	S	M	M	S	S	S	S	S	S

*PO – Programme Outcome, CO – Course Outcome.

*S – Strong, M – Medium, L – Low.

B.Sc. MATHEMATICS - 2022-2023 onwards

Programme Objectives:

1. Students should acquire the knowledge of basic mathematical concepts and the ability to communicate mathematical ideas with clarity and coherence.
2. Students should have the ability to solve problems in Mathematics independently by applying logical reasoning, abstraction, and critical analysis, and they have to know how to apply relevant mathematical techniques.
3. Competence in using computational tools and software such as Excel, Graphics, algorithms, and programs.
4. Students should possess a basic fundamental knowledge in Mathematics which is required for higher studies in pure, applied Mathematics and other professional courses.
5. To develop the attitude and ability to apply mathematical methods and ideas in other sciences and engineering programmes.

Programme Educational Objectives:

1. To acquire basic domain knowledge in mathematical concepts and their applications.
2. To develop analytical thinking, and logical reasoning skills to solve mathematical problems.
3. The ability to formulate real-life problems, applying appropriate mathematical models/tools to solve such problems.
4. Acquire the knowledge of applying mathematical techniques in other branches.
5. Students will develop the qualities such as working individually as well as the ability to work in teams.

Programme Specific Outcomes:

1. Represent the mathematical data in numerical, graphical, and visual form.
2. Develop the patience and persistence to solve a problem.
3. Students will have the knowledge to use ICT tools.
4. Motivation to the students to do research in the unexplored areas of Mathematics.
5. Ability to apply mathematical techniques in other fields of science and engineering.
6. Select appropriate algorithms and software programs to obtain accurate solutions to mathematical problems.
7. Students will be able to develop a solution oriented approach toward various social and environmental issues.
8. Gaining knowledge to pursue higher studies in pure and applied Mathematics.

9. Understand, formulate and apply quantitative models in management, economics, and business contexts.
10. Ignites their passion to do research in Mathematics.

Programme Outcomes:

1. Logical thinking, critical analysis, and reasoning skills will be highly improved.
2. Express mathematical ideas clearly and concisely to others.
3. Ability to apply suitable mathematical techniques to handle problems in physical and related sciences.
4. To demonstrate conceptual understanding of basic definitions, and theorems in Mathematics and should be able to describe elaborately with examples.
5. Ability to solve mathematical problems by applying the skills such as critical thinking, logical reasoning, and abstraction.
6. Select appropriate mathematical models and tools to solve the problems including those in real-life contexts.
7. Mathematics has its own universal language of symbols and notations. Students are expected to apply the Mathematics language appropriately while expressing mathematical ideas in both oral and written form.
8. Problem-solving techniques in mathematics will enhance the knowledge of students to formulate and solve any real-world problems independently.
9. Develop the knowledge of abstract mathematical concepts.
10. Enhance the employability skills in both public and private sector jobs

THIRUVALLUVAR UNIVERSITY
BACHELOR OF SCIENCE
B.Sc. MATHEMATICS DEGREE COURSE

(With effect from 2022 - 2023)
The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
		SEMESTER I							
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-1	5	3	Algebra	25	75	100
4.	III	Core Theory	Paper-2	5	3	Trigonometry	25	75	100
5.	III	Allied -1	Paper-1	4	3	(to choose any 1 out of 4)	25	75	100
	III	Allied- 1	Practical-1	2	0	(For Practical Allied subjects)	0	0	0
6.	III	PE	Paper 1	6	3	Professional English I	25	75	100
7.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		Sem. Total		36	22		175	525	700
SEMESTER II							CIA	Uni. Exam	Total
8.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9.	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
10.	III	Core Theory	Paper-3	4	3	Calculus	25	75	100
11.	III	Core Theory	Paper-4	4	3	Analytical Geometry of three dimensions	25	75	100
12.	III	Allied-1	Paper-2	4	3	(to choose any 1 out of 4) (For Practical Allied subjects)	25	75	100
13.	III	Allied Practical – 1	Practical-1	2	2	(to choose any 1 out of 4) (For Practical Allied subjects)	25	75	100
14.	III	PE	Paper 1	6	3	Professional English II	25	75	100
15.	IV	Value Education		2	2		25	75	100
16.	IV	Soft Skill		2	1		25	75	100
		Sem. Total		36	25		225	675	900
SEMESTER III									
17.	I	Language	Paper-3	6	4	Tamil / Other Languages	25	75	100
18.	II	English	Paper-3	6	4	English	25	75	100
19.	III	Core Theory	Paper-5	6	5	Differential Equations and Laplace Transforms	25	75	100
20.	III	Allied-2	Paper-3	4	3	(to choose any 1 out of 4) (For Practical Allied subjects)	25	75	100
	III	Allied Practical – 2	Practical-2	3	0		0	0	0
21.	IV	Skill Based Subject	Paper-1	3	2	Mathematics for competitive Examinations – I	25	75	100
22.	IV	Non-Major Elective	Paper-1	2	2	Basic Mathematics	25	75	100
		Sem. Total		30	20		150	450	600
SEMESTER IV									

[illegible]

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	6	100	200
	Allied (Even Semester)	2	5	10	100	200
	Allied Practical	2	2		100	200
	Electives	3	3	9	100	300
	Core	14	(3-5)	52	100	1400
	Core practical	1	2	2	100	100
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	5	5	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	45		140		4500

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: I

Paper type: Core

Paper code: C - 01

Name of the Paper: PAPER – 1 – ALGEBRA

Credit: 3

Hours per Week: 5

Lecture Hours: 5

Tutorial Hours:

Practical Hours:

Course Objectives

1. Students are exposed to solving polynomial equations, summation of an infinite series, matrices, and elementary number theory.
2. To learn the different methods to solve polynomial equations.
3. To understand the methods of the sum to infinity of a binomial, exponential, and logarithmic series.
4. To find the Eigen values and Eigen vectors of a given square matrix.
5. To acquire a basic knowledge of different types of numbers, a number of divisors of a positive integer.

Course Outcomes

1. After studied unit -1, the student will be able to demonstrate the knowledge of the relationship between roots and coefficients of the given equation.
2. After studied unit -2, the student will be able to carry out the calculations of approximate roots of the given polynomial equation.
3. After studied unit -3, the student will be able to find the sum to infinity of the given binomial/exponential/logarithmic series.
4. After studied unit -4, the student will be able to demonstrate the knowledge of matrices and calculate the Eigen values and Eigen vectors of a given square matrix.
5. After studied unit -5, the student will be able to discuss the basic number theory concepts.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-I: THEORY OF EQUATIONS

Polynomial Equations – Relation between roots and coefficients - Symmetric Functions of roots in terms of Coefficients - Transformation of Equations - Reciprocal Equations.

UNIT-II: THEORY OF EQUATIONS (Contd...)

Descartes Rule of Signs - Approximate Solutions of Polynomials by Horner's method - Newton - Raphson method of Solving a Cubic Polynomial.

UNIT-III: SUMMATION OF SERIES

Summation of series using Binomial - Exponential and Logarithmic series (Theorems without proofs) - Approximation using Binomial, Exponential and Logarithmic series - simple problems.

UNIT-IV: MATRICES

Symmetric - Skew Symmetric, - Hermitian - Skew Hermitian - Orthogonal and Unitary Matrices - Eigen Values - Eigen Vectors – Cayley-Hamilton Theorem (without proof) - Similar Matrices - Diagonalisation of a Matrix.

UNIT-V: ELEMENTARY NUMBER THEORY

Prime Number - Composite Number - Decomposition of a Composite Number as a Product of Primes uniquely (without proof) - Divisors of a Positive Integer - Congruence Modulo n - Euler Function (without Proof) - Highest Power of a Prime Number p contained in $n!$ - Fermat's and Wilson's Theorems (statements only) - simple problems.

Text book:

T.K.Manicavachagom Pillay, T.Natarajan and K.S.Ganapathy, *Algebra*, Volume I (2007) & II (2008) S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

Reference Books:

1. P.Kandasamy, K.Thilagavathy (2004), Mathematics for B.Sc. Vol-I, II, III & IV, S.Chand & Company Ltd., New Delhi-55.
2. S.Arumugam (2003) *Algebra*. New Gamma Publishing House, Palayamkottai.
3. P.R.Vittal, V.Malini, *Algebra and Trigonometry*, Margham Publications, Chennai.
4. S.Sudha(1998) *Algebra and Trigonometry*, Emerald Publishers, Chennai.

Course Material: website links, e-Books and e-journals

<https://tutorial.math.lamar.edu/Classes/Alg/Alg.aspx>

<https://tutorial.math.lamar.edu/Extras/AlgebraTrigReview/AlgebraTrig.aspx>

<https://ocw.mit.edu/courses/18-701-algebra-i-fall-2010/>

<https://ocw.mit.edu/courses/18-785-number-theory-i-fall-2021/>

<https://www.classcentral.com/course/algebra-i-44578>

<https://www.classcentral.com/course/polynomials-roots-44577>

Mapping with Programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	M	M	S	M	M	S	S	S	M	S
CO3	S	S	S	M	M	M	M	M	M	M
CO4	S	M	S	S	M	S	S	M	M	M
CO5	M	M	M	S	S	S	M	S	M	S

PO – Programme Outcome

CO – Course outcome

S – Strong

M-Medium

L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**B.Sc. MATHEMATICS – 2022-2023 onwards****Semester: I****Paper type: Core****Paper code: C - 02****Name of the Paper: PAPER – 2 – TRIGONOMETRY****Credit: 3**

Total Hours per Week: 4

Lecture Hours: 4

Tutorial Hours: Practical Hours:

Course Objectives

1. This course is designed for the students to expose the topics such as expansions of trigonometric functions, hyperbolic functions, inverse circular, and inverse hyperbolic functions.
2. To gain the knowledge of expansions of $\cos n\theta$ and $\sin n\theta$ in powers of $\cos\theta$ and $\sin\theta$.
3. To acquire the knowledge of hyperbolic and inverse hyperbolic functions.
4. Basic knowledge about the Logarithm of complex quantities.
5. To understand and carry out the calculations of summation of trigonometric series.

Course Outcomes

1. After studied unit -1, the student will be able to write the expansions of $\cos n\theta$ and $\sin n\theta$ in powers of $\cos\theta$ and $\sin\theta$.
2. After studied unit -2, the student will be able to expand the powers of sines and cosines of θ in terms of functions of multiples of θ .
3. After studied unit -3, the student will be able to discuss the concepts of hyperbolic functions.
4. After studied unit -4, the student will be able to demonstrate knowledge of the logarithm of complex quantities.
5. After studied unit -5, the student will be able to carry out the calculations of summation of trigonometric series.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	No	Yes	Yes
5	No	Yes	Yes	Yes	Yes	No

UNIT-I

Expansions of $\cos n\theta$, $\sin n\theta$ in powers of $\cos\theta$ and $\sin\theta$ - Expansion of $\tan n\theta$ in powers of $\tan\theta$ - Expansion of $\tan(A+B+C+\dots)$ - Formation of Equations.

Chapter III Sections 1 to 3

UNIT-II

Powers of sines and cosines of θ in terms of functions of multiples of θ - Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in a series of ascending powers of θ - Approximation problems -

Expansions of Inverse Circular Functions.
Chapter III Sections 4 and 5

UNIT-III:

Hyperbolic Functions: Definition – Relation between Hyperbolic and Circular Functions
- Inverse Hyperbolic Functions.
Chapter IV Sections 1 to 2.3

UNIT-IV

Resolution into Factors - Simple problems only - DeMoivre's Property on the Circle and
Cote's Property on the Circle - Logarithm of complex quantities.
Chapter V Sections 2 and 3(Problems only) 4, 4.1, 4.2, 5, 5.1, 5.2.

UNIT-V

Summation of Trigonometric Series: Method of Differences - Angles are in A.P, C+iS
method of summation - Gregory Series - Euler Series.
Chapter VI Sections 1, 2, 3, 3.1, 3.2.

Text book:

1. S.Narayanan and T.K. Manicavachagom Pillay (2004) *Trigonometry*. S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

Reference Books:

1. P.Kandasamy, K.Thilagavathy (2004), Mathematics for B.Sc. Vol.-I, II, III & IV, S.Chand & Company Ltd., New Delhi-55.
2. S.Duraipandian and LaxmiDuraipandian (1984) *Trigonometry*. Emerald Publishers, Chennai.
3. B.S.Grewal. (2002) *Higher Engineering Mathematics*. Khanna Publishers. New Delhi.
4. S.L.Loney. (1982) *Plane Trigonometry*, Part II, Cambridge University Press, London.
5. A.Singaravelu (2003) *Algebra and Trigonometry*, Vol-I Meenakshi Agency, Chennai.
6. P.R.Vittal. (2004) *Trigonometry*, Margham Publications, Chennai.

Course Material: website links, e-Books and e-journals

<https://tutorial.math.lamar.edu/Extras/AlgebraTrigReview/AlgebraTrig.aspx>

[https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-](https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-lines-)
[lines-](https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-lines-)

[SV8UL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=](https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-lines-SV8UL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=top_button)
[top_button](https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-lines-SV8UL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=top_button)

[https://www.engineering.iastate.edu/student-services/orientation/math-142-](https://www.engineering.iastate.edu/student-services/orientation/math-142-trigonometry-analytical-geometry/)
[trigonometry-analytical-geometry/](https://www.engineering.iastate.edu/student-services/orientation/math-142-trigonometry-analytical-geometry/)

Mapping with Programme outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	M	M	M
CO2	M	M	M	S	S	S	M	S	S	M
CO3	S	S	S	S	M	M	S	S	M	S
CO4	M	S	S	S	S	M	M	M	M	M
CO5	S	S	S	M	M	M	M	M	M	M

PO – Programme Outcome

CO – Course outcome

S – Strong

M-Medium

L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: II

Paper type: Core

Paper code: C - 03

Name of the Paper: PAPER – 3 – CALCULUS

Credit: 3

Total Hours per Week: 4 Lecture Hours: 4 Tutorial Hours: Practical Hours:

Course Objectives

1. This course introduces the basic concepts of differential and integral calculus.
2. To know about the angle between two curves and the radius of curvature.
3. To inculcate a strong knowledge about evolutes and envelopes.
4. Knowledge about reduction formulae and properties of definite integrals.
5. To acquire the knowledge about evaluation of double and triple integrals.

Course Outcomes

1. After studied unit -1, the student will be able to determine the extreme values of the given function.
2. After studied unit -2, the student will be able to demonstrate knowledge of Cartesian and polar coordinates.
3. After studied unit -3, the student will be able to gain knowledge of curvature, evolutes, and envelope concepts.
4. After studied unit -4, the student will be able to evaluate definite integration problems and able to apply reduction formulae.
5. After studied unit -5, the student will be able to evaluate double and triple integrals.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	No	Yes	Yes	Yes	Yes	No
3	No	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-I: Differential Calculus

n^{th} derivative - Leibnitz's theorem (Without proof) and its application - Jacobians - Total differential - Maxima and Minima functions of two and three independent variables - Lagrange's method (without proof) - Simple problems.

UNIT-II: Differential Calculus (Contd...)

Polar coordinates – Relation between Cartesian and Polar coordinates - Polar Equation of a Straight line, Circle and Conic only (Related problems not necessary) - Angle between radius vector and tangent – Angle between two curves – Curvature - Radius of Curvature in Cartesian and Polar coordinates.

UNIT-III: Differential Calculus (Contd...)

Centre of Curvature – Evolutes – Envelopes – Asymptotes – Methods of finding asymptotes (Rational algebraic curves only).

UNIT-IV: Integral Calculus

Reduction formula for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sin^m x \cos^n x$ - Beta and Gamma Functions - Properties and Problems – Definite Integral – Properties - Simple Problems.

UNIT-V: Integral Calculus (Contd...)

Double Integrals - Change of order of Integration - Triple Integrals - Applications to Area, Surface Area and Volume.

Text book:

S.Narayanan and T.K.Manicavachagom Pillay (2004) *Calculus*.S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

Reference Books:

1. P.Kandasamy, K.Thilagavathy (2004), *Mathematic for B.Sc. Vol.-I, II, III & IV*, S.Chand& Company Ltd., New Delhi-55.
2. Shanti Narayan (2001) *Differential Calculus*. Shyamlal Charitable Trust, New Delhi.
3. Shanti Narayan (2001) *Integral Calculus*.S.Chand& Co. New Delhi.
4. S.Sudha (1998) *Calculus*. Emerald Publishers, Chennai.
5. G.B.Thomas and R.L.Finney. (1998) *Calculus and Analytic Geometry*, Addison Wesley (9thEdn.), Mass. (Indian Print)
6. P.R.Vittal. (2004) *Calculus*, Margham Publication, Chennai.

Course Material: website links, e-Books and e-journals

<https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx>

<https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx>

<https://mathworld.wolfram.com/topics/CalculusandAnalysis.html>

<https://www.liberty.edu/online/courses/math131/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	M	S	M	S
CO2	M	S	S	S	S	S	M	M	S	M
CO3	M	M	M	S	S	S	S	S	M	M
CO4	M	S	S	S	S	S	S	S	M	S
CO5	S	M	M	S	M	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: II

Paper type: Core

Paper code: C - 04 Name of the Paper: PAPER – 4 – ANALYTICAL GEOMETRY OF THREE DIMENSIONS Credit: 3

Total Hours per Week: 4 Lecture Hours: 4 Tutorial Hours: Practical Hours:

Course Objectives

1. This course is designed to deepen the knowledge of the students in various fundamental concepts of analytical solid geometry.
2. Knowledge about the symmetrical form of a straight line and the shortest distance between two skew lines.
3. To acquire the basic knowledge of a sphere, section of a sphere by a plane.
4. To demonstrate knowledge of the different types of cones and related problems.
5. To inculcate the study about different types of cylinders.

Course Outcomes

1. After studied unit -1, the student will be able to demonstrate knowledge of the plane and its applications.
2. After studied unit -2, the student will be able to gain knowledge of straight lines and their applications.
3. After studied unit -3, the student will be able to carry out sphere-related problems.
4. After studied unit -4, the student will be able to know the concepts of the cone, right circular cone, and enveloping cone.
5. After studied unit -5, the student will be able to carry out the calculations of the problems related to the cylinder.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	Yes	Yes	No	Yes	No
2	No	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	No	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

Unit I: Plane

General equation of a plane – Equation of a plane in the normal form – Angle between planes – Plane through three given points – Equation of a plane through the line of intersection of two planes.

UNIT II: Straight Line

Symmetrical form of a straight line – Image of a point with respect to a plane – Image of a line with respect to a plane – Length and equation of the shortest distance between two skew lines - Coplanar lines.

UNIT III: Sphere

Equation of the sphere – Length of the tangent – Tangent plane – Section of a sphere by a plane – Orthogonal spheres – Equation of a sphere through a given circle.

UNIT IV: Cone

Equation of a cone with a given vertex and a given guiding curve - Equation of a cone with its vertex at the origin - Condition for the general equation of the second degree to represent a cone - Right circular cone – Enveloping cone - Tangency of a plane to a cone.

UNIT V: Cylinder

Equation of a cylinder with a given generator and a given guiding curve - Right circular cylinder - Enveloping cylinder – Enveloping cylinder as a limiting form of an enveloping cone.

Text book:

T.K.Manickavachagom Pillay & others. (2004) *Analytical Geometry* (Three Dimensions) S.Viswanathan Printers & Publishers Pvt. Ltd. Chennai.

Reference Books:

1. P.Duraipandian and LaxmiDuraipandian (1965) *Analytical Geometry-2D*, Asia Publishing company, Bombay
2. P.Duraipandian and LaxmiDuriapandian (1975) *Analytical Geometry-3 D*, Emerald Publishers, Chennai.
3. G.B.Thomas and R.L.Finney.(1998) *Calculus and Analytic Geometry*, Addison Wesley (9thEdn.), Mass. (Indian Print).
4. P.R.Vittal (2003) *Coordinate Geometry*. Margham Publishers, Chennai

Course Material: website links, e-Books and e-journals

https://www.coursera.org/lecture/fe-exam/analytic-geometry-and-trigonometry-straight-lines-SV8UL?utm_source=mobile&utm_medium=page_share&utm_content=vlp&utm_campaign=top_button
<https://www.khanacademy.org/math/geometry-home/analytic-geometry-topic>
<https://www.liberty.edu/online/courses/math131/>
<https://www.engineering.iastate.edu/student-services/orientation/math-142-trigonometry-analytical-geometry/>
<https://www.hackmath.net/en/word-math-problems/analytic-geometry>
<https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	S	S	S	M
CO2	M	M	M	S	S	S	S	S	M	M
CO3	M	M	M	S	S	S	S	S	S	S
CO4	S	S	S	S	M	M	M	M	S	S
CO5	S	M	M	M	M	M	M	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: III

Paper type: Core

Paper code: C – 05 Name of the Paper: PAPER – 5 – DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORM

Credit: 5

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: Practical Hours:

Course Objectives

1. To provide logical skills in the formation of differential equations.
2. To expose different techniques for finding solutions to differential equations.
3. To understand the topics of simultaneous and total differential equations.
4. To acquire a strong knowledge about Laplace and inverse Laplace transforms.
5. Knowledge about solving partial differential equations.

Course Outcomes

1. After studied unit -1, the student will be able to know the various methods of solving the first-order higher degree differential equations.
2. After studied unit -2, the student will be able to carry out the different methods of solving the second order differential equations.
3. After studied unit -3, the student will be able to understand the concepts of total differential equations and solve the problems.
4. After studied unit -4, the student will be able to demonstrate knowledge of Laplace transform and its applications.
5. After studied unit -5, the student will be able to solve partial differential equations.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	No	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	No	Yes	Yes

UNIT-I: Ordinary Linear Differential Equations

Bernoulli Equation – Exact Differential Equations – Equations Reducible to Exact Equations – Equations of First order and Higher degree: Equations solvable for p, Equations solvable for x and Equations Solvable for y – Clairaut's Equation.

UNIT-II: Ordinary Linear Differential Equations [Contd...]

Method of Variation of Parameters – 2nd order Differential Equations with Constant Coefficients for finding the P.I's of the form $e^{ax} V$, where V is $\sin(mx)$ or $\cos(mx)$ or x^n – Equations reducible to Linear equations with constant coefficients – Cauchy's homogeneous Linear Equations – Legendre's Linear Equations.

UNIT-III: Differential Equations of Other Types

Simultaneous Equations with Constant coefficients – Total Differential Equations
Simultaneous Total Differential Equations – Equations of the form $dx/P = dy/Q = dz/R$

UNIT-IV: Laplace Transform

Transform-Inverse Transform – Properties – Application of Laplace Transform to solution of first and second order Linear Differential equations [with constant coefficients].

UNIT-V: Partial Differential Equations

Formation of PDF – Complete Integral – Particular Integral – Singular Integral – Equations Solvable by direct Integration – Linear Equations of the first order – Non-linear Equations of the first Order:

Types: $f(p, q) = 0$, $f(x, p, q) = 0$, $f(y, p, q) = 0$, $f(z, p, q) = 0$, $f(x, q) = f(y, p)$,
 $z = px + qy + f(p, q)$.

Text book:

S.Narayanan and T.K.Manicavachagom Pillay[2004] , Calculus, S.Viswanathan Printers and publishers Private Ltd., Chennai.

Reference Books:

1. M.D. Raisinghania, [2001] Ordinary and Partial Differential Equations, S.Chand and Co., New Delhi.
2. M.R.Spiegel [2005] Advanced Mathematics for Engineers and Scientists, Tata McGraw Hill Edition, New Delhi.
3. M.R.Spiegel [2005] Laplace Transforms, Tata McGraw Hill Edition, New Delhi.
4. S.Sudha [2003] Differential Equations and Integral Transforms, Emerald Publishers, Chennai.
5. M.K.Venkataraman [1998] Higher Engineering Mathematics, III-B, National Publishing Co., Chennai.
6. P.R.Vittal [2004] Differential Equations and Laplace Transform, Margham Publications, Chennai.
7. P.Kandasamy, K.Thilagavathy [2004] Mathematics for B.Sc. Vol. III S.Chand& Co., Ltd., New Delhi-55.
8. B.S.Grewal [2002] Higher Engineering Mathematics, Khanna Publishers, New Delhi.
9. Sheply. L.Ross [1984] Differential Equations, III Edition John Wiley and Sons, New York.

Course Material: website links, e-Books and e-journals

<https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx>

<https://mathworld.wolfram.com/topics/CalculusandAnalysis.html>

<https://ocw.mit.edu/courses/18-03-differential-equations-spring-2010/pages/syllabus/>
<https://ocw.mit.edu/courses/18-031-system-functions-and-the-laplace-transform-spring-2019/pages/instructor-insights/>
<http://www.wolfram.com/wolfram-u/introduction-to-differential-equations/>
<https://www.classcentral.com/course/edx-differential-equations-fourier-series-and-partial-differential-equations-11763>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	S	S	S	S
CO2	S	S	S	S	S	M	M	M	S	M
CO3	M	M	M	M	S	S	S	S	S	S
CO4	S	S	S	S	M	M	M	M	M	S
CO5	S	S	S	S	M	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: III

Paper type: Skill based subject

**Paper code: S – 01 Name of the Paper: PAPER – 1 – MATHEMATICS FOR
COMPETITIVE EXAMINATIONS-I**

Credit: 2

Total Hours per Week: 3 Lecture Hours: 3 Tutorial Hours: Practical Hours:

Course Objectives

1. To introduce the concepts of mathematics with emphasis on analytical ability, and computational skills which are required to write the competitive examinations.
2. The students should learn to calculate the LCM and HCF of a pair of integers and of any set of given numbers, and hence that of fractions.
3. To evaluate the square roots of perfect squares and of perfect cubes. To understand that the square roots and cube roots are inverses of squares, cubes respectively. To understand the term average and what it represents.
4. To learn to solve the tricky questions related to ages, asked in banking and other competitive examinations.
5. All students should be able to understand irrational numbers and how they differ from rational numbers.

Course Outcomes

1. After studied unit-1, the student will be able to answer the questions related to the number system.
2. After studied unit-2, the student will be able to answer real-life simple problems by applying the HCF and/or LCM.
3. After studied unit-3, the student will be able to apply the correct sequence of operations to find out the value of a given mathematical expression.
4. After studied unit-4, the student will be able to solve the problems involving square roots, cube roots, and average.
5. After studied unit-5, the student will be able to carry out the problems related to ages, and simplify products and quotients involving surds.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

Number System.

UNIT - II

H.C.F. and L.C.M. of numbers, Decimal Fractions.

UNIT - III

Simplification.

UNIT - IV

Square roots and Cube Roots, Average.

UNIT -V

Problems on Numbers, Problems on Ages, Surds and Indices.

Text book:

1. R.S.Aggarwal, [2017] Quantitative Aptitude for Competitive Examinations, S Chand and Company, New Delhi.

Chapters 1 to 9.

Reference Book:

1. Praveen R. V. Quantitative Aptitude and Reasoning, PHI Learning Pvt. Ltd, New Delhi.

Course Material: website links, e-Books and e-journals

<https://study91.co.in/subject-category-list/math-classes>

<https://unacademy.com/class/mathematics-for-all-competitive-exams/KDPVC3M1>

https://artofproblemsolving.com/wiki/index.php/Resources_for_mathematics_competitions

<https://examsdaily.in/free-online-coaching-competitive-exams>

<https://ariyalur.nic.in/document/tn-government-website-for-preparing-competitive-exams-and-free-online-class/>

<https://study91.co.in/live-online-classes>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	S	M
CO2	M	S	S	S	S	S	S	M	M	S
CO3	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	M	M	S
CO5	S	M	S	M	M	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: III

Paper type: Non-Major Elective

Paper code: NME – 01 Name of the Paper: PAPER – 1 – BASIC MATHEMATICS Credit: 2

Total Hours per Week: 2 Lecture Hours: 2 Tutorial Hours: Practical Hours:

Course Objectives

1. To provide basic knowledge about set theory, De-Morgan's laws, and distributive tables.
2. The students should understand various types of number systems and the conversion of numbers from one system to another.
3. Explain and exemplify logical statements, tautology, and contradiction.
4. To know about determinants, properties, and applications of determinants.
5. To inculcate various types of matrices, operations on matrices, and their applications.

Course Outcomes

1. After studied unit -1, the student will be able to define subset, proper subset, and equivalent sets and write sets using set notations.
2. After studied unit -2, the student will be able to describe various number systems and convert one number system into another.
3. After studied unit -3, the student will be able to express logical statements and prepares the truth tables.
4. After studied unit -4, the student will be able to find the determinant values 2x2, and 3x3 matrices and solve a system of equations by applying Cramer's rule.
5. After studied unit -5, the student will be able to get a strong background in matrices and be able to solve a system of non-homogeneous equations.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	Yes
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I SETS

Definition - Subsets - Power sets - Equality of sets - Finite and Infinite sets - Set operations - De-Morgan's laws - Distributive tables - Cartesian products.

UNIT - II NUMBER SYSTEM

Binary, octal, hexadecimal numbers - conversion from one system to another system - addition and subtraction - one's complement.

UNIT – III SYMBOLIC LOGICS

Logical statements - connectives - truth tables - tautologies operations - groups - (problems and simple properties only).

UNIT - IV DETERMINANTS

Definition - properties (without proof) - application of determinants - Cramer's rule for the solution of a system of equations

UNIT - V MATRICES

Definition - types of matrices - operations on matrices - adjoint and inverse - applications - solving non-homogeneous equations.

Text books:

1. Dr.M.K.Venkataaraman & others, "Discrete mathematics and structures", The National Publishing Company, Madras.
2. Trembly J.P and Manohar.R "Discrete Mathematical Structures with applications to computer science" Tata McGraw - Hill Pub., Co., Ltd. New Delhi 2003.

Reference Books:

1. P.R.Vittal "Algebra, Analytical Geometry and trigonometry" Margham Publications, Chennai.
2. Richard Johnsonbaugh, "Discrete Mathematics" fifth Edn., Pearson Education Asia, New Delhi 2002.

Course Material: website links, e-Books and e-journals

<https://alison.com/topic/learn/115323/symbolic-logic-introduction>

<https://www.openculture.com/symbolic-logic-a-free-online-course>

<https://www.udemy.com/course/basic-math-course/>

<https://www.learndirect.com/upskilluk/free-maths>

<https://infolearners.com/courses/basic-math-online-course-free/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	M	M	M
CO2	S	S	S	S	M	M	S	S	S	S
CO3	S	M	S	M	S	S	M	S	M	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	S	M	S	S	M	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: IV

Paper type: Core

Paper code: C – 06 Name of the Paper: PAPER – 6 – VECTOR ANALYSIS AND FOURIER SERIES

Credit: 4

Total Hours per Week: 4 Lecture Hours: 4 Tutorial Hours: Practical Hours:

Course Objectives

1. To know the fundamental concepts of vector calculus, which are essential in applied mathematics.
2. To develop a detailed knowledge about vector differentiation.
3. Knowledge about vector integration.
4. Knowledge about applications of Stoke's, Gauss divergence, and Green's theorems.
5. To study the details of the full-range and half-range Fourier Series.

Course Outcomes

1. After studied unit -1, the student will be able to demonstrate knowledge of the physical and geometrical meaning of the derivative and its applications.
2. After studied unit -2, the student will be able to know the concepts of divergence, curl of a vector, and their physical interpretations.
3. After studied unit -3, the student will be able to evaluate the line, surface, and volume integrals.
4. After studied unit -4, the student will be able to know the applications of Stoke's, Gauss divergence, and Green's theorems.
5. After studied unit -5, the student will be able to express the given function as a Fourier series.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	No	Yes	Yes	No	Yes	Yes

UNIT-I: Differential Vector Calculus

Differentiation of a Vector – Geometrical Interpretation of the Derivative - Differentiation Formulae - Velocity and Acceleration Vectors – Scalar and Vector Point functions – Level surface – Gradient – Equation of tangent plane – Unit normal to the given Surface - Differentiation of dot and Cross Products - Partial Derivatives of Vectors - Differentials of Vectors.

UNIT-II: Gradient, Divergence and Curl

Vector Differential Operator Del - Directional Derivative - Geometric Interpretation - Gradient of the sum of Functions; of the product of functions and of a function of function - Operations involving Del - Divergence of a Vector and its Physical

Interpretation - Curl of a Vector and its Physical Interpretation - Expansion Formulae for Operators involving Del - Solenoidal and Irrotational – Simple Problems.

UNIT-III: Vector Integration

The Line Integral - Surface Integral and its Physical Meaning – Volume integral - Simple Problems.

UNIT-IV: Vector Integration(Contd.)

Statements of Stoke's Theorem, Gauss Divergence Theorem and Green's Theorem - Simple Problems – Simple Problems Solved to Verify the Theorems.

UNIT-V: Fourier Series

Euler's Formulae - Conditions for Fourier Expansion - Functions having Discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even periodic Functions - Half-range Series - Parseval's Formula.

Text book:

Erwin Kreyszig (2011), Advanced Engineering Mathematics, John Wiley & Sons, Inc. (10th edition), Printed in the United States of America

Reference Books:

1. G.B.Thomas and R.L.Finney. (1998) *Calculus and Analytic Geometry*, Addison Wesley (9th edition), Mass. (Indian Print).
2. M.K.Venkataraman. (1992) *Engineering Mathematics-Part B*. National Publishing Company, Chennai.
3. P.R.Vittal. (2004) *Vector Calculus, Fourier series and Fourier Transform*. Margham Publications, Chennai.
4. B.S.Grewal (2012). *Higher Engineering Mathematics*, Khanna Publishers(42nd edition), Nai Sarak, New Delhi.
5. S.J.Venkatesan, *Vector Analysis, and Fourier Analysis*, Sri Krishna Publications, Chennai.

Course Material: website links, e-Books and e-journals

<https://www.classcentral.com/course/vector-calculus-engineers-17387>

<https://www.classcentral.com/course/brilliant-vector-calculus-59277>

<https://www.sydney.edu.au/units/MATH2021>

<https://ocw.mit.edu/courses/18-085-computational-science-and-engineering-i-fall-2008/resources/lecture-28-fourier-series-part-1/>

<https://www.classcentral.com/course/edx-differential-equations-fourier-series-and-partial-differential-equations-11763>

<https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	M
CO3	M	M	M	M	S	S	S	M	S	S
CO4	M	M	M	M	M	S	S	S	S	M
CO5	M	S	S	S	S	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: IV

Paper type: Core

Paper code: C – 07

Name of the Paper: PAPER – 7 – STATICS

Credit: 4

Total Hours per Week: 5

Lecture Hours: 5

Tutorial Hours: Practical Hours:

Course Objectives

1. To provide a basic knowledge of the behavior of various types of forces and stresses the development of skills in the formation of suitable mathematical models and problems solving techniques.
2. Knowledge about the equilibrium of a particle under the action of several forces.
3. Domain knowledge about applications involving frictional forces.
4. Basic knowledge about center of mass of different laminas.
5. To acquire basic knowledge about hanging strings and suspension bridges.

Course Outcomes

1. After studied unit -1, the student will be able to know about the forces and equilibrium of a particle.
2. After studied unit -2, the student will be able to identify the parallel forces and couples and solve related problems.
3. After studied unit -3, the student will be able to demonstrate knowledge of friction and its applications.
4. After studied unit -4, the student will be able to find the centre of mass of different laminas.
5. After studied unit -5, the student will be able to demonstrate knowledge of sag and suspension bridge and solve related problems.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	No	Yes	No

Unit : I : Forces on a Particle

Forces – Types of forces – Resultant of three forces related to triangle acting at a point – Resultant of several forces acting on a particle – Equilibrium of a particle under three forces – Equilibrium of a particle under several forces (Chapter 2 : Sections 2.1, 2.2 ; Chapter 3 : Sections 3.1)

Unit – II Forces on a Rigid body

Moment of a force – General motion of a rigid body – Equivalent system of forces – Parallel forces – Forces along the sides of the triangle – Couples (Chapter 4 : Sections 4.1 to 4.6)

Unit – III : Specific Reduction of Forces and Friction

Reduction of coplanar forces into a force and couple – Friction – Laws of friction – Cone of friction and angle of friction – Applications involving frictional forces (Chapter 5 : Sections 5.1, 5.2 (excluding 5.2.1))

Unit – IV : Center of Mass

Center of mass – Center of mass of a triangular lamina – Three particles of same mass – Three particles of certain masses – Uniform rods forming a triangle – Lamina in the form of a trapezium and solid tetrahedron – Center of mass using integration – Circular arc – Circular lamina – Elliptic lamina – Solid hemisphere – Solid right circular cone – Hemispherical shell – Hollow right circular cone – Cardioid lamina (Chapter 6 : Sections 6.1, 6.2, 6.2.1, 6.2.2)

Unit – V : Hanging Strings

Equilibrium of a uniform homogeneous string – Equation of the shape of the string hanging under gravity in Cartesian form – Equation of the shape of the string hanging under gravity in parametric form – Sag – Suspension bridge (Chapter 9 : Sections 9.1, 9.2)

Text book:

P.Duraipandian, Laxmi Duraipandian, Muthamizh Jayapragasam, Mechanics, 6-e, S.Chand and Company Ltd., 2005.

Reference Books:

1. V.Dharmapadam, Statics, S.Viswanathan Pvt.Ltd., Madras, 1974.
2. R.C.Hibbler, Engineering Mechanics, Statics and Dynamics, Macmillan Publishing Company.
3. S.L.Loney, Principle of mechanics, Macmillan and Company Ltd., 1969
4. T.K.Manichavachagam Pillai and Narayanan, Statics, The National Publishing company, Madras 1961
5. T.Natarajan, T.Govinda Rajan, G.R.Venkataraman, K.Muthuswamy, Statics, Rochouse and sons, Madras, Chand and Company Ltd., New Delhi 1970.
6. S.Narayan, R.Hanumantha Rao, K.Sitaraman, P.Kandaswamy, Statics, S.c.

Course Material: website links, e-Books and e-journals

<http://mathworld.wolfram.com>

<https://www.e-booksdirectory.com/details.php?ebook=6650>

<https://ocw.mit.edu/courses/8-223-classical-mechanics-ii-january-iap-2017/pages/lecture-notes/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	S	S	S	M	M	M
CO2	M	M	M	M	S	S	M	M	S	S
CO3	S	M	S	S	M	M	M	M	M	M
CO4	S	S	M	M	M	M	M	M	M	M
CO5	M	M	S	S	S	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: IV

Paper type: Skill based subject

Paper code: S – 02

**Name of the Paper: PAPER – 2 – MATHEMATICS FOR
COMPETITIVE EXAMINATIONS-II**

Credit: 2

Total Hours per Week: 2

Lecture Hours: 2

Tutorial Hours:

Practical Hours:

Course Objectives

1. To introduce the concepts of mathematics with emphasis on analytical ability and computational skills required to write the competitive examinations.
2. To understand the concepts of percentage, profit and loss, and related problems.
3. Students will learn to solve the problems related to ratio and proportion.
4. Students will learn the concepts of logarithms, partnership, and chain rule, and solve the related problems easily.
5. Students will learn to solve the problems related to time and work.

Course Outcomes

1. After studied unit-1, the students will be able to solve real-life problems related to percentages.
2. After studied unit-2, the student will be able to carry out the problems related to profit and loss.
3. After studied unit-3, the student will be able to carry out problems related to ratio and proportion.
4. After studied unit-4, the student will be able to demonstrate knowledge of logarithms, partnership, and chain rule and solve the related problems.
5. After studied unit-1, the students will be able to solve real-life problems related to time and work.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

Percentage.

UNIT - II

Profit and Loss.

UNIT - III

Ratio and Proportion.

UNIT - IV

Logarithms, Partnership, Chain rule.

UNIT - V

Time and work.

Text book:

1. R.S.Aggarwal, [2017] Quantitative Aptitude for Competitive Examinations, S Chand and Company, New Delhi.
Chapters 10 to 17.

Reference Book:

1. Praveen R. V. Quantitative Aptitude and Reasoning, PHI Learning Pvt. Ltd, New Delhi.

Course Material: website links, e-Books and e-journals

https://artofproblemsolving.com/wiki/index.php/Resources_for_mathematics_competitions

<https://examsdaily.in/free-online-coaching-competitive-exams>

<https://ariyalur.nic.in/document/tn-government-website-for-preparing-competitive-exams-and-free-online-class/>

<https://study91.co.in/live-online-classes>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	S	M	S	S	M
CO2	M	S	S	S	S	S	S	M	M	S
CO3	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	M	M	S
CO5	S	M	S	M	M	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: IV

Paper type: Non-Major Elective

Paper code: NME – 02

Name of the Paper: PAPER – 2 – FOUNDATION

MATHEMATICS FOR COMPETITIVE EXAMINATIONS

Credit: 2

Total Hours per Week: 2

Lecture Hours: 2

Tutorial Hours:

Practical Hours:

Course Objectives

1. To introduce the concepts of mathematics with emphasis on analytical ability and computational skills required to write the competitive examinations.
2. To acquire basic knowledge to calculate the ratio, proportion, and percentages.
3. To Understand the term percentage and hence the average and what it represents.
4. To learn how to solve the tricky questions based on profit and loss.
5. All students should know the calculations of simple and compound interest. The students will learn the relationship between time/speed/distance through a variety of activities.

Course Outcomes

1. After studied unit-1, the student will be able to solve real-life problems related to percentages.
2. After studied unit-2, the student will be able to carry out real-world problems related to profit and loss.
3. After studied unit-3, the student will be able to demonstrate knowledge of real-life problems based on the ratio and proportions.
4. After studied unit-4, the student will be able to demonstrate knowledge of the work rate formula and apply this technique to solve several real-life problems.
5. After studied unit-5, the students will be able to solve real-life problems based on simple and compound interest.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

Percentage

UNIT - II

Profit and Loss.

UNIT - III

Ratio and proportion

UNIT - IV

Time, Distance and Work

UNIT - V

Simple and Compound Interest.

Text book:

R.S.Aggarwal, [2017] Quantitative Aptitude for Competitive Examinations, S Chand and Company, New Delhi.

Chapters 11 to 13, 18, 19, 22, 23.

Reference Book:

Praveen R. V. Quantitative Aptitude and Reasoning, PHI Learning Pvt. Ltd, New Delhi.

Course Material: website links, e-Books and e-journals

<https://study91.co.in/subject-category-list/math-classes>

<https://unacademy.com/class/mathematics-for-all-competitive-exams/KDPVC3M1>

https://artofproblemsolving.com/wiki/index.php/Resources_for_mathematics_competitions

<https://www.wiziq.com/tutorials/maths-for-competitive-exams>

<https://www.teacheron.com/online-competitive-maths-tutors>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	M	S	S	M	S	S	S
CO2	M	S	S	S	M	S	S	M	M	S
CO3	S	M	S	S	S	S	M	S	S	M
CO4	S	S	S	M	S	S	M	M	M	S
CO5	S	M	S	M	M	M	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: V

Paper type: Core

Paper code: C – 08 Name of the Paper: PAPER – 6 – ABSTRACT ALGEBRA Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: Practical Hours:

Course Objectives

1. To state the group axioms and to verify whether a given set and a binary operation form a group.
2. To define a subgroup, order of an element, order of a group, cyclic group, abelian or commutative group.
3. To compute the order, powers, and inverse of an element with concrete examples.
4. To define and compute cyclic groups, the additive group mod n , the multiplicative group mod p , the symmetric group, and the dihedral group.
5. To state and prove Lagrange's Theorem.
6. To know the fundamental concepts of ring theory, ideals, quotient rings, integral domains, and fields.

Course Outcomes

1. After studied unit-1, the student will be able to determine whether a given set is a group under a binary operation and find its subgroup.
2. After studied unit-2, the student will be able to demonstrate knowledge of normal subgroup, homomorphism, and isomorphism.
3. After studied unit-3, the student will be able to carry out the problems based on permutation.
4. After studied unit-4, the student will be able to demonstrate knowledge of rings, ideals, and integral domain.
5. After studied unit-5, the student will be able to understand the concepts of ideals and Euclidean rings.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I GROUPS

Definition of a Group - Examples - Subgroups - simple problems.

UNIT - II GROUP [CONTD]

Counting Principle - Normal Subgroups - Homomorphism - simple problems.

UNIT – III GROUP [CONTD]

Automorphisms - Cayley's Theorem - Permutation Groups - simple problems.

UNIT - IV RINGS

Definition and Examples of Rings- Some special classes of Rings -
Homomorphism of Rings - Ideals and Quotient Rings - simple problems.

UNIT - V RINGS [CONTD]

More Ideals and Quotient Rings - The field of quotients of an Integral domain -
Euclidean rings - simple problems.

Text book:

I.N.Herstein.[1989], "Topics in Algebra", [2nd ed] Wiley Eastern Ltd. New Delhi.
Chapter:2 (Sec: 2.1 - 2.10 [Omit Applications 1 and 2 of 2.7]),
Chapter : 3 (Sec: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7)

Reference books:

1. S.Arumugam[2004], "Modern Algebra", SciTech Publications, Chennai.
2. J.B.Fraleigh [1987], "A First Course in Algebra", [3rd edition] Addison Wesley, Mass. [Indian Print]
3. Lloyd R.Jaisingh and Frank Ayres,Jr. [2005], "Abstract Algebra", [2nd edition], Tat McGraw Hill, New Delhi.
4. M.L.Santiago[2002], "Modern Algebra", Tat McGraw Hill, New Delhi
5. SurjeetSingh and Qazi Zameeruddin[1982], "Modern algebra", Vikas Publishing House Pvt.Ltd. New Delhi.

Course Material: website links, e-Books and e-journals

<https://tutorial.math.lamar.edu/Extras/AlgebraTrigReview/AlgebraTrig.aspx>
<https://ocw.mit.edu/courses/18-703-modern-algebra-spring-2013/>
<https://ocw.mit.edu/courses/18-701-algebra-i-fall-2010/>
<https://www.classcentral.com/course/swayam-introduction-to-abstract-and-linear-algebra-14142>
<https://www.classcentral.com/subject/algebra>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	M	S	S	M
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	M	S	M	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: V

Paper type: Core

Paper code: C – 09 Name of the Paper: PAPER – 9 – REAL ANALYSIS – I Credit: 4

Total Hours per Week: 6 Lecture Hours: 6 Tutorial Hours: Practical Hours:

Course Objectives

1. To explore the topics such as convergence and divergence of sequences and series, the limit of a function on the real line, metric spaces, continuous functions, open sets, and closed sets.
2. To identify the subsequence of a given sequence, test whether a given sequence is convergent or divergent.
3. To know about convergence and divergence of sequences and series, and test the convergence of sequences and series.
4. To acquire fundamental knowledge about metric spaces and limits on metric spaces.
5. To inculcate the knowledge about continuous functions on a metric space, open sets, and closed sets.

Course Outcomes

1. After studied unit -1, the student will be able to identify countable sets, the limit of a sequence, and its convergence.
2. After studied unit -2, the student will be able to demonstrate knowledge of divergent sequence, bounded sequence, monotone sequence, and Cauchy sequence.
3. After studied unit -3, the student will be able to carry out convergence and divergence of series and related problems.
4. After studied unit -4, the student will be able to express metric spaces and convergent and divergent sequences in a metric space.
5. After studied unit -5, the student will be able to demonstrate knowledge of open sets and closed sets with suitable examples.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I FUNCTIONS AND SEQUENCES

Functions - real valued functions - equivalence - countability and real numbers - least upper bound - definition of sequence and subsequence - limit of a sequence - convergent sequence - Simple problems.

Ch. 1.4 to 1.7, 2.1 to 2.3.

UNIT - II SEQUENCES [CONTD...]

Divergent sequences - Bounded sequences - Monotone sequence - Operations on convergent sequences - Operations on divergent sequences - Limit superior and Limit inferior - Cauchy sequences - Simple problems.

Ch. 2.4 to 2.10.

UNIT - III SERIES OF REAL NUMBERS

Convergence and Divergence - Series with non negative terms - Alternating series - conditional convergence and Absolute convergence - Test for Absolute convergence - Simple problems.

Ch. 3.1 to 3.4 and 3.6.

UNIT - IV SERIES OF REAL NUMBERS [CONTD...]

Test for Absolute convergence - The class ℓ^2 - Limit of a function on the real line - Metric spaces - Limits in Metric spaces - Simple problems.

Ch. 3.7, 3.10, 4.1 to 4.3.

UNIT - V CONTINUOUS FUNCTIONS ON METRIC SPACES

Functions Continuous at a point on the real line - Reformulation - Functions Continuous on a Metric Spaces - Open Sets - Closed Sets - simple problems.

Ch. 5.1 to 5.5.

Text book:

R.Goldberg [2000] Methods of Real Analysis. Oxford & IBH Publishing Co., New Delhi.

Reference books:

1. Tom M.Apostol [1974] Mathematical Analysis, 2nd Edition, Addison-Wesley New York.
2. Bartle, R.G. and Shebert [1976] Real Analysis, John Wiley and Sons Inc., New York.
3. Malik, S.C. and SavitaArora [1991] Mathematical Analysis, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansilal [1991], Introduction to Real Analysis, SatyaPrakashan, New Delhi.

Course Material: website links, e-Books and e-journals

<https://mathworld.wolfram.com/topics/CalculusandAnalysis.html>

<https://ocw.mit.edu/courses/18-100a-real-analysis-fall-2020/>

<https://ocw.mit.edu/courses/18-100b-analysis-i-fall-2010/>

<https://ocw.mit.edu/courses/18-s097-introduction-to-metric-spaces-iap-2022/>

<https://pkalika.in/2019/09/06/real-analysis/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	S	S	S	S	M	M	M	S
CO2	S	S	M	M	M	M	M	M	M	S
CO3	S	S	S	M	M	S	S	M	S	S
CO4	M	M	M	S	S	S	M	M	M	M
CO5	M	S	S	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**B.Sc. MATHEMATICS – 2022-2023 onwards****Semester: V****Paper type: Core****Paper code: C – 10****Name of the Paper: PAPER – 10 – DYNAMICS****Credit: 4**

Total Hours per Week: 6

Lecture Hours: 6

Tutorial Hours: Practical Hours:

Course Objectives

1. To introduce the study of the motion of particles or bodies under the influence of forces and to provide a basic knowledge of the behavior of objects in motion.
2. Knowledge about Projectiles.
3. To acquire knowledge about simple harmonic motions.
4. Basic knowledge about different types of Impacts.
5. To understand the knowledge about various methods to find the central orbits.

Course Outcomes

1. After studied unit -1, the student will be able to demonstrate knowledge of velocity, acceleration, and coplanar motion.
2. After studied unit -2, the student will be able to gain knowledge of projectile and its applications.
3. After studied unit -3, the student will be able to know about simple harmonic motion and simple pendulum.
4. After studied unit -4, the student will be able to carry out problems related to impact and laws of impact.
5. After studied unit -5, the student will be able to demonstrate knowledge of the central orbits.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	No	Yes	Yes
5	No	Yes	Yes	Yes	Yes	Yes

Unit – I : Kinematics

Introduction – Velocity – Relative velocity – Angular velocity – Acceleration – Rectilinear motion – Rectilinear motion with a constant acceleration – Relative angular velocity – Coplanar motion (Chapter I : Sections 1.2 to 1.4)

Unit – II : Simple Harmonic Motion

Simple harmonic motion – Projection of a particle having a uniform circular motion – composition of two simple harmonic motions of same period – Simple harmonic motion along a horizontal line – Simple harmonic motion along a vertical line – Motion under gravity in a resisting medium (Chapter 12: Sections 12.1, 12.3, 12.4)

Unit – III : Projectiles

Forces on a projectile – Displacement as a combination of vertical and horizontal displacements – Nature of trajectory – Maximum horizontal range for a given velocity – Two trajectories with a given speed and range – Projectile projected horizontally – Projectile projected on an inclined plane – Maximum range on a inclined plane – Enveloping parabola (Chapter 13 : Sections 13.1 to 13.3)

Unit – IV : Impact

Impulsive force – Conservation of linear momentum – Impact of a sphere – Laws of impact – Impact of two smooth spheres – Direct impact of two smooth spheres – Direct impact of a smooth sphere on a plane – Oblique impact of a smooth sphere on a plane – Oblique impact of two smooth spheres. (Chapter 14 : Sections 14.1 to 14.5)

Unit – V : Central orbits

Differential equation of a central orbit – Laws of a central force – Methods to find the central orbits (Chapter 16: Sections 16.1, 16.2)

Text book:

P.Duraipandian, Laxmi Duraipandian, Muthamizh Jayapragasam, Mechanics, S.Chand and Company Ltd., 2010.

Reference books:

1. A.V.Dharmapadam, Dynamics, S.Viswanathan Pvt Ltd., 1981
2. S.J.Loney, Dynamics of a particle, Macmillan and Company Ltd., 1969
3. John L.Synage, Byron A.Griffth, Principles of Mechanics, McGraw Hill International Book Company, Singapore, 1970
4. M.K.Venkataraman, Text book of Dynamics, Sharma's Sanatorium press, Pudukottai, 1990

Course Material: website links, e-Books and e-journals

<http://mathworld.wolfram.com>

<https://www.classcentral.com/course/rigid-body-dynamics-20108>

<https://nptel.ac.in/courses/112106286>

<https://ocw.mit.edu/courses/8-223-classical-mechanics-ii-january-iap-2017/pages/lecture-notes/>

<https://www.edx.org/learn/mechanics>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	M	S	M
CO2	M	S	M	M	S	M	S	M	M	S
CO3	S	M	S	S	M	S	S	M	S	M
CO4	M	M	M	S	S	S	M	M	S	S
CO5	M	S	S	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**B.Sc. MATHEMATICS – 2022-2023 onwards****Semester: V****Paper type: Elective****Paper code: E – 01 Name of the Paper: PAPER – 1A – LINEAR PROGRAMMING Credit:3**

Total Hours per Week: 5

Lecture Hours: 5

Tutorial Hours: Practical Hours:

Course Objectives

1. To describe the role of mathematical models in operations research and decision making.
2. Formulate a real-life problem into a linear programming problem.
3. To solve an LPP by graphical and other methods.
4. To acquire knowledge of transportation and assignment problems.
5. To understand a knowledge of simulation and its applications

Course Outcomes

1. After studied unit-1, the student will be able to formulate a real-world problem into an LPP and carry out the calculations of the simplex method.
2. After studied unit-2, the student will be able to solve transportation problems.
3. After studied unit-3, the student will be able to understand analogies between transportation problems and assignment models.
4. After studied unit-4, the student will be able to demonstrate knowledge of game theory and its applications.
5. After studied unit-5, the student will be able to know the concept of simulation and solve the problems by applying the Monte Carlo simulation technique.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I

Linear programming problem - Mathematical formulation of the problem - Graphical solution method - Simplex method - The Big-M method - Duality - Dual simplex method (Simple Problems).

UNIT - II

Definitions of the transportation model - Formulation and solution of transportation models - Finding an initial basic feasible solution (NWCM - LCM - VAM) - Degeneracy in Transportation Problem - Transportation Algorithm (MODI Method)

UNIT - III

Definition of Assignment models - Mathematical representation of assignment models - Comparison with the transportation models - Solution of the assignment model - The Hungarian methods for solution of the assignment models - variation of the assignment

problem - Travelling salesman problem.

UNIT - IV

Games and Strategies - Two person zero sum - Some basic terms - the maximin-minimax principle - saddle points - Games without saddle points-Mixed strategies - graphic solution $2 \times n$ and $m \times 2$ games.

UNIT - V

Simulation - applications - advantages and disadvantages - Monte Carlo method - simple problems.

Text book:

Gupta P.K. and Hira D.S., (2000) Problems in Operations Research, S.Chand & Co. Delhi

Reference Books

1. J.K.Sharma, (2001) Operations Research: Theory and Applications, Macmillan, Delhi
2. KantiSwaroop, Gupta P.K. and Manmohan, (1999) *Problems in Operations Research*, Sultan Chand & Sons., Delhi.
3. V.K.Kapoor [1989] *Operations Research*, sultan Chand & sons.
4. Ravindran A., Philips D.T. and Solberg J.J., (1987) *Operations research*, John Wiley & Sons, New York.
5. Taha H.A. (2003) *Operations Research*, Macmillan Publishing Company, New York.
6. S.J.Venkatesan, *Operations Research*, J.S. Publishers, Cheyyar-604 407.

Course Material: website links, e-Books and e-journals

[https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-](https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/resources/lecture-15-linear-programming-lp-reductions-simplex/)

[2015/resources/lecture-15-linear-programming-lp-reductions-simplex/](https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/resources/lecture-15-linear-programming-lp-reductions-simplex/)

<https://www.mygreatlearning.com/academy/learn-for-free/courses/linear-programming-examples>

<https://www.studocu.com/en-us/document/university-at-buffalo/advanced-topics-in-computer-science/lecture-notes-introduction-to-linear-programming-1/647312>

<https://www.udemy.com/course/operation-research-a-course-on-linear-programming-problems/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	S	S	M
CO2	M	S	S	M	S	S	S	S	S	S
CO3	S	S	M	S	M	S	M	S	S	S
CO4	S	M	S	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: V

Paper type: Elective

Paper code: E – 01 Name of the Paper: PAPER – 1B – SPECIAL FUNCTIONS Credit:3

Total Hours per Week: 5 Lecture Hours: 5 Tutorial Hours: Practical Hours:

Course Objectives

1. To develop computational skills in certain special functions which are frequently occurring in higher mathematics and mathematical physics.
2. Learn the concepts of simultaneous linear differential equations and some solvable types of nonlinear equations.
3. Basic knowledge about numerical solutions using the Taylor series.
4. To understand the concepts of Bessel functions, Legendre functions, and their properties.
5. To give an insight about Fourier integral, term by term differentiation of Fourier series and Legendre series.

Course Outcomes

1. After studied unit -1, the student will be able to acquire the concept of linear operators, and solve simultaneous linear differential equations.
2. After studied unit -2, the student will be able to interpret Adams and Modified Adams method and extrapolation techniques.
3. After studied unit -3, the student will be able to understand the concept of power series solution.
4. After studied unit -4, the student will be able to explain the concepts of Bessel functions, Legendre functions, and their properties.
5. After studied unit -5, the student will be able to analyze term-by-term differentiation of the Fourier series and Legendre series.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT-I:

Properties of Linear Operators - Simultaneous Linear Differential Equations - Special Solvable Types of Nonlinear Equations.

UNIT-II:

Numerical Solutions Using Taylor Series - Adams and Modified Adams Method - Extrapolation with Differences

UNIT-III:

Properties of Power Series - Examples - Singular Points of Linear Second Order Differential Equations - Method of Frobenius.

UNIT-IV:

Bessel Functions - Properties - Legendre Functions.

UNIT-V:

Term by Term Differentiation of Fourier Series, Legendre Series - Fourier Integral.

Recommended Text

1. F.B.Hildebrand. (1977) Advanced Calculus for Applications. Prentice Hall. New Jersey.

Reference Books

1. J.N.Sharma and R.K.Gupta (1998) Special Functions, Krishna Prakashan Mandir, Meerut.
2. Satya Prakash. (2004) Mathematical Physics. Sultan & Sons. New Delhi.
3. B.D.Gupta (1978) Mathematical Physics, Vikas Publishing House.

Course Material: website links, e-Books and e-journals

special-function-kalika124pages.pdf

<https://mathworld.wolfram.com/topics/CalculusandAnalysis.html>

<https://alison.com/topic/learn/127039/special-functions>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	S	M	S	M	S	M
CO2	S	M	S	S	M	S	S	S	M	S
CO3	M	M	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	M	S	M	S	S
CO5	M	S	S	M	S	S	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**B.Sc. MATHEMATICS – 2022-2023 onwards****Semester: V****Paper type: Elective****Paper code: E – 02****Name of the Paper: PAPER – 2A – GRAPH THEORY****Credit:3**

Total Hours per Week: 4

Lecture Hours: 4

Tutorial Hours:

Practical Hours:

Course Objectives

1. To impart the knowledge of graph theory and study the basic concepts of graphs, and subgraphs.
2. To study operations on graphs and adjacency and incidence of matrices.
3. Knowledge about connectedness and components.
4. To acquire knowledge about connectivity theorems on graphs.
5. Knowledge about Eulerian and Hamiltonian graphs.

Course Outcomes

1. After studied unit -1, the student will be able to know various graph structures and isomorphism between graphs.
2. After studied unit -2, the student will be able to know the representation of the graphs in matrix form.
3. After studied unit -3, the student will be able to know the concepts of connected graph, component, cut point, and bridge of a graph.
4. After studied unit -4, the student will be able to know about trees and their applications.
5. After studied unit -5, the student will be able to demonstrate knowledge of Eulerian and Hamiltonian graphs.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	No	Yes	Yes	No	Yes	Yes
2	No	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	No	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	No	Yes	Yes

UNIT - I

Graphs - subgraphs - Degree of a vertex - Isomorphism of graphs - Ramsey numbers - independent sets and coverings.

UNIT - II

Intersection graphs - Adjacency and incidence of matrices - Operations on graphs - Simple problems.

UNIT - III

Walks, trails and paths - Connectedness and components - cut points - bridges - blocks.

UNIT - IV

Connectivity theorems and simple problems –Trees - Theorems and simple problems.

UNIT - V

Eulerian graphs and Hamiltonian graphs - Necessary and sufficient conditions - Theorems and simple problems.

Text book:

S.Arumugam and S.Ramachandran, “Invitation to Graph Theory”, SCITECH Publications India Pvt. Ltd., T.Nagar, Chennai - 17. 2001.

Unit 1 Chapter 2 Section 2.1 to 2.6

Unit 2 Chapter 2 Section 2.7 to 2.9

Unit 3 Chapter 4 Section 4.1 to 4.3

Unit 4 Chapter 4 Section 4.4

Chapter 6 Section 6.1, 6.2

Unit 5 Chapter 5 Section 5.1, 5.2

Reference Books

1. S.Kumaravelu, SusheelaKumaravelu, Graph Theory, Publishers, Nagercoil-629 002.
2. S.A.Choudham, A First Course in Graph Theory, Macmillan India Ltd.
3. Robin J.Wilson, Introduction to Graph Theory, Longman Group Ltd.

Course Material: website links, e-Books and e-journals

<http://www.stanford.edu/class/cs103x/>

<https://mathworld.wolfram.com/topics/GraphTheory.html>

<https://nptel.ac.in/courses/111/106/111106102/>

<https://ocw.mit.edu/courses/18-217-graph-theory-and-additive-combinatorics-fall-2019/>

<https://ocw.mit.edu/courses/18-304-undergraduate-seminar-in-discrete-mathematics-spring-2015/>

<https://ocw.mit.edu/courses/18-315-combinatorial-theory-introduction-to-graph-theory-extremal-and-enumerative-combinatorics-spring-2005/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	M	M	S	S	S	S
CO2	M	M	M	S	M	M	S	S	M	S
CO3	M	M	M	S	M	S	S	S	S	S
CO4	S	S	M	M	S	M	M	S	M	S
CO5	S	S	S	M	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115**B.Sc. MATHEMATICS – 2022-2023 onwards****Semester: V****Paper type: Elective****Paper code: E – 02 Name of the Paper: PAPER – 2B – DISCRETE MATHEMATICS****Credit:3**

Total Hours per Week: 4 Lecture Hours: 4 Tutorial Hours: Practical Hours:

Course Objectives

1. This course aims to develop mathematical maturity and the ability to deal with abstraction and to develop construction and verification of formal logical manipulation.
2. To expose to different techniques about recurrence relations and solutions of homogeneous and non-homogeneous relations.
3. To study mathematical logic and form a truth table of a formula.
4. To acquire knowledge about modular and distributive lattices and the properties of lattices.
5. Knowledge about Boolean polynomials.

Course Outcomes

1. After studied unit -1, the student will be able to demonstrate knowledge of recurrence relations and generating functions.
2. After studied unit -2, the student will be able to form a truth table and know the concepts of tautological implications and equivalence of formulae.
3. After studied unit -3, the student will be able to know the concepts of functionally complete sets of connectives and duality law.
4. After studied unit -4, the student will be able to demonstrate knowledge of modular and distributive lattices and the properties of lattices.
5. After studied unit -5, the student will be able to understand the concepts of Boolean Algebra, Boolean polynomials, and Karnaugh Maps.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I RECURRENCE RELATIONS AND GENERATING FUNCTIONS

Recurrence - Polynomials and their Evaluations - Recurrence Relations - Solution of Finite Order Homogeneous [linear] Relations - Solutions of Non-homogeneous Relations.

UNIT - II MATHEMATICAL LOGIC

TF Statements - Connectives - Atomic and Compound Statements - Well-formed [Statement Formulae] - Parsing - Truth Table of a Formula - Tautology - Tautological Implications and Equivalence of Formulae.

UNIT - III MATHEMATICAL LOGIC [CONTD..]

Replacement process - Functionally complete sets of connectives and Duality law - Normal Forms - Principal Normal Forms.

UNIT - IV LATTICES

Lattices [omit example 15 Pp No.10.6) - Some properties of Lattices - New Lattices (omit remark Pp 10.14) - Modular and Distributive Lattices (omit theorem 10 and 17, Example 4 - Pp 10.23, Example 11 - Pp 10.24)

UNIT - V BOOLEAN ALGEBRA

Boolean Algebra (omit theorem 25) - Boolean Polynomials - Karnaugh Maps (omit K-map for 5 and 6 variables)

Text book:

M.K.Venkataraman, N.Sridharan and N.Chandrasekaran, [2003] Discrete Mathematics, The National Publishing Company, Chennai.

Reference Books

1. R.Johnsonbaugh [2001] Discrete Mathematics [5th Edn.] Pearson Education, Asia.,
2. C.L.Liu, [1985] elements of Discrete Mathematics, McGraw Hill, New York,
3. J.Truss. [2000] Discrete Mathematics for Computer Scientists [2nd Edn.] Pearson Education, Asia.
4. M.K.Sen and B.C.Chakraborty [2002] Discrete Mathematics [2nd Edition,] Books and allied private Ltd., Kolkata.

Course Material: website links, e-Books and e-journals

<https://mathworld.wolfram.com/topics/DiscreteMathematics.html>

<https://ocw.mit.edu/courses/18-304-undergraduate-seminar-in-discrete-mathematics-spring-2015/>

<https://www.coursera.org/learn/discrete-mathematics>

<https://click.linksynergy.com/deepink?id=nFJR8bwmzBk&mid=39197&murl=https%3A%2F%2Fwww.udemy.com%2Fcourse%2Fdiscrete-mathematics-open-doors-to-great-careers%2F>

https://onlinecourses.nptel.ac.in/noc20_cs82/preview

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S	S
CO3	M	M	M	M	M	S	M	S	M	M
CO4	S	S	M	S	S	S	S	S	M	S
CO5	S	M	S	M	S	M	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: V

Paper type: Skill based subject

Paper code: S – 03

Name of the Paper: PAPER – 3 – MATHEMATICS FOR

COMPETITIVE EXAMINATIONS-III

Credit: 2

Total Hours per Week: 3

Lecture Hours: 3

Tutorial Hours:

Practical Hours:

Course Objectives

1. To introduce the concepts of mathematics with emphasis on analytical ability and computational skills required to write the competitive examinations.
2. Students will learn the relationship between time/speed/distance through a variety of activities.
3. Students should learn a few tricks which may help them to solve the boat and stream - related problems in the quantitative aptitude section faster and without errors.
4. Students learn the detailed concept of alligation along with some of the important formulae to solve the questions related to this topic.
5. To acquire the basic knowledge about simple, compound interest, and calculating areas of different shapes.

Course Outcomes

1. After studied unit -1, the student will be able to solve the problems related to time and distance.
2. After studied unit -2, the student will be able to carry out the boat and stream, train, and speed- based questions.
3. After studied unit -3, the student will answer the questions based on alligation or mixture. Aspirants preparing for the upcoming competitive examinations will be able to answer such questions in a faster way.
4. After studied unit -4, the student will be able to carry out problems related to compound interest.
5. After studied unit -5, the student will be able to demonstrate knowledge of area-related problems.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I

Time and Distance.

UNIT - II

Boats and Streams, Problems on Trains.

UNIT - III

Alligation or Mixture, Simple Interest.

UNIT - IV

Compound Interest.

UNIT - V

Area.

Text book:

1. R.S.Aggarwal, [2017] Quantitative Aptitude for Competitive Examinations, S Chand and Company, New Delhi.

Chapters 18 to 24.

Reference Book:

1.Praveen R. V. Quantitative Aptitude and Reasoning, PHI Learning Pvt. Ltd, New Delhi.

Course Material: website links, e-Books and e-journals

<https://study91.co.in/subject-category-list/math-classes>

<https://unacademy.com/class/mathematics-for-all-competitive-exams/KDPVC3M1>

https://artofproblemsolving.com/wiki/index.php/Resources_for_mathematics_competitions

<https://examsdaily.in/free-online-coaching-competitive-exams>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	S	M	S	S	S	M
CO2	M	S	S	M	S	M	S	M	M	S
CO3	S	M	M	S	M	S	M	S	S	M
CO4	M	S	M	M	S	M	S	S	M	S
CO5	S	S	S	M	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Core

Paper code: C – 11 Name of the Paper: PAPER – 11 – LINEAR ALGEBRA Credit: 4

Total Hours per Week: 5 Lecture Hours: 5 Tutorial Hours: Practical Hours:

Course Objectives

1. To introduce the concepts of vector spaces.
2. To learn the concepts of dual spaces.
3. Knowledge about the algebra of linear transformations.
4. Basic knowledge about linear transformations and their properties related to a matrix.
5. To know about matrices, determinants, and their properties.

Course Outcomes

1. After studied unit -1, the student will be able to identify linear dependent and independent vectors.
2. After studied unit -2, the student will be able to classify orthogonal and orthonormal vectors.
3. After studied unit -3, the student will be able to know about the algebra of linear transformations.
4. After studied unit -4, the student will be able to know about the matrix of a linear transformation and its properties.
5. After studied unit -5, the student will be able to solve a system of linear equations.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	No	Yes	No

UNIT - I

VECTOR SPACES

Linear dependence and independence - Bases – Dimension – Basic concepts and examples.

UNIT - II

VECTOR SPACES [CONTD]

Dual spaces - Annihilator of a Subspace - inner product spaces.

UNIT - III

LINEAR TRANSFORMATIONS

Algebra of linear transformations - Sub Algebra - Minimal Polynomial - Invertible - Characteristics roots - Characteristic Vectors.

UNIT - IV

LINEAR TRANSFORMATIONS [CONTD]

Matrices - Matrix of a Linear Transformation and its Properties- Canonical forms - triangular forms - Invariant Transformation - Triangular Matrix of 'T'

UNIT - V

LINEAR TRANSFORMATIONS [CONTD]

Trace and Transpose: Definition and Properties-Jacobson Lemma- Symmetric, Skew Symmetric and Adjoint of a matrix - Determinants: Definition and Properties- Solving system of Linear Equations-Secular Equation.

Text book:

I.N.Herstein [1989], "Topics in Algebra", Wiley Eastern Ltd. New Delhi.
Chapters - 4 & 6(Sec: 4.1, 4.2, 4.3, 4.4 & 6.1, 6.2, 6.3, 6.4, 6.8, 6.9).

Reference books:

1. S.Arumugam.[2004], "Modern Algebra", Scitech Publications, Chennai.
- 2.J.B.Fraleigh [1987], "A First Course in Algebra", [3rd edition] Addison Wesley, Mass.
[Indian Print]
3. Lloyd R.Jaisingh and Frank Ayres,Jr. [2005], "Abstract Algebra", [2nd edition], Tata McGraw Hill, New Delhi.
4. M.L.Santiago[2002], "Modern Algebra", Tata McGraw Hill, New Delhi
5. Surjeet Singh and Qazi Zameeruddin[1982], "Modern algebra", Vikas Publishing House Pvt.Ltd. New Delhi.

Course Material: website links, e-Books and e-journals

<https://www.classcentral.com/course/youtube-vector-spaces-80274>

<https://wolframalpha.com/examples/mathematics/linear-algebra>

<http://linear.ups.edu/index.html>

<https://open.umn.edu/opentextbooks/textbooks/5>

<https://ocw.mit.edu/courses/18-06-linear-algebra-spring-2010/pages/syllabus/>

<https://ocw.mit.edu/courses/18-702-algebra-ii-spring-2011/>

<http://www.wolfram.com/wolfram-u/introduction-to-linear-algebra/>

<https://www.classcentral.com/course/edx-linear-algebra-ii-matrix-algebra-20932>

<https://www.classcentral.com/course/brilliant-linear-algebra-59261>

<https://www.classcentral.com/course/swayam-introduction-to-abstract-and-linear-algebra-14142>

<https://www.classcentral.com/subject/algebra>

<https://www.classcentral.com/course/edx-introduction-to-linear-models-and-matrix-algebra-2963>

<https://pkalika.in/2019/10/21/abstract-algebra-linear-algebra/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	S	M	S	S	S	M
CO2	S	S	S	S	M	S	S	M	M	S
CO3	M	S	S	S	M	S	M	S	S	M
CO4	S	S	M	S	S	M	S	M	M	S
CO5	S	M	S	M	S	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Core

Paper code: C – 12 Name of the Paper: PAPER – 12 – REAL ANALYSIS II Credit: 4

Total Hours per Week: 5 Lecture Hours: 5 Tutorial Hours: Practical Hours:

Course Objectives

1. To attain a strong knowledge about the concepts of connected, complete, bounded, totally bounded, and compact spaces.
2. To acquire basic knowledge about continuous and uniformly continuous functions on compact metric spaces.
3. To understand the definition of Riemann integral and its properties.
4. To study the results of Rolle's theorem, the law of mean, fundamental theorems of calculus, and Taylor's theorem and carry out simple problems related to these concepts.
5. To know about pointwise convergence, uniform convergence of sequences of functions, convergence, and uniform convergence of series of functions.

Course Outcomes

1. After studied unit-1, the student will be able to demonstrate knowledge of connected sets and complete metric spaces with suitable examples.
2. After studied unit-2, the student will be able to identify the functions which are continuous and uniformly continuous.
3. After studied unit-3, the student will be able to express about Riemann integration and its properties.
4. After studied unit-4, the student will be able to carry out the problems related to Rolle's theorem and the law of mean.
5. After studied unit-5, the student will be able to demonstrate knowledge of pointwise convergence, uniform convergence of sequences of functions, and of series of functions.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT - I CONNECTEDNESS, COMPLETENESS

Open Sets - Connected Sets - Bounded Sets and Totally Bounded Sets - Complete Metric Spaces - simple problems. Ch. 6.1 to 6.4 of Goldberg

UNIT - II COMPACTNESS

Compact Metric Space - Continuous Functions on Compact Metric Spaces - Continuity of Inverse Functions - Uniform Continuity - simple problems.
Ch. 6.5 to 6.8 of Goldberg

UNIT - III RIEMANN INTEGRATION

Sets of measure zero - Definition Riemann Integral - Properties of Riemann Integral - Derivatives - simple problems.
Ch. 7.1, 7.2 7.4, 7.5 of Goldberg.

UNIT - IV RIEMANN INTEGRATION [CONTD...]

Rolle's Theorem - The law of mean - Fundamental theorems of calculus - Taylor's theorem - simple problems.
Ch. 7.6 to 7.8 and 8.5 of Goldberg.

UNIT - V SEQUENCES AND SERIES OF FUNCTIONS

Pointwise convergence of sequences of functions - Uniform convergence of sequences of functions - consequences of uniform convergence - Convergence and uniform convergence of series of functions - simple problems.
Ch. 9.1 to 9.4 of Goldberg.

Text book:

R.Goldberg, Methods of Real Analysis Oxford & IBH Publishing Co., New Delhi.

Reference Books:

1. Tom M.Apostol [1974] Mathematical Analysis, 2nd Edition, Addison-Wesley Publishing Company Inc. New York.
2. Bartle, R.G. and Shebert [1976] Real Analysis, John Wiley and Sons Inc., New York,
3. Malik, S.C. and Savita Arora [1991] Mathematical Analysis, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansi Lal [1991] Introduction to Real Analysis, Satya Prakashan, New Delhi.

Course Material: website links, e-Books and e-journals

<https://ocw.mit.edu/courses/18-100b-analysis-i-fall-2010/>

<https://ocw.mit.edu/courses/18-s097-introduction-to-metric-spaces-iap-2022/>

<https://pkalika.in/2019/09/06/real-analysis/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	S
CO2	M	S	S	S	M	M	S	S	S	M
CO3	S	S	M	S	S	S	S	S	S	S
CO4	M	S	S	S	S	S	M	S	S	S
CO5	S	M	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Core

Paper code: C – 13 Name of the Paper: PAPER – 13 – COMPLEX ANALYSIS Credit: 4

Total Hours per Week: 5 Lecture Hours: 5 Tutorial Hours: Practical Hours:

Course Objectives

1. To study the techniques of complex variables and functions together with their derivatives, and applications of analytic functions, harmonic functions, and their properties.
2. To understand the concepts of conformal mapping, bilinear transformations, and related problems.
3. To evaluate a complex integral using parameterization, and apply the results of Cauchy's fundamental theorem and Cauchy's integral formula.
4. A strong knowledge of Taylor's and Laurent's series, classifications of singularities, and evaluation of integrals using Cauchy's residue theorem.
5. To evaluate contour integrals or integrals over the real line

Course Outcomes

1. After studied unit-1, the student will be able to gain knowledge about complex functions and their nature, continuous functions, necessary and sufficient conditions of an analytic function.
2. After studied unit-2, the student will be able to demonstrate knowledge of elementary transformations, conformal and bilinear transformations with examples.
3. After studied unit-3, the student will be able to evaluate contour integrals using Cauchy's integral formula.
4. After studied unit-4, the student will be able to express a function as Taylor series or Laurent's series at the given domain, and also determine the circle or annulus of convergence power series expansions of analytic functions.
5. After studied unit-5, the student will be able to carry out the problems related to the evaluation of improper integrals.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	NO	Yes	Yes	Yes	Yes	NO
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	NO	Yes	NO	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	NO
5	Yes	Yes	Yes	Yes	Yes	NO

UNIT - I ANALYTIC FUNCTIONS

Complex valued functions-Mappings - Limits - Theorems on Limits(statement only)

Continuity - Derivatives and Differentiation formulas(without proof) - Cauchy-Riemann equations - Sufficient conditions - Cauchy - Riemann equations in polar form - properties of Analytic functions - Harmonic functions - Determination of Harmonic conjugate-problems.

UNIT – II CONFORMAL MAPPINGS & MAPPING BY ELEMENTARY FUNCTIONS

Conformal mapping - Isogonal mapping - Further properties - The transformations $w = z + d$, $w = \frac{1}{z}$, $w = z^2$, $w = \bar{z}$, $w = e^z$, $w = \sin z$ - Bilinear Transformations – problems

UNIT – III INTEGRALS

Contours - Line Integrals - Cauchy-Goursat's Theorem (without proof) - Cauchy's Integral Formula - Derivatives of Analytic Functions - Morera's theorem - Maximum Moduli of functions - The fundamental theorem of Algebra - Liouville's theorem and the Fundamental Theorem on Algebra .

UNIT – IV POWER SERIES, SINGULARITIES AND RESIDUES

Taylor's and Laurent's theorem – Examples - Singularities and classifications - Isolated singularities- Removable singularity, Pole and essential singularity - Residues - Cauchy's Residue theorem - problems.

UNIT – V CONTOUR INTEGRATION

Evaluation of Improper Real Integrals - Improper integrals involving Trigonometric functions - simple problems.

Text book:

R.V.Churchill and J.W.Brown, (1984) *Complex Variables and Applications*. McGraw Hill International Book Co., Singapore. (Fourth Edition)

Reference Books

1. P. Duraipandian and Laxmi Duraipandian. Complex Analysis: Emerald Publishers, Chennai. 1976.
2. S. Ponnusamy. Foundations of Complex Analysis, Narosa Publishing House, New Delhi. 2000.
3. Tyagi B.S. Functions of Complex Variable, 17th Edition, Pragati Prakasham Publishing Company Ltd., Meerut, 1992 - 93.

Course Material: website links, e-Books and e-journals

<https://ocw.mit.edu/courses/18-04-complex-variables-with-applications-spring-2018/>
<https://ocw.mit.edu/courses/18-04-complex-variables-with-applications-fall-1999/pages/syllabus/>

<https://ocw.mit.edu/courses/18-112-functions-of-a-complex-variable-fall-2008/pages/syllabus/>
<https://pkalika.in/2019/07/01/complex-analysis/>
<https://mathworld.wolfram.com/topics/CalculusandAnalysis.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	M	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Core

Paper code: C – 14 Name of the Paper: PAPER – 14 – PROGRAMMING IN C LANGUAGE

Credit: 3

Total Hours per Week: 3 Lecture Hours: 3 Tutorial Hours: Practical Hours:

Course Objectives

1. To make the students abreast with the programming concepts and master them in C Language.
2. To learn the basic structures of C programs and execute a 'C' Program.
3. Knowledge about data types, declaration of variables, storage class, and assigning values to variables.
4. To obtain basic knowledge about various operators, evaluation of expressions, and precedence of arithmetic operators.
5. Knowledge about formatted input and output, decision making with branching, looping, and arrays.

Course Outcomes

1. After studied unit -1, the student will be able to demonstrate 'c' tokens, keywords, the basic structure of C programs and the execution of a 'C' Program.
2. After studied unit -2, the student will be able to express the nature of constants, variables, data types, declaration of variables, and assigning values to variables.
3. After studied unit -3, the student will be able to describe valuation of expressions and usage of various operators.
4. After studied unit -4, the student will be able to express the logic using control statements.
5. After studied unit -5, the student will be able to demonstrate knowledge pertaining to arrays.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT –I: OVERVIEW OF C

Basic Structure of C Programs- Programming style- Executing a 'C' Programs –'c' Tokens- Keywords and Identifiers.

UNIT – II: CONSTANTS , VARIABLES & DATA TYPE

Constants-Variables-Data Types- Declaration of Variables- Declaration of Storage Class- Assigning values to variables.

UNIT – III: OPERATORS AND EXPRESSION

Arithmetic Operators-Relational operators- Logical operators-Assignment operators-Increment and decrement operators-Conditional operators-Evaluation of Expressions-Precedence of Arithmetic operators.

UNIT –IV: FORMATTED INPUT,OUTPUT & DECISION MAKING AND BRANCHING

Formatted input- Formatted output- Decision making with ‘IF’ statement- Simple IF statement- The IF....ELSE statement-Nesting of IF...ELSE statement-The ELSE IF ladder-The switch statement – The ?: Operators- The GOTO statement.

UNIT – V: DECISION MAKING AND LOOPING & ARRAYS

The WHILE statement-The DO statement-The FOR statement- Jumps in LOOPS-One dimensional array-Declaration of one dimensional arrays-Initialization of one dimensional arrays-Two dimensional arrays-Multi dimensional arrays.

TEXT BOOK:

1. E. Balagurusamy [1996], “Programming in ANSI C” .Tata McGraw Hill.
Unit:I Chap:1(1.8-1.10),Chap:2 (2.3,2.4)
Unit:II Chap:2 (2.5-2.10),
Unit:III Chap: 3 (3.2-3.12),
Unit-IV Chap:4 (4.4,4.5),Chap:5 (5.2-5.9),
Unit:V Chap:6 (6.2-6.5),Chap:7(7.2-7.7)

REFERENCE BOOKS:

1. V.Rajaraman [1995], “Computer Programming In C”, Prentice Hall. New Delhi.
2. H.Schildt, Osborne (1994), “Teach Yourself C”, McGraw Hill, New York ,Mullish Cooper.
3. “The Spirit of C – An Introduction to Modern Programming”,Jaico Publishing House. Delhi. 1998.
4. YashavantKanetkar, “Let Us C”, 6th edition BPB publication.

Course Material: website links, e-Books and e-journals

<https://lecturenotes.in/subject/1/programming-in-c-c>

<https://lecturenotes.in/subject/805/c-language>

<https://ocw.mit.edu/courses/6-087-practical-programming-in-c-january-iap-2010/pages/lecture-notes/>

<http://www.freebookcentre.net/programming-books-download/Lecture-Note-On-Programming-In-C.html>

https://www.technicalsymposium.com/Cprogramming_Contents.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	M	S	M	S	M	M
CO2	M	S	M	M	S	S	M	S	M	M
CO3	M	S	M	M	M	S	S	M	M	S
CO4	S	M	S	S	S	M	M	S	S	M
CO5	S	S	M	S	M	S	M	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Core Practical

Paper code: CP – 1 Name of the Paper: PAPER – 1 – PRACTICAL IN C LANGUAGE

Credit: 2

Total Hours per Week: 3 Lecture Hours: 3 Tutorial Hours: Practical Hours:

.....
The following exercises shall be performed as minimum mandatory requirements [for eligibility to take the practical examination] and a RECORD of the code-listing and outputs shall be maintained by each student.

1. Assigning the ASCII value.
2. Square of numbers: Using For loop,
3. Square of numbers: While loop
4. Square of numbers: Do- while loop,
5. Square of numbers: Go to statement.
6. Printing Alphabets between two letters
7. Counting Vowels and consonants.
8. Printing Prime number between two numbers
9. Fibonacci series
10. Factorial numbers
11. Power of a value
12. Checking Palindrome in string
13. Sin(X) series
14. Cos(X) series
15. Pascal Triangle
16. Binary search
17. Matrix Transpose
18. Matrix Addition
19. Matrix Subtraction
20. Matrix Multiplication

REFERENCE BOOKS:

1. “The spirit if C”, Mulish Cooper, Indian edition by jaicopublishers, 1987.
2. “Teach yourself C”, Herbert Scheldt, McGraw-Hill, 2nd edition 1994 Programming in C-Schaum series.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Elective

Paper code: E – 03 Name of the Paper: PAPER – 3A – OPERATIONS RESEARCH Credit:3

Total Hours per Week: 3

Lecture Hours: 3

Tutorial Hours: Practical Hours:

Course Objectives

1. To develop computational skills and logical thinking in formulating industry - oriented problems as a mathematical problems and obtaining optimal solutions to the problems.
2. To learn about splitting and arranging the activities of a project as a network diagram and determine a critical path and its duration.
3. Knowledge about programme evaluation and review techniques (PERT).
4. Basic knowledge about inventory control models and determining EOQ levels.
5. To study steady-state analysis of various queuing models with finite and infinite capacities.

Course Outcomes

1. After studied unit -1, the student will be able to determine the critical activities of a repeated project and its completion time.
2. After studied unit -2, the student will be able to determine the duration of activities of a new project based on three-time estimates.
3. After studied unit -3, the student will be able to carry out the EOQ level of various inventory control models.
4. After studied unit -4, the student will be able to calculate processing times of sequencing of jobs through 2, 3, and m machines.
5. After studied unit -5, the student will be able to find out the length of the queue, and waiting time in the queue under single and multi-channel queuing models.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I

Network logic-Numbering the events-Construction of network diagram-Critical path method (CPM) - Three floats

UNIT - II

Three time estimates-Network scheduling by PERT Method

UNIT - III

Inventory models - EOQ model (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate infinite production rate with shortages allowed (c) Uniform demand rate finite production rate with no shortages (d) Uniform demand rate finite production rate with shortages allowed - Inventory control with Price Breaks.

UNIT - IV

Sequencing problem - n jobs through 2 machines, n jobs through 3 machines - two jobs through m machines - n jobs through m machines.

UNIT - V

Queuing Theory - Basic concepts - Steady state analysis of M/M/1 and M/M/N systems with finite and infinite capacities - Multi-channel queuing model (M/M/C)/FCFS/ ∞/∞ .

Text book:

Gupta P.K. and Hira D.S. (2000) *Problems in Operations Research*, S.Chand & Co. Delhi

Reference Books

1. J.K.Sharma, (2001) *Operations Research: Theory and Applications*, Macmillan, Delhi
2. KantiSwaroop, Gupta P.K. and Manmohan, (1999) *Problems in Operations Research*, Sultan Chand & Sons., Delhi.
3. V.K.Kapoor [1989] *Operations Research*, sultan Chand & sons.
4. Ravindran A., Philips D.T. and Solberg J.J., (1987) *Operations research*, John Wiley & Sons, New York.
5. Taha H.A. (2003) *Operations Research*, Maocmillan Publishing Company, New York
6. S.J.Venkatesan, *Operations Research*, J.S. Publishers, Cheyyar-604 407.

Course Material: website links, e-Books and e-journals

<https://lecturenotes.in/subject/573/operations-research-or>

https://onlinecourses.nptel.ac.in/noc20_ma23/preview

<https://examupdates.in/operation-research-notes/>

https://collegetutor.net/notes/Operation_Research_Notes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	S	M	S
CO2	M	S	S	S	M	M	S	S	S	M
CO3	S	S	M	S	S	S	S	S	S	S
CO4	M	S	S	S	S	S	M	S	S	S
CO5	S	M	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Elective

Paper code: E – 03 Name of the Paper: PAPER – 3B – FUZZY MATHEMATICS Credit:3

Total Hours per Week: 3 Lecture Hours: 3 Tutorial Hours: Practical Hours:

Course Objectives

1. To acquire background knowledge about the fundamentals of fuzzy Algebra.
2. To know the basic definitions and concepts of fuzzy theory.
3. To know the applications of fuzzy technology.
4. To study the Algebra of fuzzy relations and logic-connectives.
5. To learn the concepts of fuzzy invariant subgroups and fuzzy subrings

Course Outcomes

1. After studied unit -1, the student will be able to know fuzzy sets and their operations.
2. After studied unit -2, the student will be able to know the addition and product of two fuzzy sets.
3. After studied unit -3, the student will be able to demonstrate knowledge of fuzzy relations and logic-connectives.
4. After studied unit -4, the student will be able to express about fuzzy subgroup, homomorphic image, and pre-image of subgroupoid.
5. After studied unit -5, the student will be able to demonstrate knowledge of fuzzy invariant subgroups and subrings.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I

Introduction- Fuzzy subsets-Lattices and Boolean Algebras- L fuzzy sets-operations on fuzzy α level sets - properties of fuzzy subsets of a set.

Sections 1.1-1.10

UNIT - II

Algebraic product and sum of two fuzzy subsets-properties satisfied by Addition and product-Cartesian product of fuzzy subsets.

Sections 1.11-1.13.

UNIT - III

Introduction- Algebra of fuzzy relations-logic-connectives.

Sections 2.1-2.4

UNIT - IV

Some more connectives-Introduction-fuzzy subgroup-homomorphic image and Pre-image of subgroupoid.

Sections 2.5,3.1-3.3

UNIT - V

Fuzzy invariant subgroups-fuzzy subrings.

Section 3.4 and 3.5.

Text book:

S.Nanda and N.R.Das “Fuzzy Mathematical concepts, Narosa Publishing House, New Delhi.

Reference Books

1. Apostolos Syropoulos, A Modern Introduction to Fuzzy Mathematics, Wiley & Sons, Inc, 2020.

Course Material: website links, e-Books and e-journals

<https://www.classcentral.com/course/swayam-introduction-to-fuzzy-set-theory-arithmetic-and-logic-14149/>

<https://worldcat.org/oclc/1141919783>

https://onlinecourses.nptel.ac.in/noc21_ma55/preview

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	M	M	M	S	S	S	M
CO2	M	M	M	S	M	M	S	M	M	S
CO3	M	M	M	S	M	S	M	S	S	M
CO4	S	S	M	M	S	M	M	S	M	S
CO5	S	M	S	M	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Paper code: E – 03 Name of the Paper: PAPER – 3C – R Programming (Practical) Credit:3

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours: 3

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Using R Programming develop the programs in the following topics:

1. Arithmetic and matrix operations.
2. Simple functions
3. Plotting Bar chart and scatter plot
4. Plotting histogram and pie chart
5. Graphics for grouped data
6. Graphical display of distributions
7. Measures of central tendency -Mean, median, mode
8. Measures of Dispersion- std. deviation, mean deviation
9. Regression and correlation. Linear models.
10. Large sample tests
11. Small sample test t- tests
12. Small sample test F-tests
13. Small sample test Chi-square tests
14. ANOVA(one way)
15. ANOVA (Two way)

Reference Books:

1. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters Beginner's Guide to R - Springer, 2009.
2. Allerhand M. Tiny Handbook of R - SpringerBriefs in Statistics, 2011
3. Baayen R. Analyzing Linguistic Data - A Practical Introduction to Statistics using R , 2008.
4. Gardener M. Beginning R - The Statistical Programming Language , 2012.
5. Jim Albert, Maria Rizzo R by Example, 2012.
6. Matloff N. Art of R Programming - A Tour of Statistical Software Design , 2011.

Course Material: website links, e-Books and e-journals

<https://www.classcentral.com/course/edx-statistics-and-r-2960>

<https://www.classcentral.com/course/probability-intro-6099>

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: VI

Paper type: Skill Based Subject

Paper code: E – 04 Name of the Paper: PAPER – 4 – MATHEMATICS FOR COMPETITIVE EXAMINATIONS-IV

Credit: 2

Total Hours per Week: 3

Lecture Hours: 3

Tutorial Hours:

Practical Hours:

Course Objectives

1. To introduce the concepts of mathematics with emphasis on analytical ability and computational skills required to write the competitive examinations.
2. To inculcate the knowledge of finding a day of a particular date and sequence the events chronologically.
3. To acquire the basic knowledge about making decisions about whether to invest or not in stocks and shares through qualitative and quantitative analysis.
4. To describe the features and benefits of different types of bar graphs and their uses.
5. To explain how pie charts are used to represent information, list the characteristics and interpret the data presented in a pie chart.

Course Outcomes

1. After studied unit -1, the student will be able to carry out surface area and volume - related problems.
2. After studied unit -2, the student will be able to predict the day of any date and sequence the events chronologically.
3. After studied unit -3, the student will be able to demonstrate knowledge of clocks, stocks, and shares, and the number of ways objects can be arranged and selected.
4. After studied unit -4, the student will be able to interpret the representation of bar charts.
5. After studied unit -5, the student will be able to represent data as a pie chart, and interpret the representation of a pie chart.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	No	Yes

UNIT - I

Volume and Surface Area.

UNIT - II

Races and Games of Skill, Calendar.

UNIT - III

Clocks, Stocks and Shares, Permutations and Combinations.

UNIT - IV

Data Interpretation: Tabulation, Bar Graphs.

UNIT - V

Data Interpretation: Pie Chart and Line Graphs.

Text book:

1. R.S.Aggarwal, [2017] Quantitative Aptitude for Competitive Examinations, S Chand and Company, New Delhi.

Chapters 25 to 30, 36 to 39.

Reference Book:

1.Praveen R. V. Quantitative Aptitude and Reasoning, PHI Learning Pvt. Ltd, New Delhi.

Course Material: website links, e-Books and e-journals

<https://study91.co.in/subject-category-list/math-classes>

<https://unacademy.com/class/mathematics-for-all-competitive-exams/KDPVC3M1>

https://artofproblemsolving.com/wiki/index.php/Resources_for_mathematics_competitions

<https://examsdaily.in/free-online-coaching-competitive-exams>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	M	S	S	S	S	S	S
CO3	S	M	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

ALLIED SUBJECTS FOR MATHEMATICS STUDENTS

To choose any two out of the following Four Allied subjects as Allied I and Allied II. Each Allied subject consists of two papers as paper I and Paper II and one Practical paper.

1. Mathematical Statistics (Paper I and II)
2. Numerical Methods (Paper I and II)
3. Physics (Paper I and II)
4. Chemistry (Paper I and II)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: I/III

Paper type: Allied

Paper code: A – 01 Name of the Paper: PAPER – 1 – MATHEMATICAL STATISTICS - I
Credit:3

Total Hours per Week: 4 Lecture Hours: 4 Tutorial Hours: Practical Hours:

Course Objectives

1. To know the fundamental concepts of Statistics.
2. Learn to apply Baye's theorem to real-life problems.
3. To know the concepts such as expectation, moments, and distribution function.
4. To know the applications of correlation and rank correlation.
5. To learn some standard discrete and continuous distributions and their applications.

Course Outcomes

6. After studied unit -1, the student will be able to express the techniques of conditional probability and Baye's theorem with examples.
7. After studied unit -2, the student will be able to calculate expectation, and distribution function.
8. After studied unit -3, the student will be able to express Chebychev's inequality and its applications.
9. After studied unit -4, the student will be able to interpret the different types of correlation coefficient and lines of regression with examples.
10. After studied unit -5, the student will be able to apply domain knowledge for discrete and continuous distributions with examples.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

UNIT-I: PROBABILITY THEORY

Axiomatic approach to probability - Some theorems on Probability - Conditional Probability - Multiplication theorem of probability - Independent events - Baye's Theorem - Simple Problems.

[Chapter 3, sec 3.8 (3.8.1;3.8.2;3.8.5;3.8.6), sec 3.9 (3.9.1,3.9.2), sec 3.10 - 3.13;
Chapter 4, sec 4.2]

UNIT –II: RANDOM VARIABLES, DISTRIBUTION FUNCTIONS AND MATHEMATICAL EXPECTATION.

Random Variables (Discrete and Continuous) - Distribution Function – Mathematical Expectation – Expected value of function of a random variable – properties of expectation – properties of variance – covariance.

[Chapter 5, sec 5.2-5.4; Chapter 6, sec 6.2-6.6]

UNIT-III: GENERATING FUNCTIONS.

Moment generating function - Characteristic Function - Uniqueness and Inversion Theorem (Statement only) - Chebychev's Inequality - Simple Problems.

[Chapter 7, sec 7.1,7.3 - 7.5]

UNIT-IV CORRELATION AND REGRESSION.

Concept of Bivariate Distribution - Correlation - Karl Pearson's Coefficient of Correlation - Rank Correlation - Linear Regression.

[Chapter 10, sec 10.4-10.7, Chapter 11, sec 11.2]

UNIT-V

Standard distributions: Discrete distributions - Binomial, Poisson, Hyper Geometric and Negative Binomial Distributions - Continuous Distributions Normal, Uniform, Exponential.

[Chapter 8, sec 8.4(8.4.1-8.4.8), sec 8.5(8.5.1-8.5.6), sec (8.6.1; 8.6.3-8.6.5), sec 8.8; Chapter 9, sec 9.2 (9.2.1-9.2.5), sec 9.3, sec 9.8]

Text book: S.C. Gupta & V.K. Kapoor : Fundamentals of Mathematical Statistics, Sultan & sons , (11th edition, June 2002).

Reference Books

1. Hogg, R.V. & Craig.A.T.(1998) : Introduction to Mathematical Statistics, Macmillan
2. Mood. A.M. Graybill. F.A.& Boes.D.G.(1974) : Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. & Cochran.W.G.(1967) : Statistical Methods, Oxford and IBH
4. Hoel, P.G (1971): Introduction to Mathematical Statistics, Wiley.
5. Wilks S.S. Elementary Statistical Analysis, Oxford and IBH

Course Material: website links, e-Books and e-journals

<https://mathworld.wolfram.com/topics/ProbabilityandStatistics.html>

<https://ocw.mit.edu/courses/18-175-theory-of-probability-spring-2014/>

<https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2014/>

<https://ocw.mit.edu/courses/18-440-probability-and-random-variables-spring-2014/>
<https://ocw.mit.edu/courses/18-600-probability-and-random-variables-fall-2019/>
<https://ocw.mit.edu/courses/18-655-mathematical-statistics-spring-2016/>
<https://www.wolfram.com/broadcast/video.php?c=420&v=1630>
<https://www.classcentral.com/course/youtube-statistics-110-probability-91487/classroom>
<https://people.richland.edu/james/lecture/m170/>
<https://ocw.mit.edu/courses/18-650-statistics-for-applications-fall-2016/resources/lecture-1-introduction-to-statistics/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	S	S	S
CO2	S	S	S	S	M	S	S	S	M	S
CO3	M	S	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	M	S	S	S	S
CO5	S	M	S	M	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

Paper code: A – 02 Name of the Paper: PAPER – 2 – MATHEMATICAL STATISTICS -II**Credit:3**

Total Hours per Week: 4

Lecture Hours: 4

Tutorial Hours: Practical Hours:

Course Objectives

1. To know the Statistical investigations and the applications of sampling techniques in our day-to-day life.
2. Learn the applications of Chi-square distribution.
3. To understand the concepts such as Students t, F, and Z distributions and their properties.
4. To know the various methods of estimation and testing of hypothesis techniques.
5. To apply ANOVA technique to verify whether all samples are drawn from the same population.

Course Outcomes

1. After studied unit -1, the student will be able to demonstrate sampling, parameter, and significance with examples.
2. After studied unit -2, the student will be able to know about Chi-square distribution and its applications.
3. After studied unit -3, the student will be able to illustrate Students t-distribution and the applications of F-distribution.
4. After studied unit -4, the student will be able to state null and alternate hypotheses to the given problem and test the hypothesis.
5. After studied unit -5, the student will be able to apply ANOVA techniques.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	No	Yes	No

UNIT - I

Statistical Population Census and Sampling Survey - Parameter and Statistics - Sampling and Sampling Distribution and Standard Error. Sampling distributions - students 't', chi - square and F distributions.

Sampling and large sample test

UNIT - II

Test of significance - Large sample test for proportion, mean and standard deviation - Exact test based on 't', Chi - square and F distribution with respect to population mean, variance and correlation coefficient - Tests of independence of attributes - goodness of fit tests.

Exact sampling distribution (Chi-square distribution)

Chapter:13 Page 334 - 351

UNIT - III

Point estimation - Concept of unbiasedness, consistency, efficiency and sufficiency - Cramer- Rao Inequality - Methods of Estimation - Maximum Likelihood Estimation - Method of Moments.

Exact sampling distribution- t, F and Z distribution

Chapter:14 Page 352-370

UNIT - IV

Test of Hypothesis: Null and Alternate Hypothesis - Type I and Type II error - Power of the test - Neymann Pearson lemma - Likelihood Ratio Test - Concept of Most Powerful test (Statement and Results only) - Simple Problems

Theory of estimation, testing of hypothesis

Ch:15 and 16 Pages: S.1-S.15 and S.18-S.30

UNIT - V

Analysis of Variance - One - way and Two-way Classification - Basic Principles of Design of Experiments - Randomization, Replication, Local Control, Completely Randomized Design, Randomized Block Design and Latin Square Design.

Analysis of variance, Design of experiments

Chapter: 17 and 18 Page: S.31-S.46 and S.47-S.75

Text book: S.C. Gupta & V.K. Kapoor: Elements of Mathematical Statistics, Third extensively revised and greatly improved edition, Sultan Chand & sons.

Books for Reference

1. Hogg, R.V. & Craig. A. T. (1998): Introduction to Mathematical Statistics, Macmillan
2. Mood.A.M.,Graybill. F.A.&Boes. D.G.(1974): Introduction to theory of Statistics, McGraw Hill.
3. Snedecor.G.W. &Cochran.W.G.(1967): Statistical Methods, Oxford and IBH
4. Hoel.P.G (1971): Introduction to Mathematical Statistics, Wiley.
5. Wilks . S. S.Elementary Statistical Analysis, Oxford and IBH
6. O. Kempthorne - Design of Experiments
7. Das and Giri : Design of Experiments Wiley Eastern

Course Material: website links, e-Books and e-journals

<https://mathworld.wolfram.com/topics/ProbabilityandStatistics.html>

<https://ocw.mit.edu/courses/18-175-theory-of-probability-spring-2014/>

<https://ocw.mit.edu/courses/18-05-introduction-to-probability-and-statistics-spring-2014/>

<https://ocw.mit.edu/courses/18-655-mathematical-statistics-spring-2016/>

<https://www.wolfram.com/broadcast/video.php?c=420&v=1630>

<https://www.classcentral.com/course/youtube-statistics-110-probability-91487/classroom>

<https://people.richland.edu/james/lecture/m170/>

<https://ocw.mit.edu/courses/18-650-statistics-for-applications-fall-2016/resources/lecture-1-introduction-to-statistics/>

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	S	M	S	S	S	M
CO2	S	S	S	S	M	S	S	M	M	S
CO3	M	S	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	M	S	S	S	S
CO5	S	M	S	M	S	M	S	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Paper code: A – 03 Name of the Paper: MATHEMATICAL STATISTICS Credit: 2

Total Hours per Week: 2 Lecture Hours: Tutorial Hours: Practical Hours: 2

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LIST OF PROBLEMS

1. Measures of location and Dispersion (absolute and relative)
2. Computation of Correlation Coefficient for raw and Grouped data, Rank Correlation Coefficient
3. Computation of Regression Equations for Raw and Grouped Data
4. Curve Fitting by the Method of Least Squares
 - a. $y = ax + b$
 - b. $y = ax^2 + bx + c$
 - c. $y = ae^{bx}$
 - d. $y = ax^b$
5. Fitting of Binomial, Poisson, Normal distributions and tests of goodness of fit.
6. Large sample tests with regard to population mean, proportion, standard deviation
7. Exact tests with respect to Mean, Variance and Coefficient of Correlation
8. Test for Independence of Attributes based on Chi-Square Distribution
9. Calculation of Confidence Intervals based on Normal, t and Chi-square and F Distributions
10. Problems based on ANOVA-one way and two way Classification
11. Completely Randomized Design
12. Randomized Block Design
13. Latin Square Design

Note

Use of scientific calculator shall be permitted for practical examination. Statistical and Mathematical tables are to be provided to the students at the examination hall.

- ☐ Mathematics faculty alone should be appointed as examiners.

Books for Reference

1. Hogg, R.V. & Craig, A.T. (1998): Introduction to Mathematical Statistics, Macmillan.
2. Mood, A.M., Graybill, F.A. & Boes, D.G. (1974) : Introduction to theory of Statistics, McGraw Hill.
1. Snedecor, G.W. & Cochran, W.G. (1967): Statistical Methods, Oxford and IBH
2. Hoel, P.G. (1971): Introduction to Mathematical Statistics, Wiley.
3. S.C. Gupta & V.K. Kapoor: Fundamentals of Mathematical Statistics, Sultan & sons
4. S.C. Gupta & V.K. Kapoor: Fundamentals of Applied Statistics, Sultan & sons

5. Wilks . S. S. Elementary Statistical Analysis, Oxford and IBH
6. O. Kempthorne - Design of Experiments.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: I/III

Paper type: Allied

Paper code: A – 02 Name of the Paper: PAPER – 1 – NUMERICAL METHODS – I Credit:3

Total Hours per Week: 4 Lecture Hours: 4

Tutorial Hours: Practical Hours:

Course Objective

1. To know the methods of solving simultaneous linear equations.
2. To acquire knowledge about forward differences and Backward differences and their relationship.
3. Knowledge about central difference operators and problems based on various central differences formulae.
4. To study Newton's divided difference formula and problems based on Lagrange's interpolation formula.
5. Knowledge about Summation of series up to n terms.

Course Outcomes

1. After studied unit -1, the student will be able to solve simultaneous linear equations by Gauss elimination method, Gauss-Jordan Method, and Gauss-Seidel method.
2. After studied unit -2, the student will be able to calculate interpolation values by applying Gregory-Newton's forward and backward formulae.
3. After studied unit -3, the student will be able to calculate the central interpolation values by applying central differences formulae.
4. After studied unit -4, the student will be able to estimate one or more missing terms of the given set of data.
5. After studied unit -5, the student will be able to estimate the interpolation value for unequal intervals based on Lagrange's formula of inverse interpolation.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	No	Yes	Yes

UNIT - I SOLUTIONS OF SIMULTANEOUS LINEAR EQUATIONS

Gauss elimination method - matrix inversion method - Gauss-Jordan Method, Gauss-Seidel method (Three unknowns only).

UNIT - II FINITE DIFFERENCES

First and higher order differences - forward differences and Backward differences - Properties of operators - Differences of a Polynomial - Factorial Polynomials - Operator E, Relation between Δ , ∇ and E – Interpolation: Gregory-Newton - forward & backward formulae for interpolation.

UNIT - III CENTRAL DIFFERENCES

Central difference Operators - Central differences formulae: Gauss Forward and Backward formulae - Stirling's formula - Bessel's formula.

UNIT - IV INTERPOLATION FOR UNEQUAL INTERVALS

Divided differences - Newton's divided difference formula - Lagrange's interpolation formula- Estimating the Missing terms (With one or more missing values).

UNIT - V INVERSE INTERPOLATION

Lagrange's formula of inverse interpolation and Reversion of series method (Using Newton's forward formula only).

Summation of series: Sum to n term of the series whose general term is the first difference of a function-summation by parts.

Text book: 1. B.D. Gupta.(2001) *Numerical Analysis*.Konark Pub. Ltd., Delhi
2. M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering* National Publishing Company, Chennai.

Books for Reference

1. S. Arumugam. (2003) *Numerical Methods*, New Gamma Publishing, Palayamkottai.
2. H.C. Saxena. (1991) *Finite differences and Numerical analysis* S.Chand & Co., Delhi
3. A.Singaravelu (2004). *Numerical Methods*Meenakshi Agency, Chennai
4. P.Kandasamy, K.Thilagavathy (2003) *Calculus of Finite differences & Numerical Analysis*, S. Chand & Company Ltd., New Delhi-55.

Course Material: website links, e-Books and e-journals

[https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-](https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/)

[2014/pages/syllabus/](https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/)

<https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/>

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	M	S	S	S	S
CO2	S	S	S	S	M	S	S	S	M	S
CO3	M	S	S	S	S	S	M	S	M	M
CO4	S	S	M	S	S	M	S	S	S	S
CO5	S	M	S	M	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semester: II/IV

Paper type: Allied

Paper code: A – 02 Name of the Paper: PAPER – 2 – NUMERICAL METHODS – IICredit:3

Total Hours per Week: 4

Lecture Hours: 4

Tutorial Hours: Practical Hours:

Course Objective

1. To evaluate derivatives using Newton's forward and backward differences formulae.
2. To acquire the knowledge about evaluation of numerical integration.
3. To evaluate the solution of linear homogeneous difference equations with constant coefficients.
4. To obtain numerical solutions to the algebraic and transcendental equations.
5. To obtain numerical solutions to the ordinary differential equations.

Course Outcomes

1. After studied unit -1, the student will be able to evaluate derivatives by applying Newton's forward and backward differences formulae.
2. After studied unit -2, the student will be able to evaluate integrations by applying the trapezoidal rule, Simpson's rules, and Weddle's rule.
3. After studied unit -3, the student will be able to find a complete solution to linear difference equations.
4. After studied unit -4, the student will be able to estimate approximate numerical solutions of algebraic and transcendental equations.
5. After studied unit -5, the student will be able to estimate approximate numerical solutions of ordinary differential equations by Euler, Picard, Taylor, and Runge-Kutta methods.

Matching Table

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

UNIT - I NUMERICAL DIFFERENTIATION

Newton's forward and backward differences to compute derivatives-derivative using divided differences formula - maxima and minima using the above formulae.

UNIT - II NUMERICAL INTEGRATION

General Quadrature formula-Trapezoidal rule-Simpson's one third rule- Simpson's three-eighth rule, Weddle's rule- Euler-Maclaurin Summation Formula

UNIT - III DIFFERENCE EQUATIONS

Linear differences equations-Linear homogeneous difference equations with constant coefficients-Particular integrals for a^x , x^m , $\sin ax$, $\cos ax$ and $a^x f(x)$.

UNIT - IV SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

Bisection method - Iteration method - Regula-falsi method (False Position Method) - Newton-Raphson Method.

UNIT - V NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (FIRST ORDER ONLY)

Euler's method- Euler's modified method-Picard's method - Taylor's methods-Runge-Kutta method (Fourth order only).

Text book: 1. B.D. Gupta.(2001) *Numerical Analysis*, Konark Pub. Ltd., Delhi
2. M.K. Venkataraman. (1992) *Numerical methods for Science and Engineering*, National Publishing Company, Chennai.

Books for Reference

1. Gupta, Malik, Calculus of finite differences and Numerical Analysis, Krishna Prakashan Media, Meerut Seventh Edition.
2. S.C.Saxena, Calculus of finite differences and Numerical Analysis, S.Chand & Co., New Delhi. IX Edition.
3. A.Singaravelu, Numerical methods, Meenakshi Publications-First Edition 1992.
4. P.Kandasamy, K.Thilagavathy (2003) Calculus of Finite Differences & Numerical Analysis, S.Chand & Company Ltd., New Delhi-55.

Course Material: website links, e-Books and e-journals

<https://ocw.mit.edu/courses/22-15-essential-numerical-methods-fall-2014/pages/syllabus/>

<https://ocw.mit.edu/courses/18-330-introduction-to-numerical-analysis-spring-2004/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	M	S	M	S	S
CO2	M	S	S	S	M	M	S	S	M	S
CO3	M	S	S	S	S	S	M	S	S	M
CO4	S	S	M	S	S	S	S	S	S	S
CO5	M	M	S	M	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

B.Sc. MATHEMATICS – 2022-2023 onwards

Semesters: I, II (or) III, IV

Paper type: Practical (Allied)

Paper code: A – 03 Name of the Paper: NUMERICAL METHODS

Credit: 2

Total Hours per Week: 2

Lecture Hours:

Tutorial Hours: Practical Hours: 2

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LIST OF PROBLEMS

1. Derivatives by Newton's method
2. Gauss elimination method.
3. Gauss-Jacobi method.
4. Gauss-Seidel method.
5. Newton's forward and backward interpolation.
6. Lagrange interpolation.
7. Trapezoidal and Simpson one-third rules.
8. Euler's method.
9. Picard's method
10. Runge-Kutta's method.

THIRUVALLUVAR UNIVERSITY

MASTER OF SCIENCE

M.Sc. Physics

(With effect from 2022– 2023)

The Course of Study and the Scheme of Examination

Sl. No.	Study Components		ins. hrs / week	Credit	Title of the Paper	Maximum Marks		
	Course Title					CIA	Uni. Exam	Total
SEMESTER I								
1.	Core-Theory	Paper-1	5	4	Mathematical Physics - I	25	75	100
2.	Core-Theory	Paper-2	5	4	Classical and Statistical Mechanics	25	75	100
3.	Core-Theory	Paper-3	5	4	Quantum Mechanics - I	25	75	100
	Core-Practical	Paper-1	4	0	General Practical	0	0	0
	Core-Practical	Paper-2	4	0	Electronics Practical	0	0	0
Internal Elective for same major students (Choose any one)								
4.	Core Elective	Paper-1	4	3	(to choose one out of 3) A. Electronic Devices and Applications B.Fiber Optic Communication C. Electronics Communication Systems	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								
5.	Open Elective	Paper-1	3	3	(to choose one out of 3) A.Energy Physics B.Basic Physics C. Communication Physics	25	75	100
			30	18		125	375	500
SEMESTER II						CIA	Uni. Exam	Total
6.	Core-Theory	Paper-4	5	4	Mathematical Physics - II	25	75	100
7.	Core-Theory	Paper-5	4	4	Electro Magnetic Theory	25	75	100
8.	Core-Theory	Paper-6	4	4	Quantum Mechanics - II	25	75	100
9.	Core-Practical	Paper-1	4	4	General Practical	25	75	100
10.	Core-Practical	Paper-2	4	4	Electronics Practical	25	75	100
Internal Elective for same major students (Choose any one)								
11.	Core Elective	Paper-2	4	3	(to choose one out of 3) A.Nanoscience B.Electronics Instrumentation C. Non- linear optics	25	75	100
External Elective for other major students (Inter/multidisciplinary papers)								
12.	Open Elective	Paper-2	3	3	(to choose one out of 3) A.Spectroscopy and Lasers B. Physics for Competitive Exams C. Analog and Digital Electronics	25	75	100
13.	Field Study		-	2		100	-	100

14.	Compulsory Paper		2	2	Human Rights & Duties	25	75	100
			30	30		300	600	900
SEMESTER III						CIA	Uni. Exam	Total
15.	Core-Theory	Paper-7	5	4	Condensed Matter Physics	25	75	100
16.	Core-Theory	Paper-8	4	4	Nuclear Physics	25	75	100
17.	Core-Theory	Paper-9	4	4	Microprocessors and Microcontrollers	25	75	100
	Core-Practical	Paper-3	5	-	Advanced General Experiments	0	0	0
	Core-Practical	Paper-4	5	-	Programming& Problem solving skills	0	0	0
Internal Elective for same major students								
18.	Core Elective	Paper-3	4	3	(to choose one out of 3) A. Research methodology B. Material Science C. Numerical Methods and C programming	25	75	100
External Elective for other major students (Inter/multi-disciplinary papers)								
19.	Open Elective	Paper-3	3	3	(to choose one out of 3) A. Electrical and Electronics Appliances B. Physics of Materials C. Geophysics	25	75	100
20.	MOOC Courses		-	2				
			30	20		125	375	600
SEMESTER IV						CIA	Uni. Exam	Total
21.	Core-Theory	Paper-10	6	4	Spectroscopy	25	75	100
22.	Core-Practical	Paper-3	5	4	Advanced General Experiments	25	75	100
23.	Core-Practical	Paper-4	5	4	Microprocessor, Microcontroller & C++ Programming	25	75	100
24.	Core	Project	5	6	Project with viva voce (Compulsory)	100 (75 Project +25 viva)		100
Internal Elective for same major students								
25.	Core Elective	Paper-4	6	3	(to choose one out of 3) A. Crystal Growth and Thin Films B. Medical Physics C. MATLAB and Python Programming	25	75	100
External Elective for other major students (Inter/multidisciplinary papers)								
26.	Open Elective	Paper-4	3	3	(to choose one out of 3) A. Nanophysics B. Astrophysics C. Weather forecasting	25	75	100
			30	24		125	475	600
			120	92				2600

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: I

Paper type: Core

Paper code:

Name of the Paper: Mathematical Physics-I

Credit: 4

Total Hours per Week: 5 Lecture Hours: 75 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To acquire the knowledge about linear vector spaces and matrices.
2. To learn the new aspects of tensors.
3. To teach the concept of differential equations.
4. To impart the knowledge about special functions.
5. To study the fundamentals of Dirac-Delta and Green's functions.

UNIT-1: Linear Vector Spaces and Matrices

Teaching Hours: 16

Linear Vector Spaces explanation- Examples of linear vector spaces-Linear independence of vectors and dimension – Basis and expansion theorem-Inner products and unitary spaces-Orthonormal sets- Schwarz inequality -Schmidt orthogonalization process- Solved examples-Matrices-Linear transformation-Orthogonal, unitary and similarity transformation-Eigen values, Eigen vectors-Characteristic equation of a matrix-Caley-Hamilton theorem with proof-Problems

UNIT-2: Tensors

Teaching Hours: 14

Introduction-Coordinate transformation– Indical and summation convention – Dummy and real indices-Kronecker delta symbol-Scalars, Contravariant, Covariant tensors – Tensors of higher ranks-Algebraic operations of Tensors-Addition and subtraction-Contraction of tensors-Inner product-Quotient law-Statement and example- Symmetric and anti-symmetric tensors - Invariant tensors -Levi-Civita Symbol-Problems

UNIT-3: Differential Equations

Teaching Hours: 13

Order and Degree of a differential equation-Linear differential equation of first order and its solution-Solution of Second order differential equation with constant coefficients- Singular points of differential equations-Self adjoint differential equation-Power series solution-Frobenius' method.

UNIT-4: Special Functions

Teaching Hours: 17

Special functions – Legendre differential equation and polynomials-Generating functions-- Recurrence formulae- Rodrigue's formula for Legendre polynomials-Orthogonal properties of Legendre polynomials- Bessel differential equation and polynomials-Generating functions- Recurrence formulae- for Bessel polynomials-Orthogonality of Spherical Besselfunctions-

Hermite Differential equation and Polynomials-Generating function of Polynomials-Recurrence formulae-Rodrigue's formula for Hermite polynomials-Orthogonal properties of Hermite polynomials-Laguerre -Differential equation and Polynomials-Generating function of Polynomials-Recurrence formulae-Rodrigue's formula for Laguerre polynomials-Orthogonal properties of Laguerre polynomials.

UNIT-5: Dirac-Delta and Green's Functions

Teaching Hours: 15

Dirac-Delta function-Properties of Delta function-Fourier and Laplace transform of Delta Function- Green's function Introduction- Green's function for one-dimensional case (solution of Sturm-Liouville equation)-Symmetry property of Green's function-Eigen function - expansion of the Green's function-Green's function for Three dimensional Helmholtz equation.

Text Books

Unit -I to Unit -V

1. Satyaprakash, Mathematical Physics with Classical Mechanics Sultan Chand & sons, New Delhi, 2016.

Reference Books

1. P.K. Chattopadhyay, Mathematical Physics, New Age International Publishers, New Delhi, 2016.
2. B.S. Rajput, Mathematical Physics, PragatiPrakashan, Meerut, 2009.
3. H.K. Dass, Dr. Rama Verma, Mathematical Physics, New Delhi, 2014.
4. B.D. Gupta, Mathematical Physics, Vikas publishing house 3rd Edition, New Delhi, 2006.
5. Schaum's Outline Series, (i) Vector and tensor analysis, (ii) Linear Algebra, (iii) Matrices, (iv) Differential Equations

E-Materials

1. http://web.mst.edu/~hale/courses/M402/M402_notes/M402-Chapter1/M402-Chapter1.Fall13b.pdf
2. <https://www.youtube.com/watch?v=eeMJg4uI7o0>
3. <https://www.youtube.com/watch?v=v02D7C7js3g>
4. <https://www.youtube.com/watch?v=adXPC4HC6ck>
5. <https://www.youtube.com/watch?v=xNqLZnM-PPY>
6. http://electron6.phys.utk.edu/qm1/modules/m4/Vector_space.htm
7. <https://en.wikipedia.org/wiki/Tensor>
8. <https://www.youtube.com/watch?v=uaQeXi4E7gA>
9. https://www.grc.nasa.gov/www/k-12/Numbers/Math/documents/Tensors_TM2002211716.pdf
10. <http://www.physics.wm.edu/~finn/home/MathPhysics.pdf>

Course Outcomes

1. After studied unit-1, the student will be able to explain linear vector spaces and matrices and can solve the problems.
2. After studied unit-2, the student will be able to describe tensors in detail.
3. After studied unit-3, the student will be able to solve the differential equations.
4. After studied unit-4, the student will be able to formulate the differential equations for special functions.
5. After studied unit-5, the student will be able to understand Dirac-Delta function, Introduction on Green functions and Green's function for one dimensional and three dimensional cases.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	M	M	L
CO2	S	S	S	M	M	M	M	M	M	L
CO3	S	S	S	M	M	M	M	M	M	S
CO4	S	S	S	S	M	M	M	M	M	M
CO5	S	S	S	M	M	M	M	M	M	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: I

Paper type: Core

Paper code:

Name of the Paper: Classical and Statistical Mechanics Credit: 4

Total Hours per Week: 5 Lecture Hours: 75 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To make learning of Classical Mechanics interesting.
2. To teach and understand the Lagrangian and Hamiltonian formalisms and study their applications in mechanical systems and solving of problems.
3. To teach the theory of small oscillations and the Hamilton Jacobi
4. To teach and impart the knowledge associated with Rigid body dynamics
5. To teach Thermodynamics, Classical Statistics and quantum statistics

UNIT-1: Lagrangian , Hamiltonian formalisms and canonical transformations

Teaching Hours: 15

Lagrangian formalism: Constrains-classification-D'Alembert's principle-Lagrange's equation from D'Alembert's principle- Applications: spherical pendulum, cylinder rolling down an inclined plane.

Hamiltonian formalism: Cyclic coordinates and conservation theorem - Hamilton's equations –Hamilton's variational principle-Hamilton's equation of motion from variational principle- Applications: Linear harmonic oscillator and projectile in space.

Canonical transformations: Generating function- condition for a function to be canonical-simple example-Poisson's brackets-properties-Hamilton's equation of motion in Poisson's bracket-invariance of Poisson's bracket under canonical transformation.

UNIT-2: Hamilton - Jacobi Theory and Theory of Small Oscillations Teaching Hours: 15

Hamilton-Jacobi equations: Hamilton's characteristic function- Application to Linear harmonic oscillator problem - Action Angle variables –Action angle variable in a system of one degree of freedom-Application to Kepler's problem - Oscillatory motion: Theory of small oscillation - Linear triatomic molecule - Stability of Oscillatory motion - Forced Harmonic Oscillator.

UNIT-3: Rigid body dynamics

Teaching Hours: 15

Rigid body motion: Degrees of freedom-independent coordinates-Orthogonal transformation-Euler's angles - Angular momentum and kinetic Energy – Moment of inertia tensor - Euler's equations of motion-Torque-free motion of a rigid body - Motion of a symmetrical top under the action of gravity -Precession and nutation.

UNIT-4: Thermodynamics and Classical statistics**Teaching Hours: 15**

Thermodynamic parameters – Thermodynamic potentials – Gibbs phase rule – First and second order phase transitions – Entropy – fluctuations and irreversible process - Random walk - Brownian motion - Langevin theory.

Classical Statistics: Postulates - Maxwell Boltzmann distribution- application to diatomic molecule - Phase space - ensembles - Micro Canonical, Canonical and Grand Canonical ensembles - Liouville theorem and its significance- Partition function and its thermodynamical properties - Translational partition functions - Gibbs's Paradox - Sackur-Tetrode equation.

UNIT-V: Quantum Statistics**Teaching Hours: 15**

Quantum Statistics of ideal gas - Ideas of Bose – Einstein-Bose-Einstein condensation of gases – liquid helium- Fermi-Dirac distribution- Degeneracy of gases - Photon gas - Planck's law of radiation and its limitation - Thermionic emission - Pauli's theory of Paramagnetism.

Text Books**Unit-1& Unit-3**

1. SathyaPrakash and J.P Agarwal, Statistical Mechanics, 7th Edition, KedarNath and Ram Nath & Co, Meerut, 1994.
2. J.K.Bhattacharjee, Statistical Mechanics: An Introductory Text, Allied Publication, New Delhi, 1996.

Unit-2

1. Gupta Kumar Sharma, Classical Mechanics, PragatiPrakashan, Meerut, 2004.
2. SathyaPrakash and J.P Agarwal, Statistical Mechanics, 7th Edition, KedarNath and Ram Nath & Co, Meerut, 1994.
3. J.K.Bhattacharjee, Statistical Mechanics: An Introductory Text, Allied Publication, New Delhi, 1996.

Unit-4

1. S.N. Biswas, Classical Mechanics, Books and Allied Ltd., Kolkata, 1998.
2. Upadhyaya, Classical Mechanics, Himalaya Publishing Co., New Delhi, 1999.
3. Gupta Kumar Sharma, Classical Mechanics, PragatiPrakashan, Meerut, 2004.

Unit-5

1. B.K. Agarwal and M. Eisner, Statistical Mechanics, 2nd Edition, New Age International, New Delhi, 1998.
2. SathyaPrakash and J.P Agarwal, Statistical Mechanics, 7th Edition, KedarNath and Ram Nath & Co, Meerut, 1994.

Reference Items: books, Journal

1. H. Goldstein, Classical Mechanics. 3rd Edition. Pearson Education, Asia, New Delhi, 2002.

2. K. Huang, Statistical Mechanics, Wiley Eastern Ltd., New Delhi, 1975.
3. L.D. Landau and E.M. Lifshitz, Mechanics, Pergomon Press, Oxford, 1969.
4. K.R. Symon, Mechanics, Addison Wesley, London, 1971.
5. J.L. Synge and B.A Griffith, Principles of Classical Mechanics, Mc.Graw-Hill, NewYork, 1949.
6. C.R.Mondal, Classical Mechanics, Prentice - Hall of India, New Delhi.
7. L.P. Kadanoff, Statistical Physics - Statics, Dynamics and Renormalization, World Scientific, Singapore, 2001.
8. M. Glazer and J. Wark, Statistical Mechanics, Oxford University Press, Oxford, 2001.

E- Materials

1. <http://www.freebookcentre.net/physics-books-download/Notes-On-Statistical-Mechanics-by-K.P.N.-Murthy.html>
2. <http://www.freebookcentre.net/physics-books-download/Statistical-Mechanics-by-Henri-J.F.-Jansen.html>
3. <http://www.freebookcentre.net/physics-books-download/Lecture-Notes,-Statistical-Mechanics.html>
4. <http://www.freebookcentre.net/physics-books-download/Classical-Mechanics-Lecture-Notes-byTom-Kirchner.html>
5. http://www.atmosp.physics.utoronto.ca/~shahnas/Courses/Classical_Mech_Grad/Classical_Mech_Grad_Chap01.pdf
6. <http://www.freebookcentre.net/physics-books-download/Classical-Mechanics-by-Eric-D-Hoker.html>
7. <http://hyperphysics.phy-astr.gsu.edu/hbase/quantum/disfd.html>
8. <https://www.youtube.com/watch?v=fdS12EaXH3A>
9. <https://www.youtube.com/watch?v=rDHQ60CXDbU>
10. [https://en.wikipedia.org/wiki/Statistical_ensemble_\(mathematical_physics\)](https://en.wikipedia.org/wiki/Statistical_ensemble_(mathematical_physics))

Course Outcomes

1. After studying unit-1, the student will
have depth knowledge about Lagrangian and solve problems in mechanical systems using Lagrangian formulation.
Understand conservation theorems and its relevance in classical formulation.
Learn Hamiltonian formulations and solve problems using Hamiltonian formulation.
2. After studying unit-2, the student will be able to
Apply Hamilton's characteristic function to solve problems
Understand Action Angle variables and solve one degree of freedom and Kepler's problem
Acquire knowledge about oscillatory motion and stability of oscillatory motion
3. After studying unit-3, the student will
have knowledge about fundamentals of rigid body motion.
Explain Moment of inertia tensor.
Derive and solve Euler's angles Euler's equations of motion.

Able to solve problems on force free motion of a rigid body and symmetrical top.

4. After studying unit-4, the student will be able to
 Explain different statistical ensembles, their distribution functions, ranges of applicability and the corresponding thermodynamic potentials.
 Calculate basic thermo dynamical quantities in classical and quantum statistical models.
 Understand and solve problems on partition and translational partition function.
5. After studying unit-5, the student will be able to
 Apply quantum distribution laws and solve Bose-Einstein condensation of gases and Photon gas.
 Signify the results of Planck's law of radiation and its limitation.
 Explain Thermionic emission and Pauli's theory of Para magnetism.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	S	S	S	M	M	M	S	M	M	L
CO3	S	S	M	M	M	M	S	S	M	S
CO4	S	S	S	S	M	M	S	M	M	M
CO5	M	S	S	M	M	M	S	M	M	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: I

Paper type: Core

Paper code:

Name of the Paper: Quantum Mechanics-I

Credit: 4

Total Hours per Week: 5 Lecture Hours: 75 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. The primary objective is to teach the students the physical and mathematical basis of quantum mechanics for non-relativistic systems.
2. To derive the Time independent Schrodinger equation.
3. To teach Dirac's bra and ket notations
4. To acquire the knowledge about Schrodinger and Heisenberg pictures
5. To learn about angular momentum operators

UNIT-1: Basic formalism

Teaching Hours: 15

Schrodinger equation – Max Born's interpretation of wave function – Normalisation, scattering states and bound states – admissibility conditions for a quantum mechanical wave function – Equation of continuity and conservation of probability – Time independent Schrodinger equation – stationary eigen states – particle in a box – square well potential – Rectangular potential Barrier – tunnelling.

UNIT-2: Abstract formulation of Quantum Mechanics

Teaching Hours: 15

Mathematical properties of linear vector spaces – Dirac's bra and ket notation – Hermitian operators, eigenvalues and eigenvectors – Postulates of quantum mechanics. Position and momentum representations, connection with wave mechanics – Commuting operators – Generalised uncertainty principle. Change of basis and unitary transformation. Expectation values – Ehrenfest theorem.

UNIT-3: Quantum Dynamics

Teaching Hours: 15

Schrodinger picture – Heisenberg picture – Heisenberg equation of motion, Classical limit. Solution of simple harmonic oscillator problem by the operator method – General view of symmetries and conservation laws.

UNIT-4: Symmetries in Quantum Mechanics

Teaching Hours: 15

Hydrogen like atoms and spherical harmonics – Spatial translation, continuous and discrete, Time translation – Parity – Time reversal – Density matrices - properties, pure and mixed density matrices, expectation value of an observable, time-evolution, reduced density matrix

UNIT-5: Angular Momentum

Teaching Hours: 15

Commutation relations of angular momentum operators – Eigenvalues, eigenvectors – Ladder operators and their matrix representations – Addition of angular momenta, Clebsch-Gordan coefficients – Wigner-Eckart theorem.

Text Books

Unit 1 to Unit 5

1. P. M. Mathews and K. Venkatesan, 1976, A Text book of Quantum Mechanics, Tata McGraw-Hill, New Delhi.
2. L. I. Schiff, 1968, Quantum Mechanics, 3rd Edition, International Student Edition, MacGraw-Hill Kogakusha, Tokyo.
3. V. Devanathan, 2005, Quantum Mechanics, Narosa Publishing House, New Delhi.
4. G. Aruldas, 2002, Quantum Mechanics, Prentice Hall of India, New Delhi.
5. A. Ghatak and S. Lokanathan, Quantum Mechanics: Theory and Applications, 4th Edition, Macmillan India.

Reference Books

1. E. Merzbacher, 1970, Quantum Mechanics 2nd edition, John Wiley and Sons, New York.
2. V. K. Thankappan, 1985, Quantum Mechanics, 2nd Edition, Wiley Eastern Ltd, New Delhi.
3. P. A. M. Dirac, 1973, The Principles of Quantum Mechanics, Oxford University Press, London.
4. L. D. Landau and E. M. Lifshitz, 1976, Quantum Mechanics Pergamon Press, Oxford.
5. S. N. Biswas, 1999, Quantum Mechanics, Books And Allied Ltd., Kolkata.
6. J. S. Bell, Gottfried and M. Veltman, 2001, The Foundations of Quantum Mechanics World Scientific, Singapore.
7. R. P. Feynman, R. B. Leighton, and M. Sands, 1998, The Feynman Lectures on Physics, Vols. 3, Narosa, New Delhi.
8. J.J. Sakurai, Modern Quantum Mechanics, Addison-Wesley, 1993

E-Materials

1. <http://www.netsa.org.lk/OcwWeb/Physics/index.htm>
2. <http://www.theory.caltech.edu/people/preskill/ph229/>
3. <http://www.nsl.msui.edu/~pratt/phy851/lectures/lectures.html>
4. <http://walet.phy.umist.ac.uk/QM/LectureNotes/>
5. <http://www.ks.uiuc.edu/Services/Class/PHYS480/>
6. <http://www.mat.univie.ac.at/~gerald/ftp/book-schroe/index.html>
7. <http://people.deas.harvard.edu/~jones/ap216/lectures/lectures.html>
8. <http://www.netsa.org.lk/OcwWeb/Chemistry/5-73Introductory-Quantum-Mechanics-IFall2002/LectureNotes/index.htm>
9. <http://www.glue.umd.edu/~fivel/>
10. <http://www.phys.ualberta.ca/~gingrich/phys512/latex2html/phys512.html>

Course Outcomes:

1. The interpretation of wave function of quantum particle and quantum theory formulation is introduced through Schrodinger equation, student gets exposed to the behaviour of quantum particle encountering a i) barrier, ii) potential well.
2. Understand the general formulation of quantum mechanics which deal with the abstract object such as kets, bras, and operators.
3. Acquire knowledge about unitary transformation and able to analyse Schrodinger and Heisenberg interaction pictures.
4. Gain the knowledge of solving non-relativistic hydrogen atom, expectation value and density matrix.
5. Gain the knowledge about spin, angular momentum states, addition rules and identical particles.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	Yes	No
5	Yes	Yes	No	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	l
CO2	S	M	S	M	S	M	S	M	M	L
CO3	M	S	M	M	S	M	S	S	M	m
CO4	S	S	S	S	S	S	S	M	S	M
CO5	M	S	S	M	S	M	S	M	M	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: I

Paper type: Core Elective-1 (A)

Paper code: Name of the Paper: Electronic Devices and Applications Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To introduce structures, physical operations and circuit applications of basic semiconductor devices and display devices.
2. To develop the ability to analyse and design electronic circuits and to grasp the basic ideas of op-amps and its applications.
3. To provide an exposure to the wide applications of logic families, optoelectronic devices, Operational amplifiers, 555 Timer and Phase Locked Loops.
4. To study the basics of transducers and its types.
5. To familiarize the basic principles and advantages of pulse and digital communications.

UNIT-1: Logic families and Opto electronic devices

Teaching Hours: 15

Logic Families: TTL Inverter-TTL NAND - P MOS-N MOS-CMOS and I²L logics (Inverter and NAND)

Opto electronic devices: Light emitting diode - Surface emitting LED - Edge Emitting LED - Seven segment display - LDR - Photo diode - p-i-n Photo diode - Photo transistors - Solar cells – Photo detectors: IR and UV detectors.

Unit-2: OP-AMP Applications

Teaching Hours: 15

Op-amp - characteristics - Difference amplifier - CMRR - Integrator - differentiator - comparator- Zero crossing detector- Log and Antilog amplifier-Multiplier and divider-Instrumentation amplifier - V to I and I to V converters - Sample and Hold circuits-Electronic analog computation: Solving Simultaneous equations and Second order differential equations.

UNIT-3: 555 Timer and Phase Locked Loop

Teaching Hours: 15

555 Timer - Description - Monostable operation - Applications: Pulse width modulator-Frequency divider - Astable operation - Applications: Schmitt trigger - FSK generator.

Phase Locked Loops: - PLL IC 565 - Description - Lock-in range - capture range - pull-in time (Basic principles) - Applications: Frequency multiplication and Translation.

UNIT-4: Transducers

Teaching Hours: 15

Classification of Transducers - Principle, construction and working of Thermistor - LVDT, Electrical strain gauges and capacitive transducers, Photoelectric transducer, Piezoelectric transducer – Photovoltaic transducer, Photo emissive transducer, Measurement of non-

electrical quantities - Strain, Displacement, temperature, Pressure, Magnetic fields, vibration, optical and particle detectors.

UNIT-5: Pulse and digital Communication

Teaching Hours: 15

Pulse communications - Modulation and Demodulation: Pulse Amplitude Modulation (PAM) - Pulse Time Modulation (PTM): Pulse Width Modulation (PWM) - Pulse Position Modulation (PPM) - Pulse Code Modulation (PCM) - Quantizing noise- Frequency-Shift keying- Digital communication - Advantages of digital communication - Modem classification - Modes of modem operation – Modem interconnection - Modem interfacing.

Text Books

Unit 1 and Unit 3

1. V. Vijayendran, Introduction to Integrated Electronics: Digital and Analog, Third Reprint, S.Viswanathan (Printers &Publishers), PVT., Ltd, 2007.
2. J. Millman and C.Halkias , Integrated Electronics, New Delhi, Tata McGraw Hill, 2001.

Unit 2

1. D. Roy Choudhury.D and ShailB.Jain, Linear Integrated Circuits, 4th edition, New AgeInternational (P) Ltd, Chennai,2010.
2. George Kennedy, Electronic Communication systems, 3rd Edition, McGraw Hill, London 1987.

Unit-4

1. Dr.Rajendra Prasad, Electronic Measurements and Instrumentation, Khanna Publications.
2. S.Ramabhadran, Electronic Measurements and Instrumentation Khanna Publications.

Unit-5

1. Pallab Bhattacharya, Semiconductor Optoelectronic devices, Second Edition, Pearson Education, New Delhi, 2001.
2. D. Roy Choudhuryand ShailB.Jain, Linear Integrated Circuits, 4th edition, New Age International (P) Ltd, Chennai,2010.

Books for Reference

1. C. Sarkar , D.C.Darkar, Optoelectronics and Fibre Optics communication, New Delhi, New Age International Publishers, 2006.
2. M.S.Tyagi, Introduction to Semiconductor Devices, Wiley, New York.
3. Ramakant A. Gayakwad, Op-Amps and Linear Integrated Circuits, Third Edition, Prentice Hall India, New Delhi,1997.
4. R.F. Coughlin and F.F, Driscoll, Op-Amp and linear integrated circuits, Prentice Hall of India, New Delhi, 1996.
5. Louis E. Fresnel, Communication Electronics : principles and Applications, TMH Pub. Co., Ltd, 2002.

6. Wayne Tomasi, Electronic communication Systems, Fifth Edition, New Delhi, Pearson education, Inc, 2011.
7. Donald P Leach, Albert Paul Malvino and GoutamSaha, Digital Principles and Applications, Sixth Edition, Tata McGraw-Hill publishing company Ltd, New Delhi, 2008.
8. Allen Mottershead, Electronic devices and circuits, Prentice Hall India, New Delhi, 2000.

E-Materials

1. https://www.iare.ac.in/sites/default/files/lecture_notes/IARE_ECE_EDC%20NOTES.pdf
2. https://www.researchgate.net/publication/275408225_Electronic_Devices_and_Circuits
3. https://www.researchgate.net/publication/312190335_Fundamentals_of_Electronic_Devices_Circuits_from_A_to_Z
4. <http://engineering.nyu.edu/gk12/amps-cbri/pdf/Basic%20Electronics.pdf>
5. <http://www.ece.mtu.edu/faculty/ljbohman/onlinetext/elapp200.pdf>
6. <https://en.wikipedia.org/wiki/Transducer>
7. <https://www.youtube.com/watch?v=PTENYozF9fA>
8. <https://www.youtube.com/watch?v=VMBGtCS2EGg>
9. https://www.tutorialspoint.com/principles_of_communication/principles_of_communication_analog_pulse_modulation.htm
10. <https://www.elprocus.com/pulse-amplitude-modulation/>

Course Outcomes

1. After studying unit-I, the students will be able to:
 - understand the characteristics and significance of logic families
 - Identify different types of logic families
 - describe fundamental and applied aspects of optoelectronic device physics and its applications to the design and operation of laser diodes, light-emitting diodes, and photo detectors
2. After studying unit-II, the students will be able to:
 - understand the significance of Op-amps and their importance
 - understand various linear/non-linear applications
 - to solve simultaneous equations and second order differential equations
3. After studying unit-III, the students will be able to:
 - understand about the 555 timer and applications
 - explain the working of multivibrators using IC 555
 - Illustrate the function of application of PLL and its applications
4. After studying unit-IV, the students will be able to:
 - Know the principle and working of transducers
 - Explain different types of transducers
5. After studying unit-V, the students will be able to:
 - compare different modulation schemes with their advantages, disadvantages and applications.

Use modulation and demodulation techniques in analog and digital communications
able to understand the concept of MODEM and MODEM interfacing

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	S	S	S	M	M	M	S	M	M	L
CO3	S	S	M	M	M	M	S	S	M	S
CO4	S	S	S	S	M	M	S	M	M	M
CO5	M	S	S	M	M	M	S	M	M	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: I

Paper type: Core Elective-1 (B)

Paper code: Name of the Paper: Fibre Optic Communication Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course objectives

1. To understand the concept of electromagnetic waves and formulate the Maxwell's equations.
2. To acquire the basic knowledge about optical fiber and waveguides
3. To study the different types of optical fiber and its characteristics
4. To teach the fabrication and connection of optical fibers
5. To learn the nonlinear effects in fiber and solitons

UNIT-1: Linear, nonlinear waves and Maxwell's equations Teaching Hours: 12

Simple pendulum – small and large oscillations – Duffing oscillator – Linear and nonlinear medium - Maxwell's equations – Electromagnetic waves phase and group velocity, modes in a planar and cylindrical wave guides – polarization - dielectric susceptibility – first and higher order susceptibilities.

UNIT -2: Optical fiber waveguides and sources Teaching Hours: 12

Ray theory transmission: Total internal reflection, acceptance angle, numerical aperture and skew rays — evanescent field and Goos-Haechen shift – step index and graded index fibers – single and multi-mode fibers.

Sources: LED - Lasers – mode locked Lasers - modulation capability- transient response - semiconductor losses - diode structure and threshold conditions – modulation – temperature effects – source linearity and reliability – Photo detectors – PIN Photo detector – avalanche photodiode.

UNIT -3: Transmission characteristics of optical fibers Teaching Hours: 12

Attenuation – material absorption losses in silica fibers – linear and nonlinear scattering losses – fiber bend loss – mid-infrared and far-infrared transmission – intramodal and intermodal dispersion – overall fiber dispersion in multimode and single-mode fibers – modal birefringence.

UNIT-4: Fabrication and connection of optical fibers Teaching Hours: 12

Glass fibers - Preparation of optical fibers – Liquid-phase (melting) and Vapour-phase deposition techniques – characteristics of single-mode, multimode, plastic-clad and all-plastic fibers - Stability of the Fiber Transmission Characteristics: Micro bending and hydrogen

absorption – fiber alignment and joint loss – fiber splices – Fiber connectors: cylindrical ferrule expanded beam connectors - Fiber couplers: Three and four port couplers - star couplers.

UNIT-5: Nonlinear effects in fiber and solitons

Teaching Hours: 12

Refractive index – frequency and intensity dependent refractive index – group velocity dispersion – self-phase modulation - Kerr effect – chirping - stimulated Raman scattering – stimulated Brillouin scattering – self-steepening – self-focusing – self-defocusing – concept of solitons – formation of solitons – kdV equation - Nonlinear Schrödinger equation for solitons – soliton switching – soliton laser- advantages of soliton based communication.

Text Books

Unit 1 to Unit 5

1. Ajoy Ghatak and K. Thyagarajan, Introduction to fiber optics, 6th Edition, Cambridge University press, 2006.
2. John M. Senior, Optical fiber communications: Principles and practice, 2nd edition, PHI.
3. Govind P. Agrawal, Fiber-Optic communication systems, John Wiley, 2003.
4. Waves called Solitons: concepts and experiments, Springer Verlag, 1992.
5. Gerd Keiser, Optical fiber communications, 5th edition, McGraw-Hill Education Pvt. Ltd., New Delhi, 2013.

Reference Books

1. B.B. Laud, Lasers and Non-Linear optics, New Age International, New Delhi.
2. Akira Hasegawa and Yujiodama, Solitons in optical communications, Oxford Press, 1995.
3. Robert W Boyd, Nonlinear fiber optics, 2nd Edition, Elsevier, 2006.

E-Materials

1. <http://www.fibersystems.com/pdf/whitepapers/Basics-of-Fiber-Optics.pdf>
2. https://en.wikipedia.org/wiki/Maxwell%27s_equations
3. <https://optiwave.com/optibpm-manuals/bpm-introduction-to-optical-waveguides>
4. <http://optic1999.tripod.com/chapter3.htm>
5. <https://www.quora.com/What-are-the-different-methods-of-optical-fibre-fabrication-techniques>
6. <http://what-when-how.com/fiber-optics/nonlinear-effects-in-optical-fibers-part-1>
7. [https://en.wikipedia.org/wiki/Soliton_\(optics\)](https://en.wikipedia.org/wiki/Soliton_(optics))
8. <https://www.youtube.com/watch?v=635Ip6NWnfk>
9. <https://arxiv.org/ftp/arxiv/papers/1111/1111.5226.pdf>
10. <https://www.youtube.com/watch?v=QB1ns1WdzYI>

Course Outcomes

1. After studied unit-1, the student will be able to explain basics and electromagnetic wave and can derive the Maxwell's equations.
2. After studied unit-2, the student will be able to describe waveguides and sources
3. After studied unit-3, the student will be able to demonstrate the different characteristic of optical fibers
4. After studied unit-4, the student will be able to design the fabrication and connection of optical fibers.
5. After studied unit-5, the student will be able to understand nonlinear effects in fibers and solitons and applications.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	No	No	Yes	No
4	No	No	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	S	M	M	M
CO2	M	M	S	M	M	M	S	M	M	L
CO3	S	M	M	M	M	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	M	M
CO5	M	M	S	M	M	M	S	M	M	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: I

Paper type: Core Elective-1 (C)

Paper code: Name of the Paper: Electronic Communication Systems Credit: 3

Total Hours per Week:4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To Understand the Signal coding Techniques
2. To learn the coding and Error Techniques of different control system
3. Students can get the depth Knowledge of Satellite Communication system like GEO, MEO etc.
4. To teach the basics concept of Cellular communication System
5. To acquire the basic knowledge of Local area networks communication system

UNIT-1: Signal Encoding Techniques

Teaching Hours: 12

Antennas: types-Propagation modes – line of sight transmission- fading in the mobile environment – signal encoding techniques: criteria- ASK – FSK – BFSK – MFSK – PSK – BPSK – QPSK –multilevel PSK – AM modulation – Angle modulation – PCM – delta and adaptive delta modulation.

UNIT-2: Coding and Error Control

Teaching Hours: 12

Error detection – Parity check – cycle redundancy check – block error correction codes – hamming code – cyclic codes – BCH code – reed – Solomon codes – block interleaving – convolution codes – decoding – turbo coding – automatic repeat request – flow control – error control.

UNIT-3: Satellite Communication

Teaching Hours: 12

Satellite parameters and configurations – Satellite orbits – GEO – MEO – LEO – frequency bands – transmission impairments – Satellite foot print – atmospheric attenuation – satellite network – configuration – capacity allocation – multiplexing : FDM and TDM.

UNIT-4: Cellular wireless networks

Teaching Hours: 12

Principles of cellular networks : Organization – frequency reuse – operation – mobile radio propagation effects – hand-off – power control – traffic engineering – first generation analog – AMPS – second generation – TDMA – mobile wireless TDMA design consideration – CDMA – mobile wireless CDMA design considerations – Soft handoff – IS 95 – Third generation systems – wireless local loop.

UNIT-5: Wireless LANS

Teaching Hours: 12

Overview: Wireless LAN applications, requirements and technology – Infrared LANS – spread spectrum LANS – narrow band microwave LANS – IEEE 802 architecture – IEEE 802.11 architecture.

Text Books

Unit 1to Unit 5

1. William Schweber, Electronic Communication Systems, Complete Course Pearson Pub, 2011.
2. George Kennedy, Electronic Communication Systems, 3 rd Edition, Tata McGrawHill Edition, New Delhi, 2008.

Reference books

1. William Stallings, Wireless communications and Networks, Pearson education, Asia, 2002.
2. Robert J. Schoenbeck, Electronic communications, modulation and transmission PHI, 1999.
3. P. Gnanasivam, Telecommunication switching and networks, PHI, 2004.

E-Materials

1. <https://www.youtube.com/watch?v=mSrdM0vUNRw>
2. https://en.wikipedia.org/wiki/Antenna_types
3. https://en.wikipedia.org/wiki/Error_detection_and_correction
4. https://www.youtube.com/watch?v=9ftH_6uCEhU
5. <https://www.youtube.com/watch?v=Samc3ce6Fsw>
6. <http://www.swiftutors.com/types-of-satellite-orbits.html>
7. <https://electronics.howstuffworks.com/cell-phone7.htm>
8. <https://www.youtube.com/watch?v=oYRMYSIVj1o&vl=pt-BR>
9. <https://www.youtube.com/watch?v=r6yDbRCIS78>
10. https://en.wikipedia.org/wiki/Wireless_LAN

Course outcomes

1. After studied unit-1, the student will be able to know the principle of antenna and its types.
2. After studied unit-2, the student will be able to explain error detection, parity check etc.
3. After studied unit-3, the student will be able to understanding the satellite the principle of GEO, MEO and LEO.
4. After studied unit-4, the student will be able to learn the cellular networks like TDMA.
5. After studied unit-5, the student will be able to know the wireless LAN applications and its types.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	S	S	S	M	M	M	S	M	M	L
CO3	S	M	M	M	S	M	S	S	M	S
CO4	S	S	S	S	M	M	S	M	M	L
CO5	M	S	S	M	M	S	S	M	M	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: I

Paper type: OpenElective-1 (A)

Paper code: Name of the Paper: Energy Physics

Credit: 3

Total Hours per Week:3 Lecture Hours: 45 Tutorial Hours: Nil Practical Hours: Nil

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Course objectives

1. Ability to know the power potential of the sun and its utility.
2. Understanding the experimental procedure of collecting solar energy.
3. Knowing various types of storage methods involving.
4. Knowing the other alternative sources for energy production.
5. Applying knowledge to fabricate solar cells for energy storage purpose and knowing other forms of energy which are existing in the nature.

UNIT-1: Solar - Thermal Conversion

Teaching Hours: 09

An overview of thermal application and solar radiation – energy alternatives – devices for thermal collection and storage – thermal applications – Water heating – Space heating – Power generation – instruments for measuring solar radiation and sun shine

UNIT-2: Performance of Flat-Plate Collectors

Teaching Hours: 09

Performance analysis - -Transmissivity of the cover system based on reflection - Refraction - Absorption - Transmissivity for diffuse radiation - Transmissivity - Absorptive product

UNIT-3: Concentrating Collectors and Energy Storage Teaching Hours: 09

General characteristics - Definitions - Methods of classifications – Thermal energy storage - Sensible heat storage - Liquids - Solids - Latent heat storage - Thermal chemical storage

UNIT-4: Photo Conversion

Teaching Hours: 09

Photovoltaic conversion - Single crystal silicon cell - Principle and working insular cells - Conversion efficiency - Single crystal silicon – Polycrystalline and amorphous silicon - Cadmium sulphide - Cadmium telluride – copper Indium di-selenide

UNIT-5: Other Forms of Energy

Teaching Hours: 09

Wind energy - Recent developments - Energy from biomass - Direct methods - Indirect methods ~ Wave energy – Vegetation for fuel - Bio-diesel – Plants for Bio-diesel- Physical and chemical properties of Bio-diesel .

Text Book

1. P. Sukhatme, Solar energy (Second edition), Tata McGraw-Hill Publishing Co. Ltd. (New Delhi)

Reference Book

1. G.D.Rai, Solar Energy Utilization, Khanna publishers (New Delhi)

E-Materials

1. <https://www.nrel.gov/docs/legosti/old/1846.pdf>
2. <https://www.e-education.psu.edu/eme811/node/730>
3. <https://www.newport.com/n/photovoltaic-energy-conversion>
4. <https://www.youtube.com/watch?v=qOyc3p0OmSg>
5. http://www.iraj.in/journal/journal_file/journal_pdf/2-129-143080175869-74.pdf
6. <https://www.youtube.com/watch?v=wvl0QAQCJyc>
7. <https://www.youtube.com/watch?v=BL34OwuUrBU>
8. <https://www.youtube.com/watch?v=oos7fETc2OE>
9. <https://en.wikipedia.org/wiki/Biomass>
10. <https://physicsworld.com/a/biomass-energy-green-or-dirty/>

Course Outcomes

1. After studied unit-1, the student will be able to explain thermal conversion
2. After studied unit-2, the student will be able to describe performance of flat-plate collectors
3. After studied unit-3, the student will be able to design the thermal energy storage devices
4. After studied unit-4, the student will be able to understand the principles of photovoltaic conversion
5. After studied unit-5, the student will be able to know other forms of renewable energy sources.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	Yes	Yes	No	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	S	S	S	M	M	M	S	M	M	L
CO3	S	M	M	M	S	M	S	S	M	S
CO4	S	S	S	S	M	M	S	M	M	L
CO5	M	S	S	M	M	S	S	M	M	L

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: I

Paper type: Open Elective-1 (B)

Paper code: Name of the Paper: Basic Physics

Credit: 3

Total Hours per Week: 3 Lecture Hours: 45 Tutorial Hours: Nil Practical Hours: Nil

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Course objectives

1. Students can learn the importance of measurements and its units
2. To study the basic concepts of heat and different scales of temperatures
3. To learn the basics of charges and know about Ohm's law
4. To understand the different types of wave motion and its properties
5. To teach the importance of light energy and propagation of light

UNIT-1: Fundamentals of Physics

Teaching Hours : 09

Need of measurement and unit-definition of unit , requirements of standard unit, systems of units-CGS,MKS and SI, fundamental and derived quantities and their units - Least count and range of instrument, least count of vernier caliper, micrometer screw gauge-Definition of accuracy, precision and error, estimation of errors - absolute error, relative error and percentage error, rules and identification of significant figures.

UNIT2: Thermal Physics

Teaching Hours: 09

Heat-unit of heat-Different scales of temperatures, thermal expansions, Calorimetry – specific heat, latent heat, triple point, transmission of heat, heat conductivity, Black body, Stefan Boltzmann Law, Wien's Displacement Law,

UNIT-3: Electricity

Teaching Hours: 09

Concept of charge, Coulomb's inverse square law, Electric field, intensity, potential and potential difference.-Electric current, Ohm's law, laws of series and parallel combination of resistance -D.C. circuits, Kirchhoff's law, heating effect & chemical effect of current

UNIT-4: Waves

Teaching Hours: 09

Definition of wave motion, amplitude, period, frequency, and wavelength, relation between velocity, frequency and wavelength, longitudinal and transverse wave, principle of superposition of waves, definition of stationary wave , node and antinode, definition of resonance with examples, Formula for velocity of sound in air-Factors affecting the velocity of sound-Doppler effect

UNIT-5: Light

Teaching Hours: 09

Reflection, Refraction and total internal reflection of light and their applications-Mirrors-Lenses-Aberration in Lenses-spherical aberration-Prism-dispersion-dispersive power of a prism-refractive index of a prism- Optical instruments – microscopes, telescopes, binoculars, Defects of Human Eye.

Text Book

Unit-1 to Unit-5

1. N Subramaniam&BrijLal, Principles of Physics, BrijlalSubramaniam, S.Chand&Co.,Ltd, New Delhi,2001.
2. Plus one and Plus two Physics Books–TN State Board.
3. Plus one and Plus Two Physics Books-NCERT/CBSE.

Reference Books

1. N Subramaniam&BrijLal, Heat and Thermodynamics, S.ChandCo.,Ltd, New Delhi,2001.
2. D Jayaraman and K Ilangovan, Thermal Physics, Ananda Book Depot, Chennai, 2018.
3. K Ilangovan, Properties of Matter and Sound, Ananda Book Depot, Chennai, 2018.
4. R Murugesan, Electricity and Magnetism, S Chand & Co., Ltd.,New Delhi, 2006.
5. N SubramanyamBrijLal, A Text Book of Sound, Vikas Publishing House Pvt. Ltd., New Delhi, 2016.
6. N Subramanyam&BrijLal, Waves and Oscillations, Vikas Publishing House Pvt. Ltd., New Delhi, 2016.
7. J Jayachitra and M Gunasekaran, Properties of Matter and Acoustics, KRU Publications, Chennai, 2007.
8. N Subramanyam&BrijLal and MN Avadhanulu, A Text Book of Optics, S.Chand& Co. Ltd,New Delhi, 2010.
9. The Feynman Lectures on Physics, Vols. I, II and III, by R P Feynman, RB Leighton and M Sands, Narosa, New Delhi, 1998.
10. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY 2001.

E-Materials

1. <https://www.quora.com/What-are-fundamental-units-and-derived-units>
2. <http://tnschools.gov.in/textbooks>
3. <https://ncertbooks.ncert.gov.in/login>
4. <https://en.wikipedia.org/wiki/Heat>
5. <https://learn.sparkfun.com/tutorials/voltage-current-resistance-and-ohms-law/all>
6. <http://agni.phys.iit.edu/~vpa/wavesosci.html>

7. <https://en.wikipedia.org/wiki/Light>
8. <https://www.youtube.com/watch?v=dzR7rcO2-fI>
9. <https://www.youtube.com/watch?v=GXwZ3LMb-ik>
10. <https://www.youtube.com/watch?v=32q5x-81H5Q>
11. https://www.youtube.com/watch?v=sBb5WUw2_2I

Course outcomes

1. After studied unit-1, the student will be able to know the fundamental quantities and its units and also they can derive the derived quantities and its units
2. After studied unit-2, the student will be able to learn about heat and its measurements.
3. After studied unit-3, the student will be able to distinguish between positive and negative charges and they can Ohm's law
4. After studied unit-4, the student will be able to study the basics of sound and its properties and also they formulate the expression for velocity of sound
5. After studied unit-5, the student will be able to understand the basic phenomenon of light and learn about the optical instruments like telescope, microscope etc.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	M	M
CO2	S	S	S	M	M	M	S	M	M	L
CO3	S	M	M	M	S	M	S	S	M	S
CO4	S	S	S	S	M	M	S	M	M	L
CO5	M	S	S	M	M	S	S	M	M	L

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: I

Paper type: Open Elective-1 (C)

Paper code: Name of the Paper: Communication Physics Credit: 3

Total Hours per Week:3 Lecture Hours: 45 Tutorial Hours: Nil Practical Hours: Nil

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Course objectives

1. From the course students can study the principles of radio transmission and reception.
2. To learn the basic principle of fiber optics and its application for communication system
3. To teach the introduction on radar system and its application
4. To know the history of satellites and its features
5. To study the concept of cellular phones and to understand the Wi-Fi network system.

UNIT -1: Radio transmission and Reception

Teaching Hours: 09

Transmitter: Modulation - types of modulation-amplitude modulation -modulation factor-sideband frequencies in AM wave-limitations of amplitude modulation - frequency modulation-comparison of FM and AMDemodulation-Essentials in demodulation. Receivers: A.M. radio receivers -Types of A.M. radio receivers – Stages ofsuperhetrodyne radio receiver-Advantages of superhetrodyne circuit –FMreceiver-Difference between FM and AM receivers.

UNIT-2: Fiber optic Communication

Teaching Hours: 09

Introduction -Basic principle of fiber optics – Advantages – Constructionof optical fiber-Acceptance angle and Numerical aperture –Classification ofoptical fibers based on the refractive index profile – Classification of opticalfibers based on the number of modes of propagation – Losses in opticalfibers – Attenuation – Fiber optic communication – Advantages.

UNIT-3: Radar Communication

Teaching Hours: 09

Introduction -Basic radar system -Radar range –Antenna scanning – Pulsedradar system – A Scope- Plan position indicator-Search radar- Trackingradar- Moving target indicator-Doppler effect-MTI Principle- CW DopplerRadar- Frequency modulator CW Radar.

Unit-4: Satellite Communication

Teaching Hours: 09

Introduction – history of satellites – satellite communication system –satellite orbits Basic components of satellite communication system-constructural features of satellites- Commonly used frequency in satellite-communication- Multiple access – communication package – antenna- power-source – satellite foot points- satellite communication in India.

UNIT -5: Mobile Communication

Teaching Hours: 09

Introduction-The concept of cell –Basic cellular mobile radio system-cellphone-Facsimile-Important features of Fax machine-Application of Facsimile – VSAT (very small aperture terminals) – Modem – IPTV (internet protocol television) –Wi-Fi-4G (Basic ideas only).

Text Books

Unit 1

1. V.K.Metha, Principles of Electronics, S. Chand & Company Ltd., 2013

Unit 2 to Unit 5

1. Anokh Singh and Chopra A.K., Principles of communication Engineering, S.Chand & Company Pvt. Ltd., 2013.

Reference Books:

1. I. PoornimaThangam, Satellite communication, Charulatha Publications,2012.
2. Dennis Roddy and John Coolen, Electronic Communication, PHI, 1990.
3. William C.Y. lee, Cellular telecommunication (second edition), TataMcgraw Hill, 1991.

E-Materials

1. <https://en.wikipedia.org/wiki/Radio>
2. <https://www.britannica.com/technology/radio-technology>
3. https://en.wikipedia.org/wiki/Fiber-optic_communication
4. <https://en.wikipedia.org/wiki/Radar>
5. http://archive.mu.ac.in/myweb_test/Satelight%20Comm..pdf
6. https://www.youtube.com/watch?v=q8U_mne2fO0
7. <https://www.youtube.com/watch?v=-ap00IUJm7k&list=PLFW6lRTa1g83YaqmM9r2MAAiJVY93bOP7>
8. <https://www.youtube.com/watch?v=bXcY5Kjz8Hw>
9. <https://www.youtube.com/watch?v=dt4Ce8gQPns&list=PLAnjLC20C-XQnoowCtt-67WmyxoQPu2Fi>
10. <https://www.youtube.com/watch?v=f2wIHL1Sok8&list=PLuv3GM6-gsE3ypUYh43pPuZsXxJVG1e7F>

Course outcomes

1. After studied unit-1, the student will be able to understand the different types of modulation will be used in radio transmission and reception.
2. After studied unit-2, the student will be able to know the basics of fiber optics and its types
3. After studied unit-3, the student will be able to learn the principle of radar communication
4. After studied unit-4, the student will be able to describe the satellites and its importance,
5. After studied unit-5, the student will be able to demonstrate the different types of mobile phones and updating the knowledge about Wi-Fi and fourth generation of communication system.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core

Paper code:

Name of the Paper: Mathematical Physics-II

Credit: 4

Total Hours per Week: 5 Lecture Hours: 75 Tutorial Hours: Nil

Practical Hours: Nil

Course objectives

1. To teach the basics of complex variables and formulate the different theorems
2. To provide the knowledge on partial differential equations and to get the solutions of two and three dimensional heat flow
3. To expose an idea about Fourier and Laplace's integral Transforms
4. To describe the basics of group theory and different representation of a group
5. To explain the different probability distributions and theory of errors

UNIT-1: Complex Variables

Teaching Hours : 16

Functions of a complex variable – Analytic function-The necessary and sufficient conditions-Cauchy-Riemann Differential equations- Cauchy-Riemann equations in polar form-Laplace equation-Line integral of a complex function-Basic properties of the complex line integrals-Cauchy's integral theorem with proof-Cauchy's Integral formula with proof-and formula - Derivatives of an analytic function-Taylor and Laurent's series with proof-Cauchy Residue theorem expansions-Residues and their evaluation- Residue theorem -Evaluation of definite integrals.

UNIT-2: Partial differential equations

Teaching Hours: 13

Introduction-Laplace's equations – solutions of Laplace's Equations in Cartesian coordinates-Two dimensional cylindrical coordinates-spherical polar coordinates-Diffusion equation (Fourier equation of heat flow) – solutions of two and three dimensional heat flow –The equation of motion for the vibrating string-D'Alembert's solution.

UNIT-3: Fourier and Laplace's Integral Transforms

Teaching Hours: 13

Fourier's Transform-Infinite Fourier Sine and Cosine Transforms-Properties of Fourier's Theorem- Finite Fourier sine and cosine transforms- Simple applications of Fourier Transforms-Laplace transforms- Properties of Laplace Transforms-Convolution or Faltung Theorem-Evaluation of Inverse Laplace Transforms by Convolution Theorem-Evaluation of Laplace Transform by using Differential Equations-with constant and variable coefficients.

UNIT-4: Group Theory

Teaching Hours: 16

Concept of a group-Examples of group-Abelian group-Cyclic group-Group multiplication table-Subgroups-Group of order two and three-Conjugate elements and classes-Isomorphism and homomorphism-Symmetry operations and symmetry elements-Group multiplication

table for water molecule-Molecular points groups-Matrix representation of symmetry operations- Reducible and irreducible representations –The Great Orthogonally theorem with explanation (no proof)- Character Table for C_{2v} and C_{3v} Point groups-Infrared and Raman activity for CH_3Cl molecule-The three dimensional rotation group $SO(3)$ -The special unitary groups $SU(2)$ and $SU(3)$.

UNIT-5: Probability

Teaching Hours: 17

Definition of probability-A priori probability- A posterior probability-Repeated trials-Sample space-random variables-The expectation-The Laplace De Moivre Limits Theorem-Theoretical Distributions-Binomial distribution-The constants or first four moments, mode and moment generating function of Binomial distribution-Poisson's distribution- The constants or first four moments, mode and moment generating function of Poisson's distribution-Normal distribution- Standard form of the normal curve-Properties of the normal curve-Moment generating function of normal distribution.

Text Books

Unit -1 to Unit -3

1. Satyaprakash, Mathematical Physics with Classical Mechanics Sultan Chand & sons, New Delhi, 2016.

Unit-4

1. Satyaprakash, Mathematical Physics with Classical Mechanics Sultan Chand & sons, New Delhi, 2016
2. Aruldas G, Molecular Structure and Spectroscopy, Prentice-Hall of India PVT Ltd, New Delhi, 2005.
3. P.K. Chattopadhyay, Mathematical Physics, New Age International Publishers, New Delhi, 2016.

Unit-5

1. B.S. Rajput, Mathematical Physics, PragatiPrakashan, Meerut, 2009
2. Satyaprakash, Mathematical Physics with Classical Mechanics Sultan Chand & sons, New Delhi, 2016.

Reference Books

1. H.K. Dass, Dr. Rama Verma, Mathematical Physics, New Delhi, 2014.
2. B.D. Gupta, Mathematical Physics, Vikas publishing house 3rd Edition, New Delhi, 2006.

E-Materials

1. https://en.wikipedia.org/wiki/Analytic_function
2. https://en.wikipedia.org/wiki/Cauchy%E2%80%93Riemann_equations
3. <https://dlmf.nist.gov/1.14>
4. <https://www.youtube.com/watch?v=qnmUzjnY35M>
5. <https://www.youtube.com/watch?v=ey9rAu6-uEY>

6. <http://www.bhojvirtualuniversity.com/slm/mscche1p4.pdf>
7. <https://www.youtube.com/watch?v=oBPQsOrhbuc&t=2s>
8. https://www.youtube.com/watch?v=82Ad1orN-NA&list=PLDp9Jik5WjRtVUYHjx_Q0KohHqqDVKhcX
9. <https://www.youtube.com/watch?v=WWv0RUxDfbs>
10. https://en.wikipedia.org/wiki/Binomial_distribution

Course outcomes

1. After studied unit-1, the student will be able to learn analytic functions, derive an equation for Cauchy-Riemann Differential equations in different forms about Taylor, Laurent's series and Cauchy Residue theorem
2. After studied unit-2, the student will be able to obtain the solution for Laplace's Equations in Cartesian coordinates and also for two and three dimensional heat flow
3. After studied unit-3, the student will be able to study the Fourier and Laplace's Integral Transforms in detail
4. After studied unit-4, the student will be able to describe group theory and construct the character table for different point groups
5. After studied unit-5, the student will be able to acquire theory of probability and different theoretical distributions.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core

Paper code:

Name of the Paper: Electro Magnetic Theory

Credit: 4

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To provide a clear and logical presentation of Electrostatics.
2. To learn the basic ideas of Biot-Savart Law and applied to different objects
3. To introduce the Maxwell's equations applicable and its applications.
4. To study the electromagnetic fields and radiation from a localized sources.
5. To make the students understand the source of production and propagation of electromagnetic waves.

UNIT-1: Electrostatics

Teaching Hours: 12

System of charges: Charge distribution-charge densities-Electric field-Electrostatic potential-multipole expansion-Gauss' law-integral and differential forms.- Laplace and Poisson equations-Solution of Laplace's equation in Cartesian and spherical coordinates- Conducting sphere in a uniform electric field. Dielectric polarization: Polarization and displacement vectors-molecular polarizability and electrical susceptibility-dielectric sphere in a uniform field-Electrostatic energy

UNIT-2: Magnetostatics

Teaching Hours: 12

Biot-Savart Law –integral and differential forms-Application to a long wire carrying steady current- Ampere's circuital law –integral and differential forms-Application to a long wire and a solenoid carrying current. Magnetic vector potential-characteristics-application to a distant current loop-Magnetic scalar potential- characteristics- application to a circular coil carrying current-Magnetostatic energy.

UNIT-3: Maxwell's equations and Applications

Teaching Hours: 12

Faraday's laws of Induction - Maxwell's displacement current – continuity equation for current density –Maxwell's equations -differential and integral forms- significance of Maxwell's equations-Maxwell's equations in free space, linear isotropic media and in conducting medium- Gauge invariance - Coulomb and Lorentz gauges –inhomogeneous wave equations-Lorentz force- Lorentz force in terms of magnetic scalar and vector potentials- Energy and momentum of the field - Poynting's theorem - Conservation laws for a system of charges and electromagnetic fields.

UNIT-4: Electromagnetic fields

Teaching Hours: 12

Retarded potentials- oscillating electric dipole: magnetic vector and scalar potentials-electric and magnetic fields-power radiated and radiation resistance-Radiation from a small current element-Radiation from a linear antenna- Radiation from a centre fed half wave linear antenna- Antenna array.

UNIT-5: EM Wave propagation

Teaching Hours: 12

Plane wave equation and solution- Wave propagation in free space, isotropic dielectric and in a conducting medium-skin depth-Reflection and refraction at a plane interface:kinematic and dynamic properties-Fresnel's formulae-propagation between two perfectly conducting planes –propagation in a rectangular wave guide.

Text Books

Unit 1 to Unit 5

1. Satyaprakash, Electromagnetic theory and Electrodynamics, Meerut, KedarNath Ram,2010.
2. David.J.Griffiths, Introduction to Electrodynamics, New Delhi, Addison Wesley, 2012.
3. Uma Mukherji, , Electromagnetic field Theory and Wave Propagation, New Delhi,Narosa publishing House, New Delhi, 2006.

Reference Books

1. Agarwal G.C, Agarwal G. C., Chopra K. K., Electromagnetic Theory, K Nath& Co.,2010.
2. Edward C.Jordan, Keith G. Balmain, Electromagnetic waves and Radiating systems,Prentice Hall of India, 2005.
3. Reitz John R., Foundations of Electromagnetic Theory, , Pearson Education India, New Delhi, 2009.
4. Puri S.P, Classical Electrodynamics, , Tata McGraw-Hill publishing company Limited,New Delhi, 1997.
5. Prasad K.D Antenna and Wave Propagation, ,Sathyaprakashan, New Delhi, 1993.
6. Meenakumari, R.,Subasri R., Electromagnetic fields, second edition, , New Age
7. International Publishers, New Delhi, 2008.
8. J.D.Jackson, Classical Electrodynamics, 3rd Edition, Wiley Eastern Ltd, New Delhi, 1998.

E-Materials

1. <https://www.slideshare.net/abhishekchoksi56/poissons-and-laplaces-equation>
2. https://www.youtube.com/watch?v=m9CEXTmve_A
3. <https://www.youtube.com/watch?v=Nwnj1JSvfnk>
4. https://en.wikipedia.org/wiki/Magnetic_potential
5. https://en.wikipedia.org/wiki/Displacement_current
6. <https://www.youtube.com/watch?v=eJJrzekmuiA>
7. https://www.youtube.com/watch?v=0J_v2kD4Tcs
8. https://en.wikipedia.org/wiki/Retarded_potential

9. https://en.wikipedia.org/wiki/Electromagnetic_wave_equation
10. <https://www.youtube.com/watch?v=siaFxdokmM>

Course outcomes

1. After studying Unit-1, the students will be able to have a depth knowledge of electrostatics and clearly understand dielectric polarization.
2. After studying Unit-2, the students will be able to know the fundamental laws to find the magnetic field of a source. have depth knowledge of magnetic potential. apply the magnetic scalar and vector potentials to find the magnetic field due to localized source.
3. After studying Unit-3, the students will be able to use Maxwell's equations for a system of charge and electromagnetic field. Obtain homogeneous equations for a charged system. Students will be able to understand clearly Gauge transformation and gauge invariance.
4. After studying Unit-4, the students will be able to Understand about the oscillating dipole. Know how the power radiated from a linear antenna. Understand clearly antenna arrays.
5. After studying Unit-5, the students will be able to Know the propagation of electromagnetic waves in free space, dielectric medium and Conducting medium. Have depth knowledge of kinematic and dynamic properties of electromagnetic waves. Understand the wave propagation principle in the case of wave guide.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	Yes
2	Yes	No	Yes	Yes	Yes	No
3	No	Yes	No	Yes	Yes	Yes
4	Yes	No	Yes	Yes	No	No
5	Yes	No	No	No	No	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	M	M	S	M	S	M
CO2	M	S	M	M	M	S	S	M	S	L
CO3	S	M	M	M	M	M	S	S	S	S
CO4	S	M	M	M	M	M	M	M	S	M
CO5	M	S	M	M	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core

Paper code:

Name of the Paper: Quantum Mechanics-II

Credit: 4

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. The primary objective is to teach the students perturbation, variational methods and WKB approximation methods.
2. To study the Fermi Golden rule and Sudden and adiabatic approximations.
3. The important topic of quantum scattering
4. It is also dealt with. Relativistic quantum theory like Klein-Gordon equation
5. Dirac equation and creation and annihilation operators can be studied.

UNIT-1: Approximation Methods for Stationary Systems

Teaching Hours: 12

Time-independent perturbation theory, (a) non- degenerate and (b) degenerate – Variational method and its applications – WKB method and its applications

UNIT-2: Approximation Methods for perturbation theory

Teaching Hours:12

Time dependent perturbation theory – Transition to a continuum of final states, Fermi's GoldenRule – Application to constant and harmonic perturbations – Sudden and adiabatic approximations

UNIT-3: Scattering

Teaching Hours: 12

Wave packet description of scattering – Formal treatment of scattering by Green's function method – Born approximation and applications – Partial wave analysis – Optical theorem

UNIT-4: Relativistic Quantum Mechanics

Teaching Hours: 12

Klein – Gordon and Dirac equations – Properties of Dirac matrices – Plane wave solutions of Dirac equation – Spin and magnetic moment of the electron – Non-relativistic reduction of the Dirac equation

UNIT-5: Dirac Equation

Teaching Hours: 12

Covariant form of Dirac equation – Second quantization of Klein-Gordon field – Creation and annihilation operators – Properties of gamma Matrices – Traces – Relativistic invariance of Dirac equation – Probability density – current four vector – Bilinear Covariant.

Text Books

Unit 1 to Unit 5

1. P. M. Mathews and K. Venkatesan, 1976, A Text book of Quantum Mechanics, Tata McGraw-Hill, New Delhi.
2. L. I. Schiff, 1968, Quantum Mechanics, 3rd Edition, International Student Edition, McGraw-Hill Kogakusha, Tokyo.
3. E. Merzbacher, 1970, Quantum Mechanics, 2nd edition, John Wiley and Sons, New York.
4. V. K. Thankappan, 1985, Quantum Mechanics, 2nd Edition, Wiley Eastern Ltd, New Delhi.
5. J.D. Bjorken and S.D. Drell, 1964, Relativistic Quantum Mechanics, MacGraw-Hill New York.
6. V. Devanathan, 2005, Quantum Mechanics, Narosa Publishing House, New Delhi.
7. S.L. Gupta and I.D.Gupta - Quantum Mechanics.

Reference Books

1. P. A. M. Dirac, 1973, The Principles of Quantum Mechanics, Oxford University Press, London.
2. L. D. Landau and E. M. Lifshitz, 1958 Quantum Mechanics, Pergomon Press, London.
3. S. N. Biswas, 1999, Quantum Mechanics, Books and Allied, Kolkata.
4. G. Aruldas, 2002, Quantum Mechanics, Prentice-Hall of India, New Delhi.
5. J. S. Bell, Gottfried and M. Veltman, 2001, The Foundations of Quantum Mechanics, World Scientific.
6. V. Devanathan, 1999, Angular Momentum Techniques in Quantum Mechanics, Kluwer Academic Publishers, Dordrecht.
7. Lewis H. Ryder, Quantum Field Theory, 2nd Ed., Cambridge University Press, 1996.
8. J.D. Bjorken and S.D. Drell, Relativistic Quantum Fields, Vol. I McGraw-Hill, 1964.
9. J.D. Bjorken and S.D. Drell, Relativistic Quantum Fields, Vol. II (McGraw-Hill, 1978)

E-Materials

1. <http://www.freebookcentre.net/physics-books-download/Lecture-Notes-on-Quantum-Physics.html>.
2. <http://www.freebookcentre.net/physics-books-download/Quantum-Physics-by-Prof.-Graeme-Ackland.html>
3. <https://web.phys.ksu.edu/vqm/AVQM%20Website/AVQMweb.htm>
4. <https://ocw.mit.edu/courses/physics/8-04-quantum-physics-i-spring-2016/lecture-notes/>
5. <http://www.eas.asu.edu/~vasilesk/EEE434.html>
6. <http://minty.caltech.edu/Ph125a>
7. <http://walet.phy.umist.ac.uk/QM/LectureNotes/>
8. http://www.physics.usu.edu/torre/Classical_Field_Theory/Lectures/02_KG.pdf
9. <https://www.youtube.com/watch?v=oKqvj4Qv9Ts>

Course Outcomes

1. Understand the concept of perturbation theory to solve problems in quantum mechanics.
2. Acquire the knowledge of variation methods and able to solve harmonic perturbation step by step using mathematical methods.
3. Formulates ideas on born approximation transformation and concepts of scattering theory.
4. Understand the Dirac matrices and gained knowledge about spin and magnetic movement of electron.
5. Able to understand the creation and annihilation operator and gain the knowledge about anti particle.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	Yes	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	M	S	S	S	M	M	S	M	S	L
CO3	S	M	S	S	S	M	S	S	S	S
CO4	S	M	S	S	S	S	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Elective-2 (A)

Paper code:

Name of the Paper: Nanoscience

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course objectives

1. The course gives the some fundamental concepts of nanomaterials and its properties
2. Students can learn the synthesis of nanostructure materials by different methods
3. To expose an idea about quantum dots and growth of the quantum dots
4. To demonstrate the different tools for the characterization of synthesized materials
5. To study the important applications of nanomaterials and nanocomposites.

UNIT-1: Fundamentals of Nanoscale Science

Teaching Hours: 12

Introduction - nano and nature - background to nanotechnology -scientific revolutions opportunities at the nanoscale - time and lengthscale in structures - surfaces and dimensional space - evolution of band structures and Fermi surfaces - electronic structure of nanocrystals - bulk to nano transition - size and shapes -dimensionality and size dependent phenomena- Energy landscapes basic intermolecular forces –interdynamic aspects of intermolecular forces.

UNIT-2: Classification of nanoparticles and its properties

Teaching Hours: 12

Metal Nanoparticles: Size control of metal nanoparticles, Structural, Surface, electronic and optical properties.

Semiconductor Nanoparticles: solid state phase transformation, Excitons, Quantum confinement effect, Semiconductor quantum dots (SQDs), Correlation of properties with size, Quantum Well, Quantum Wires, Super lattices band and Band offsets, Quantum dot lasers.

Magnetic nanomaterials: Fundamentals of magnetic materials, Dia, Para, Ferro, Ferric, and Superpara magnetic materials, Nanostructured Magnetism.

Semiconductor Nanocomposites: Types of Nanocomposites (Metal oxides, ceramic and Glass), Core - Shell nanoparticles – Types of systems - properties of nanocomposites.

Carbon Nanostructures: Introduction, Fullerenes, C60, CNT, mechanical, optical and properties.

Unit 3: Synthesis of Nanomaterials

Teaching Hours: 12

Physical methods: Thermal evaporation, Spray pyrolysis, Molecular beam epitaxy (MBE), Physical vapour deposition (PVD), Microwave heating, Electric arc deposition, Ion implantation.

Chemical methods: Chemical and co - precipitation, sol - gel synthesis of metal oxides, Micro emulsions or reverse micelles, Solvothermal, Sonochemical synthesis, Electrochemical synthesis, Photochemical synthesis, Langmuir -blodgett (LB) technique, Chemical vapour deposition (CVD)

Unit 4: Characterization Techniques

Teaching Hours: 12

Powder X - Ray Diffraction, Scanning electron microscope(SEM), Transmission electron microscope (TEM), Scanningtunnelling microscope (STM), Atomic force microscope (AFM),Scanning probe microscopy (SPM), FTIR, UV - Visible absorption,Impedance measurement, V - I characteristics, Vibrating sample magnetometer (VSM)-Brunauer - Emmett - Teller (BET) Surface Area Analysis,Energy dispersive X - ray (EDX), X - ray photoelectron spectroscopy(XPS) and Photoluminescence.

Unit 5: Applications of Nanomaterials and Nanocomposites Teaching Hours: 12

Nanophotonics and Devices: ID, 2D, 3D Photonic crystals,Couplers, Waveguides, Photonic crystal fibres, Optical data storagesystems and Quantum computing

Medical applications: Imaging of cancer cells, Biological tags andTargeted nano drug delivery system.

Nanosensors: Sensors based on physical properties -Electrochemical sensors, Sensors for aerospace, defence andBiosensors.

Energy: Solar cells, LEDs and Photovoltaic device applications.

Photocatalytic applications: Air purification, Water purificationsand Volatile organic pollution degradation.

Carbon nanotubes: Field emission, Fuel cells and Display devices.

Text Books

Unit 1 to Unit 5

1. B. Viswanathan, Structure and Properties of Solid State Materials, 2nd Edition, Alpha Science International,2006.
2. T.Pradeep, Nano - The Essentials, Tata McGraw -Hillpublishing company limited,2007.

Reference Books

1. Pulickel M. Ajayan, Linda S. Schadler, Paul V. Braun, Nanocomposite Science and Technology, John Wiley &Sons, 2006.
2. Günter,Schmid, Nanoparticles: From Theory to Application, 2nd Edition, John Wiley & Sons, 2011.
3. SulabhaK.Kulkarni, Nanotechnology: Principles And Practices, Capital publishing company,2007.
4. B. Viswanathan, Nanomaterials, Narosa PublishingHouse Pvt. Ltd., New Delhi, 2009.
5. A. K. Bandyopadhyay, Nano Materials, 2nd Edition, NewAge International Publishers Ltd., New Delhi, 2007.
6. Charles P.Poole, Frank J. Owens,Introduction to nanotechnology, John Wiley & Sons publication,2003.

E-Materials

1. <https://www.ncsl.org/print/standcomm/sctech/Roberto0806.pdf>
2. <https://education.mrsec.wisc.edu/what-is-nanotechnology-defining-nanotechnology/>
3. https://en.wikipedia.org/wiki/Quantum_dot
4. <https://www.youtube.com/watch?v=AGfOQJPjGEE>
5. <https://www.youtube.com/watch?v=0JW6WcbcFFY>
6. <https://nptel.ac.in/content/storage2/courses/117104022/Lectures/Lec8.pdf>
7. https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/113106064/lec12.pdf
8. <https://www.youtube.com/watch?v=mC0rYNIMz9Q>
9. <https://www.youtube.com/watch?v=RnUGSDW-Tfk>
10. <https://en.wikipedia.org/wiki/Nanophotonics>

Course Outcomes

1. After studied unit-1, the student will be able to understand the nanoscale and nanomaterial.
2. After studied unit-2, the student will be able to learn how to synthesis the nanostructured materials
3. After studied unit-3, the student will be able to distinguish between nanoparticles and quantum dots
4. After studied unit-4, the student will be able to describe the different tools will be used for characterization of the nanomaterial.
5. After studied unit-5, the student will be able explain the different applications of nanotechnology

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Elective

Paper code:

Name of the Paper: Electronics Instrumentation

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. Students can learn the principle and classification of transducers
2. To know the principle, block diagram and working of some digital instruments
3. To study the working and applications of analytical instrumentation techniques
4. To teach the some basics of bio-medical instruments
5. To acquire the knowledge about internal and external peripheral devices

UNIT-1 : Transducers

Teaching Hours: 12

Classification of Transducers - Principle, construction and working of Thermistor - LVDT, Electrical strain gauges and capacitive transducers, Photoelectric transducer, Piezoelectric transducer – Photovoltaic transducer, Photo emissive transducer, Measurement of non-electrical quantities - Strain, Displacement, temperature, Pressure, Magnetic fields, vibration, optical and particle detectors.

UNIT-2: Digital Instrumentation

Teaching Hours: 12

Principle, block diagram and working of Digital frequency counter, digital multimeter, digital pH meter, digital conductivity meter and digital storage oscilloscope. Introduction to digital LCR meters, Working of LCR, introduction to virtual instrumentation, Supervisory control and data acquisition (SCADA), data acquisition system.

UNIT-3: Analytical Instrumentation

Teaching Hours: 12

Principle, block diagram, description, working and applications of Photoelectron Spectroscopy (XPS), Auger Electron Spectroscopy, Atomic Absorption Spectroscopy, Secondary Ion Mass spectroscopy (SIMS), Carbon Hydrogen Nitrogen Sulphur analyzer (CHNS). Flame emission spectrometer and ICP -Basic concepts of Gas and Liquid Chromatography.

UNIT-4: Bio-Medical Instrumentation

Teaching Hours: 12

Physiological transducers to measure blood pressure, body temperature - Sources of Bioelectric potentials - resting potential, action potential, bio-potential electrodes - Principle, block diagram and operation of ECG, EEG and EMG recorders. Principle-block diagram and operation of CT Scanner –MRI Machine.

UNIT-5: Computer Peripherals

Teaching Hours: 12

Introduction to Internal and external peripherals- Printers - Printer mechanism – Classification - Dot matrix, Ink jet and laser printers - Basic concepts of key board and mouse. Mass data storage - Hard Disk - Optical disk (CD) – DVD –Blu-ray disc, Flash memory – I/O Interfaces-Universal Serial Bus (USB). Communications (COM), Serial ports.

Text Books

Unit 1 to Unit 5

1. Dr. Rajendra Prasad, Electronic Measurements and Instrumentation, Khanna Publications.
2. S. Ramabhadran, Electronic Measurements and Instrumentation Khanna Publications.
3. Leslie Cromwell, Fred J. Weibull, Erich A. Pfeiffer, Biomedical Instrumentation and Measurements 2nd Edition, Prentice –Hall of India Private Ltd, New Delhi, 2010.
4. D. Kealey and P.J. Haines, Analytical chemistry, Viva Publications, New Delhi, 2002.
5. R. Lakshmi Rekha., C. Ravikumar, Biomedical Instrumentation and Medical electronics, Lakshmi Publications, Chennai, 2009.

Reference Books

1. S.M. Dhir, Electronics and Instrumentation, Khanna Publishers, Khandpur.
2. Albert D. Heltrick, William D. Cooper, Modern Electronics Instrumentation and measurement Techniques, PHI, New Delhi.
3. Douglas A. Skoog, F. James Holler, Timothy A. Nieman, Principles of Instrumental Analysis, Harcourt College publishers, 5th edition, 2001
4. A.J. Bouwens, Digital Instrumentation, McGraw Hill International, New Delhi, 2002
5. W.D. Cooper and A.D. Helfrick, Electronic Instrumentation and Measurement Techniques, 1st edition, Dorling Kindersly Pvt. Ltd. India, 2009

E-Materials

1. <https://en.wikipedia.org/wiki/Transducer>
2. <https://www.youtube.com/watch?v=AZdCXJx4xSA>
3. <https://www.youtube.com/watch?v=CJ6YWBuHoes>
4. <https://en.wikipedia.org/wiki/Multimeter>
5. https://en.wikipedia.org/wiki/X-ray_photoelectron_spectroscopy
6. <https://www.youtube.com/watch?v=XpDqJfybma4>
7. <https://www.youtube.com/watch?v=xIZQRjkwV9Q>
8. <https://en.wikipedia.org/wiki/Electrocardiography>
9. <https://en.wikipedia.org/wiki/USB>
10. <https://www.digitaltrends.com/computing/usb-c-vs-usb-a/>

Course Outcomes

1. After studied unit-1, the student will be able to know the principle, working and types of transducers.
2. After studied unit-2, the student will be able to demonstrate the principle, function of different digital instruments like digital multimeter.
3. After studied unit-3, the student will be able to explain the working and applications of Photoelectron Spectroscopy (XPS) ,Auger Electron Spectroscopy, Atomic Absorption Spectroscopy.
4. After studied unit-4, the student will be able to describe the operation of ECG,EEG and EMG biomedical instrumentations.
5. After studied unit-5, the student will be able to know the classification of printers, function of hard disk, CD and DVD.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	Yes	Yes	Yes	No	Yes
5	Yes	Yes	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	L
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	S	S	M	M	M	S	S	L
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Elective-2 (C)

Paper code:

Name of the Paper: Non-linear optics

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course objectives

1. To study the basics of Lasers and its types
2. To acquire the knowledge on introduction to non-linear optics and its generation
3. To teach the multiphonon processes and hence to study the optical Kerr effect
4. To expose the basic information on non-linear optical materials
5. To know about the fundamentals of fiber optics and different types of fibers

UNIT-1: Lasers

Teaching Hours: 12

Gas lasers – He-Ne, Ar⁺ ion lasers – Solid state lasers – Ruby – Nd:YAG, Ti sapphire - Organic dye laser – Rhodamine – Semiconductor lasers – Diode laser, p-n-junction laser and GaAs laser.

UNIT-2: Basics of Nonlinear Optics

Teaching Hours: 12

Wave propagation in an anisotropic crystal – Polarization response of materials to light – Harmonic generation – Second harmonic generation – Sum and difference frequency-generation – Phase matching – Third harmonic generation – Terahertz – Bistability-Self-focusing.

UNIT-3: Multiphoton Processes

Teaching Hours: 12

Two photon process – Theory and experiment – Three photon process – Parametric generation of light – Oscillator – Amplifier – Stimulated Raman scattering – Intensity dependent refractive index -- Optical Kerr effect -- Foucault effect – Photorefractive, electronic and optic effects.

UNIT-4: Nonlinear Optical Materials

Teaching Hours: 12

Basic requirements – Inorganics – Borates – Organics – Urea, Nitroaniline – Semiorganics – Thoreau complex – Laser induced surface damage threshold.

UNIT-5: Fiber Optics

Teaching Hours: 12

Step -Graded index fibers – Wave propagation – Fiber modes – Single and multimode fibers - Numerical aperture – Dispersion – Fiber bandwidth- Fiber losses -Scattering, absorption, bending, leaky mode and mode coupling losses-Attenuation coefficient -Material absorption.

Text Books

Unit 1 to Unit 5

1. K.R. Nambiar, *Lasers: Principles, Types and Applications* (New Age International Publishers Ltd, New Delhi, 2014).
2. B.B. Laud, *Lasers and Nonlinear Optics*, 3rd Edn. (New Age, New Delhi, 2011).
3. R.W. Boyd, *Nonlinear Optics*, 2nd Edn. (Academic Press, New York, 2003).
4. G.P. Agarwal, *Fiber-Optics Communication Systems*, 3rd Edn. (John Wiley, Singapore, 2003).

Reference Books

1. W.T. Silvast, *Laser Fundamentals* (Cambridge University Press, Cambridge, 2003).
2. D.L. Mills, *Nonlinear Optics – Basic Concepts* (Springer, Berlin, 1998).

E-Materials

1. <https://en.wikipedia.org/wiki/Laser>
2. https://en.wikipedia.org/wiki/Helium%E2%80%933neon_laser
3. <https://www.physics-and-radio-electronics.com/physics/laser/ndyaglaser.html>
4. https://en.wikipedia.org/wiki/Nonlinear_optics
5. <https://www.youtube.com/watch?v=3WevI1A2Bdk>
6. <https://shodhganga.inflibnet.ac.in/bitstream/10603/35888/1/chapter1.pdf>
7. https://www.photonics.com/Articles/Fiber_Optics_Understanding_the_Basics/a25151
8. <http://www.infocobuild.com/education/audio-video-courses/physics/IntroToNonlinearOptics-IIT-Kharagpur/lecture-12.html>
9. <https://www.slideshare.net/krishslide/nonlinear-optical-materials>
10. https://en.wikipedia.org/wiki/Graded-index_fiber

Course Outcomes

1. After studied unit-1, the student will be able to understand the laser and its types
2. After studied unit-2, the student will be able to know the fundamentals of non-linear optics.
3. After studied unit-3, the student will be able to study the multiphonon process in nonlinear optics.
4. After studied unit-4, the student will be able to learn the basic requirements for nonlinear optical materials like borates, organics etc.
5. After studied unit-5, the student will be able explain the principle, construction and working of fiber modes.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	o	Yes	No	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	S	M	S	M	M	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Open Elective-2 (A)

Paper code:

Name of the Paper: Spectroscopy and Lasers

Credit: 3

Total Hours per Week: 3 Lecture Hours: 45 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. The aim of the course is to give some fundamentals of spectroscopy and lasers.
2. To provide good knowledge on microwave spectroscopy and its applications.
3. To teach the different regions of Infrared spectroscopy and its theory.
4. Students can acquire facts about Raman spectroscopy and its applications.
5. To learn the basics of lasers, its types and applications.

UNIT 1: Microwave Spectroscopy

Teaching Hours: 09

Classification of molecules-Interaction of radiation with rotating molecule-Rotational spectra of rigid diatomic molecules-Non-rigid rotor-Linear polyatomic molecules-Symmetric and asymmetric top molecules-Design of microwave spectrometer-Applications

UNIT 2: Infrared Spectroscopy

Teaching Hours: 09

Introduction on Infrared spectroscopy-Vibration energy of a diatomic molecule-Morse curve and the energy of a diatomic molecule-Vibrating diatomic molecule-Vibrations of polyatomic molecules-Normal modes of molecular vibrations-Normal modes of CO₂ and H₂O molecules-Dipole moment change in CO₂ molecule-FTIR spectroscopy-Principle-Instrumentation and applications.

UNIT-3: Raman spectroscopy

Teaching Hours: 09

Introduction on Raman effect-Differences between Raman and Infrared Spectra-Classical and quantum mechanical picture of Raman effect-Characteristic parameters of Raman lines-Rotational Raman spectra- Vibrational Raman Spectra- Structure determination using IR and Raman Spectroscopy for CO₂ and H₂O-Laser Raman spectrometer-Principle-instrumentation-Applications of Raman spectroscopy.

UNIT-4: Laser

Teaching Hours: 09

Basic Principle of Laser – Einstein Coefficients – Condition for light amplification – Population Inversion – Threshold Condition – Line Shape Function – Optical Resonators – Three level and four level systems.

UNIT-5: Laser Types and Applications

Teaching Hours: 09

Solid State Lasers- Ruby and Nd-YAG Laser-Gas Lasers – He-Ne and CO₂ lasers- Application of laser in industry -cutting and welding-drilling – Surface Hardening-Medical applications.

Text Books

Unit-1 to Unit-3

1. G. Aruldas Molecular and Structure and Spectroscopy:, PHI PVT, Ltd, New Delhi, 2007
2. H. Kaur, Spectroscopy, PragatiPrakashan, Meerut, 2017.

Unit-4 and Unit-5

1. K. Thyagarajan and AjoyGhatak, Laser Theory and Applications, Cambridge University Press, 1999.

Reference Books

1. Colin Banwell, Elaine M. McCash, Fundamentals of Molecular Spectroscopy:, TMH publishers, 2013.
2. D.N. Satyanarayana, Vibrational Spectroscopy and Applications, New Age International Publications, New Delhi, 2004.
3. G.R.Chatwal and S.K.Anand, Spectroscopy (Atomic & Molecular), Himalaya Publishing House, 2016
4. M.N.Abadhanulu, An Introduction to Laser: Theory and Applications, S.Chand and Co., New Delhi, 2001.
5. P.K. Palanisamy, Physics for Engineering, Scitech Publishing Pvt. Ltd., Chennai.

E-Materials

1. https://en.wikipedia.org/wiki/Microwave_spectroscopy
2. <https://www.youtube.com/watch?v=3-8nAn0Mo6w>
3. https://en.wikipedia.org/wiki/Vibrational_spectroscopy_of_linear_molecules
4. <https://www.youtube.com/watch?v=58wqjy-ALLg>
5. https://en.wikipedia.org/wiki/Raman_spectroscopy
6. <https://www.youtube.com/watch?v=Y7GbNd8mMHg>
7. <https://en.wikipedia.org/wiki/Spectroscopy>
8. <https://www.youtube.com/watch?v=ADpmJppu83Q>
9. <https://www.slideshare.net/jaydipkanpariya1/ndyag-laser-working-and-construction>
10. <https://www.youtube.com/watch?v=XI18Is5Lp9I>

Course Outcomes

1. After studied unit-1, the student will be able to learn more about microwave spectroscopy and its applications.
2. After studied unit-2, the student will be able to know the fundamentals of vibrational spectroscopy and can assign normal modes of vibrations for different type of molecules.
3. After studied unit-3, the student will be able to distinguish the classical and quantum theory of Raman spectroscopy and it will be applied for structural confirmation of a molecule.
4. After studied unit-4, the student will be able to derive the expression for Einstein Coefficients for Stimulated emission of Radiation and learn about three level and four level systems.
5. After studied unit-5, the student will be able describe the different types of Laser and know the condition for population inversion and can study the Laser applications.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	No	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	M	S	S	S	M	M	S	M	S	L
CO3	M	M	M	M	S	M	M	M	M	M
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Open Elective-2 (B)

Paper code:

Name of the Paper: Physics for competitive Exams Credit: 3

Total Hours per Week:3 Lecture Hours: 45 Tutorial Hours: Nil

Practical Hours: Nil

Course Outcomes

1. Understand the principle of mechanics and properties of matter.
2. Analyze, understand and solve the problems in thermodynamics.
3. To study the basics of magnetic field and related phenomenon
4. Understand principles physical optics and lasers
5. To expose an idea about modern physics and electronics

UNIT -1: General mechanics and Properties of matter

Teaching Hours: 09

Scalars and Vectors(Concepts), Newton's Equations of Motion, impulse, Principle of conservation of Linear momentum- Direct Collision between two smooth spheres- Circular motion-Relation between linear velocity and angular velocity-Centripetal force- banking of Curved roads- Newton's Law of Gravitation- Variation of acceleration due to gravity with altitude and depth-Kepler's Laws-Escape velocity- Elasticity-Introduction-Bending of Beams-Cantilever-Viscosity-Poiseuille's method- Surface Tension-Drop weight method

UNIT-2: Thermodynamics

Teaching Hours: 09

Boyle's Law, Charles's Law-Ideal gas equation-First law of thermodynamics-Second law of thermodynamics-Carnot Engine- thermodynamic scale of temperature concepts of entropy – temperature entropy diagram – entropy of perfect gas.

UNIT-3: Magnetism

Teaching Hours: 09

Magnetic field-magnetic intensity-magnetic lines of force-magnetic flux-Biot-Savart's law-straight conductor, circular coil, solenoid carrying current-Lenz's law.

Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para- and ferro-magnetic materials.

UNIT-4: Optics and Laser

Teaching Hours: 09

Interference- Theory of thin films – Air wedge – Determination of diameter of a thin wire by air wedge –Diffraction-Fresnel and Fraunhofer Diffraction- Polarization-Double refraction-Optical Activity - Specific Rotatory Power.

Laser: Properties of laser- spontaneous and stimulated emission- population inversion, optical pumping- construction and working of Ruby Laser- applications of lasers.

UNIT-V: Modern physics and Electronics

Teaching Hours: 09

Bohr's theory-Hydrogen spectrum, Nuclear Physics, Binding Energy, X-rays, Alpha,Beta and Gamma rays, Einstein's photo electric effect-Mass-Energyrelation- Semi-conductors-PN Junction Diodes-Half wave rectifier-Zener diode-Voltage regulator-LED-Transistors-NPN-PNP-Modes of Transistors-CE Characteristics of a transistor-Single stage Amplifier.

Text Books

Unit-1

1. R Murugeshn, Mechanics and Mathematical Methods,S Chand Pvt Ltd, New Delhi 2016.
2. R Murugeshn, Properties of Matter,S Chand Pvt Ltd, New Delhi 2016.
3. K Ilangoan, Properties of Matter and Sound, Ananda Book Depot, Chennai, 2018.
4. N Subramaniam&BrijLal, Properties of Matter, S.ChandCo.,Ltd, New Delhi,2001

Unit-2

1. N Subramaniam&BrijLal, Heat and Thermodynamics, S.ChandCo.,Ltd, New Delhi,2001

Unit-3

1. R Murugesan, Electricity and Magnetism, S Chand & Co., Ltd.,New Delhi, 2006

Unit-4

1. N Subramanyam&BrijLal and MN Avadhanulu, A Text Book of Optics, S.Chand& Co. Ltd,New Delhi, 2010.
2. Laser theory and applications by K. Thyagarajan and AjoyGhatak, Cambridge University Press, 1999.

Unit-5

1. R Murugesan and KiruthigaSivaprasath, Modern Physics, S Chand & Co., Ltd.,New Delhi, 2016
2. V.K. Mehta and Rohit Mehta, Principles of Electronics, S Chand & Co., Ltd.,New Delhi, 2014

Reference Books:

1. J Jayachitra and M Gunasekaran, Properties of Matter and Acoustics, KRU Publications, Chennai, 2007.
2. D Jayaraman and K Ilangoan, Thermal Physics, Ananda Book Depot, Chennai, 2018
3. R Murugesan, Optics & Spectroscopy, S Chand & Co., Ltd.,New Delhi, 2006
4. An Introduction to Laser : Theory and Applications by M. N. Avadhanulu, S.Chand and Co., New Delhi 2001.
5. M.ArulThalapathi, Basic & Applied Electronics, Comptek Publishers, Chennai,2010

E-materials:

1. https://en.wikipedia.org/wiki/Equations_of_motion
2. <https://www.youtube.com/watch?v=xViRvJxTu6k>

3. [https://en.wikipedia.org/wiki/Elasticity_\(physics\)](https://en.wikipedia.org/wiki/Elasticity_(physics))
4. <https://www.youtube.com/watch?v=PoG14wRRQmM>
5. https://en.wikipedia.org/wiki/First_law_of_thermodynamics
6. <https://www.khanacademy.org/science/biology/energy-and-enzymes/the-laws-of-thermodynamics/v/first-law-of-thermodynamics-introduction>
7. <https://byjus.com/physics/biot-savart-law/>
8. https://en.wikipedia.org/wiki/Biot%E2%80%93Savart_law
9. https://en.wikipedia.org/wiki/Wave_interference
10. <https://www.youtube.com/watch?v=CAe3lkYNKt8>
11. <https://en.wikipedia.org/wiki/X-ray>
12. <https://byjus.com/physics/x-ray/>
13. <https://www.electrical4u.com/theory-of-semiconductor/>
14. <https://en.wikipedia.org/wiki/Semiconductor>

Course Outcomes

1. After studied unit-1, the student will be able to understand the concept of mechanics and to study the different properties of matter
2. After studied unit-2, the student will be able to learn about First and second law of thermodynamics and also provided basics of entropy
3. After studied unit-3, the student will be able to study the magnetism and magnetic materials
4. After studied unit-4, the student will be able to explain the phenomenon of interference, diffraction and polarization and also to describe the fundamentals of laser
5. After studied unit-5, the student will be able to demonstrate the atomic structure using Bohr's theory and also derive Einstein's Mass-Energy relation. Also they acquired knowledge on fundamentals of semiconductors.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	Yes
5	No	No	No	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	L
CO2	M	S	S	S	M	M	S	M	S	L
CO3	S	S	M	S	S	M	S	S	S	M
CO4	S	S	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Open Elective -2 (C)

Paper code:

Name of the Paper: Analog and Digital Electronics

Credit: 3

Total Hours per Week: 3 Lecture Hours: 45 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. The course gives the basics of semiconductors and it will be used to learn different type of semiconductors and can understand the concept of PN junction.
2. Rectifiers and amplifiers will be explained to know how it works
3. The basics of operational amplifiers are introduced
4. The various number systems are introduced and to understand the different codes
5. To give an insight to the students about fundamental logic gates

UNIT-1: Basics of Semiconductors

Teaching Hours: 09

Classification of solids in terms of forbidden energy gap-Fermi level-Intrinsic and extrinsic semiconductors-N-Type and P-Type semiconductors-Forward and Reverse Bias-PN junction-PN junction Diode and Zener Diode-V-I Characteristics-Zener Diode as a Voltage regulator.

UNIT-2: Rectifiers and Amplifiers

Teaching Hours: 09

Half-wave, Full-wave and bridge rectifier –Transistor-NPN and PNP transistors- Three modes of transistors-CE characteristics of a Transistor-Single stage amplifier-frequency response curve-Feedback amplifier.

UNIT-3: Operational Amplifier Fundamentals

Teaching Hours: 09

OPAMP –Symbol and Terminals -Parameter-Inverting and Non-inverting amplifier – gain - Virtual ground -Offset voltage- offset current-CMRR.
Mathematical operations-OPAMP – Sign and Scale changer -adder, subtractor and voltage follower.

UNIT-4 :Number systems

Teaching Hours: 09

Number systems – decimal, binary, octal and hexadecimal system – Conversion from one number system to another. Codes – BCD code – Excess 3 code, Gray code — Binary arithmetic –Binary addition – subtraction – unsigned binary numbers – sign magnitude numbers – 1's and 2's complement.

UNIT-5: Logic gates

Teaching Hours: 09

Basic Logic gates- AND, OR using diodes- NOT gate using transistor-NAND, NOR and EXOR gates- NAND & NOR as universal gates- De Morgan's theorems and their circuit implications -Half adder- Halfsubtractor.

Text Books

Unit-1 and Unit-2

1. V.K. Mehta and Rohit Mehta, Principles of Electronics, S Chand & Co., Ltd., New Delhi, 2014.

Unit-3 to Unit-5

1. V Vijayendiran, Introduction to Integrated Electronics, Ananda Book Depot, Chennai, 2007.

Reference Books

1. Malvino and Leech, Digital Principles and Applications, 4th Edition, Tata McGraw Hill, New Delhi, 2000.
2. Millman and Halkias, Integrated Electronics, International Edition, McGraw Hill, New Delhi, 1972.
3. M Arul Thalapapathi, Fundamentals of Digital Computers, Comptek publishers, Chennai, 1995.

E-Materials

1. <https://en.wikipedia.org/wiki/Semiconductor>
2. https://www.youtube.com/watch?v=CjAVfW_6juw
3. <https://en.wikipedia.org/wiki/Amplifier>
4. <https://www.youtube.com/watch?v=WZD9RZoMhVE>
5. https://en.wikipedia.org/wiki/Operational_amplifier
6. <https://www.youtube.com/watch?v=XmCuCf6GZLY>
7. https://www.tutorialspoint.com/digital_circuits/digital_circuits_number_systems.htm
8. <https://www.elprocus.com/basic-logic-gates-with-truth-tables/>
9. <https://www.youtube.com/watch?v=aWp8ILOgudI>
10. <https://www.electrical4u.com/universal-gate-nand-nor-gate-as-universal-gate/>

Course Outcomes

1. After studied unit-1, the student will be able to understand basics of semiconductors and able to distinguish between N-Type and P-Type semiconductors.
2. After studied unit-2, the student will be able to design rectifier circuits using diodes and amplifier circuits using transistors.
3. After studied unit-3, the student will be able to perform the various mathematical operations using OP-AMP.
4. After studied unit-4, the student will be able to understand the different number systems and to know how to convert one number to another number system.
5. After studied unit-5, the student will be able to demonstrate the basic logic gates AND, OR and NOT gates using diodes and transistor and also explain the Universal logic gates using NAND and NOR gates.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	No	Yes	No	Yes
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	M	M	M	M	S	M	M	S	S	S
CO4	S	M	S	S	M	M	S	M	M	L
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Practical-1

Paper code:

Name of the Paper: General Practical

Credit: 4

Total Hours per Week: 4 Lecture Hours: Nil Tutorial Hours: Nil

Practical Hours: 60

(Any 15 experiments out of 20)

1. Young's modulus -Cornu's method - forming elliptical fringes.
2. Young's modulus Cornu's method – forming hyperbolic fringes.
3. Spectrometer-Determination of Cauchy's constants
4. Spectrometer - Polarizability of liquids.
5. Spectrometer - Charge of an electron.
6. Spectrometer- Biprism - Wavelength of monochromatic source - Refractive Index of a liquid
7. Co-efficient of linear expansion - Air wedge method.
8. Hydrogen spectrum - Rydberg's constant.
9. Solar spectrum - Hartmann's Interpolation formula
10. Viscosity of liquid - Meyer's disc.
11. Determination of Stefan's constant.
12. Determination of solar constant using Lee's Disc.
13. Thermistor-Band gap energy.
14. Electrical resistance of a metal / alloy as a function of temperature by four probe method.
15. Determination of dielectric constant of solid samples
16. Determination of dielectric constant at high frequency by Lecher wire.
17. Specific charge of an electron -Thomson's method / Magnetron method.
18. B-H loop using Anchor ring.
19. Permittivity of a liquid using RFO.
20. Measurement of Numerical aperture and attenuation characteristics of the optical fibre for variable lengths.

Text Books

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, Ananda Book Depot, Chennai, 2018
2. M.N.Srinivasan, S. Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015

Reference Books

1. Samir Kumar Ghosh, A Textbook of Advanced Practical Physics, NCBA, Kolkatta, 2000
2. D. Chattopadhyay, P.C.Rakshit, An Advanced Course in Practical Physics,NCBA, Kolkatta, 2011

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Practical-2

Paper code:

Name of the Paper: Electronics Practical

Credit: 4

Total Hours per Week: 4 Lecture Hours: Nil Tutorial Hours: Nil

Practical Hours: 60

(Any 15 experiments out of 20)

1. Construction of dual regulated power supply.
2. V-I characteristics of solar cell.
3. OP-AMP-Active 2nd order filter circuits: Low pass, High pass and Band pass filters.
4. OP-AMP- Design of Phase-shift Oscillator-Study of attenuation characteristics
5. OP-AMP- Design of Wien Bridge Oscillator-Study of attenuation characteristics.
6. OP-AMP - Solving simultaneous equations.
7. OP-AMP - Design of square wave, saw tooth wave, and Triangular wave generators.
8. OP-AMP- Design of Schmitt Trigger and construction of Monostable multivibrator.
9. OP-AMP- Instrumentation amplifier
10. Arithmetic operations (Adder/ Subtractor) Using IC 7483.
11. Study of (i) Multiplexer using IC 74150 for the generation of Boolean functions and (ii) Demultiplexer using IC 74154
12. Study the function of Decoder and Encoder.
13. IC 7490 -as modulus counters and display using IC-7447
14. Up-down counters - Design of modulus counters.
15. IC 555 –Astable multivibrator and Voltage Controlled Oscillator.
16. IC 555 –Monostable multivibrator and Frequency Divider.
17. IC 555 - Schmitt Trigger and Hysteresis.
18. IC 555-Temperature co-efficient of resistance
19. A/D converter using comparator LM 339.
20. Study of A/D converters-4 bit simultaneous A/D converter and successive approximation A/D converter using ADC IC 0801/IC 0804.

Text Books

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, Ananda Book Depot, Chennai, 2018
2. M.N.Srinivasan, S. Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015

Reference Books

1. Samir Kumar Ghosh, A Textbook of Advanced Practical Physics, NCBA, Kolkatta, 2000
2. D. Chattopadhyay, P.C.Rakshit, An Advanced Course in Practical Physics, NCBA, Kolkatta, 2011

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: III

Paper type: Core

Paper code:

Name of the Paper: Condensed Matter Physics

Credit: 4

Total Hours per Week: 5 Lecture Hours: 75 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To understand the basic crystal structures, bonding of solids and the lattice energy calculations.
2. To study the lattice dynamics and phonon momentum.
3. To explain the free electron gas in three dimensions and electronic heat capacity.
4. To understand basic concept of magnetism and its applications.
5. To study the properties of superconducting materials and its applications.

Unit-1: Crystal Physics

Teaching Hours: 15

Types of lattices - Miller indices – symmetry elements and allowed rotations - simple crystal structures – Atomic packing factor - Crystal diffraction - Bragg's law – Scattered wave amplitude - Reciprocal lattice (sc, bcc, fcc) – Diffraction conditions - Laue equations – Brillouin Zone - Structure factor - Atomic form factor - Inert gas crystals.

UNIT-2: Lattice Dynamics

Teaching Hours: 15

Monoatomic lattices - Lattice with two atoms per primitive cell - First Brillouin zone - Group and phase velocities - Quantization of lattice vibrations - Phonon momentum - Inelastic scattering by phonons - Einstein's model and Debye's model of specific heat.

UNIT-3: Band theory of metals and Semiconductors

Teaching Hours: 15

Free electron gas in three dimensions - Electronic heat capacity - Wiedemann-Franz law - Band theory of metals and semiconductors - Bloch theorem - Kronig-Penny model - Semiconductors - Intrinsic carrier concentration – Temperature dependence - Mobility - Impurity conductivity – Impurity states - Hall effect.

UNIT-4: Magnetism

Teaching Hours: 15

Diamagnetism - quantum theory of Paramagnetism - Rare earth ion - Hund's rule - Quenching of orbital angular momentum - Adiabatic demagnetization - Quantum theory of ferromagnetism - Curie point - Exchange integral - Heisenberg's interpretation of Weiss field - ferromagnetic domains - Bloch Wall - Spin waves - Quantization - Magnons - thermal excitation of magnons

UNIT-5: Super conductors and its applications

Teaching Hours: 15

Experimental facts: Occurrence - Effect of magnetic fields - Meissner effect – Critical field – Critical current - Entropy and heat capacity - Isotope effect - Energy gap - Type I and Type II superconductors. Theoretical explanation: Thermodynamics of super conducting transition - London equation - BCS Theory - Coherence length — Cooper pairs - Single particle Tunneling - Josephson tunneling - DC and AC Josephson effects - High temperature super conductors - SQUIDS.

Text Books

Unit 1 to Unit 5

1. S.O. Pillai, Solid State Physics, New Age International, New Delhi, 2016.

Reference Books

1. C. Kittel, Introduction to Solid State Physics, 7th Edition, Wiley, New York, 1996.
2. M. Ali Omar, Elementary Solid State Physics-Principles and Applications, Addison-Wesley, London, 1974.
3. K. Ilangoan, Solid State Physics, S. Viswanathan (Printers&Publishers) Pvt.Ltd.,Chennai,2007.
4. N.W. Aschroft, N.D. Mermin, Solid State Physics, Rhinehart and Winton, New York.
5. Gupta Kumar Sharma, Solid State Physics, K Nath Publishers, Meerut.
6. A.J. Dekker, Solid State Physics, Macmillan India, New Delhi.
7. H.M. Rosenberg, The Solid State, 3rd Edition, Oxford University Press, Oxford, 1993.
8. S.L. Altmann, Band Theory of Metals, Pergamon, Oxford.
9. M.A. Wahab, Solid State Physics, Structure and Properties of Materials, Narosa, New Delhi, 1999.
10. J.M. Ziman, Principles of the Theory of Solids, Cambridge University Press, London, 1971.

E-Materials

1. https://web.iit.edu/sites/web/files/departments/academic-affairs/academic-resource-center/pdfs/Miller_Indices.pdf
1. https://www.youtube.com/watch?v=LcoUFX3_A1s
2. <https://www.youtube.com/watch?v=-MTYPNfVw5Y>
3. https://en.wikipedia.org/wiki/Brillouin_zone
4. http://yclept.ucdavis.edu/course/215b.W17/Kronig-Penney_Rapp-3.pdf
5. <https://www.youtube.com/watch?v=6EdotZPaCIA>
6. <https://www.youtube.com/watch?v=IMbGqcb8aN4>
7. https://en.wikipedia.org/wiki/Hund%27s_rules
8. https://en.wikipedia.org/wiki/Meissner_effect
9. <https://www.youtube.com/watch?v=NVeAmKUvXA>

Course Outcomes

1. After studied unit-1, the student will be able to know the types of lattices and crystal structures.
2. After studied unit-2, the student will be able to explain lattice dynamics like Einstein's model and Debye's model of specific heat.
3. After studied unit-3, the student will be able to study Band theory of metals and semiconductors and also able to explain Kronig-Penny model.
4. After studied unit-4, the student will be able to understand the quantum theory of paramagnetism and ferromagnetism.
5. After studied unit-5, the student will be able to basics of superconductors and its applications. Also able to differentiate Type I and Type II superconductors.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	No	Yes	No	Yes
5	No	No	No	No	No	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	M	S	M	S	M
CO2	M	S	S	S	M	M	S	M	S	L
CO3	S	M	M	M	S	S	M	M	S	M
CO4	M	M	M	M	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Physics – 2022-2023 onwards

Semester: III

Paper type: Core

Paper code:

Name of the Paper: Nuclear Physics

Credit: 4

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To teach the basic properties of nuclear properties like energy levels, angular momentum, parity and isospin.
2. To study the alpha, beta, gamma decay and nuclear reactions.
3. To acquire the knowledge on different nuclear models
4. To know the principle and working of nuclear detectors.
5. To learn the classification of elementary particles and its properties.

UNIT-1: Nuclear Properties

Teaching Hours: 12

Nuclear energy levels - Nuclear angular momentum, parity, isospin – Nuclear magnetic dipole moment – Nuclear electric quadrupole moment - Ground state of deuteron – Magnetic dipole moment of deuteron – Proton-neutron scattering at low energies – Scattering length, phase shift – Nature and properties of nuclear forces – Spin dependence – Charge symmetry – Charge independence – Repulsion at short distances – Exchange forces – Meson theory.

UNIT-2: Decay and Reactions

Teaching Hours: 12

Alpha decay: Energy relations - Q values – Spectrum and selection rules - Gamow's theory.
Beta decay: Energy relations - Q values – Spectrum - Pauli's neutrino hypothesis – Electron capture - Fermi's theory of beta decay – Selection rules .
Gamma decay- Kinematics of Gamma decay – Spectrum – Internal conversion – Selection rules
Nuclear Reactions -Types and conservation laws – Q-equation -Threshold energy -General solution of the Q equations – Cross section of nuclear reactions –Scattering and reaction cross section - Compound nucleus model -Breit Wigner single level formula-Ghosal's experiment

UNIT-3: Nuclear Models

Teaching Hours: 12

Liquid drop model: Semi empirical mass formula – Applications of LDM - Mass parabola – Q-values (Alpha, Beta and Fission) – Energetics of fission – Fissility parameter - Bohr-Wheeler's theory Shell model:Evidences in favour of shell model - Shell model potential – Square well, Harmonic Oscillator, Woods-Saxon – Spin – Orbit coupling – Nuclear Ground state configuration and spin parity – Nuclear moment – Nuclear isomerism – Predictions and failures of the shell model Collective model: Vibrational model – Rotational model – Quadrupole moment – Fermi gas model

UNIT-4: Detectors and applications

Teaching Hours: 12

Detectors: General Properties- Energy proportionality – Pulse shape – Energy resolution – Detection efficiency – Time resolution - Ionization Chamber – Geiger-Muller counter – Scintillation detectors – Semiconductor detectors Accelerators –Linear Accelerator – Cyclotron – Large Hadron Collider.

Applications – Neutron activation analysis – Rutherford backscattering spectrometry – Accelerator mass spectroscopy

UNIT-5: Elementary Particles

Teaching Hours: 12

Nucleons, leptons, mesons, baryons, hyperons, hadrons, strange particles -Classification of fundamental forces and elementary particles – Basic conservation laws-Additional conservation laws: Baryonic, leptonic, strangeness and isospin charges/quantum numbers – Gell-mann—Nishijima formula - Invariance under charge conjugation (C), parity (P) and time reversal (T) -CPT theorem -Parity non-conservation in weak interactions – CP violation – Eight-fold way and supermultiplets – SU(3) symmetry and quark model-Gell – Mann Okubo mass formula for octet and decaplet-Ideas of Standard model and Higgs particle.

Text Books

1. K. S. Krane, Introductory Nuclear Physics, John-Wiley, New York, (1987).
2. S. B. Patel, Nuclear Physics: An Introduction, Wiley-Eastern, New Delhi, (1991).
3. B. L. Cohen, Concepts of Nuclear Physics, Tata McGraw Hill, New Delhi, (1988).
4. M.L Pandya and R.P.S Yadav, Elements of Nuclear Physics, KedarNath Ram, Meerut(1994).

Reference Books

1. H. S. Hans, Nuclear Physics: Experimental and Theoretical, New Age International Publishers, New Delhi, (2001).
1. D. C. Cheng and G. K. O'Neill, Elementary Particle Physics: An Introduction, Addison-Wesley, (1979).

E-Materials

1. <https://www.youtube.com/watch?v=Jf6MSWoZRmc>
2. http://www.scholarpedia.org/article/Nuclear_Forces
3. https://en.wikipedia.org/wiki/Alpha_decay
4. <https://www.youtube.com/watch?v=CwExbnOzc4o>
5. <https://www.youtube.com/watch?v=nqSs7vrF9DY>
6. <http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/liqdrop.html>
7. https://en.wikipedia.org/wiki/Geiger_counter
8. <https://www.youtube.com/watch?v=jxY6RC52Cf0>
9. https://www.youtube.com/watch?v=fivOAjr_suA
10. https://en.wikipedia.org/wiki/Gell-Mann%E2%80%93Nishijima_formula

Course Outcomes

1. After studied unit-1, the student will be able to understand the concept of nuclear energy levels, nuclear angular momentum, parity and isospin. Also able to explain nature and properties of nuclear forces.
2. After studied unit-2, the student will be able to describe Gamow's theory, Fermi's theory of beta decay and kinematics of gamma decay. Also able to derive the Breit Wigner single level formula.
3. After studied unit-3, the student will be able to differentiate different nuclear models.
4. After studied unit-4, the student will be able to know the principle and working of G.M. counter, scintillation detectors and particle accelerators.
5. After studied unit-5, the student will be able to obtain Gell-mann--Nishijima formula and Gell – Mann Okubo mass formula. Also able to explain the classification of elementary particles.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	No	Yes	Yes	No	Yes
5	Yes	No	Yes	No	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	M	M	S	M
CO2	S	S	S	S	M	M	M	M	S	L
CO3	S	M	M	S	S	M	M	S	S	S
CO4	S	M	S	S	M	M	M	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: III

Paper type: Core

Paper code: Name of the Paper: Microprocessors & Microcontrollers Credit: 4

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To learn interrupts of 8085, Timing diagram and assembly language programming.
2. To understand the principle of interfacing with peripheral devices
3. To acquire new knowledge on fundamentals of microcontroller 8051.
4. To study the Interrupts and instructions set of 8051 and hence to acquire the knowledge on Programming.
5. To expose PUSH and POP, Jump and Call instructions and some interfacing devices.

Unit-1: Instructions & ALP

Teaching Hours: 12

8085- Instructions- Data transfer, Arithmetic, Logical, Branch and I/O and Machine Control Instructions-Timing Diagram for Memory Read/Write Cycle-Timing diagram for MOV/MVI instructions-Delay Calculations-Time delay using a single register-Two register-Register pair.

Assembly language programs -8-bit Addition with Carry-Multibyte addition-8-bit Subtraction with Borrow-Multibyte subtraction-BCD subtraction-16-bit Multiplication-BCD Multiplication-8-bit Division-BCD division-Square and Square root-Largest and smallest numbers in a data set – Ascending order and descending order – Binary to ASCII-ASCII to Binary-BCD to ASCII and ASCII to BCD-Debugging a program.

Unit-2: Peripheral Devices and Interface (8085)

Teaching Hours: 12

Data transfer schemes -- Synchronous and asynchronous data transfer-Interfacing memory and devices- I/O and Memory mapped I/O – Pin function, working and interfacing of Programmable peripheral interface (8255)-Programmable keyboard / display interface (8279)-Interfacing Seven segment display interface-Block diagram and interfacing of analog to digital converter (ADC) and Digital to analog converter (DAC)- Stepper motor with clockwise and anti-clockwise rotation-Traffic control.

Unit-3: Basic of Microcontroller 8051

Teaching Hours: 12

8051 Micro-controller hardware: 8051 oscillator and clock - Program counter and data pointer - A and B CPU register - Flags and PSW - Internal memory - Internal RAM - Stack and stack pointer - Special function registers - Internal ROM-Input / output pin, ports and circuits - External memory.

Counter and Timer: Counter / Timer interrupts - Timing - Timer modes of operation – Counting-Serial data input / Output: Serial data interrupt - Data transmission - Data reception - serial data transmission modes.

UNIT-4: Interrupts & Instructions

Teaching Hours: 12

Interrupts: Timer flag interrupt - Serial port interrupt - External interrupt - reset - Interrupt control - Interrupt priority - Interrupt destination - Software generated interrupts.

Introduction - Addressing modes - Byte level logic operations - Bit level logic operations - Rotate and swap operations - Simple program.

Arithmetic Operations: Introduction - Flags - Incrementing and Decrementing - Addition - Subtraction - Multiplication and Division - Simple Program.

Unit-5: Instructions & Interfacing

Teaching Hours: 12

Introduction - External data move - code memory read only data move - PUSH and POP - Opcodes - Data exchange - Simple Programs.

Jump and Call instructions: Introduction - Jump and call program range - Jumps - Calls and subroutine - Interrupt and returns - more detail on interrupts - Simple programs.

Keyboard interfacing - Display interface - 7 segment and LED display - D/A conversion - A/D conversion - Stepper motor Interface.

Text Books

Unit-1 to Unit-2

1. V.Vijayendran, Fundamentals of Microprocessor 8085 - Architecture, programming and interfacing, S.Viswanathan (Printers & Publishers) Pvt, Ltd, Chennai, 2008.
2. A. NagoorKani, 8085 Microprocessor and its Applications, Tata McGraw –Hill Education Private Ltd, New Delhi, 2013.

Unit-3 to Unit-5

1. Kenneth Ayala, The 8051Microcontroller, Cengage Learning India, New Delhi, 2013.

Reference Books

1. R.S. Gaonkar, ‘Microprocessor Architecture Programming and Application’, with 8085, Wiley Eastern Ltd., New Delhi, 2013.
2. B. Ram, Fundamentals of Microprocessors and Microcomputers, DhanpatRai publications, New Delhi.
3. Krishna Kant, “Microprocessor and Microcontrollers”, Eastern Company Edition, Prentice Hall of India, New Delhi , 2007.

4. Soumitra Kumar Mandal, Microprocessor & Microcontroller Architecture, Programming & Interfacing using 8085,8086,8051,McGraw Hill Edu,2013.
5. Muhammed Ali Mazidi, Janice Gillespie Mazidi and Rolin D McKinlay,The 8051 Microcontroller and Embedded Systems, Pearson Education , 2013.
6. P.S. Manoharan, Microprocessors and Microcontroller, Charulatha Publications.

E-Materials

1. https://en.wikipedia.org/wiki/Intel_8085
2. https://www.youtube.com/watch?v=fS7FFOaC_iQ
3. <https://www.youtube.com/watch?v=tC4WvbM3hZA>
4. <http://www.uomisan.edu.iq/eng/ar/admin/pdf/90949589293.pdf>
5. <https://www.pantechsolutions.net/how-to-interface-stepper-motor-with-8085-lab-trainer-kit>
6. <http://www.8085projects.info/Stepper-Motor-control-Program70.html>
7. <https://www.youtube.com/watch?v=shJAszu34xY>
8. <https://www.elprocus.com/8051-microcontroller-architecture-and-applications/>
9. https://www.youtube.com/watch?v=iXSXIIn_Xwc
10. <https://www.electronicshub.org/stepper-motor-control-using-8051-microcontroller/>
11. <https://circuitdigest.com/microcontroller-projects/stepper-motor-interfacing-with-8051>

Course Outcomes

1. After studied unit-1, the student will be able to know various interrupts, timing diagram for memory read/write cycle and able to write assembly language programs.
2. After studied unit-2, the student will be able to describe the different interfacing devices and can demonstrate the interfacing of DAC/ADC and stepper motor with 8085.
3. After studied unit-3, the student will be able to understand the hardware of 8051, memories, Counter and Timer.
4. After studied unit-4, the student will be able to explain the interrupts, addressing modes and arithmetic operations.
5. After studied unit-5, the student will be able to describe PUSH-POP, jump and call instructions and able to know how to interface the peripheral devices with 8051.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	Yes
5	No	No	No	No	No	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	L
CO3	S	M	M	S	S	S	S	S	S	S
CO4	S	M	S	S	M	S	S	S	S	M
CO5	M	S	S	S	M	S	S	S	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Elective-3 (A)

Paper code:

Name of the Paper: Research Methodology

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To teach the basics of research philosophies and research approaches.
2. To know how to do the review of literature.
3. To expose the importance of internet in research.
4. To learn how to write a thesis or paper.
5. To understand the different numerical methods.

UNIT-1: Basics of Research

Teaching Hours: 12

Understanding Research Philosophies and Approaches -Meaning, Objectives and Motivation in research - Types of research - Research Approaches - Research Process - Validity and Reliability in research.

Research Design -Features of a good design - Types of Research Design - Basic principles of Experimental Design-Survey Design-Classroom-Based Research. Sampling Design - Steps in Sample Design - Characteristics of a good sample design - Random Samples and Random Sampling Design.

UNIT-2: Review of literature

Teaching Hours: 12

Survey of literature including patents - chemical nomenclature and literature primary sources-secondary sources including reviews. Treatise and monographs, literature searching, Review of work relevant to the chosen problems.

UNIT-3: Internet and Presentation

Teaching Hours: 12

Internet and its applications-Search engines- Wikipedia-Web of Science- SCOPUS-BASE-CORE-Google Scholar-Science Hub.

Presentation: Presenting articles in Seminars, workshops, conferences and symposia.

Publication of research paper:e-journals- National, International and Electronic Journals -UGC CARE list Journals- Open access articles benefits-citations-impact factor, h-index- copy rights-Intellectual property rights and patents.

UNIT-4 : Writing methods

Teaching Hours: 12

Writing a thesis or paper - General formation - page and chapter formation. The use of quotation - footnotes - tables and figures - referencing - appendixes - revising the paper or

thesis - editing and evaluating and the final product - proof reading -Plagiarism-the final types copy.

UNIT-5: Numerical methods

Teaching Hours: 12

Linear Interpolation-Gregory-Newton forward and Backward Interpolation formula--Gauss forward and backward interpolation formula.

Numerical Differentiation:-Modified Euler's method-Runge-Kutta second and fourth order method for solving first order differential equations.

Numerical Integration: Trapezoidal rule-Simpson's 1/3rd rule .

Text Books

Unit 1 to Unit 4

1. J Anderson, B.H. Dursten and M. Poole , Thesis and Assignment Writing, Wiley Eastern,1977.
2. C.R.Kothari, Research Methodology: Methods and Techniques. New Delhi: New Age International (P) Publishers, 2004.

Unit 5

1. S.S. Sastry, Introductory Methods of Numerical analysis, PHI, N.Delhi
2. E. Balagurusamy, Numerical Methods,Tata McGraw Hill, New Delhi, 2013.

Reference Books

1. R.Kumar, Research Methodology: A Step-by-Step Guide for Beginners.London: Sage Publications, (2011).
2. J.H. Mathews, Numerical Methods for Mathematics, Science and Engineering Prentice-Hall of India, New Delhi, 1998.
3. P.B. Patil and U.P. Verma, Numerical Computational Methods (Narosa, New Delhi, 2013.
4. M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation (New Age International, New Delhi, 1993
5. M.K.Venkataraman, Numerical methods in Science and Engineering, National Publishing Company, Chennai ,2004.

E-Materials

1. https://en.wikipedia.org/wiki/Research_design
2. <https://study.com/academy/lesson/types-of-research-design.html>
3. <https://www.scribbr.com/dissertation/literature-review/>
4. https://www.youtube.com/watch?v=-ny_EUJXHHs
5. <https://www.youtube.com/watch?v=XDfgdwMBPfc>
6. <https://www.colorado.edu/history/undergraduates/paper-guidelines/using-internet-research>

7. https://www.ldeo.columbia.edu/~martins/sen_sem/thesis_org.html
8. <https://www.wikihow.com/Write-a-Thesis-Statement>
9. <https://www.youtube.com/watch?v=gt3QZgMNq3s>
10. https://en.wikipedia.org/wiki/Simpson%27s_rule

Course Objectives

1. After studied unit-1, the student will be able to know the basics of research theories, approaches and design.
2. After studied unit-2, the student will be able to demonstrate what do you mean by review of literature and know how to proceed the research work based on review of literature.
3. After studied unit-3, the student will be able to explain the importance of internet in the field of research.
4. After studied unit-4, the student will be able to how to write a thesis or a research paper. Also students will be able to learn how to present a research article in a seminar/conference or how to publish the article in e-journals.
5. After studied unit-5, the student will be able to formulate the Euler's method, Range Kutta method, Trapezoidal rule and Simpson's 1/3rd rule of numerical methods.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	No	Yes	Yes	No	Yes
5	No	Yes	Yes	Yes	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	M	S	M	M	S	M	L
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Elective-3 (B)

Paper code:

Name of the Paper: Material Science

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To understand the basic concepts of phase transition materials.
2. To learn the introduction on ceramic and polymer materials.
3. To teach biomaterials for biomedical applications.
4. To expose the knowledge on nonlinear optical materials.
5. To give an idea about energy conversion and storage materials

UNIT-1: Phase transition materials

Teaching Hours: 12

Definition and basic concepts - solubility limit -phases - microstructure –phase equilibria – unary phase diagrams-Binary phase diagrams – Binary isomorphous systems – Interpretation of phase diagrams-Development of microstructure in isomorphous alloys -mechanical properties of isomorphous alloys- Binary eutectic systems – Development of microstructure in eutectic alloys – Equilibrium diagrams having intermediate phases or components – Eutectoid and peritectic reactions -Concurrent phase transformations -ceramics and ternary phase diagrams -The Gibbs phase rule - The iron – iron carbide phase diagrams.

UNIT-2: Ceramics and Polymers

Teaching Hours: 12

Ceramics: Introduction -Glasses - Glass Ceramics - clay products – refractory's –abrasives-cements – advanced ceramics - ceramic phase diagrams - brittle fracture of ceramics- stress - strain behavior – mechanism of plastic deformation – miscellaneous mechanical consideration.

Polymers - Polymerization mechanism - Polymer structures - Deformation of polymers - Behaviour of polymers,

UNIT-3: Biomaterials

Teaching Hours: 12

Introduction to biomaterials for biomedical applications, Chemical structure and property of biomaterials, Degradation of biomaterials, Polymeric biomaterials: Introduction, preparation, hydrogel biomaterials, Bioconjugation techniques, Biomaterials for drug delivery application (small molecules, gene and protein)-Biomaterials implantation- Biomaterials for imaging and diagnosis.

UNIT-4: NLO materials**Teaching Hours: 12**

Introduction-Harmonic Generation-Second Harmonic Generation-Phase Matching-Third Harmonic Generation-Optical Mixing-Parametric Generation of Light-Selffocusing of Light-nonlinear optical materials.

UNIT-5: Energy conversion and Storage materials**Teaching Hours: 12**

Solar cells: Organic solar cells - Polymer composites for solar cells - p-n junction - Device fabrication and characterization – Nanomaterials for solar cells - Dye-sensitized solar cells - Organic - inorganic hybrid solar cells.

Batteries -primary and secondary batteries, Lithium, Solid-state and molten solvent batteries; Lead acid batteries; Nickel Cadmium Batteries; Advanced Batteries, Super capacitors for energy storage. Role of carbon nanomaterials as electrodes in batteries and super capacitors.

Text Books**Unit 1 to Unit 5**

1. G.K. Narula, K.S. Narula, and V.K. Gupta, Material Science, TMH, New Delhi, 1995.
2. Dr. M.N. Avadhanulu, Material science, S.Chand & Company, New Delhi, 2014
3. V.Ragavan, Material Science and Engineering, 4th Edition, Prentice Hall of India, New Delhi, 2003.
4. M. Arumugam, Materials Science, 3rd Edition, Anuradha Agencies, 2002.

Reference Books

1. Lawrence H. Vlack, Elements of Materials Science and Engineering, 6th Edition, Second ISE reprint, Addison-Wesley, 1998.
2. H. Ibach, H. Luth, Solid State Physics, An introduction to principles of Material Science, 2nd Edition, Springer, 2001.
3. Balasubramanian. R., Callister's, Material Science and Engineering, Wiley, India, 2010.
4. A.J. Dekker, Solid State Physics, McMillan Co., 1981.

E-Materials

1. https://www.tf.uni-kiel.de/matwis/amat/iss/kap_6/illustr/s6_1_1.html
2. <https://www.youtube.com/watch?v=3EFu2t94Mrw>
3. <https://www.youtube.com/watch?v=vnVPwf2T4Eo>
4. <https://en.wikipedia.org/wiki/Glass-ceramic>
5. <https://en.wikipedia.org/wiki/Biomaterial>
6. <https://nptel.ac.in/courses/113104009/>
7. <https://www.slideshare.net/krishslide/nonlinear-optical-materials>
8. <https://shodhganga.inflibnet.ac.in/bitstream/10603/36565/4/chapter%201.pdf>
9. https://en.wikipedia.org/wiki/Dye-sensitized_solar_cell
10. <https://www.youtube.com/watch?v=17SsOKEN5dE>

Course Outcomes

1. After studied unit-1, the student will be able to know the concepts of phase diagrams and phase transformations.
2. After studied unit-2, the student will be able to explain the property of ceramic materials and also able to learn polymerization mechanism.
3. After studied unit-3, the student will be able to explain the chemical structure and property of biomaterials.
4. After studied unit-4, the student will be able to understand the properties NLO materials and its harmonic generation.
5. After studied unit-5, the student will be able to design the energy conversion and storage materials.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Core Elective-3 (C)

Paper code: Name of the Paper: Numerical Methods & C Programming Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

Course Objectives

1. To learn the fundamentals of numerical differential and integration
2. The course gives the principles of scientific research
3. Students can study the basics of C programming
4. To acquire knowledge on operator, arrays and strings
5. To teach how to write the simple programs using C language

UNIT-1: Numerical methods

Teaching Hours: 12

Solutions of equations - Simple iterative methods - Newton - Raphson method - Numerical Integration - Simpson's 3/8 rule – RungeKutta method II order - Solution of Simultaneous equation.

UNIT-2: Principles of Scientific Research

Teaching Hours: 12

Identification of the problem - Literature survey - Reference collection - Familiarity with ideas and concept of investigation – Use of Internet in research - Drawing Inferences from data – Qualitative and Quantitative analysis - Results – Presentation in a Seminar - Synopsis writing - Art of writing a Research paper and Thesis - Power point presentation

UNIT-3: Programming in C

Teaching Hours: 12

Introduction –Importance of C language - Basic structure of C Programming - Character set - constants - Keywords - Identifiers - Variables - declaration of variables - Assigning values to variables - defining symbolic constants – Types of Operators - Arithmetic, relational, logical, assignment, increment, decrement conditional and special type conversion in Expressions.

UNIT-4: Operators, Arrays and Strings

Teaching Hours: 12

Arrays:Introduction - one, two and multi-dimensional arrays - Initializing two dimensional arrays - Declaring and Initialising string variables - Reading and Writing Strings on the screen – Arithmetic operations on strings.

UNIT-5: Simple Programs

Teaching Hours: 12

Multiplication programs - Return values and their types - Calling Functions - Categories of functions - Matrix multiplication - Diagonalisation and inversion - Solution to simultaneous equations - differential and integral equations.

Text Books

Unit 1

1. S.S. Sastry, Introductory Methods of Numerical analysis, PHI, N.Delhi
2. E. Balagurusamy, Numerical methods, Tata McGraw-Hill, Delhi

Unit 2

1. J. Anderson B.H. Burston and M. Poole, Thesis and Assignment writing, Wiley, UK,1977
2. Rajammal.P. Devadas, Hand book of Methodology of Research, RMM Vidyalaya Press. 1976

Unit 3- Unit 5

1. E. Balagurusamy, Programming in ANSI C, 4th Edition TMH, New Delhi, 2009
2. V. Rajaraman, 1993, Computer Oriented Numerical Methods, 3rd Edition, PHI, New Delhi.
3. Let Us C, Yeshvant Kanetkar

Reference Books

1. V. Rajaraman, Programming in C, PHI, New Delhi.
2. C.R. Kothari, Research methodology : Methods and Techniques, New Age International Publishers
3. S.D. Conte and C.de Boor, Elementary Numerical analysis-an algorithmic approach, 3rd Edition, McGraw Hill,1981
4. B.F. Gerald, and P.O. Wheatley, Applied Numerical analysis, 5th Edition, Addison-Wesley, M.A,1994

E-Materials

1. <https://nptel.ac.in/courses/122102009/>
2. <httphttps://www.scribbr.com/dissertation/literature-review/s://math.dartmouth.edu/~m3cod/klbookLectures/406unit/trap.pdf>
3. <https://uscupstate.libguides.com/c.php?g=627058&p=4389968>
4. <https://www.geeksforgeeks.org/c-language-set-1-introduction/>
5. <https://www.youtube.com/watch?v=KJgsSFOSQv0>
6. <https://www.youtube.com/watch?v=aMpsKnf6DrQ>
7. <https://www.studytonight.com/c/programs/>
8. <https://www.youtube.com/watch?v=Yzfl3rtF0SM>
9. <https://learnenglish.britishcouncil.org/writing-purpose/literature-surveys-structure-1>
10. https://www.tutorialspoint.com/cprogramming/c_arrays.htm

Course Outcomes

1. After studied unit-1, the student will be able to get the solutions using different numerical methods.
2. After studied unit-2, the student will be able to explain the fundamentals of research and know how to write a thesis or paper.

3. After studied unit-3, the student will be able to understand the basic structure of C programming.
4. After studied unit-4, the student will be able to learn the one, two and multidimensional arrays and also know the reading and writing strings.
5. After studied unit-5, the student will be able to write different programs after learning the structure of C programming.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	No	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	S	S	M
CO2	S	S	M	S	M	S	S	S	S	L
CO3	M	M	M	S	S	S	S	S	S	S
CO4	S	M	S	S	M	S	S	S	S	M
CO5	M	S	S	S	M	S	S	S	S	L

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: II

Paper type: Open Elective-3 (A)

Paper code: Name of the Paper: Electrical and Electronics Appliances Credit: 3

Total Hours per Week: 3 Lecture Hours: 45 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. The course gives the some fundamental knowledge of electrical and electronics technology
2. To identify the discrete components will be used in electrical circuits
3. To know basics of household electrical connections
4. To expose the principle and design of electrical appliances used in our day-today life
5. To teach basics of semiconductors and related electronics circuits
6. To give the fundamentals and working design of consumer electronics appliances

UNIT-1: Basics of Electrical Technology I

Teaching Hours: 09

Resistance and its types – capacitance and its types – Colour codes-inductance and its units – Transformers – Electrical Charge – Current – Electrical Potential-Ohm's law – Galvanometer, Ammeter, Voltmeter and Multimeter -Analog and Digital - Electrical Energy - Power – Watt – kWh – Consumption and electrical power.

UNIT-2: Basics of Electrical Technology II

Teaching Hours: 09

AC-Single phase and three phase connections - House wiring – Star and delta connection – overloading-Earthling-short circuiting-Fuses-Colour code for insulation wires- Transformers

UNIT-3: Electrical Appliances

Teaching Hours: 09

Electric iron Box-Electric Fan-Construction and Working of Ceiling and Table fans-Water Heater –Types-Function -Wet Grinder-Mixer Grinder-Principle and Design

UNIT-4: Basics of Electronics

Teaching Hours: 09

Semiconductors-Junction diode-Zener diode-LED- Transistor-configurations – diode half wave and full wave rectifier -Regulated power supply using Zener diode-Transistor amplifier

UNIT-5: Electronics Appliances

Teaching Hours: 09

Scientific Calculators, Personal computer-Lap Top-Smart Phones- Laser Printer-Color TV-OLED-QLED TV-Refrigerator-Washing Machine – Function – Types – Semi and Fully

Automatic-Top and Front loading-washing technique-Air Conditioner, Microwave Oven-Principle and Design

Text Books

Unit-1 to Unit-4

1. B L Theraja , A text book in Electrical Technology, S. Chand & Co., New Delhi, 2013
2. V K Metha , Principles of Electronics by, S. Chand & Co., 2001.
3. R.S Sedha, A Text Book of Digital Electronics, S.Chand&CO.Ltd., New Delhi, 2010
4. Performance and design of AC machines – M G Say ElBSEdn.

Unit-5

1. S.P Bali, Consumer Electronics, Pearson, 2004

Reference Books

1. Bagde and Singh, Elements of Electronics, S. Chand & Co., New Delhi, 2000.
2. Gulati, Monochrome and Colour TV, New Age International (P) limited, Publishers, New Delhi, 2005
3. Mitchel Schultz, Grob's Basic Electronics, McGraw Hill NY , 2010.

E-Materials

1. <https://www.allaboutcircuits.com/textbook/reference/chpt-2/resistor-color-codes/>
2. <https://www.youtube.com/watch?v=SjlnW5g9np4>
3. <https://circuitglobe.com/difference-between-single-phase-and-three-phase.html>
4. https://www.youtube.com/watch?v=r_DGW3OrPVg
5. <https://www.youtube.com/watch?v=NNkoAJkXUAW>
6. <https://www.slideshare.net/ideseditor/533-28626238>
7. <https://en.wikipedia.org/wiki/Semiconductor>
8. https://www.youtube.com/watch?v=CjAVfW_6juw
9. <https://www.youtube.com/watch?v=7HiNABH1kYE>
10. <https://mrwashingmachine.in/working-principle-of-washing-machine/>

Course Outcomes

1. After studied unit-1, the student will be able to identify the given discrete components like resistors using color coding method.
2. After studied unit-2, the student will be able to understand the theory of household electrical connections.
3. After studied unit-3, the student will be able to know the principle and working of some household electrical appliances.
4. After studied unit-4, the student will be able to acquire knowledge about theory of semiconductors.
5. After studied unit-5, the student will be able to know the principle and working of some household electronics appliances.

6. Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	No	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	Yes	Yes
5	No	No	Yes	No	Yes	No

7.

8. Mapping with Programme Outcomes

9.

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	M	L
CO3	M	M	M	M	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	M	M	S	S	M	S	L

10.

11. PO – Programme Outcome, CO – Course outcome

12. S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

M.Sc. Physics – 2022-2023 onwards

Semester: III

Paper type: Open Elective-3 (B)

Paper code:

Name of the Paper: Physics of Materials

Credit: 3

Total Hours per Week: 3 Lecture Hours: 45 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To teach the basics of bonding in crystals
2. Students can learn the diffraction of X-Rays by crystals
3. To expose the classical and quantum free electron theory of metals
4. To discuss the theory of different energy bands in solids
5. To explain the introduction and properties of superconductors

Unit-1: Crystals

Teaching Hours: 09

Basic concepts-Symmetry elements-Bravais Lattice-Miller Indices-Basic definitions of crystal structure-BCC and Cesium chloride structure-Bonding in solids: Types of bonds in crystals - Ionic, Covalent, Metallic, Molecular and Hydrogen bonds.

UNIT-2: Diffraction of X-Rays by crystals

Teaching Hours: 09

X-ray diffraction: Derivation of Bragg's law - Bragg spectrometer –Determination of interatomic distance-Determination of interplanar distance-Interpretation of X-ray diffraction pattern - Laue's, Rotating crystal and Powder methods.

UNIT-3: Conductors

Teaching Hours: 09

Classical free electron theory- Expression for electrical conductivity-Verification of Ohm's law-Thermal conductivity- Expression for thermal conductivity-Wiedmann-Franz law and Lorentz number- Quantum free electron theory of metals

UNIT-4: Semiconductors

Teaching Hours: 09

Energy bands in solids: Classification of solids on the basis of energy band theory - Semiconductors- n-type and p-type semiconductors - Fermi level in intrinsic semiconductor-Electrical conductivity-Determination of band gap-Hall effect-Determination of Hall coefficient

UNIT-5: Superconductors

Teaching Hours: 09

Introduction-Properties of superconductors-Meissner effect-Types of Superconductors-Type I and Type II-BCS theory of superconductivity-Cooper pair-Josephson Effect-Applications.

Text Book

Unit 1 to Unit 5

K. Ilangoan, Solid State Physics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007

Reference Books

1. S.O. Pillai, Solid State Physics, New Age International Publishers, 2015.
2. C. Kittel, Introduction to Solid State Physics, Wiley Eastern Limited, 2005.
3. Saxena, Gupta & Saxena, Fundamentals of Solid State Physics, Pragati Prakashan, Meerut, 2015.

E-Materials

1. https://en.wikipedia.org/wiki/Crystal_structure
2. <https://byjus.com/chemistry/crystal-structure/>
3. https://en.wikipedia.org/wiki/Bragg%27s_law
4. https://www.youtube.com/watch?v=8Gma_FfCl2A
5. <https://www.youtube.com/watch?v=vMZ0YpOUGZ8>
6. <http://en2k6.blogspot.com/2008/02/free-electron-theory.html>
7. <https://vlab.amrita.edu/?sub=1&brch=282&sim=879&cnt=1>
8. https://www.youtube.com/watch?v=_AwjbHzwWLo
9. <https://www.youtube.com/watch?v=Vqx21iqQ7cI>
10. https://en.wikipedia.org/wiki/Meissner_effect

Course Outcomes

1. After studied unit-1, the student will be able to learn the basics of crystal structure and various types of bond exists in the crystals
2. After studied unit-2, the student will be able to know the statement of Bragg's law and to study the Diffraction of X-ray by different methods
3. After studied unit-3, the student will be able to understand the classical and quantum theory of free electrons in metals
4. After studied unit-4, the student will be able to distinguish between intrinsic and extrinsic semiconductor and can determine the Hall coefficient of a material
5. After studied unit-5, the student will be able to describe the properties of superconductors and hence the students can distinguish Type I and Type II superconductors

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	No	Yes	No	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	No	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	M	S
CO4	S	M	S	M	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
M.Sc. Physics – 2022-2023 onwards

Semester: III

Paper type: Open Elective-3 (C)

Paper code:

Name of the Paper: Geophysics

Credit: 3

Total Hours per Week: 3 Lecture Hours: 45 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

The aim of the course is to understand physical properties of Earth through Physics principles

1. To learn the different concepts related to the earth
2. Study of earth with geophysical and geochemical methods
3. To give an introduction about seismology
4. To study the properties of earth with reference to magnetic field
5. To inculcate knowledge on radioactivity of earth and its thermal properties

Unit 1: Physics of the Earth

Teaching Hours: 09

Introduction to Geophysics- Earth as a member of the solarsystem-Atmosphere-Ionosphere-Asthenosphere-Lithosphere-Hydrosphere and Biosphere-Meteorology-Oceanography andHydrology.

Unit 2: Geophysical and Geochemical methods

Teaching Hours: 09

Geophysical methods: Geo referencing using Arc GIS software-Electrical methods- Qualitative interpretation of VerticalElectrical Sounding curves –Preparing pseudo cross section forelectrical resistivity data and interpretation

Geochemical methods: Introduction-Principles of groundwaterchemistry-Sources of contamination- Ground water qualityanalysis.

Unit 3: Introduction to Seismology

Teaching Hours: 09

The earth's interior and crust as revealed by earthquakes-Rayleigh waves and Love waves-Elastic rebound theory-Continental drift-Earthquake magnitude and intensity-Horizontal seismograph and seismograph equation-Tsunami-Causes andImpacts-Tsunami warning systems.

Unit 4: Geomagnetism and Gravity

Teaching Hours: 09

Historical introduction –The physical origin of magnetism-Causes of the main field-Dynamo theory of earth's magnetism-Gravitational potential-Laplace's equation and Poisson's equation-Absolute and relative measurements of gravity-Worden gravimeter.

Unit 5: Geochronology and Geothermal physics

Teaching Hours: 09

Radioactivity of the earth-Radioactive dating of rocks and minerals-Geological time scale-The age of the earth-Flow of heat to the surface of the earth –Sources of heat within the earth-Process and heat transport and internal temperature of earth.

Text Books

1. Cook, A.H., Physics of the Earth and Planets, McMillan Press, London, 1973.
2. Arthur W. Hounslow, Water quality data -Analysis and Interpretation, Lewis publishers, Washington D.C. 1995
3. G.P. Mahapatra, Physical Geology, CBS Publishers, New Delhi, 1994.

Reference Books

1. Garland, Introduction to Geophysics 11 edition, WBSaunders Company, London, 1979.
2. William Lowrie, Fundamentals of Geophysics, 11 Edition, Cambridge press, UK.
3. Nils-Axel Morne, Geochronology-Methods and case studies, INTECH publications.
4. John Rafferty, Geochronology –Dating and Precambrian time –The beginning of the world as we know it, Britannica Educational publishers, New York-2011.
5. Don L. Anderson, Theory of the Earth, Blackwell Scientific Publications-UK, 1979

E-Materials

1. https://en.wikipedia.org/wiki/Earth_science
2. <https://en.wikipedia.org/wiki/Earth>
3. https://www.youtube.com/watch?v=JGXi_9A__Vc
4. <https://www.youtube.com/watch?v=-ZFmAAHBfOU>
5. <https://mangomap.com/gis-software>
6. <https://en.wikipedia.org/wiki/Earthquake>
7. <https://www.youtube.com/watch?v=GQQCvsxHtJo>
8. <https://www.youtube.com/watch?v=fQt6UaR8Fcw>
9. <https://en.wikipedia.org/wiki/Gravimeter>
10. https://www.radioactivity.eu.com/site/pages/Earth_Heat.htm
11. https://www.youtube.com/watch?v=46MN_okpKbQ

Course Outcomes

1. After studied unit-1, the student will be able to explain about solar system and atmosphere, ionosphere etc.
2. After studied unit-2, the student will be able to demonstrate geo referencing using GIS software and to test the contamination of ground water using geochemical method.
3. After studied unit-3, the student will be able to describe about earthquakes and natural disaster Tsunami and its impacts
4. After studied unit-4, the student will be able to learn about the earth in the presence of magnetic field and gravity
5. After studied unit-5, the student will be able to know the radioactivity of the earth, can calculate the radioactive dating of rocks and minerals and thermal properties of the earth.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	Yes	No	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: IV

Paper type: Core

Paper code:

Name of the Paper: Spectroscopy

Credit: 4

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To give an idea about rotational spectra of different molecules using rotational spectroscopy
2. To study the vibrational spectroscopy of diatomic and polyatomic molecules using Infrared spectroscopy
3. To acquire knowledge on Raman spectroscopy and its applications.
4. To expose the concept of Ultra Violet spectroscopy and its applications
5. Students can learn the theory and applications of NMR ,ESR, AAS and Mössbauerspectroscopy.

UNIT-1: Rotational (Microwave) Spectroscopy

Teaching Hours: 16

Classification of molecules-Interaction of radiation with rotating molecule- Rotational spectra of Rigid –Isotope effect in rotational spectra- Intensity of rotational lines-Non-rigid rotator-Linear polyatomicmolecules- Symmetric and asymmetric top molecules-Stark effect-QuadrupoleHyperfine Interaction-Microwave spectrometer Instrumentation-Applications..

UNIT-2: Infrared spectroscopy

Teaching Hours: 16

Introduction- Vibrational energy of a diatomic molecule-Vibrating diatomic molecule-Diatomic vibrating rotator-Vibrations of polyatomic molecules-Normal modes of molecular vibrations- Normal mode vibrations of CO₂ and H₂O molecules-Dipole moment change in CO₂ molecule-Hydrogen bonding-Interpretation of vibrational spectra-Instrumentation of IR spectrometer-FTIR spectroscopy-Principle, Instrumentation, sample handling techniques and applications-ATR Technique.

UNIT-3: Raman Spectroscopy

Teaching Hours: 16

Classical theory of Raman Scattering - Quantum theory of Raman effect-Rotational, Vibrational Raman spectra of molecules; Structure determination using IR and Raman spectroscopy-Instrumentation of Raman spectrometer-Coherent anti-Stokes Raman Spectroscopy - Surfaces for SERS study – Enhancement mechanism – Instrumentation and sampling techniques - FT Raman Spectroscopy: Principle, Instrumentation, sample handling techniques and applications.

UNIT-4: UV Spectroscopy

Teaching Hours: 16

Energy levels-Molecular orbitals-Theory of UV (electronic) spectra-Franck Condon Principle -transition Probability, measurement of spectrum – Types of transition in Organic molecules - Types of absorption bands – transition in metal complexes – Selection rules Chromophore concept – Principle-Instrumentation-Applications of UV Spectroscopy.

UNIT-V: NMR, ESR, AAS and Mössbauer Spectroscopy

Teaching Hours: 16

Magnetic properties of nuclei-Resonance Condition-NMR instrumentation-Relaxation Process--Bloch equations - Chemical shifts –NMR Imaging.

Introduction-Principle of ESR - ESR spectrometer-Hyperfine Structure- ESR spectrum of Hydrogen-Applications.

Atomic Absorption Spectroscopy (AAS): Principle of AAS-single beam Spectrophotometer - Applications of AAS.

Mössbauer Effect - Recoilless emission and absorption - Mossbauer spectrum -Experimental methods - Mossbauer spectrometer-Applications.

Text Books

Unit 1 to Unit 3 and Unit 5

1. G. Aruldas, 2001, Molecular Structure and Spectroscopy, Prentice - Hall of India Pvt.Ltd., New Delhi.

Unit 4

1. H. Kaur, Spectroscopy, PragatiPrakashan, Meerut, 2017.

Reference Books

1. Colin Banwell, Elaine M. McCash, Fundamentals of Molecular Spectroscopy:, TMH publishers, 2013.
2. D.N. Satyanarayana, Vibrational Spectroscopy and Applications, New Age International Publications, New Delhi, 2004.
3. G.R.Chatwal and S.K.Anand, Spectroscopy (Atomic & Molecular), Himalaya Publishing House, 2016

E-Materials

1. https://en.wikipedia.org/wiki/Microwave_spectroscopy
2. <https://www.youtube.com/watch?v=3-8nAn0Mo6w>
3. https://en.wikipedia.org/wiki/Vibrational_spectroscopy_of_linear_molecules
4. <https://www.youtube.com/watch?v=58wqjy-ALLg>
5. https://en.wikipedia.org/wiki/Attenuated_total_reflectance
6. <https://www.youtube.com/watch?v=q0evGXCK-sY>
7. <https://www.youtube.com/watch?v=paZS5gv3P8g>
8. https://en.wikipedia.org/wiki/Raman_spectroscopy

9. <https://nptel.ac.in/content/storage2/courses/115101003/downloads/module3/lecture30.pdf>
10. https://www.youtube.com/watch?v=-76hr_97m10://en.wikipedia.org/wiki/Franck%E2%80%93Condon_principle
11. <https://nptel.ac.in/courses/104108078/>
12. <https://www.vanderbilt.edu/AnS/Chemistry/Rizzo/chem220a/Ch13slides.pdf>
13. https://en.wikipedia.org/wiki/Electron_paramagnetic_resonance

Course Outcomes

1. After studied unit-1, the student will be able to study the rotational spectra of diatomic and polyatomic molecules using rotational/ microwave spectroscopy.
2. After studied unit-2, the student will be able to distinguish between the rigid rotator and non-rigid rotator and students can calculate normal modes of vibrations for H₂O and N₂O molecules.
3. After studied unit-3, the student will be able to derive the expression for classical and quantum theory of Raman effect and also to study the molecular structure of water and CO₂ molecules.
4. After studied unit-4, the student will be able to understand the qualitative idea of UV-spectroscopy and also to learn the electronic spectra of poly atomic molecules.
5. After studied unit-5, the student will be able to know qualitatively the principle, theory, instrumentation and applications of NMR, ESR, AAS and Mössbauer spectroscopy.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	L
CO3	S	M	M	S	S	S	S	S	S	S
CO4	S	M	S	S	M	S	S	S	S	M
CO5	M	S	S	S	M	S	S	S	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: IV

Paper type: Core Elective -4 (A)

Paper code:

Name of the Paper: Crystal Growth and Thin films

Credit: 3

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To introduce theories of crystal growth.
2. To teach the various mechanisms of crystal growth.
3. To study the crystal symmetry and crystal structures.
4. To know the basics of thin film deposition techniques.
5. To learn the different characterization techniques.

UNIT-1: Theories of Crystal Growth

Teaching Hours: 15

Introduction to crystal growth – Solubility – Saturation – Supersaturation – Induction Time - nucleation – Metastable Zone width – Gibbs - Thomson equation - kinetic theory of nucleation – Classical Nucleation Theory - homogeneous and heterogeneous nucleation – different shapes of nuclei – spherical, cap, cylindrical and orthorhombic – Temkins model – BCF theory.

UNIT -2: Crystal growth Techniques

Teaching Hours: 20

Crystal Growth Mechanisms – Solid phase – Liquid Phase and Gas Phase crystal growth - Bridgman technique - Czochralski method – Skull Melting process - Verneuil technique - zone melting – Floating Zone method - gel growth – solution growth methods – low and high temperature solution growth methods – HTSG Flux growth – vapour growth - epitaxial growth techniques - LPE – MOCVD – MBE – Deposition Techniques – PVD – CVD- Sputtering – Ion Implantation – Gel growth – Hydrothermal Growth

UNIT-3: Crystal symmetry and Structures

Teaching Hours: 15

Symmetry operations, elements - translational symmetries - point groups - space groups - equivalent positions – close packed structures - voids - important crystal structures – Pauling's rules - defects in crystals – Amorphous - polymorphism and twinning.

UNIT-4: Thin Film deposition Techniques

Teaching Hours: 20

Thin Films – Basic of Thin films and Nanostructures - Role of thin films in Devices - Sol-gel synthesis - Spin coating – Chemical Bath Deposition – Electro Deposition - Chemical Bath Deposition - Physical Methods – Resistive Heating - Electron Beam Gun - Laser Gun-Spray pyrolysis- Evaporation and Flash Evaporations - Sputtering - Reactive Sputtering, Radio-Frequency Sputtering - ion implantation - Cathodic arc deposition - Pulsed laser deposition – Molecular beam epitaxy - Introduction to Vacuum Technology - Deposition Techniques - Films and artificial superstructures.

UNIT-5:Characterization Techniques

Teaching Hours: 20

X – Ray Diffraction (XRD) – Powder and single crystal – Laue pattern – Spectrometry - UV-Vis-NIR Spectrometer - IR spectroscopy - Fourier transform Infrared analysis (FT-IR) – Elemental analysis – NMR: Nuclear Magnetic Resonance – ESR: Electron Spin Resonance – EPR: Electron Paramagnetic Resonance - Elemental dispersive X-ray analysis (EDAX) - Scanning Electron Microscopy (SEM) – Transmission Electron Microscopy (TEM) – Atomic Force Microscopy (AFM) – Luminescence Studies – Thermo Luminescence – Photo Luminescence — Etching Studies (Chemical) – Micro hardness tests – Vickers – Brinells - Micro hardness – TGA-DTA studies - Dielectric studies – Harmonic generation tests – SHG-higher generation tests.

Text Books

Unit 1 to Unit 3

1. H.E.Buckley. Crystal growth. John Wiley & sons, New York, 1981.
2. P. Ramasamy and P. Santhanaraghavan. Crystal growth processes and methods. KRU Publications, 2000.

Unit 4

1. A. Goswami, Thin Film Fundamentals, New Age International (P) Limited, New Delhi, 1996.

Reference Books

1. J.C. Brice, Crystal Growth Processes, John Wiley and Sons, New York (1986)
2. S.O. Pillai, Solid State Physics, New Age International Publishers, 2016.
3. D. Elwell and H.J. Scheel. Crystal growth from high temperature solution. Academic Press, New York, 1995.
4. R.A. Laudise. The growth of single crystals. Prentice Hall, Englewood, 1970.
5. L.V. Azaroff. Elements of X-ray crystallography. Techbooks, 1992.
6. J.A.K. Tareen and T.R.N. Kutty. A Basic course in Crystallography. University Press, 2001.
7. C. Hammond. The Basics of Crystallography and Diffraction, IUCr-Oxford University Press, 2009.
8. H.H. Willard, L.L. Meritt, J.A. Dean, F.A. Sette, Instrumental Methods of
9. Analysis, CBS Publishers, New Delhi, 1986.
10. S. Zhang, L. Li and A. Kumar, Materials Characterization Techniques (CRC Press, Boca Raton, 2009).
11. J.C. Brice, Crystal Growth Process (John Wiley, New York, 1986).
12. M. Ohring, Materials Science of Thin Films (Academic Press, Boston, 2002) 2nd edition.
13. E. N. Kaufmann, Characterization of Materials, Volume-I, John Wiley, New Jersey, 2012.

E-Materials

1. <http://14.139.186.108/jspui/bitstream/123456789/16020/1/Chapter%20I%20to%20XI.pdf>
2. https://www.youtube.com/watch?v=G76H7A6_iyo
3. <https://www.slideshare.net/SHASHISHAW1/crystal-growth-techniques>
4. https://shodhganga.inflibnet.ac.in/bitstream/10603/364/9/09_chapter%202.pdf
5. <https://www.slideshare.net/AvinashAvi110/crystal-stmmetry>
6. <https://slideplayer.com/slide/4199534/>
7. <https://www.youtube.com/watch?v=ZBf46mqRGf0>
8. https://shodhganga.inflibnet.ac.in/bitstream/10603/136917/10/10_chapter%203.pdf
9. https://en.wikipedia.org/wiki/Transmission_electron_microscopy
10. <https://www.youtube.com/watch?v=BbBK4T5Yr3M>

Course Outcomes

1. After studied unit-1, the student will be able to learn the different theories of crystal growth and able to formulate Gibbs - Thomson equation.
2. After studied unit-2, the student will be able to demonstrate the Bridgman technique, Czochralski method, Skull Melting process etc. of crystal growth.
3. After studied unit-3, the student will be able to understand the symmetry operations, elements, point groups, space groups and defects in crystals.
4. After studied unit-4, the student will be able to explain the basics of thin film deposition techniques like, spin coating, chemical bath deposition, spray pyrolysis etc.
5. After studied unit-5, the student will be able to know the principle, working and applications of different characterization techniques.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	M	S	M	S	M
CO2	S	S	M	S	M	M	S	M	S	L
CO3	S	M	S	S	S	M	S	S	S	S
CO4	S	M	M	S	M	M	S	M	S	L
CO5	M	S	M	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: IV

Paper type: Core Elective-4 (B)

Paper code:

Name of the Paper: Medical Physics

Credit: 3

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

This paper provides a broad knowledge on the

1. Interaction of Non-Ionizing Radiation
2. Applications of Laser in Medicine
3. Ultrasound in tissues and their use in medicine.
4. Medical Ultrasound Applications
5. Radio frequency and Microwaves

UNIT-1: Review of non-ionising Radiation Physics in Medicine Teaching Hours: 15

Different sources of Non Ionising radiation-their physical; properties-first law of photochemistry- Law of reciprocity- - Electrical Impedance and Biological Impedance - Principle and theory of thermography – applications.

UNIT-2: Tissue Optics

Teaching Hours: 20

Various types of optical radiations - UV, visible and IR sources - Lasers: Theory and mechanism-Laser Surgical Systems-Measurement of fluence from optical sources - Optical properties of tissues – theory and experimental techniques-interaction of laser radiation with tissues – photothermal -photochemical – photoablation – electromechanical effect.

UNIT-3: Mediphotonics

Teaching Hours: 20

Lasers in dermatology, oncology and cell biology - Application of ultrafast pulsed lasers in medicine and biology-Lasers in blood flow measurement - Fiber optics in medicine - microscopy in medicine - birefringence - Fluorescence microscope - confocal microscope - Hazards of lasers and their safety measures.

UNIT-4: Medical Ultrasound

Teaching Hours: 15

Production, properties and propagation of ultrasonic waves- Bioacoustics – Acoustical characteristics of human body- Ultrasonic Dosimetry - Destructive and nondestructive tests - Cavitation - Piezo electric receivers, thermoelectric probe – Lithotripsy - High power ultrasound in therapy.

UNIT-5: Radio Frequency and Microwaves

Teaching Hours: 20

Production and properties - interaction mechanism of RF and microwaves with biological systems: Thermal and non-thermal effects on whole body, lens and cardiovascular systems – tissue characterization and Hyperthermia and other applications-Biomagnetism - Effects - applications.

Text Books

Unit-1

1. S. S Martellucci and A. N. Chester, Laser Photobiology and Photomedicine, Plenum Press, New York, 1985.

Unit-2

1. Markolf H. Neimz, Laser-Tissue Interactions, Springer Verlag, Germany, 1996.

Unit-3 to Unit-5

1. S. S Martellucci and A. N. Chester, Laser Photobiology and Photomedicine, Plenum Press, New York, 1985.

.Reference Books

1. J. R. Greening, Medical Physics, North Holland Publishing Co., New York, 1999.
2. R. Pratesi and C. A. Sacchi, Lasers in Photomedicine and Photobiology, Springer Verlag, West Germany, 1980.
3. Harry Moseley, Hospital Physicists' Association, Non-ionising radiation: microwaves, ultraviolet, and laser radiation, A. Hilger, in collaboration with the Hospital Physicists, Association, 1988

E-Materials

1. https://www.youtube.com/watch?v=9TCK1Sa0_Vc
2. <https://en.wikipedia.org/wiki/Thermography>
3. https://en.wikipedia.org/wiki/Laser_surgery
4. <https://www.indiamart.com/proddetail/co2-laser-surgical-system-3595170512.html>
5. <https://ilchiro.org/laser-safety-for-clinical-applications/>
6. https://en.wikipedia.org/wiki/Laser_safety
7. <https://grantome.com/grant/NIH/R01-HD021687-06>
8. <https://www.frontiersin.org/articles/10.3389/fbioe.2020.00025/full>
9. <https://www.youtube.com/watch?v=CY4roB9ZTEo>
10. <https://en.wikipedia.org/wiki/Biomagnetism>

Course Outcomes

1. After studied unit-1, the student will be able to study the different sources of non-ionizing radiations.
2. After studied unit-2, the student will be able to know the various types of optical radiations like UV,IR etc.
3. After studied unit-3, the student will be able to explain the laser and fiber optic instruments for mediphotonics.
4. After studied unit-4, the student will be able to learn the properties and propagation of ultrasonic waves and also able to know the ultrasonic dosimetry.
5. After studied unit-5, the student will be able to understand the applications of radio frequency and microwaves.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	Yes
3	Yes	Yes	No	No	Yes	No
4	Yes	Yes	No	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	S	M	S	M
CO2	S	S	S	M	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	M	M	M	S	M	S	M
CO5	M	S	S	M	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: IV

Paper type: Core Elective-4 (C)

Paper code: Name of the Paper: Matlab and Python Programming Credit: 3

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To give an basic concepts of MATLAB
2. To teach the BODMAS rules and mathematical operations
3. To expose the fundamentals of Python programming
4. To learn the structured types, mutability and higher-order functions
5. To conceptualize the TKinter modules

UNIT-1: Introduction on MATLAB

Teaching Hours: 20

Introduction-Use of MATLAB-Introduction to MATLAB software-MATLAB window-Command window-workspace-Command history-Setting Directory-Working with the MATLAB user interface-Basic Commands-Assigning variables-Operations with variables-Character and string-Arrays and vectors-Column vectors-Row vectors.

UNIT-2: Mathematical Operations

Teaching Hours: 20

BODMAS rules-Arithmetic operations-Operators and special characters-Mathematical and logical operators-Creating rows and columns matrix-Matrix operations-Transpose-Determinant-Inverse-Solving Matrix-Plots-2D plots-3D Plots.

UNIT-3: Basics of Python

Teaching Hours: 20

The basic elements of python (Software, Development Tools, Programming with Python, writing a Python Program, Python Interactive Shell, Values and Variables, Expressions) - Branching Programs - Control Structures – Strings and Input – Iteration - Functions and scoping – Specifications – Recursion- Global variables – Modules – Files - System - Functions and Parameters –simple programs.

UNIT-4: Structured Types, Mutability and Higher-order Functions Teaching Hours: 15

Strings, Tuples, Lists and Dictionaries - Lists and Mutability - Functions as Objects – extrapolation, de'slanders table, – Classes and Object-Oriented Programming – programs.

UNIT-5: TKinter

Teaching Hours: 15

TKinter modules -Tkinter classes - Tkinter widgets: button, canvas, frame, listbox, messagebox -widget configuration – widget styles – events and bindings - standard dialogs – GUI programs

Text Books

Unit 1

1. Amos Gilat, MATLAB an Introduction with Applications, John Wiley & Sons, INC Publication, 2004

Unit 2 to Unit 4

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India 2013

Unit 5

1. Tkinter manual

Reference Books

1. MATLAB 7.0 Basics, P. Howard, spring, 2005.
2. R. NageswaraRao, "Core Python Programming", Dream Tech.
3. Wesley J. Chun. "Core Python Programming - Second Edition", Prentice Hall
4. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Python", Wiley
5. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication

E-Materials

1. <https://www.tutorialspoint.com/matlab/index.htm>www.mathworks.com/products/matlab.html
2. http://mayankagr.in/images/matlab_tutorial.pdf
3. <https://www.mccormick.northwestern.edu/documents/students/undergraduate/introduction-to-matlab.pdf>
4. <https://www.mathworks.com/videos/introduction-to-matlab-81592.html>
5. https://www.youtube.com/watch?v=_uQrJ0TkZlc
6. <https://www.youtube.com/watch?v=rfscVS0vtbw>
7. <https://www.youtube.com/watch?v=Y8Tko2YC5hA>
8. <https://www.programiz.com/python-programming>
9. https://www.w3schools.com/python/python_intro.asp
10. https://www.tutorialspoint.com/python/python_gui_programming.htm
11. <https://likegeeks.com/python-gui-examples-tkinter-tutorial/>

Course Outcomes

1. After studied unit-1, the student will be able to understand the basics of MATLAB
2. After studied unit-2, the student will be able to develop skills for writing a program using MATLAB
3. After studied unit-3, the student will be able to learn the fundamentals of Python programming
4. After studied unit-4, the student will be able to know the concepts of OOPs in Python
5. After studied unit-5, the student will be able to learn how to develop graphical user interfaces by writing some Python GUI examples using Tkinter package.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	No	Yes	Yes	Yes	Yes
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	No	Yes	Yes	No	Yes
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	M	M	M	M	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	M	M	M	M	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: IV

Paper type: Open Elective- 4 (A)

Paper code:

Name of the Paper: Nanophysics

Credit: 3

Total Hours per Week: 3 Lecture Hours: 45 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To know the fundamentals of nanotechnology.
2. To learn about carbon nanostructures and its properties.
3. To study the preparation of nanomaterial by different methods.
4. To analyse the synthesized nanomaterial by various characterization techniques.
5. To understand the various applications of nanotechnology.

UNIT-1: Introduction to Nano and Types of Nanomaterial Teaching Hours: 09

Need and origin of nano - Emergence of nanotechnology with special reference to Feynman. Size & Scales: definition of nanostructures; Top-down and bottom-up approaches – Introductory ideas of 1D, 2D and 3D nanostructured material– Quantum dots -- Quantum wire – Quantum well -- Exciton confinement in quantum dots.

UNIT-2: Carbon Nanostructures Teaching Hours: 09

Carbon molecules and carbon bond-C60: Discovery and structure of C60 and its crystal - Superconductivity in C60-Carbon nanotubes: Fabrication - Structure-Electrical properties – Vibrational properties -Mechanical properties – Applications(fuel cells, chemical sensors, catalysts).

UNIT-3: Fabrication of Nanomaterial Teaching Hours: 09

Synthesis of oxide nanoparticles by sol-gel method -Electrochemical deposition method- Electrospinning method –Lithography-Atomic layer deposition-Langmuir--Blodgett films - Zeolite cages -- Core shell structures – Organic and inorganic hybrids.

UNIT-4: Characterization of Nanomaterial Teaching Hours: 09

Principles, experimental set-up, procedure and utility of scanning electron microscopy (SEM), transmission electron microscopy (TEM), scanning tunneling microscope (STM) and scanning probe microscopy (SPM).

UNIT-5: Applications

Teaching Hours: 09

Molecular electronics and nanoelectronics -Nanorobots -Biological applications of nanoparticles -Catalysis by gold nanoparticles-Band-gap engineered quantum devices- Nanomechanics - CNT emitters- Photoelectrochemical cells-Photonic crystals -Plasmon waveguides.

Text Books

Unit 1 to Unit 5

1. T.Pradeep et al., A Textbook of Nanoscience and Nanotechnology,Tata McGraw Hill,New Delhi, 2012.
2. T.Pradeep , Nano: The Essentials, Tata McGraw Hill, New Delhi, 2012.
3. R.W. Kelsall, I.W. Hamley and M. Geoghegan, Nanoscale Science and
4. Nanotechnology (John-Wiley & Sons, Chichester, 2005.
5. G. Cao, Nanostructures and Nanomaterials,Imperial College Press, London, 2004.
6. C.P. Poole and F.J. Owens, Introduction to Nanotechnology,Wiley, New Delhi, 2003.

Reference Books

1. H.S. Nalwa, Nanostructured Materials and Nanotechnology,Academic Press, San Diego, 2002.
2. M. Wilson, K. Kannangara, G. Smith, M. Simmons, B. Raguse, Nanotechnology:
3. Basic Science and Emerging Technologies,Overseas Press, New Delhi, 2005.

E-Materials

1. <https://en.wikipedia.org/wiki/Nanotechnology>
2. https://en.wikipedia.org/wiki/Carbon_nanotube
3. https://www.nanowerk.com/nanotechnology/introduction/introduction_to_nanotechnology_22.php
4. <https://www.youtube.com/watch?v=sbuIluJhT4A>
5. <https://www.youtube.com/watch?v=14DqBIG96W0>
6. <https://www.sciencedirect.com/topics/chemistry/sol-gel-process>
7. <https://www.slideshare.net/RamalingamGopal/sol-gel-synthesis-of-nanoparticles>
8. https://en.wikipedia.org/wiki/Scanning_electron_microscope
9. <https://www.youtube.com/watch?v=kdb6dHEHCA0>
10. <https://interestingengineering.com/15-medical-robots-that-are-changing-the-world>
11. <https://en.wikipedia.org/wiki/Nanorobotics>

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	No	No	Yes	No
3	Yes	Yes	Yes	No	Yes	Yes
4	Yes	No	Yes	Yes	No	No
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	S	S	M	M	S	M	M	M
CO2	S	S	S	S	M	M	S	M	M	L
CO3	S	M	M	S	S	M	S	S	M	S
CO4	S	M	S	S	M	M	S	M	M	M
CO5	M	S	S	S	M	S	S	M	M	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: IV

Paper type: Open Elective- 4 (B)

Paper code:

Name of the Paper: Astro Physics

Credit: 3

Total Hours per Week: 3 Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To acquire the knowledge of astronomical instruments
2. To understand the basic ideas of space
3. To learn about the birth of stars, color, age etc.
4. To study the complete details of our solar system
5. To gain the knowledge on celestial measurements

UNIT -1: Astronomical Instruments

Teaching Hours: 09

Optical telescope - reflecting telescope - types of reflecting telescope - advantages of reflecting telescopes - radio telescope - astronomical spectrographs - photographic photometry - photoelectric spectrometry- detectors and image processing.

UNIT-2: Space

Teaching Hours: 09

Introduction – Hubble’s Law – Big bang theory – Shape of Universe – Expanding universe in space – Galaxies – Types of Galaxies – Spiral, Elliptical and Irregular Galaxies – Clusters of Galaxies – Milky Way – Quasars.

UNIT -3 : Stars

Teaching Hours: 09

Birth of Stars – Colour and Age – Life of Stars – Red giant stars – White dwarf star – Neutron Star – Black hole – Supernovae – Constellations - Zodiac.

UNIT -4: Solar system

Teaching Hours: 09

Introduction – Sun – Structure of Sun – Nuclear reactions in sun – Sun spot and solar flares – Earth – Structure of earth – Atmosphere – Moon and its structure – Inner planets – Outer planets – Asteroids – Meteors – Meteorites - Comets.

UNIT-5 :Space distance, Units and Co-ordinates

Teaching Hours: 09

Cislunar space -Translunar space-Inter planetary distance –Inter stellar space -Inter galactic space-Light Year- Astronomical Unit-Astronomical Map. Astronomical Systems - Astronomical co-ordinates -Celestial Sphere -Celestial Equators – Celestial Poles.

Text Books

1. BaidyanathBasu, An introduction to Astrophysics, Prentice Hall of India Private limited New Delhi, 2001.
2. A.Hewish., Physics of the Universe, CSIR publication, New Delhi, 1992.

Reference Books

1. BimanBasu, Inside Stars, CSIR Publication, New Delhi, 1992.
2. BimanBasu, Cosmic Vistas, National Book Trust of India, 2002.
3. K.S. Krishnasamy, Astro Physics a Modern Perspective, New Age International ,New Delhi.
4. R. Murugesan and KiruthigaSivaprasath, Modern Physics, S.Chand&Co.Pvt.Ltd, 2016.
5. Mohan SundaraRajan, Space Today, National Book Trust of India, 2000.

E-Materials

1. <http://www.phy.olemiss.edu/~perera/astr325/Lec23.pdf>
2. https://en.wikipedia.org/wiki/List_of_astronomical_instruments
3. <https://www.youtube.com/watch?v=O0HyEEkckR0>
4. <https://www.youtube.com/watch?v=5bYNIY7m03w>
5. https://en.wikipedia.org/wiki/The_Big_Bang_Theory
6. <https://en.wikipedia.org/wiki/Galaxy>
7. <https://www.youtube.com/watch?v=BcjmoEspoRI>
8. <https://www.youtube.com/watch?v=ZrS3Ye8p61Y>
9. <https://en.wikipedia.org/wiki/Star>
10. https://en.wikipedia.org/wiki/Solar_System
11. https://www.youtube.com/watch?v=KsF_hdjWJjo
12. <https://www.youtube.com/watch?v=1Toya19H12w>
13. https://en.wikipedia.org/wiki/Celestial_sphere

Course Outcomes

1. After studied unit-1, the student will be able to know the principle and working of astronomical instruments.
2. After studied unit-2, the student will be able to explain big bang theory and galaxies
3. After studied unit-3, the student will be able to demonstrate variety of stars.
4. After studied unit-4, the student will be able to describe the complete details of solar system including comets.
5. After studied unit-5, the student will be able to the units to be used for the measurements celestial distance and coordinates.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	No
5	No	No	No	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	S	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	M	M	M	M	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc. Physics – 2022-2023 onwards

Semester: IV

Paper type: Open Elective- 4 (C)

Paper code:

Name of the Paper: Weather Forecasting

Credit: 3

Total Hours per Week: 3

Lecture Hours: 60 Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To learn about the elementary idea of atmosphere, atmospheric pressure etc.
2. To study how to measure wind speed, direction, rain fall etc.
3. To teach the different weather systems and hurricanes
4. To explain the climate and environmental issues related to climate
5. To give an idea about weather forecasting

UNIT-1: Introduction to atmosphere

Teaching Hours: 09

Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement; cyclones and anticyclones: its characteristics.

UNIT-2: Measuring the weather

Teaching Hours: 09

Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.

UNIT-3: Weather systems

Teaching Hours : 09

Global wind systems; air masses and fronts: classifications; jetstreams; local thunderstorms; tropical cyclones: classification; tornadoes; hurricanes.

UNIT-4: Climate and Climate Change

Teaching Hours : 09

Climate: its classification; causes of climate change; global warming and its outcomes; air pollution; aerosols, ozone depletion, acid rain, environmental issues related to climate.

UNIT-5: Basics of weather forecasting

Teaching Hours : 09

Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.

Text Books

Unit 1 to Unit 5

1. Chandrasekar, Basics of Atmospheric Science, PHI Learning Pvt Ltd, New Delhi, 2010
2. Howard J Critchfield, General Climatology, Prentice Hall of India, Pvt Ltd, New Delhi, 1975

Reference Books

1. I.C. Joshi, Aviation Meteorology, Himalayan Books, 2014
2. Stephen Burt, The weather Observers Hand book, Cambridge University Press, 2012
3. S.R. Ghadekar, Meteorology, Agromet Publishers, Nagpur, 2001.
4. S.R. Ghadekar, Text Book of Agrometeorology, Agromet Publishers, Nagpur, 2005
5. Charles Franklin Brooks Why the weather, Chapman & Hall, London. 1924
6. John G. Harvey, Atmosphere and Ocean, The Artemis Press, 1995.

E-Materials

1. <https://en.wikipedia.org/wiki/Atmosphere>
2. <https://www.youtube.com/watch?v=6LkmD6B2ncs>
3. <https://www.youtube.com/watch?v=jTWwnUIygc8>
4. <https://weatherstationguide.com/measure-wind-speed/>
5. <https://en.wikipedia.org/wiki/Thunderstorm>
6. <https://en.wikipedia.org/wiki/Cyclone>
7. <https://www.toppr.com/guides/science/winds-storms-and-cyclones/thunderstorms-and-cyclones/>
8. <https://climatekids.nasa.gov/weather-climate/>
9. <https://en.wikipedia.org/wiki/Climate>
10. https://en.wikipedia.org/wiki/Weather_forecasting
11. <https://www.skymetweather.com/15-days-rainfall-forecast-for-india/>

Course Outcomes

1. After studied unit-1, the student will be able to study the atmosphere and its physical structure and also to know the variation of pressure and temperature with height
2. After studied unit-2, the student will be able to describe the measurement of wind speed, direction humidity, rainfall and can state the radiation laws
3. After studied unit-3, the student will be able to explain the global wind systems and able to know thunderstorms and cyclones
4. After studied unit-4, the student will be able to conceptualize the classification of climate, ozone depletion, acid rain and environmental hazards due to climate change
5. After studied unit-5, the student will be able to understand the analysis and historical background of weather forecasting and know the predictability, probability of forecasts

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	No	Yes	Yes	No	Yes	No
4	Yes	No	Yes	Yes	No	Yes
5	No	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	M	M	S	M	S	M
CO2	S	S	S	S	M	M	S	M	M	L
CO3	S	M	M	S	S	M	S	S	S	S
CO4	S	M	S	S	M	M	S	M	S	M
CO5	M	S	S	S	M	S	S	M	S	L

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: IV

Paper type: Core Practical-III

Paper code:

Name of the Paper: Advanced General Experiments

Credit: 4

Total Hours per Week: 5

Lecture Hours: Nil

Tutorial Hours: Nil

Practical Hours: 75

.....
(Any 12 Experiments out of 15)

1. Determination of the velocity and compressibility of the given liquid using ultrasonic interferometer.
2. Determination of the wavelength of given monochromatic source and the difference in wavelength of the two spectral lines D1 and D2 of Sodium source using Michelson Interferometer.
3. Magnetic susceptibility of a paramagnetic solution using Quincke's tube Method.
4. Determination of magnetic susceptibility of liquid by Guoy method.
5. Determination of the coercivity, retentivity and saturation magnetization of the given material using hysteresis loop tracer equipment.
6. Determination of numerical aperture of an optical fiber by using He-Ne Laser.
7. Determination of diameter of the given thin wire by diffraction method using He-Ne-Laser.
8. Determination of focal length of a given lens using He-Ne laser.
9. Determination of diameter of the given pinhole using He-Ne laser.
10. Determination of Planck's constant.
11. Measure the ionizing radiation from the given source using GM counter and study
a) its characteristics and b) Inverse square law
12. Determination of Hall coefficient, mobility, Hall angle and number of charge carriers by using Hall setup
13. Analysis of XRD spectrum - Determination of lattice parameters of a crystal
14. Analysis of FTIR spectrum – Vibrational assignments of a given sample
15. UV-Vis spectrometer - Analysis of UV- Vis spectrum - Determination of absorption coefficient and band gap

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: IV

Paper type: Core Practical-IV

Paper code: Name of the Paper: Microprocessor, Microcontroller and C++ Programming Credit: 4

Total Hours per Week: 5 Lecture Hours: Nil Tutorial Hours: Nil Practical Hours: 75

.....

(15 programming out of 25)

I Microprocessor 8085 programs

(Choose maximum of 6 programs)

1. Number conversion - 8 bit and 16 bit: BCD to Binary, Binary to BCD
2. Square and square root of BCD and HEX numbers (both 8 and 16 bit).
3. Largest and smallest numbers in a data set
4. Sum of simple series
5. Interfacing (i) Op-amp 8 bit DAC R-2R network (ii) Switching an array of LEDs.
6. ADC and interfacing IC 0809 with MPU
7. Analog to digital conversion using a DAC Comparator and MPU system.
8. Interfacing a DC stepper motor to the MPU system - clockwise and anticlockwise – full Stepping and half stepping
9. Interfacing and programming IC 0800 with MPU – Unipolar and Bipolar.
10. Interfacing a HEX keyboard to the MPU system through I/O ports.

II Microcontroller 8051 Programs

(Choose maximum of 3 programs)

1. 16 bit -Addition, Subtraction
2. 16 bit- Multiplication and Division.
3. BCD to Binary conversion and binary to BCD
4. Stepper motor interface.
5. Hex Key board interface

II C++ Programming

(Choose maximum of 6 programs)

1. Matrix addition, subtraction and multiplication.
2. Eigen values of a given matrix.
3. Transpose and inverse of a matrix.
4. Evaluating a root of non - linear equation by Newton - Raphson method.
5. Solution of simultaneous equations.
6. Straight line fit using the method of least squares.
7. Exponential fit using the method of least squares.
8. Newton's and Lagrange's Interpolation.
9. Numerical integration by Simpson's rule and Trapezoidal rule.
10. Solution of Differential equation by Fourth order Runge - Kutta Method.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

M.Sc Physics – 2022-2023 onwards

Semester: IV

Paper type: Core Project

Paper code: Name of the Paper: Compulsory Project

Credit: 4

Total Hours per Week: 5 Lecture Hours: Nil Tutorial Hours: Nil

Practical Hours: 75

Preamble

The concept of introducing the project will help the student community to learn and apply the principles of Physics and explore the new research avenues.

In the course of the project the student will refer books, Journals or collect literature / data by the way of visiting research institutes/ industries. He/she may even do experimental /theoretical work in his/her college and submit a dissertation report with a minimum of 40 pages not exceeding 50 pages.

Format for Preparation of Dissertation

The sequence in which the dissertation should be arranged and bound should be as follows

1. Cover Page and title Page
2. Declaration
3. Certificate
4. Abstract (not exceeding one page)
5. Acknowledgement (not exceeding one page)
6. Contents (12 Font size, Times new Roman with double line spacing)
7. List of Figures/ Exhibits/Charts
8. List of tables
9. Symbols and notations
10. Chapters
11. References

Distribution of marks for Dissertation: (25+75 = 100 Marks)

Internal: 25 Marks

External: 75 Marks

- | | |
|---|------------|
| (a) For Organization and presentation of Thesis | - 40 marks |
| (b) For the novelty /Social relevance | -10 marks |
| (c) Presentation of work /Participation in state/ | |
| (d) national level Seminar/publication | - 5 marks |
| (e) Viva voce (Preparation, Presentation of | |
| work and Response to questions) | - 20 marks |

**THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(MASTER OF SCIENCE) – 2022-2023 onwards**

Programme Objectives:

1. To achieve excellence in education and Research field of Zoology.
2. To develop the quality performance in Zoology.
3. To provide Higher education and Research.
4. To motivate self-employment programmes and organize extension activities.
5. To provide opportunities for professional and personal development through curricular and co-curricular activities.

Programme Educational Objectives:

1. To provide quality education in the branch of Biological Sciences.
2. To facilitate Higher Education in Research field in Zoology.
3. To provide quality education offering skill based programmes.
4. To inculcate the value based education among the students.
5. To understand the classification of higher taxa molecular biology, genetics and field of Biotechnology.

Programme Specific Outcomes:

1. PSO1: Students can be educated by Taxonomical, Developmental, Genetical and Molecular level of animals.
2. PSO2: To create knowledge among students to analyse problems through Biostatistics and Computational Management.
3. PSO3: Students can understand various tools regarding search engines in Bioinformatics.
4. PSO4: Students gain knowledge about the principle and applications of Bioinstrumentation in Biological Sciences.
5. PSO5: Students can understand the applications of biological sciences in Apiculture, Aquaculture, Endocrinology and Biochemistry.
6. PSO6: Students can gain knowledge about agricultural based self-employment programme by Sericulture, Apiculture, Vermiculture, Pearl Culture and Aquarium Fish Keeping to up come entrepreneurs.

Programme Outcomes:

1. PO1: To gain knowledge and skill in the field of animal science and evolutionary significance of animal kingdom.
2. PO2: To describe the interrelationship between various animal phylum.
3. PO3: To understand the structure and function of cell and how they control the metabolic activities.
4. PO4: To educate the students in evolutionary significance of animals and their behaviour and hormone related development in animals.
5. PO5: To gain knowledge of organ and organ system of animals.
6. PO6: To understand the genes and their inheritance.
7. PO7: To understand the knowledge about technology based biological innovation in Agriculture, Medicine for Human Health.
8. PO8: To create awareness in immune and immune systems of human beings.
9. PO9: To understand analytical techniques, literature collection formulating hypothesis, thesis writing and publication in reputed journals.
10. PO10: To create awareness in student minds to save the flora and fauna of the environment.

INTERNAL ASSESMENT GUIDELINES:

The following teaching, learning and evolution process may be brought under internal assessment system. Interested teachers can choose one or more innovative methods.

- a. Book review and research paper review, syllabus and curriculum review.
- b. Data collection and paper writing practices: books level, field study level. Using the course content for society and nature development – exercise.
- c. Workshops, preparing technical term dictionaries from text books and reference books.
- d. Preparing question paper by the candidates: objective type, descriptive type, training given by the teacher
- e. Forming digital library: collecting text and reference books, course material.
- f. Preparing course material.
- g. Following eminent intellectuals and research institutions in global level.
- h. Open book examination
- i. For application oriented study: Villages, Institutions, various people groups may be adopted by the departments of the colleges for practicing their theoretical study. Innovative methods may be implemented in the practices and report can be written for documentation, further discussion and research.
- j. Extracurricular activities may be framed through their syllabus content.
- k. Grouping students for self discussion, self learning and self evaluation process.

THIRUVALLUVAR UNIVERSITY
MASTER OF
SCIENCE
M.Sc. ZOOLOGY
DEGREE COURSE
UNDER CBCS

(With effect from 2020-2021)

The Course of Study and the Scheme of Examinations

S.No	Study Components		Ins. Hrs /Week	Credit	Title of the paper	Maximum Marks		
	Course Title							
SEMESTER I						CIA	Uni. Exam	Marks
1	Core	Paper-1	5	4	Life and Diversity of Invertebrates	25	75	100
2		Paper-2	5	4	Life and Diversity of Chordates	25	75	100
3		Paper-3	5	4	Cell and Molecular biology	25	75	100
4	Practical I	Paper-1	9		Life and diversity of Invertebrates, Life and diversityof Chordates and Cell and molecular Biology	-	-	-
5	ELECTIVE	Paper-1	3	3	(A) Aquaculture and Farm management (B) Biostatistics and Bioinformatics	25	75	100
6	OPEN ELECTIVE (Non-Major)	Paper-1	3	3	(A) Apiculture (B) Public Health and Hygiene	25	75	100
			30	18		125	375	500
SEMESTER II						CIA	Uni. Exam	Marks
7	Core	Paper-4	4	4	Genetics	25	75	100
8		Paper-5	4	4	Environmental Biology	25	75	100
9		Paper-6	4	4	Biotechnology	25	75	100
10	Practical I	Paper-I	-	4	Life and diversity of Invertebrates, Chordates, Cell and molecular Biology.	25	75	100
11		Paper-II	10	4	Genetics, Environmental Biology and Biotechnology	25	75	100
12	Compulsory Paper		2	2	Human Rights	25	75	100
13	ELECTIVE	Paper-2	3	3	(A) Endocrinology (B) Bio-Chemistry	25	75	100
14	OPEN ELECTIVE Non-Major	Paper-2	3	3	(A) Vermiculture (B) Wild Life Management and Conservation	25	75	100
			30	30		225	675	900

SEMESTER III						CIA	Uni. Exam	Marks
15.	Core Theory	Paper-7	4	3	Animal Physiology	25	75	100
16.	Core Theory	Paper-8	4	3	Developmental Biology	25	75	100
17.	Core Theory	Paper-9	4	3	Immunology	25	75	100
18.	Core Practical	Paper-3	12	-	Animal Physiology, Developmental biology and Immunology	-	-	-
Internal Elective for same major students								
19.	Core Elective	Paper-3	3	3	(to choose one out of 2) (A) Bioethics and Biosafety (B) Biophysics	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
20.	Open Elective	Paper-3	3	3	(to choose one out of 2) (A) Aquarium fish keeping (B) Medical Laboratory Technology	25	75	100
21.	Field Study			2		25	75	100
22.	MOOC Course		-	2		-	-	100
			30	17		125	375	600
SEMESTER IV								
23.	Core Theory	Paper-10	5	4	Research Methodology	25	75	100
24.	Core Theory	Paper-11	5	4	Entomology	25	75	100
25.	Core	Project	5	5	Project with viva voce (Compulsory)	100(75 Project+ 25 Viva)		100
26.	Core Practical	Paper-3	-	4	Animal Physiology, Developmental Biology and Immunology	25	75	100
27.	Core Practical	Paper-4	9	4	Research Methodology and Entomology	25	75	100
Internal Elective for same major students								
28.	Core Elective	Paper-4	3	3	(to choose one out of 2) (A) Sericulture (B) Microbiology	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
29.	Open Elective	Paper-4	3	3	(to choose one out of 2) (A) Sericulture (B) Pearl Culture	25	75	100
			30	27		175	525	700
				92				2700

THIRUVALLUVAR UNIVERSITY
MASTER OF SCIENCE

M.Sc. ZOOLOGY

SYLLABUS

UNDER

CBCS

(With effect from 2020-2021)

Semester: I

Paper code: DZO11

Credit: 4

Paper type: Core Paper 1

Name of the Paper: LIFE AND DIVERSITY OF INVERTEBRATES

Total Hours per Week: 5

Course Objectives

1. The program provides the student with an introduction to the recent advances in zoology
2. Compare and contrast the major groups of marine protozoans and invertebrates
3. Completion of the courses students will be able. CO1- To classify Phylum Porifera with taxonomic Keys.
4. Demonstrated a broad understood of animal diversity, including knowledge of the scientific classification
5. Students gain knowledge and skill in the fundamentals of animal sciences, understands the complex interactions among various living organisms
6. Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment
7. Apply the knowledge and understanding of Zoology to one's own life and work
8. Understands the complex evolutionary processes and behaviour of animals
9. Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms.
10. Describe Phylum Nematoda and give examples of pathogenic Nematodes
11. Classify Protista up to phylum using examples from parasitic adaptation
12. Pathology associated with various diseases

UNIT-I

Broad Classification of the Animal Kingdom – Concepts of species, hierarchical taxonomy.

Protozoa

Feeding - Locomotion, Reproduction and Parasitic adaptations of Rhizopoda, Mastigopora, Ciliophora, Saprozoans and Mycetozoa with suitable examples.

Economic importance with respect to Health aspect of Soil, Fresh water and Marine Protozoans, Osmoregulation in Protozoa.

Theories on Origin and evolution of Metazoa – Syncytial, Colonial and Polyphyletic theories.

Porifera

Functional morphology of freshwater sponges with suitable example. Inter relationship between different classes.

Marine sponges.

Reproduction – Asexual and Sexual, Regeneration in sponges. Systematic position and Affinities of sponges.

UNIT-II

Coelenterata

Origin and evolution of Coelenterata, Polymorphism, Reproduction and Metagenesis of Coelenterata. Corals and Coral reefs, Types of theories. Systematic position of Ctenophora.

Helminthes

Platyhelminthes - Functional morphology and adaptive Biology for parasitic mode of life. Aschelminthes - Functional morphology and adaptive Biology for parasitic mode of life.

Helminthes in human diseases.
Life cycle of *Wuchereria bancrofti*

UNIT-III

Annelida

Archannelida, Interrelationship between different classes of Annelida. Evolutionary significance of Trochophore Larva. Origin and evolution of coelom. Adaptive radiation in Annelida. Origin of Metamerism in Annelida.

Arthropoda

Xiphosura-structure and affinities. Onychophora. Origin and Evolutionary significance of Crustacean Larvae. Sense organs in Arthropoda, Tagmatization, Crustacean parasites, Mouth parts in insects. Commercial products of insects. Economic importance of insects. Arthropod vectors.

UNIT-IV

Mollusca

Torsion and Detorsion in Gastropoda - Adaptive radiation in Mollusca. Shell in different classes of Mollusca. Foot in Mollusca. Economic importance of Mollusca. Photoreceptors in Mollusca. Larval forms in Mollusca. Pearls producing Marine and Fresh Water Molluscs.

Echinodermata

Origin and evolutionary significance of Echinodermata. Water vascular system in Echinodermata. Pedicellariae of Echinodermata. Feeding mechanism in Echinodermata. Origin and evolutionary significance of Echinoderm larva.

UNIT-V

Minor Phyla

Structural peculiarities and affinities of Ctenophores, Acanthocephala, Nematomorpha, pogonophora.

Invertebrate fossils: Trilobites, Brachiopoda, cephalopoda and Echinodermata.

Course Out Comes (five outcomes for each units should be mentioned)

1) After studied unit-1, the student will be able to understand

- Basic Concepts of Species
- Hierarchial taxonomy
- Importance of Parasitic Protozoan
- Economic importance of Protozoan and Porifera
- Systematic position and Affinities of sponges

2) After studied unit-2, the student will be able to understand

- Origin and evolution of Coelenterata.
- Corals and Coral reefs.
- Systematic position of Ctenophora.
- Helminthes in human diseases.
- Life cycle of Wuchereria bancrofti.

3) After studied unit-3, the student will be able to understand

- Origin and Evolution of Annelida
- Evolutionary significance of Trochophore Larva
- Adaptive radiation in Annelida
- Origin and Evolutionary significance of Crustacean
- Economic importance of insects

4) After studied unit-4, the student will be able to understand

- Torsion and Detorsion in Gastropoda
- Economic importance of Mollusca
- Pearls production.
- Water vascular system
- Evolutionary significance of Echinoderm larva

5) After studied unit-5, the student will be able to understand

- Structural peculiarities and affinities of Acanthocephala
- Structural peculiarities and affinities of Nematomorpha, Brachiopoda
- Structural peculiarities and affinities of Chaetognatha and Echiuroidea
- Invertebrate fossils: Trilobites, Brachiopoda
- Invertebrate fossils: Mollusca and Echinodermata.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	No	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)**Teaching Hours: 1**

- To understand the broad classification of the Animal Kingdom
- To learn the concepts of species, hierarchical taxonomy.
- By learning the feeding, locomotion and economic importance of health aspects of different protozoa.

Unit-2: (50 to 100 contents)**Teaching Hours: 1**

- To study origin and evolution of Coelenterata.
- To understand the polymorphism and reproduction.
- To acquire the knowledge of Metagenesis of Coelenterata.

Unit-3: (50 to 100 contents)**Teaching Hours: 1**

- To study about the segmented worms.
- To study the Interrelationship between different classes of Annelida and Arthropoda.
- To learn and acquire the knowledge in helminthes.

Unit-4: (50 to 100 contents)**Teaching Hours: 1**

- To learn in human diseases and understand the origin and evolutionary significance of Mollusca and Echinodermata.
- To learn and understand the Fresh water molluscs and water vascular system in Echinodermata.

Unit-5: (50 to 100 contents)**Teaching Hours: 1**

- To learn Structural peculiarities and affinities of Minor Phyla.
- To learn the characteristic feature of fossils.

Text Books

1. Barnes. R.D. 1974. Invertebrate Zoology. W.B. Saunders Co., Philadelphia.
2. Hyman L.H. 1951 The Invertebrata, Vol I to VI. Mc Graw – Hill Book Co., New York.
3. Barrington, E.J. W. 1969. Invertebrate Structure and Functions. English Language Book Society.
4. Hyman, L. H. 1940. The Invertebrates (6 volumes) New York: McGraw-Hill. A classic work.
5. Kotpal R.L. (2014) Modern text book of zoology: Invertebrates: animal diversity- I. 11th Edition. Meerut: Rastogi Publications.

Reference Items: books, Journal

1. Jordan E. L. and Verma P.S. (2001) Invertebrate Zoology Revised Edition, Published by S. Chand Publications.
2. Kotpal R. L. (2014) Modern Text Book of Zoology: Vertebrates. Rastogi Publications.
3. Kotpal R.L. (2014) Modern text book of zoology: Invertebrates: animal diversity- I. 11th Edition. Meerut: Rastogi Publications.
4. Animal Kingdom D. Bhaskara Rao – 2010
5. Chemical zoology. Vol. II. Porifera, Coelenterata and Platyhelminthes. M Florkin, BT Scheer 1968.
6. Hyman, L. H. 1940. The Invertebrates (6 volumes) New York: McGraw-Hill. A classic work.
7. Anderson, D. T. (Ed.). (2001). Invertebrate zoology (2nd ed.). Oxford: Oxford University Press.
8. Brusca, R. C., & Brusca, G. J. (2003). Invertebrates (2nd ed.). Sunderland, Mass.: Sinauer Associates.
9. Miller, S.A., & Harley, J.P. (1996). Zoology (4th ed.). Boston: WCB/McGraw-Hill.
10. Pechenik, Jan A. (2005). Biology of the invertebrates. Boston: McGraw-Hill, Higher Education. pp. 590 pp. ISBN 978-0-07-234899-6.
11. Ruppert, E. E., Fox, R. S., & Barnes, R. D. (2004). Invertebrate zoology: a functional evolutionary approach. Belmont, CA: Thomas-Brooks/Cole.
12. Adiyodi, K.G. & Adiyodi, R.G. (Eds) 1983- . Reproductive Biology of Invertebrates. Wiley, New York. (Many volumes.)
13. Giese, A.G. & Pearse, J.S. (Eds) 1974- . Reproduction of Marine Invertebrates. Academic Press, New York. (Many volumes.)
14. Advances in Invertebrate Reproduction. Elsevier Science, Amsterdam. (Five volumes.)

E- Materials

- [https://books.google.co.in/books?id=k6l9FGcjM_EC&pg=PA5&dq=Classification+Bino
mial+Nomenclature+animal+kingdom&hl=en&sa=X&ved=0ahUKEwj57P7Qxv7nAhW8I
bcAHQ9LB6sQ6AEIMjAB#v=onepage&q=Classification%20Binomial%20Nomenclatur
e%20animal%20kingdom&f=false](https://books.google.co.in/books?id=k6l9FGcjM_EC&pg=PA5&dq=Classification+Bino%20mial+Nomenclature+animal+kingdom&hl=en&sa=X&ved=0ahUKEwj57P7Qxv7nAhW8IbcAHQ9LB6sQ6AEIMjAB#v=onepage&q=Classification%20Binomial%20Nomenclature%20animal%20kingdom&f=false)
- http://tnschools.gov.in/media/textbooks/11_Zoo_Vol_2___EM.pdf
- <https://biologydictionary.net/taxonomy/>
- [https://books.google.co.in/books?id=TAkrDAAQBAJ&pg=PA94&dq=animal+kingdom
+phylum+protozoa+and+porifera+invertebrates&hl=en&sa=X&ved=0ahUKEwjyqybtX_7
nAhVJ6XMBHUFVBtQQ6AEIMDAB#v=onepage&q=animal%20kingdom%20phylum%
20protozoa%20and%20porifera%20invertebrates&f=false](https://books.google.co.in/books?id=TAkrDAAQBAJ&pg=PA94&dq=animal+kingdom
+phylum+protozoa+and+porifera+invertebrates&hl=en&sa=X&ved=0ahUKEwjyqybtX_7
nAhVJ6XMBHUFVBtQQ6AEIMDAB#v=onepage&q=animal%20kingdom%20phylum%
20protozoa%20and%20porifera%20invertebrates&f=false)
- [https://www.askiitians.com/revision-notes/biology/animal-kingdom/phylum-protozoa-and-
porifera.html](https://www.askiitians.com/revision-notes/biology/animal-kingdom/phylum-protozoa-and-porifera.html)
- <https://www.pmfias.com/classification-animalia-animal-kingdom/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: I
Paper code: DZO12
Credit: 4

Paper type: Core Paper 2
Name of the Paper: LIFE AND DIVERSITY OF CHORDATES
Total Hours per Week: 5

Course Objectives

1. To understand the taxonomy of vertebrates
2. To inculcate the importance of taxonomy and animal diversity
3. To teach the functional morphology and adaptive radiations
4. To explicit the evolutionary significance and affinities of chordates
5. To understand the phylogeny of chordates

UNIT - I

Principles of Taxonomy: Nomenclature – Binominal and Trinominal nomenclature
Suffix as for

super family name (oidea), family name (idae)

Use of suffixes ‘i’, ‘orum’, ‘ae’ ‘arum’, ‘ensis’ and ‘iensis’.

Tautonyms, Synonyms and Homonyms.

New Trends in Taxonomy: Ecological approach, Ethological approach, Cytological approach, Biochemical approach and Numerical taxonomy.

Taxonomic key: Indented, Simple non-Bracket, Grouped type, Combination

Pictorial: Branching type, Circular and Box-type of keys.

UNIT - II

Prochordata: Systematic position and Phylogeny of Prochordates.

Ostracoderms: Silurian and Devonian Ostracoderms and their evolutionary position.

Placoderms: Origin of Jaws- Structural peculiarities of Cyclostomata.

UNIT-III

Chondrichthyes: Fossil history of Chondrichthyes, tendencies in Elasmobranch evolution.

Actinopterygii: Origin and evolution, Adaptive radiation of bony fishes.

Amphibia: Origin and evolution of Amphibia.

UNIT-IV

Reptilia: Evolution of Reptilia. Saurischian and Ornithischian Dinosaurs -Rhynchocephalia -Adaptive radiation of Reptiles.

Aves: Birds as glorified reptiles. Fossil history of birds. Palate in Birds. Adaptive radiation in birds.

Mammal: Evolution of Mammals, Structural peculiarities of Prototheria, Metatheria and Eutheria.

UNIT-V

Comparative anatomy: Origin and evolution of the vertebrate integumentary system, Paired fins and limbs, heart and brain of vertebrates.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- Understand the principles of taxonomy
- Acquire knowledge on nomenclature
- Realize the importance of suffix used in taxonomy
- Know the trends in taxonomy
- Understanding the different taxonomical keys used for identifying the species

2. After studied unit-2, the student will be able to

- Know the primitive forms of chordates
- Understand the systematic position of the primitive forms
- Acquire knowledge on Silurian and Devonian Chordates
- Realize the importance evolutionary significance
- Understanding the origin of Jaw and structural peculiarities of the species

3. After studied unit-3, the student will be able to

- Understand the fossil history of Chondrichthyes
- Know the tendencies of elasmobranch evolution
- Acquire knowledge on origin and evolution of Actinopterygii
- Understand the adaptive radiation and evolution of bony fishes
- Know the origin and evolution of Amphibia

4. After studied unit-4, the student will be able to

- Acquire knowledge of evolution of Reptilia and adaptive radiations and the evolution of Saurischian and Ornithischian Dinosaurs
- Know the fossil history of birds and why it is called as glorified reptiles?.
- Understand the adaptive radiation of birds and palate in birds
- Acquire knowledge on evolution of Mammals
- Grasping the structural peculiarities of Prototheria, Metatheria and Eutheria

5. After studied unit-5, the student will be able to

- Acquire knowledge on Comparative anatomy of vertebrates
- Understand the origin and evolution of vertebrate integuments
- Know the evolution of paired fins and limbs
- Acquire knowledge on the evolution of heart and aortic arches
- Grasping the development of brain in vertebrates

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours: 1

Principles of Taxonomy: Nomenclature – Binominal and Trinominal nomenclature Suffix as for super family name (oidea), family name (idae)
Use of suffixes ‘i’, ‘orum’, ‘ae’ ‘arum’, ‘ensis’ and ‘iensis’. Tautonyms, Synonyms and Homonyms
New Trends in Taxonomy: Ecologic approach, Ethological approach, Cytological approach, Biochemical approach and Numerical approach.
Taxonomic key: Indented, Simple non-Bracket Grouped type, combination Pictorial: Branching type, Circular and Box-type of keys.

Unit-2: (50 to 100 contents)

Teaching Hours: 1

Prochordata: Systematic position and Phylogeny of Prochordates.
Ostracoderms: Silurian and Devonian Ostracoderms and their evolutionary position. Placoderms: Origin of Jaws- Structural peculiarities of Cyclostomata.

Unit-3: (50 to 100 contents)

Teaching Hours: 1

Chondrichthyes: Fossil history of Chondrichthyes, tendencies in Elasmobranch evolution. Actinopterygii: Origin and evolution, Adaptive radiation of bony fishes.
Amphibia: Origin and evolution of Amphibia.

Unit-4: (50 to 100 contents)

Teaching Hours: 1

Reptilia: Evolution of Reptilia. Saurischian and Ornithischian Dinosaurs -Rhynchocephalia -Adaptive radiation of Reptiles.
Aves: Birds as glorified reptiles. Fossil history of birds. Palate in Birds. Adaptive radiation in birds.
Mammal: Evolution of Mammals, Structural peculiarities of Prototheria, Metatheria and Eutheria.

Unit-5: (50 to 100 contents)

Teaching Hours: 1

Comparative anatomy: Origin and evolution of the vertebrate integumentary system, Paired fins and limbs, heart and brain of vertebrates.

Text Books

- 1 Kapoor, V.C., 1998. Theory and Practice of Animal Taxonomy. Oxford and IBH Publishing Co., Pvt., Ltd., New Delhi.
- 2 Colbert, E.H., 1969. Evolution of Vertebrates. John Wiley and Sons Inc., New York.
- 3 Hobart M. Smith, 1960. Evolution of Chordate Structure. Holt, Rinehart and Winston, Inc., New York.
- 4 Waterman, A.J., 1971. Chordate structure and function. McMillan Co., London
- 5 Jolie, M. 1968. Chordate Morphology. East West Press, Pvt., Ltd.,
- 6 Young, J.Z., 1969. Life of Vertebrates. Clarendon Press, Oxford.
- 7 Holstead, 1969. The pattern of Vertebrate Evolution. Freeman and Co. San Francisco, USA.
- 8 Waterman, A.J., 1971. Chordate structure and function. McMillan Co., London
- 9 P.S. Verma and V. K. Agarwal, Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand Publishing Corporation Ltd.,
- 10 Mohan P. Arora, 2010. Organic Evolution. Himalaya Publishing House, Pvt., Ltd., New Delhi.
- 11 Romer, A.S. and T. S. Parson, 1978. Vertebrate Body. W.B. Saunders Co., Philadelphia.
- Subramanian, M.A., 2013. Chordate evolution. MJH Publishers, Chennai.
- 12 Hyman, L.H., 1966. Comparative Vertebrate Anatomy. The University of Chicago Press, Chicago.

Reference Items: books, Journal

- 1 The behavior of Animals: Mechanism, Function and Evolution (ed. Johan J. Bolhuis, Luc-Alain Giraldeau), 2004, Wiley Publishers
- 2 The Growth of Biological Thought: Diversity, Evolution, and Inheritance by Ernst Mayr. The Belknap Press of Harvard University Press.

E- Materials

- eBook: *Cell Biology, Genetics, Molecular Biology, Evolution and Ecology* (Multicolour Edition) P.S. Verma.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: I
Paper code: DZO13
Credit: 4

Paper type: Core Paper 3
Name of the Paper: CELL AND MOLECULAR BIOLOGY
Total Hours per Week: 5

Course Objectives

To understand the structure and molecular basis of cellular interactions, energy transformation, regulation and control of genes, cell cycle and information transfer.

UNIT-I: STRUCTURE AND FUNCTIONS OF CELL ORGANELLES

Plasma membrane: Structure, Membrane receptors, Membrane transport - Membrane Potentials. Secondary active transport – ion – selective channels.

Endoplasmic reticulum – structure and functions of Endoplasmic Reticulum. Mitochondria - Energetics – functions of mitochondria.

UNIT-II: NUCLEUS

Structure and function of Nuclear membrane, Structure and function of Nucleolus.

Structure and function of Chromatin - Euchromatin and heterochromatin - Polytene and lampbrush Chromosomes

UNIT-III: CELL CYCLES AND CANCER CELL

Cell cycles – Molecular M-Cdk inactivation and creation of G₁ phase, cell growth and cell cycle progression, genetics of cell cycle.

Cancer cell: Characteristics of – possible causes of carcinogenesis (Theories) - Oncogenes - Environmental factors inducing cancer. Hormones in relation to Cancer.

UNIT-IV: CHEMISTRY OF NUCLEIC ACIDS

Chemistry of DNA - DNA replication – Experimental proof of semiconservative replication – enzymes in replication.

Chemistry of RNA - Different types of RNA and their functions.

UNIT-V: INFORMATION TRANSFER

Information transfer in Prokaryotes and Eukaryotes. Transcription - Promoters - Initiators and terminators – post transcriptional modifications. Trimming of introns and splicing of exons. RNA processing

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- Explain the structure of membrane and intercellular components and related to the function.
- Summarizing the energy transduction in cells.

2. After studied unit-2, the student will be

- Exhibiting knowledge in structure and function of Nuclear membrane.
- Understanding the properties of polytene chromosome.
- To study the structure and function of Nucleolus.

3. After studied unit-3, the student will be

- Demonstrate the knowledge of cell cycle and M-Cdk inactivation.
- To understand the creating G1 phase and cell cycle progression.
- To acquire the knowledge in hormonal activity and cancer.

4. After studied unit-4, the student will be

- Understand the chemistry of DNA
- They acquire the knowledge of describing the structure, replication of DNA
- To explain the post of transcriptional and transduction of DNA.

5. After studied unit-5, the student will be

- To know the information transfer in prokaryotic and eukaryotic.
- The student can able to understand the about the specificity of exon and introns.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)**Teaching Hours: 1**

- Understand the history of cytology, draw the structure of plasma membrane and locate its function.
- Understand and appreciate the diversity of use as it is evolved overtime by the process of mutation, selection and genetic change.
- Acquire the knowledge of energetics.

Unit-2: (50 to 100 contents)**Teaching Hours: 1**

- To learn and understand the structure of chromatin and euchromatin.
- Enable the students to describe the structure of polytene chromosomes.
- Explaining the process of Nuclear membrane structure and function etc.

Unit-3: (50 to 100 contents)**Teaching Hours: 1**

- Describing the events of each phase of eukaryotic cell cycles.
- Describing and understanding the mitotic phase, nuclear and cell division
- Describing cell cycle progression cell cycle regulation.
- Describing the cell cycle maturation promoting factor MPE and cycle dependent kinase and G1 phase

Unit-4: (50 to 100 contents)

Teaching Hours: 1

- Analysing the DNA Chemical modification and impact on chromatin remodelling and regulation of gene expression.
- Describing semi conservative replication
- Explaining the process of semi conservative replication.

Unit-5: (50 to 100 contents)

Teaching Hours: 1

- Explaining the nucleic acid transcription, promoters, initiators and terminators.
- Learn the post transcriptional modifications.
- Acquire the knowledge of trimming of introns and splicing.

Text Books

1. Verma Agarwal, 2014. Chand & Co Private Limited, New Delhi
2. Avers. C.J., 1976. CellBiology. Van Nostrand Company, New York.
3. Korenberg. A. 1974. DNA Replication. Dorothy- W.H. Freeman and Company, San Francisco.
5. 6. Hawkins, J.D.1996. Gene Structure and Expression, Cambridge University Press, London.
6. 7. Ajoy Paul, 2011. Text book of Molecular Biology, Book and Allied Private limited, Kolkata.

Reference Items: books, Journal

1. De Robertis. E.D.F. and De Robertis. E.M.F. 2001. Cells and Molecular Biology, B.I Publications Pvt Ltd, India.
2. Lewin, B.2000 Genes VII. Oxford University Press, New York.
2. Howland J.L. 1973. Cell Physiology, McMillan Publishing Co., New York.
3. De Witt, 1977. Biology of the cell. An evolutionary approach. Saunders Company.
5. Karp, G. 1979. Cell Biology. McGraw Hill Ltd., Japan.
4. Avers. C.J., 1976. CellBiology. Van Nostrand Company, New York.
5. Korenberg. A. 1974. DNA Replication. Dorothy- W.H. Freeman and Company, San Francisco.
6. Hawkins, J.D.1996. Gene Structure and Expression, Cambridge University Press, London.
7. Ajoy Paul, 2011. Text book of Molecular Biology, Book and Allied Private limited, Kolkata.

E- Materials

- <http://www.freebookcentre.net/Biology/Cell-Biology-Books.html>
- https://books.google.co.in/books/about/Cell_And_Molecular_Biology.html?id=iXeQ1Bi9P7cC

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: I

Paper code: DEZO14A

Credit: 3

Paper type: Core Elective Paper 1

Name of the Paper: A. AQUACULTURE AND FARM MANAGEMENT

Total Hours per Week: 3

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(to Choose either A (or) of B)

Course Objectives

1. To obtain knowledge on cultivable fin and shell fish resources
2. To understand the culture practices of fin and shell fishes and their management practices
3. To know the commercially important candidate species for culture practices
4. To understand the distribution of seaweeds and their culture methods
5. To know the employment opportunities in aquaculture industry

UNIT-I:

Introduction to Aquaculture: Importance of Aquaculture, Global Scenario, Present Status in India - Prospects and scope.

Aquaculture Farms: Site selection, topography, water availability and supply, Soil conditions and quality. Design and layout, structure and constructions.

UNIT II:

Cultivable species and their culture system:

Species selection–Culture of Seaweeds (Gracilaria), Crustaceans (Prawns – Litopenausvannamei & Macrobrachium rosenbergi), Molluscs (Edible Oysters and Pearl Oyster) and Fishes (Seabass & Catla)

UNIT-III:

Survey of seed Resources and Live Feed Production:

Distributions and abundance seed resources of natural system, collection methods and segregation. Artificial breeding under controlled conditions, induced breeding technique, larval rearing, packing and transportation. Live feed –Culture of Microalgae, Rotifer and Artemia - Feed formulations.

UNIT-IV:

Type of Culture systems and Employment opportunity

Traditional, Extensive, Semi-intensive and Intensive systems, composite fish culture, sewage water fish culture, paddy-cum-fish culture, integrated fish culture, raceway culture, cage, pen and rack culture. Employment opportunities in aquaculture industry.

UNIT-V:

Farm Management:

Water quality management – (temperature, salinity, pH, O₂, nutrients); Feed management; Control of parasites, predators and weeds.

Disease diagnosis: ELISA, Western Blotting

Course Out Comes (five outcomes for each units should be mentioned)**1. After studied unit-1, the student will be able to**

- Know what are Aquaculture and their importance?
- Gain knowledge on Global scenario and Indian status
- Understand the prospects and scope of aquaculture
- Acquire knowledge on farm design, structure and construction
- Realize the importance of farm management

2. After studied unit-2, the student will be able to

- Acquire knowledge on cultivable species
- Understand the culture system of the species
- To gain the knowledge of culture practice of seaweeds, prawns, molluscs and fishes
- Realize the importance of physico-chemical parameters in the culture
- Gain knowledge on management aspects of farm

3. After studied unit-3, the student will be able to

- Understand the seed resource availability in the natural system
- Know the methods of How to collect seeds from wild environment?
- Acquire knowledge on artificial breeding techniques and induced breeding methods
- Gain knowledge on packing and transportation of seeds
- Learn information on the culture of live feed organisms and feed formulations

4. After studied unit-4, the student will be able to

- Know the traditional culture system followed in our country
- Understand the intensive culture system practices in our country
- Realize the importance of culture system of fishes
- Why the integrated aqua farming of fishes practiced?
- Understand the employment opportunity in the aquaculture industry

5. After studied unit-5, the student will be able to

- Understand the role of environmental factors in the culture system
- Gain knowledge on feed management in the culture system
- Acquire knowledge on Control of parasites and predators in the culture system
- Know the eradication techniques of weeds in the farm
- Procure knowledge on disease diagnosis and the methods used for diagnosis.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- To study and learn the importance of aquaculture, global scenario, present status in India - prospects and scope.
- To understand the aquaculture farms: site selection, topography, water availability and supply, soil conditions and quality. design, layout, structure and constructions.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To learn and understand the cultivable species and their culture system: species selection and culture of seaweeds (gracilaria), crustaceans (prawns – *litopenaus vannamei* & *macrobrachium rosenbergi*).
- To learn the molluscs (edible oysters and pearl oyster) and fishes (seabass & catla)

Unit-3: (50 to 100 contents)

Teaching Hours:

- To understand the survey of seed resources and live feed production: distributions and abundance of seed resources of natural system, collection methods and segregation.
- To learn the artificial breeding under controlled conditions, induced breeding technique, larval rearing, packing and transportation.
- To acquire the knowledge of live feed - culture of microalgae, rotifer and artemia - feed formulations.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To understand the type of culture systems and employment opportunity: traditional, extensive, semi-intensive and intensive systems.
- To understand the composite fish culture, sewage water fish culture, paddy-cum-fish culture. To learn a study, the integrated fish culture, raceway culture, cage, pen and rack culture. employment opportunity in aquaculture industry.

Unit-5: (50 to 100 contents)

Teaching Hours:

- To understand the farm management: water quality management – (temperature, salinity, pH, O₂, nutrients); feed management;
- To study the control of parasites, predators and weeds in the farm.
- To learn the disease diagnosis: elisa, western blotting

Text Books

1. Site selection and Farm Design. 1997. CIBA, Chennai.
2. Principles and Practices of Pond Aquaculture (Aennan, J.F., R.O. Smilterman and G. Tehebenoglosus (eds.), Oregon State University, U.S.A., 1983.
3. Biswas, K.P. A text book of Fish, Fisheries and Technology. Narmada Publishing House, New Delhi.
4. The giant freshwater Prawn *Macrobrachium rosenbergii* (De Man).1990. Kerala Agricultural University, College of Fisheries, Kochi.
5. Freshwater fishes. 1992. Hand Book on Aquafarming. MEPDA, Kochi.
6. Bhamrah, H.S. and Juneja, K. An Introduction to Fishes (K. Balvinder, ed.,). Anmol Publications Pvt. Ltd.,
7. Hand Book on Aquafarming. 1992. Oceanic Cage Culture: Sea Fishes, Shrimp, Lobster and Mud Crab. MPEDA, Kochi.
8. Bhamrah, H.S. and Juneja, K. An Introduction to Fishes (K. Balvinder, ed.,). Anmol Publications Pvt. Ltd.,
9. Biswas, K.P. A text book of Fish, Fisheries and Technology. Narmada Publishing House, New Delhi.
10. Artificial Reproduction – FAO
11. Production of live feeds- FAO
12. Live Feeds - an overview | Science Direct Topics
13. Rajan, R. 2018. Training Manual on Live Feed Production for Marine Finfishes
14. Pillai, T.V.R., 1990. Aquaculture. Principles and Practise. Fishing News Books, Blackwell Publishing Ltd., 575pp.
15. Aquaculture and the Environment (ed. T.V.R. Pillay), 2004. Blackwell Publishing Ltd.,
16. Pillai, T.V.R., 1990. Aquaculture. Principles and Practise. Fishing News Books, Blackwell Publishing Ltd., 575pp.
17. Aquaculture and the Environment (ed. T.V.R. Pillay), 2004. Blackwell Publishing Ltd., Aquaculture Development, Health and Wealth - FAO

Reference Items: books, Journal

1. Jhingran, V. G., 1982. Fish and Fisheries of India. Hindustan Publishing Corporation, New Delhi.
2. Principles and Practices of Pond Aquaculture (Aennan, J.F., R.O. Smilterman and G. Tehebenoglosus (eds.), Oregon State University, U.S.A., 1983.
3. Hand Book on Aquafarming.1992. Oceanic Cage Culture: Sea Fishes, Shrimp, Lobster and Mud Crab. MPEDA, Kochi.
4. Site selection and Farm Design. 1997. CIBA, Chennai.
5. The giant freshwater Prawn *Macrobrachium rosenbergii* (De Man).1990. Kerala Agricultural University, College of Fisheries, Kochi.
6. Freshwater fishes. 1992. Hand Book on Aquafarming. MEPDA, Kochi.
7. Bhamrah,H.S. and Juneja, K.An Introduction to Fishes (K. Balvinder, ed.,). Anmol Publications Pvt. Ltd.,
8. Biswas, K.P. A text book of Fish, Fisheries and Technology. Narmada Publishing House, New Delhi.

9. Aquaculture and the Environment (ed. T.V.R. Pillay), 2004. Blackwell Publishing Ltd.,
10. Aquaculture Journal
11. Aquaculture Research Journal
12. Aquaculture Disease Diagnosis and Health Management. 10.1007/978-81-322-2271-2_23

E- Materials

- www.fao.org-Production of live feeds - FAO
- <http://eprints.cmfri.org.in/id/eprint/7787> - Live feed production for marine aquaculture status, problems and prospects
- www.sciencedirect.com - Live Feeds - an overview
[www.researchgate.net](http://www.researchgate.net/publication/215799508) › publication › 215799508 - Production and Utilization of Marine Copepods as Live feed for Larval Rearing of Tiger Shrimp *Penaeus monodon* with Special Emphasis on Astaxanthin.
- [www.researchgate.net](http://www.researchgate.net/publication/261994048) › publication › 261994048 - Induced_Breeding

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: I

Paper code: DEZO14B

Credit: 3

Paper type: Core Elective Paper 1

Name of the Paper: B. BIOSTATISTICS AND BIOINFORMATICS

Total Hours per Week: 3

Course Objectives

- To understand the basic concepts of biostatistics and bioinformatics.
- To solve biological problems through computational management.

UNIT-I: INFERENCE STATISTICS

Introduction: Definition of statistical population and sample in biological studies. Variables: qualitative and quantitative, Discrete and continuous.

Probability; Basic principles - apriori and aposteriori probabilities - addition and multiplication rules of probability. Conditional probability. Theoretical distribution, normal binomial and Poisson - application (computation required).

UNIT-II

Hypothesis testing - Null hypothesis - levels of significance - degrees of freedom - type I and type II errors.

Test of significance: Chi-square test for goodness of fit, homogeneity and association between attributes (Problem relating to Genetics, patterns of distribution etc. to be worked out).

Test of significance for large and small samples - comparison of sample mean with population mean comparison of two - sample (computation required)

UNIT-III: CORRELATION AND REGRESSION

Correlation: definition and types - simple, multiple -partial, linear, nonlinear, mutual, cause and effect etc. Uses of scatter diagram and correlation graph in the study of correlation between two variables. Computation of Karl Pearson's co-efficient of correlation - testing its significance, Interpretation.

Regression analysis, derivation of regression equation between two variable regression coefficient - construction of regression lines - properties - application. ANOVA

Population Statistics -Vital statistics - natality and morality rates. Population estimation - population growth.

UNIT-IV: BASIC BIOINFORMATICS

Bioinformatics - Biological /Specialized Database - Servers for Bioinformatics (NCBI, EBI, Genoment) Virtual Library - Data mining - Data Warehousing - Searching techniques - Genomics - Proteomics.

UNIT-V: ALGORITHM IN BIOINFORMATICS

Algorithm and tools sequence analysis - Similarity Search - Genetic algorithm - Gene finding - Protein prediction - Biomolecular visualization - Phylogenetic analysis - Drug designing.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- Compute basic probabilities as used in statistical applications by demonstrating the elementary rules of probability
- prove an understanding of discrete probability distributions by assembling a discrete probability distribution
- Solving binomial distribution problems that require the use of a discrete binomial distribution
- Planning and proposing the uses of the Poisson distribution for solving problems

2. After studied unit-2, the student will be able to

- Show a working knowledge of sampling, sampling distributions, and confidence intervals by constructing a sampling distribution of the sample mean.
- The use and application of hypothesis testing
- Understand the applications of Chi-square

3. After studied unit-3, the student will be able to

- Understand how to apply linear regression to analyze problems
- Understand how to design an experiment by ANOVA.

4. After studied unit-4, the student will be able to

- Understand the basic concepts of Bioinformatics and its significance in Biological data analysis.
- Understand various techniques used in genomics and proteomics

5. After studied unit-5, the student will be able to

- Understand the various techniques, algorithms and tools used for Phylogenetic Analysis

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- To study about the inferential statistics.
- To learn the statistical population and sample in biological studies.
- To understand the Variables, qualitative, quantitative and Discrete and continuous.
- To study the probability and basic principles.
- To study the apriori and aposteriori probabilities and addition and multiplication rules of probability.
- To understand the Conditional probability.
- To learn the Theoretical distribution, normal binomial and Poisson - application (computation required).

Unit-2: (50 to 100 contents)

Teaching Hours:

- To acquire the knowledge hypothesis testing and null hypothesis.
- To study the levels of significance, degrees of freedom and type I and type II errors.
- To learn and understand the Test of significance: Chi-square test for goodness of fit, homogeneity and association between attributes (Problem relating to Genetics, patterns of distribution,
- To understand and learn the Test of significance for large and small samples and comparison of sample mean with population mean comparison of two - sample (computation required)

Unit-3: (50 to 100 contents)

Teaching Hours:

- To study the correlation and types of simple, multiple -partial, linear, nonlinear, mutual, cause and effect etc.
- To understand the graphs and uses of scatter diagram and correlation graph in the study of correlation between two variables.
- To learn the Computation of Karl Pearson's co-efficient of correlation.
- To study the testing its significance, Interpretation.
- To learn and understand the regression analysis, derivation of regression equation between two variable regression coefficient.
- To learn the construction of regression lines - properties - application.
- To understand and study the ANOVA.
- To learn the Population Statistics and Vital statistics.
- To learn the natality and morality rates. Population estimation - population growth.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To understand the basic concepts of bioinformatics.
- To learn and study the Biological /Specialized Database.
- To understand and study the Servers for Bioinformatics (NCBI, EBI, Genoment) Virtual Library Data mining - Data Warehousing.
- To learn the Searching techniques.
- To study the Genomics and Proteomics.

Unit-5: (50 to 100 contents)

- To understand the algorithm in bioinformatics.
- To learn the Algorithm and tools sequence analysis.
- To study the Similarity Search, Genetic algorithm, Gene finding, Protein prediction and Biomolecular visualization
- To learn the Phylogenetic analysis and Drug designing.

Text Books

1. Gupta, S.P. 1988. An easy approach to statistics. Chand & Co., New Delhi.
2. Pillai, R.S.N. and Bagawathi, V. 2005 Statistics. S. Chand & Co. Ltd, New Delhi.
3. Mahajan, B.K. 1984. Methods in Biostatistics for Medical students and research Workers. Smt. Indu Mahajan, New Delhi.
4. Westhead, D.R., Parish, J.H. and Tugman, R.M. 2003 Bioinformatics. Viva Books Pvt. Ltd., New Delhi
5. Arthur, M.L. 2003. Introduction to Bioinformatics Oxford University Press, New Delhi.
6. Higgins D. and Taylor, W. 2000 Bioinformatics: Sequence, Structure and Databanks. Oxford University Press, New Delhi.

Reference Items: books, Journal

1. Milton, J.S 1992 Statistical Methods in Biological and Health Science. McGraw-Hill Inc, New York.
2. Scheffler, W.C. 1963 Statistics for biological sciences. Addition - Wesley Publication Co., London.
3. Snedecor, G. and Cochran, W. G. 1967 Statistical Methods. Oxford Publication Co., New Delhi.
4. Spiegel, M.R. 1981 Theory and problems of statistics, Schaum's Outline Series McGraw - Hill International Book Co., Singapore.
5. Stansfield, W.O. 1984 Theory and Problems of genetics (including 600 problems) Schaum's outline series. McGraw - Hill Book, Co., New York.
6. Sokal, R.R. and Rohlf, F. J. 1969 Biometry. The Principles and Practice of Statistics in Biological Research. W.H. Freeman and Co., San Francisco.
7. Durbin, R., Eddy, S.R., Krogh, A. and Mitchison, G. 1998. Biological sequence Analysis. Cambridge University Press, Cambridge, U.K.
8. Baxevanis, A. and Ouellette, B.F. 1998. Bioinformatics: A practical guide to the analysis of genes and proteins. Wiley Interscience, Hoboken, New Jersey, USA.
9. Arthur M. Lesk. 2006. Introduction to Protein structure. Oxford University Press, New Delhi.

E- Materials

- <http://www.freebookcentre.net/Biology/BioInformatics-Books.html>
- <http://www.biostat.jhsph.edu/~iruczins/teaching/misc/notes.bio.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: I
Paper code: DOZO15A
Credit: 3

Paper type: Open Elective (Non Major) Paper 1
Name of the Paper: A. APICULTURE (BEE KEEPING)
Total Hours per Week: 3

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(to Choose either A or B)

Course Objectives

1. To provide direction of higher education towards social utility (benefit).
2. To equip the students with latest technologies in emerging area.
3. To extend the knowledge from laboratory to field.
4. To provide skills and job oriented techniques to the students.
5. To understand the basic life cycle of the honeybee.
6. Learn to manage the beehives for honey production and pollination.

Unit I

Introduction of Modern bee keeping- Importance of beekeeping - Scope of beekeeping - Bee species- Cast differentiation, Colony organization - Division of labor in honeybee - Life cycle of honeybee and nuptial flight

Unit II

Scientific bee keeping- Beekeeping equipments- Equipments for improving efficiency of honeybees - Equipments for improving efficiency of bee's keepers - Equipments for improving hygienic conditions - Methods of Swarm Capturing- Capturing a Swarm from a tree branch - Capturing a Swarm from Ground - Inspection and Handling the Colony - Hiving by dividing an established colony - Establishment, Seasonal Management of apiary and inspection of bee colonies.

Unit III

Apiculture in Agriculture -Bee plants and floral calendar- Importance and qualities of good bee flora - Pollination, Need of bee pollination - Management of honeybees for pollination - Migratory beekeeping.

Unit IV

Honeybee products -- Honey- Its constituents, methods of collection and uses - Importance of other bee products to mankind - Pollen –Method of collection, constituents, uses - Royal jelly- Method of collection, constituents, uses - Propolis - Method of collection, constituents, uses - Bee wax- Method of collection, constituents, uses - Bee venom- Method of collection, constituents, uses.

Unit V

Problems of beekeeping industries, Natural Climate Condition, natural enemies, pest and diseases, human activities and Apiary and Hive Hygiene.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- Identify different types of species.
- Ascertain different roles played in different species of bees.
- Ascertain importance of economic aspects of honeybees.

2. After studied unit-2, the student will be able to

- Identify the need of improving efficiency of bee keepers.
- Understanding the biology and the behavior.
- Manage insect's diseases and nuisances in beehive.

3. After studied unit-3, the student will be able to

- Identify common Indian tests stored in combs built by bees.
- Enable to learn the management techniques.

4. After studied unit-4, the student will be able to

- Learn and understand the local skills, knowledge and traditions.
- Acquire knowledge of integration into forming system.
- To learn different types of products and its uses.

5. After studied unit-5, the student will be able to

- To Acquire the knowledge of beekeeping industries.
- To learn and understand the natural climate condition, natural enemies, pest and diseases, human activities.
- To study and learn the apiary and hive hygiene.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- Understand the general discipline of bees.
- Identify different species of bees.
- Understand the different cast of bees and their role in colony.
- Get acquainted in the communication skill methods used to buy bees.

Unit-2: (50 to 100 contents)**Teaching Hours:**

- Understand the factors to be considered for site selection.
- Selective sites for hive installation.
- Perform inspection of colonies.
- Manage the colonies of beehive

Unit-3: (50 to 100 contents)**Teaching Hours:**

- Identifying different types of floral calendar.
- Understand the methods of bee pollination.
- Acquiring knowledge about migratory.

Unit-4: (50 to 100 contents)**Teaching Hours:**

- Extract honey using appropriate procedure.
- Understanding of harvesting royal jelly, propolis, pollen and bee venom.
- Understand the methods of harvesting honey.

Unit-5: (50 to 100 contents)**Teaching Hours:**

- To Acquire the knowledge of beekeeping industries.
- To learn the natural climate condition, natural enemies, pest and diseases, human activities.
- To study the apiary and hive hygiene.

Text Books

- 1) Introduction to disease of bee –Bailey, L
- 2) World of honeybee –Butter C. G.
- 3) Beekeeping in India –Sardar Sing (ICAR)

Reference Items: books, Journal

- 1) Introduction to disease of bee –Bailey, L
- 2) World of honeybee –Butter C. G.
- 3) Beekeeping in India –Sardar Sing (ICAR)
- 4) The Principle of Insect Physiology-Wigglesworth, V.S.
- 5) Applied Zoology- B. B. Waykar, A. Y. Mahajan, B. C. More. (Prashant Publication Jalgaon)

E - Materials

- http://www.digitalbookindex.org/_search/search010agriculturebeekeepinga.asp
- http://library.uniteddiversity.coop/Beekeeping/A_Practical_Manual_of_Beekeeping.pdf
- <https://thebeeyard.org/ebooks/>

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: I

Paper code: DOZO15B

Credit: 3

Paper type: Open Elective (Non Major) Paper 1

Name of the Paper: B. PUBLIC HEALTH AND HYGIENE

Total Hours per Week: 3

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Course Objectives

- To impart awareness on public health, Hygiene and diseases. To educate and emphasize on preventive measures of diseases. To create knowledge on Health Education.

UNIT – I

Scope of Public Health and Hygiene – Nutrition and health – classification of foods – Balanced Diet – malnutrition - Nutritional deficiencies – Vitamin deficiencies. Nutritional requirements of special groups.

UNIT – II

Environment and Health Hazards – Environmental degradation – pollution and associated health Hazards – Health problems due to industrializations – Hospital waste management.

UNIT – III

Communicable diseases and their control measures such as Measles, Polio, Chikungunya, Rabies, Plague, Leprosy and AIDS.

UNIT – IV

Non – communicable diseases and their preventive measures such as Hypertension, Coronary Heart Diseases, Stroke, Diabetes, Obesity and Mental ill – Health. Alcoholism and drug dependence.

UNIT – V

Health Education and Health programmes in India – WHO programmes – government and voluntary Organizations and their health service – Precautions first Aid and awareness on sporadic diseases.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- Describe under connected relationships among physical social and environmental health and diseases.
- Students come to know about the role of multiple determination of health across diverse population.

2. After studied unit-2, the student will be able to

- Describe the environmental pollution and health hazards.
- To study and be able to understand hospital applications, health problems due to industrialization.

3. After studied unit-3, the student will be able to understand

- The major themes for life skill based hygiene education.
- Student acquires knowledge about communicable diseases.

4. After studied unit-4, the student will be able to understand

- How to take precautionary steps for communicable diseases and sporadic diseases.
- Student can be able to learn the demerits and alcoholism and drug dependence.
- To learn the remedy for obesity mental illness and health problems.

5. After studied unit-5, the student will be able to understand

- To know the government and voluntary organizations and their health service of India.
- Understand the health programme in India.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

- To give a better understanding about yourself.
- Understand the nutrition, health, nourishment of children.
- To acquire the knowledge about nutritional requirements, vitamins deficiencies, and balanced diet.

Unit-2: (50 to 100 contents)

- To understand the pollution and health hazards.
- By learning the health problems and due to industrialization.
- To understand the Hospital waste management.

Unit-3: (50 to 100 contents)

- By learning the communicable diseases and control measures.
- To know about the disease of the Measles, Polio, Chikungunya, Rabies, etc.
- To know completely about, HIV and Leprosy.

Unit-4: (50 to 100 contents)

- By learning the Non-communicable diseases and preventive measures.
- Learning about obesity and mental ill health problem.
- Understand about, alcoholism and drug dependence.

Unit-5: (50 to 100 contents)

- To thoroughly know the WHO programmes.
- To study the government service helpline to create awareness on alcoholism and drug dependence.

Text Books

- Park and Park, 1995: Text book of preventive and social medicine – Banarsidas Bhanot Publ. jodhpur- India.
- Verma, S. 1998: Medical zoology, Rastogi Publ.- Meerut- India Singh, H.s. and Rastogi, P. 2009: Parasitology, Rastogi Publ. India.
- Dubey, R.C and Maheswari, D.K. 2007: Text Book of Microbiology – S. Chand & co. Publ. New Delhi– India.

Reference Items: books, Journal

- Park and Park, 1995: Text book of preventive and social medicine – Banarsidas Bhanot Publ. jodhpur- India.
- Verma, S. 1998: Medical zoology, Rastogi Publ.- Meerut- India Singh, H.s. and Rastogi, P. 2009: Parasitology, Rastogi Publ. India.
- Dubey, R.C and Maheswari, D.K. 2007: Text Book of Microbiology – S. Chand & co. Publ. New Delhi– India.

E-Materials

- http://www.digitalbookindex.org/_search/search010homeecohygienesanitationa.asp

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: II
Paper code: DZO21
Credit: 4

Paper type: Core Paper 4
Name of the Paper: GENETICS
Total Hours per Week: 4

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Course Objectives

1. To understand the fine structure of genetic materials.
2. To acquire the knowledge of Regulation of gene action.
3. To know the chromosomal basis of genetic disorders.
4. To understand the development and differentiation of genes.
5. To know the importance of population genetics.
6. To understand the nuances of genetic engineering and applied genetics.

UNIT-I: MOLECULAR STRUCTURE OF GENETIC MATERIAL

Molecular structure of DNA and RNA - Replication, theories, Gene concept - One gene one polypeptide concept.

Identification of DNA and RNA as the genetic material.

Microbial Genetics - Conjugation, transformation and transduction and Sexduction.
Chromosome mapping in prokaryotes (Virus, Bacteria), Gene mapping by human pedigree analysis, synteny.

UNIT-II: REGULATION OF GENE ACTION

Enzyme regulation of gene action. Gene regulation of gene action - Operon concept - GAL and LAC Operon system. Evidence of regulation of gene action.

Genes and metabolism. Inborn errors of metabolism in Man (With reference to protein, carbohydrates, Lipid and nucleic acid).

UNIT-III: CHROMOSOME AND GENETICS DISORDERS

Applied Genetics - Application of genetics in animal breeding. Application of genetics in Crime and Law - DNA fingerprinting, Genetic basis of intelligence. Studies on Twins.
Sex chromosomes. Dosage compensation- X inactivation. Genomic imprinting.
Human Genetics: Variations in karyotypes (autosomal and sex chromosomal) with special reference to Klinefelters, Turners and Down's syndromes in man. Genetic counselling - Objectives, ethics and principles.

UNIT-IV: GENES IN DEVELOPMENT, RADIATION GENETICS AND POPULATION GENETICS

Genes in development and differentiation Mechanism of chromosomal breakage - physical chemical and biological factors or agents. Mutagens and mutagenesis and carcinogenesis – genetics effects of radiation.

Population genetics:

Population and gene pool. Hardy Weinberg Law-Genetic equilibrium.
Calculation of gene frequencies for Autosomal (Complete dominance, codominance and multiple alleles) and sex linked genes. Factors affecting Hardy Weinberg equilibrium.

UNIT-V: GENETIC ENGINEERING AND APPLIED GENETICS

Genetic Engineering – Techniques of genomic sequencing - Recombinant DNA techniques. Applications of Recombinant DNA technology.

Applied Genetics - Application of genetics in animal breeding. Application of genetics in Crime and Law - DNA fingerprinting, Genetic basis of intelligence. Studies on Twins.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- Describe the structure of nucleic acid and polypeptide concept.
- They can able to understand the bacterial genetics and family history.

2. After studied unit-2, the student will be able to

- Discuss the mechanisms of genetic regulation.
- To understand the knowledge of operon systems and metabolic errors.

3. After studied unit-3, the student will be able to

- Describe the mutation of dosage compensation and imprinting.
- To study the syndromes of sex & autosomal chromosomes in human.

4. After studied unit-4, the student will be able to

- To understand the genes and development, chromosomal breakage, mutagenesis and carcinogenesis
- Understand the insight into the mathematical, statistical and computational basis of genetic analysis.

5. After studied unit-5, the student will be able to

- To analyse the function of applied genetic research in technology, nature, and society.
- They access the impact of genomics, proteomics and bioinformatics on society.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- To understand molecular structure of genetic material.
- To acquire the knowledge of replication theories identification.
- To Understand the principles of gene mapping mechanisms.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To Study the enzyme regulation of gene action.
- To enable the students to understand the operon concepts, metabolic disorders.

Unit-3: (50 to 100 contents)

Teaching Hours:

- To understand how the mutation can affect gene dosage, X inactivation chromosomal aberrations.
- To discuss the human genome structure in the context of physiological function and disease.
- To analyse epigenetic modification and imprinting in the role of disease.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To understand the development of genes and breakage, to understand the knowledge of radiation procedure and effects of radiations.
- Describing population structure in terms of genetic variation.
- Evaluating the principles to describe the genetics profile of populations as specified by Hardy Weinberg Law.

Unit-5: (50 to 100 contents)

Teaching Hours:

- Analyzing the function of applied genetic research in technology, nature, and society.
- Assessing the impact of genomics, proteomics and bioinformatics on society.
- Identifying ethical issues related to gene manipulation and analysis.

Text Books

1. Verma, P.S. and V.K. Agarwal, 1995 Genectis, 8th edition, S. Chand & Co, New Delhi – 110 055.580pp.
2. Verma, P.S. and V.K. Agarwal, 2009.9th edition, S. Chand & Co, New Delhi.
3. S.C. Rastogi Biotechnology, Principles and Applications 2007 Narosa Publishing house, Pvt.Ltd.
4. Verma.P.S and Agarwal.V.K (2004) Genetics, S.Chand & Co., New Delhi .
5. Dalela.R.C and Verma.S.R (1970) A Textbook of Genetics,Jaiprakash Nath and Company., Meerut.

Reference Items: books, Journal

1. Watson. J.D. Hopkins, N.H., Roberts, J.W., Steitz, J.A. and Weiner, A.M. 1987 Molecular Biology of the Gene. W.A. Benjamin/Cummings Co., New York.
2. Sinnot. E.W., Dunn. L.C., Dobzhansky, T.H. 1973. Principles of Genetics. McGraw Hill Co., New Delhi.
3. Daniel L. Hartl. 1994. Geneties. Jones and Barflaff Publishing, Boston.
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10. Gardner E.J. Simmons, M.J. and Snustad, D.P.1991 John Wiley & Sons, New York.

E- Materials

- <http://www.agrimoon.com/principles-of-genetic-pdf-book/>
- http://www.bionet.nsc.ru/ICIG/CHM/books/Hartl_Jones_Genetics.pdf
- http://gsi.semmelweis.hu/files/ebook/Genetics%20genomics_en.pdf
- http://www.freebookcentre.net/medical_text_books_journals/genetics_ebooks_online_text_s_download.html
- http://web.iitd.ac.in/~amittal/SBL101_Essentials_of_Genetics.pdf
- <https://epdf.pub/principles-of-genetics.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: II
Paper code: DZO22
Credit: 4

Paper type: Core Paper 5
Name of the Paper: ENVIRONMENTAL BIOLOGY
Total Hours per Week: 4

Course Objectives

- To generate up-to-date knowledge on environmental conservation and management through a comprehensive understanding of the components of ecosystem, biological cycles, habitat ecology, resource ecology, pollution and its management.

UNIT-I:

PRINCIPAL AND SCOPE OF ENVIRONMENTAL BIOLOGY

Ecology and Environment: an introduction - Earth, Man and Environment Relationship - Importance of biological cycles in the environment. Principal and Scope of environmental biology
– Environmental health, education and Public understanding. Natural and Man-made ecosystem, Marine environment an analysis. Food chain and food web, Energy flow - Trophic structure and levels – Pyramids, ecological efficiencies. Classification of ecosystem: Fresh water, marine, estuarine and terrestrial ecosystems. Primary and secondary production – definition, measurement of productivity in terrestrial and aquatic pathways in ecosystem; Basic laws of energy flow; energy flow models, nature and flux of energy through communities. Influence of competition, predation and disturbances - Community succession - homeostasis.

UNIT-II:

COMMUNITY, POPULATION AND BIOLOGICAL CYCLES

Community ecology: types of community, succession process, competition and coexistence, types of interactions: predation, parasitism, antibiosis, commensalism, cooperation and mutualism, population growth. Social and Economic impact of environmental policies. Classification of biomass, major biotic elements of each biome and their characteristics, Community succession and climax stage.

Population ecology: Structure and distribution of population - Growth curves - Groups, Natality, Mortality - Density indices, Life study tables - factors affecting population growth - Carrying capacity. Fluctuation and regulation Population regulation and human population control. Complete and incomplete biogeochemical cycles - Sedimentary cycle - Recycle pathway of elements - Cycling of non - essential and organic nutrients.

UNIT-III:

HABITAT AND RESOURCES ECOLOGY

Biomass, Adaptations with reference to physico - chemical features of environment of terrestrial, freshwater, estuarine, marine habitats. Unique features of Coral Reefs, Seaweeds, Sea grasses and Mangroves. Renewable and non - renewable resources - animal resources. Conventional and non - conventional energy sources. Natural resources and their conservation.

UNIT-IV:

ENVIRONMENTAL CONSERVATION, DISASTER AND MANAGEMENT

Principles of conservation - Rain water harvesting - Soil health and fauna inputs in agriculture Biosphere reserves - wildlife conservation, forest conservation and management. Biodiversity - Germplasm conservation and cryopreservation. Social forestry - tribal welfare. Fossil fuel and the environments. Environmental Disaster and Management: Effect of climate change, global warming and its effect on living organisms – Tsunami, Cyclone Earth Quake, Flood: Causes, consequences, control and management. War and its impact on environment. Remediation and reclamation of the Environment-Role of microbes in bioremediation.

UNIT-V:**POLLUTION AND MANAGEMENT**

Environmental Pollution: Types of environmental pollution and their biological effects. Air, soil, noise, Radioactive and water pollution - causes, effects and control. Hazardous solid waste. Industrial disaster and pollution - Case studies-chemical Industries - Pesticide Industries - Bhopal Disaster, Chernobyl accident, Love canal Disaster, Exxon Oil Disaster, Impact and Remedial Measures - Labeling - Laws and Regulations - Pollution Control Board. Thermal Pollution, Marine Pollution – Biological indicators and their role in environmental monitoring. Environmental education and awareness - Organizations involved in environmental protection - Principles of conservation: Application of ecological principles - germplasm conservation. Global Environmental Issues and Human Health Environmental Impact Assessment, Policy and Laws.

Course Out Comes (five outcomes for each units should be mentioned)**1. After studied unit-1, the student will be able to understand**

- Asses necessary scientific concepts and data.
- They establish integral cultural context.

2. After studied unit-2, the student will be able to understand

- Acquire the knowledge and skill to view the self and social situation in the ecological and cultural and social context.
- Acquire the knowledge skill necessary to achieve and understanding environmental problems.

3. After studied unit-3, the student will be able to understand

- Appreciate attributes of natural resources and management.
- Appreciate the ideas of unsustainable development.

4. After studied unit-4, the student will be able to understand

- Competent in basic forest management principles and evaluation of forest stands for health, wild life habitat.
- Identifying soil type how they are formed and ways to modify soil structure and improved soil fertility.

5. After studied unit-5, the student will be able to understand list out major places and

- Describing the effects of air pollution and their management.
- Know about the global environmental issues.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- Environmental studies will be able to recognize the physical, chemical, and biological components of earth system.
- Understanding the classification of Ecosystem.

Unit-2: (50 to 100 contents)

Teaching Hours:

- Understand the social and economic impact of the environment.
- Understand the detailed explanation of population and distribution.

Unit-3: (50 to 100 contents)

Teaching Hours:

- Study the various habitats of environments.
- Acquire knowledge in renewable and non-renewable sources.

Unit-4: (50 to 100 contents)

Teaching Hours:

- Studying the disaster management.
- Understand the definition of Tsunami, Cyclone, earth quake and how it occurs.

Unit-5: (50 to 100 contents)

Teaching Hours:

- Understand the types of pollution causative factors, and control.
- Understand the importance of the non-polluting sources of energy to the energy.

Text Books

1. Odum F.P. 1983 Basic Ecology, Saunders College Publication 613 papers.
2. Odum, Eugene D. 2004 Fundamental of ecology. Brooks college 5th edition 624 pages.
3. Rastogi V.B and Jayaraj.M.S Animal Ecology and distribution of animals.

Reference Items: books, Journal

1. Alpha Soli, I. Arceivala.1998. Wastewater treatment for pollution control - Second Ed. Tata McGraw Hill Publication Company Ltd., New Delhi.
2. Asthana, D.K. and Asthana, M.2001. Environmental Problems and Solutions. S. Chand and Co., New Delhi.
3. Bandopadhyay, J.1985. India's Environment Crisis and response. Nataraj Publishers, Dehra Dun.
4. Berwer. A.1988. The Science of ecology. Saunders's college publishing.
5. Cain ML, Bowman WD and Hacker SD (2011) Ecology, Sinauer Associates Publishers.
6. Clark RS (2001) Marine Pollution, Clarendon Press Oxford, New York
7. Henry M and Stevens H (2009) A Primer of Ecology with R, Springer.
8. Ismail, S.A.1997. Vermiculture, Biology of Earthworms. Orient Longman, Chennai.
9. Krebs CJ (2008) Ecology: The Experimental Analysis of Distribution and Abundance (6th Edition), Benjamin Cummings.
10. Kudesia, V.P and Ritu Kudesia (1992) Water Pollution, Pragati Prakashan Publication, Meerut.14
11. Kurnarasawmy, K., A. Alagappa Moses and M. Vasanthy (2004) Environmental Studies (A Text Book for All Under Graduate Students) Bharathidasan University Publications.
12. Molles MC (2013) Ecology: Concepts and Applications, McGraw-Hill Publishers, UK
13. Odum. E.P. 1996 Fundamentals of Ecology. Nataraj Publishers, Dehra Dun.
14. Odum EP (2008) Fundamentals of Ecology, Cengage Learning (Thompson), USA.
15. Rao, M. N and H.V.N. Rao (1993) Air Pollution, Tata McGraw -Hill Publishing Company Limited. New Delhi.

16. Sawyer, C. N., P.L McCarty and G.F. Perkin (1994) Chemistry for Environmental Engineers, "Edition. McGraw-Hill.
17. Sharma, B.K and H.Kaur (1994) Soil and Noise Pollution. God Publishing House, Meerut.
18. Smith TM and Smith RL (2008) Elements of Ecology (7th Edition), Benjamin Cummings.
19. Smith, R.L.1986. Elements of Ecology. Harpet and Row Publishers, New York.
20. Stiling P (2014) Ecology, McGraw-Hill Publishers, UK
21. Trivedi, P.R.and Gurdeepraj, K. 1992. Environmental Biology. Akashdeep Publishing House New Delhi
22. Swarup, R.,Mishra, S.N. and Jauhari,V.P. 1992. Encyclopodia of Ecology. Mittal Publications, New Delhi.

E-Materials

- <https://open.umn.edu/opentextbooks/textbooks/environmental-biology>.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: II
Paper code: DZO23
Credit: 4

Paper type: Core Paper 6
Name of the Paper: BIOTECHNOLOGY
Total Hours per Week: 4

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Course Objectives

- To familiarize the use of the data and techniques in Biotechnology in living organisms. To find solution of problems concerning human activities including agriculture, medical treatment, industry and environment.

UNIT-I:

GENETIC ENGINEERING AND RECOMBINANT DNA TECHNOLOGY

Gene cloning - the basic steps - various types of restriction enzymes - ligase linkers and adaptors - c DNA - transformation - Selection of recombinants.

Gene probe - Molecular finger printing (DNA finger printing) - RFLP - the PCR techniques - Genomic library - Blotting techniques - Southern blotting - Northern blotting - Western blotting

UNIT-II:

CLONING VECTORS

Bacterial plasmid vectors PBR 322 and PUL 19 – Bacteriophage vectors – phage λ – phage M13 - cosmids – phagemids – yeast plasmid vectors – Y1p, yEp – Transposons – shuttle vectors.

UNIT-III:

ANIMAL BIOTECHNOLOGY

In vitro fertilization (IVF) technology - Dolly - embryo transfer in human.

Human gene therapy – stem cell therapy – genes for vaccines – legal and ethical issues in biotechnology.

UNIT-IV:

MICROBIAL BIOTECHNOLOGY

Fermentation - bioreactor - Microbials products - Primary & Secondary Metabolites - Biopolymers, Biopesticides and Biofertilizers. Biological control – microbial inoculants.

UNIT-V:

ENVIRONMENTAL BIOTECHNOLOGY AND APPLICATIONS OF BIOTECHNOLOGY

Bioremediation - bioremediation of hydrocarbons - Industrial wastes - Heavy metals – Xenobiotics - bioleaching - biomining - biofuels. Applications of biotechnology in agriculture, medicine and food science. Genetically modified organism (GMO'S) - GM foods. Biotechnology & biosafety – IPR – Patent.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand

- The tools and strategies used in genetic engineering.
- The applications of recombinant DNA technology and genetic engineering.

2. After studied unit-2, the student will be able to understand

- The Bacterial plasmid vectors PBR 322 and PUL 19.
- Bacteriophage vectors

3. After studied unit-3, the student will be able to understand

- Biotechnological techniques like embryo transfer and in vitro fertilization

4. After studied unit-4, the student will be able to understand

- Critically evaluate the role of micro-organisms in specific biotechnological processes

5. After studied unit-5, the student will be able to understand

- The applications of biotechnology in agriculture, medicine and food science.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- To study about the gene cloning techniques
- To learn the various type of restriction enzyme technology.
- To study the ligase linker and adaptors.
- To study the c DNA - transformation - Selection of recombinants.
- To understand the Gene probe - molecular finger printing (DNA finger printing), RFLP Techniques.
- To learn the genomic library.
- To learn the PCR blotting techniques.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To acquire the knowledge of Cloning Vectors such as bacterial plasmid vectors PBR 322 and PUL 19.
- To study the bacteriophage vectors – phage λ –phage m13 - cosmids – phagemids.
- To study Yeast plasmid vectors – y1p, yep – transposons – shuttle vectors.

Unit-3: (50 to 100 contents)

Teaching Hours:

- To understanding thoroughly the Animal biotechnology like In vitro fertilization (IVF) technology - Dolly - embryo transfer in human.
- To understand the human gene therapy, stem cell therapy and gene vaccines.
- To learn the legal and ethical issues in biotechnology.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To study the fermentation and bioreactor techniques.
- To understand the microbial product of Primary and Secondary Metabolites.
- To learn the Bio-polymers, Bio-pesticides and Bio-fertilizers.
- Attaining knowledge in Biological control – microbial inoculants.

Unit-5: (50 to 100 contents)

Teaching Hours:

- To understand the environmental and applications of biotechnology.
- To study the Bioremediation of hydrocarbons.
- To learn the Industrial wastes and Heavy metals.
- To study the Xenobiotics, bioleaching, biomining, biofuels.
- To learn the applications of biotechnology in agriculture, medicine and food science.
- To study the Genetically modified organism (GMO'S) - GM foods.
- To understand the Biotechnology & biosafety – IPR – Patent.

Text Books

1. Gupta, P.K. 2004. Biotechnology and Genomics. Rastogi Publications, Meerut.
2. R.C. Dubey 2001 A text book of biotechnology. Rajendra Ravindra Printer. New Delhi.
3. Chopra, V.L. and Nanin, A. 1992. Genetic Engineering and Biotechnology.
4. Oxford and I BH Publishing Co., New Delhi.

Reference Items: books, Journal

1. Purohit, S.S. and S.K. Mathur. 1999. Biotechnology Fundamentals and Application. Agro Botanica, New Delhi.
2. Alan Scragg. 1999. Environmental Biotechnology, Longman Publication.
3. T.A. Brown 2004 Gene cloning and DNA analysis. Blackwell Science, Osney Mead, Oxford.
4. Dawson, M.T., Powell, R., and Gannon, F. 1996. Gene Technology. Bios Scientific Publishers.
5. Marx, J.L. 1989 A Revolution in Biotechnology. Cambridge University, Press, Oxford.
6. Old, R.W. and Primrose, S.B. 1985 Principles of Gene Manipulations. An introduction to Genetic Engineering. Oxford Blackwell Publishers, London.
7. Winnacker, E.L. 2003. From Genes to Clones. Panima Publishing Corporation, New Delhi.
8. Das, H.K. 2004. Text Book of Biotechnology. Wiley Dreamtech India Pvt. Ltd., New Delhi.

E.Materials

- <https://www.ebooks.com/en-us/subjects/science-biotechnology-ebooks/114/>
- <https://library.umac.mo/ebooks/b2805507x.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: II

Paper code: DPZO26

Paper type: Core Practical 1

**Name of the Paper: LIFE AND DIVERSITY OF INVERTEBRATES
AND CHORDATES AND CELL AND MOLECULAR BIOLOGY**

Credit: 4

Total Hours per Week: 9

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INVERTEBRATA (Slides / Specimens / Xerox)

1. Identification and study of selected Protozoans and Helminthes of medical importance. (Any Two)
2. Identification and study of sections of available animals from Cnidaria, Aschelminthes and Annelida to understand the evolution of /different types of coelom.
3. Identification and study of larval forms from all major phyla of Invertebrates. (Any Four)
4. Identification and study of types minor phyla.
5. Identification and study of Invertebrate fossils
6. Dissection of digestive system of any insect, pila/sepia
7. Dissection of nervous system of Prawn, any insect, Pila/Sepia
8. Dissection of reproductive system of any insect.
9. Mounting of:
 - a. Appendages of Prawn
 - b. Radula of Pila
 - c. Sting of Honeybee
 - d. Pedicellaria of Sea urchin - Demonstration
 - e. Aristotle's lantern of sea urchin - Demonstration
10. Study of prepared slides of mouth part of Honey bee, Housefly, Mosquito, Bed bug and Butterfly to relate structure and function.

CHORDATA (Slides / Specimens / Xerox)

1. Study of the following specimen to bring out their affinities:
 - a. Amphioxus
 - b. Balanoglossus
 - c. Ascidian
 - d. Petromyzon
2. Study of the following specimens with reference to their adaptive features for their respective modes of life
 - a. Echinoids
 - b. Ichthyophis / Urotychophis

- c. Hyla
- d. Draco
- e. Pigeon
- f. Bat

3. Study of the following skull types with reference to jaw suspensions

- a. Fish
- b. Frog
- c. Calotes
- d. Snake
- e. Rat/Rabbit

4. Dissection of aortic arches in Teleost

5. Dissection and display of IXth and Xth Cranial nerves of cat fish

6. Demonstration of portal system of Rat

CELL AND MOLECULAR BIOLOGY

CYTOLOGICAL TECHNIQUES

Micrometry – measurements using ocular and stage micrometers – measurements of cell from any prepared slide. Vital staining – Buccal smear stained with Methylene blue. CHROMOSOME Chromosome preparation – procedure. Preparation of meiotic chromosomes from any fish – (demonstration) MOLECULAR BIOLOGY TECHNIQUES (Demonstration only) Centrifuge, Isolation of DNA from Liver – Isolation of RNA – Denaturation of DNA – measurement of spectrophotometry – Isolation and analysis of proteins – electrophoresis.

Semester: II

Paper code: DPZO27

Paper type: Core Practical 11

**Name of the Paper: GENETICS, ENVIRONMENTAL BIOLOGY
AND BIOTECHNOLOGY**

Credit: 4

Total Hours per Week: 10

GENETICS

1. Preparation of culture medium Culture of *Drosophila*. Methods of maintenance. Sex identification. Identification of four mutants.
2. Identification of blood groups A, B, ABO and Rh
3. Mounting of salivary glands of *Chironomus* larva. Analysis of banding pattern
4. Preparation of Buccal smear to show squamous epithelial cells.
5. Karyotyping using human metaphase chromosome plates (Giemsa stained). Identification of syndromes (Down, Klinefelter and Turner) from Karyotype Photographs showing clinical features of each syndrome case.
6. Problems relating to the application of binominal theorem in population genetics with reference to P.T.C. and Earlobe attachment.

ENVIRONMENTAL BIOLOGY

1. Estimation of Aquatic - Primary productivity - Dark and Light bottle.
2. Estimation of Dissolved oxygen, Salinity, Nitrites, Phosphates, Calcium, Silicates and Alkalinity in water samples.
3. Analysis of Industrial effluent - TDS, TSS, BOD, (COD - Demonstration).
4. Collection, isolation and identification of Plankton.
5. Study of sandy, muddy and rocky shore fauna with special reference to the adaptation to the environment.
6. Animal Association - parasitism, mutualism and commensalisms.
8. An educational tour to:-
 - a). Drinking water treatment plant.
 - b). Effluent treatment plant
 - c). Sewage treatment plant.
 - d). Sandy, Muddy and Rocky Shores.

BIOTECHNOLOGY

Visit to Biotechnology Laboratory to observe the demonstration of,

1. Tissue culture.
2. Titration and preparation of virulent phage.
3. Isolation of DNA from the plasmids.
4. Restriction enzymes digestion of DNA.
5. DNA electrophoresis in Agarose gel.

Necessary books may be referred to learn the techniques and to be recorded in the record Note books. Observation of photographs of different instruments used in Biotechnology, their principles and applications.

Semester: II
Paper code: DEZO24
Credit: 3

Paper type: Core Elective 2
Name of the Paper: A. ENDOCRINOLOGY
Total Hours per Week: 3

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(to Choose either A or B)

Course Objectives

- To understand the objectives of endocrinology. To study the comparative account and functions of endocrine glands of vertebrates Hormone receptors / receptor biology, Molecular biology, Hormonal assays

UNIT-I: Hormones and Hormone Action

Principles of Endocrinology - The endocrine patient - Principles of Hormone Action - Health Care Reform, Population Health, and the Endocrinologist - Laboratory Techniques for Recognition of Endocrine Disorders.

UNIT-II: Hypothalamus and Pituitary

Neuro-endocrinology and Disorders of the Neuro-hypophysis - Pituitary Physiology and Diagnostic Evaluation - Pituitary Masses and Tumors - Posterior Pituitary Gland.

UNIT-III: Thyroid

Thyroid Physiology and Diagnostic Evaluation of Patients with Thyroid Disorders - Hyperthyroid Disorders - Hypothyroidism and Thyroiditis - Nontoxic Diffuse Goiter, Nodular Thyroid Disorders, and Thyroid Malignancies - Sick euthyroid syndrome.

UNIT-IV: Reproduction

Endocrine changes in pregnancy - Endocrinology of fetal development - Normal and aberrant growth. Puberty, ontogeny, physiology disorders - Hormonal Contraception and fertility control - Testicular Disorders and male reproductive tract - Sexual Dysfunction in Men and Women - Menstrual Disorders and Pelvic Pain - The Menopause Transition and Postmenopausal Hormone Therapy - Hirsutism and Virilization - Gynecologic Malignancies.

UNIT-V: Polyendocrine and Neoplastic Disorders

Pediatric Disorders of Sex Development - Normal and Aberrant Growth in Children - Physiology and Disorders of Puberty - Hormones and Athletic Performance - Endocrinology and Aging - Multiple Endocrine Neoplasia. The Immunoendocrinopathy Syndromes - Endocrinology of HIV/AIDS - The Long - Term Endocrine Sequelae of Multimodality Cancer Therapy.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand

- Understanding the function of endocrine organs, metabolisms and their effects on their body.
- Knowledge the pharmacology and use of insulin.
- Understand the endocrine problems.

2. After studied unit-2, the student will be able to understand

- Ability to analyse the related to hormone
- Ability to analyse pituitary disorders.
- Learning the deficiency hypothalamus.

3. After studied unit-3, the student will be able to understand

- Learning and acquiring the
- Studying hypo and hyper thyroidism.
- Understanding the diagnosis of thyroid gland function.

4. After studied unit-4, the student will be able to understand

- Acquiring knowledge about reproduction system.
- Learning the reproduction anatomy of physiology.
- Acquire the knowledge of gonadal hormones of physiology.

5. After studied unit-5, the student will be able to understand list out major places.

- Enable them to understand child disorders.
- Learning the athletic performance by hormone test.
- Learning about different types of neoplasma and learn about multimodality cancer therapy.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- Learning the principles of Endocrinology.
- Studying the function of endocrine glands and vertebrate's hormones.
- Learning and acquiring knowledge of hormonal assay.

Unit-2: (50 to 100 contents)

Teaching Hours:

- Acquire knowledge of neuro endocrines.
- Function of hormone action and healthcare.
- Studying the recognition disorders.

Unit-3: (50 to 100 contents)

Teaching Hours:

- Understanding thoroughly the physiological function of thyroid gland.
- Deficiencies of thyroid disorders.
- Learning the cancer tissues of thyroid.

Unit-4: (50 to 100 contents)

Teaching Hours:

- Study the reproductive biology of embryo.
- Attaining knowledge in fertility control and male and female disorder.

Unit-5: (50 to 100 contents)

Teaching Hours:

- Study the Pediatric disorders.
- Learning natural and absent growth in children.
- Understanding the knowledge of immune endocrinopathy syndromes.

Text Books

1. Barington (1979) Hormones and evolution Vol I&II Academic press, New York.
2. John F- Laycock and Peter H. Wise, Essential of Endocrinology
3. Wiliaimas R.H.(1974). Textbook of Endocrinology V.Ed. Saunders Press, London.
4. Endocrinology- Hadley
5. General endocrinology Bagrara and Tumer, W.B. Saunders.
6. The Physiology of Reproduction, Vol I& II E.K.Nobil and JU. D.Neil, Raven Press, New York, 1988.
7. Benjamin Levin-Gene VII, Oxford University Press.
8. Lodish et al Molecular Cell Biology

Reference Items: books, Journal

1. Haris, G.W. and B.T. Donovan. 1968. The Pituitary Gland. S. Chand and Co.,
2. Bentley, P.J. 1985. Comparative vertebrate endocrinology, Second Edition, Cambridge University Press. Cambridge.
3. Mac Hadley. 1992. Endocrinology, 3rd Edition. Prentice - Hall Inc. A Simon & Schuster Company, Englewood Cliffs, New Jersey. USA.
4. Ingleton, P.M. and J.T. Bangara. 1986. Fundamentals of comparative vertebrate endocrinology, Kluwer Academic Publishers.
5. Turner, C.D. and J.T. Bangara. 1986. General endocrinology. Saunders International Student edition. Toppan Company Limited. Tokyo.
6. Barrington, E.J.W. 1985. An introduction to general and comparative endocrinology. Claredon Press Oxford.

E-Materials

- <https://www.ebooks.com/en-us/subjects/medicine-endocrinology-metabolism-ebooks/1069/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: II
Paper code: DEZO24
Credit: 3

Paper type: Core Elective 2
Name of the Paper: B. BIOCHEMISTRY
Total Hours per Week: 3

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UNIT-I:

WATER AND ANALYTICAL BIOCHEMISTRY

Water - Biological importance, pH and Acid - Base balance. Henderson Hasselbach equation. Buffers - Biological importance. Acidosis, Alkalosis. Electrolyte and water balance - Regulation of electrolyte content of body fluids and maintenance of pH, reabsorption of electrolytes. Collection and processing of blood and urine samples, Anticoagulants, Preservative for blood and urine, Transport of biological samples.

UNIT-II:

BIOMOLECULES

Digestion of dietary proteins; Absorption of amino acids; General reactions in the degradation of amino acids; Deamination and transamination reactions; Urea cycle; Glucogenic and ketogenic amino acids; Fate of the carbon skeleton of individual amino acids; Carbohydrate metabolism- Introduction - Normal, fasting and post prandial level, maintenance of blood glucose concentration-hypo and hyperglycemia, renal threshold value. Diabetes Mellitus: types, clinical features, metabolic defects, complications, GTT, galactosemia, fructosuria, glycogen storage diseases. Protein - structure, classification, Properties of protein and biological significance. variation of plasma and serum protein; Clinical features of phenylketonuria, alkaptonuria, albinism and tyrosinosis; Disorders in urea cycle. Lipids - hyper triacylglyceridemia, hypo and hyperlipoproteinemia; Atherosclerosis - clinical features and complications; Lipid storage disease, fatty liver.

UNIT-III:

BIOENERGETICS

Bioenergetics: Laws of thermodynamics; Concept of free energy, and standard free energy change; Determination of free energy change for a reaction; Equilibrium constant and standard free energy change; Biological oxidation-reduction reactions; Standard reduction potential and its relationship with free energy change. Metabolic pathways: Characteristics of metabolic pathways; Strategies used to study metabolic pathways. High energy compounds: ATP as universal energy currency in biological systems; Processes that generate and utilize ATP in the cell; other high-energy compounds; Role of NADH and NADPH in metabolism. Carbohydrate - structure, classification and biological significance. Lipid - Structure classification and biological significance. METABOLISM 1. Glycogenesis, 2. Glycogenolysis, 3. Glyconeogenesis, 4. Glycolysis, 5. Hexose mono phosphate shunt. Biosynthesis and Oxidation of Fatty Acids. Energetics.

UNIT-IV:

HORMONES/ SIGNALING MOLECULES

General characteristics of hormones and other signaling molecules; Classification - Steroid Hormones, Protein Hormones, Tissue Hormones, functions, Vasoactive Peptide Synthetic Hormones, mechanism of action and abnormalities of the hormones of thyroid, pancreas, hypothalamus, pituitary and gonads; Hormone replacement therapy; Plant hormones with specific reference to Auxins; Pheromones: types and functions.

UNIT-V:**VITAMINS AND CLINICAL BIOCHEMISTRY**

Water and Lipid Soluble Vitamins - structure, classification, sources and deficiencies. Biochemical functions, requirements and deficiency diseases associated with vitamin B complex, C and A, D, E & K vitamins in man. Disorders of Carbohydrate Metabolism, Lipids – Digestive diseases – Maldigestion, malabsorption, creatorrhoea, diarrhoea and steatorrhoea. Disorders of liver and kidney – Jaundice, fatty liver, normal and abnormal functions of liver and kidney. Inulin and urea clearance. Abnormalities in Nitrogen Metabolism - Blood Clotting: Disturbances in blood clotting mechanisms – haemorrhagic disorders – haemophilia, Von Willebrand's disease, purpura, Rendu-Osler-Werber disease, thrombotic thrombocytopenic purpura, disseminated intravascular coagulation, acquired prothrombin complex disorders, circulating anticoagulants. Cancer – Cellular differentiation, carcinogens and cancer therapy.

Course Out Comes (five outcomes for each units should be mentioned)**1. After studied unit-1, the student will be able to**

- Analyse buffer, electrolytes, and water balance.
- Student acquire knowledge to the experiments on blood and urine samples.
- Describe the transport of biological samples.

2. After studied unit-2, the student will be able to

- Describe the digestion of protein, absorption, degradation of aminoacids.
- Students can understand the deamination and transamination reactions.
- Student will use current biochemical techniques to plan and molecular techniques.

3. After studied unit-3, the student will be

- Exposed to wide range carries that combine biology and medicine.
- Student learn the biological significance of how macro molecules broken down into micro molecules.

4. After studied unit-4, the student will be able to understand

- Students were aware of tissues hormones and Synthetic hormones.

5. After studied unit-5, the student will be able to soluble vitamins.

- Student can be able to understand the disorders of carbohydrates metabolisms.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- Understand the chemistry of water.
- Describe the chemistry of enzymes.
- Describe the classification of organization of proteins.

Unit-2: (50 to 100 contents)

Teaching Hours:

- Understanding of fundamental biochemical principles, functions of biomolecules, metabolic pathways.
- Learning the regulation of biological and biochemical process.

Unit-3: (50 to 100 contents)

Teaching Hours:

- To understand the properties of carbohydrates, proteins, lipids, cholesterol, DNA, RNA, and their Biological importance.
- To learn understand concept and mechanisms of ATP Synthesis.

Unit-4: (50 to 100 contents)

Teaching Hours:

- Learning different types of Hormones.
- Studying the structure of endocrine glands.
- Acquire knowledge of plant hormones and pheromons.

Unit-5: (50 to 100 contents)

Teaching Hours:

- Learn the biochemical changes, deficiency disorders.
- Study the blood clotting mechanisms.
- Learn and study the digestive disease of liver and Kidney.

Text Books

1. Practical Clinical Biochemistry- Harold Varley, Fifth edition, CBS Publication and Distributors, New Delhi.
2. Medical Biochemistry- Dr. M.N. Chatterjee III Edition, 1998 JAYPEE BROTHERS, Medica publishers (p) LTD, New Delhi.
3. Essentials of Medical Physiology 7th Edition 2016 by K Sembulingam Prema Sembulingam.
4. Biophysical chemistry- Principles and techniques- Upadhyay, Upadhyay and Nath Himalaya publication house Mumbai.

Reference Items: books, Journal

1. Textbook of Biochemistry for Medical Students by Vasudevan DM.
2. Murray, R. K, Granner, D.K. Maynes, P.A and Rodwell, V. W. 1998. Harper's Biochemistry. 25th Edition. McGraw Hill, New York.
3. Hames, B. D., Hoopa, N.M and Houghton, J.D. 1998. Instant notes in Biochemistry. Viva Books Pvt. Ltd. New Delhi.
4. Jain, J. L. Jain, S. and Jain N. 2005. Fundamental of Biochemistry, S. Chandra & Co. Ltd. New Delhi.
5. Vasudevan, D.M. and Sreekumar. S. 2000. Text of Biochemistry for Medical students. Jaypee Brothers, Medical Publishers (P) Ltd. New Delhi.
6. Rama Rao, A.V.S.S. 1986. Text Book of Biochemistry. L.K. & S Publishers. A.P.
7. Ambika, S. 1990. Fundamentals of Biochemistry for Medical Students, Published by the author. Lehninger, A.L. 2004. Principles of Biochemistry. CBS Publishers, New Delhi.
8. Zubay, G.1989. Biochemistry. McMillan Publishing Co., New York.
9. Voet, D and Voet, J.G. 2004. Biochemistry. John Wiley and Sons, Inc.
10. Physical chemistry- Puri and Sharma, Pathania Vishal Publication and Co., Jalandhar.

E-Materials

- <https://www.ebooks.com/en-us/subjects/science-biochemistry-ebooks/645/>
- <https://www.e-booksdirectory.com/listing.php?category=8>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: II
Paper code: DOZO25
Credit: 3

Paper type: Open Elective (Non Major) 2
Name of the Paper: A. VERMICULTURE
Total Hours per Week: 3

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(to Choose either A or B)

Course Objectives

- 1.To acquire knowledge of vermiculture
- 2.To get the thorough knowledge of making vermicompost and vermiculture
3. To create self-employment opportunity.

UNIT I

Earthworm taxonomy – Morphological and anatomical – Classification of earthworms – Food habits – Digestive system – Excretion – Reproduction and Life cycle – Earthworm as farmer's friend.

UNIT II

Types of earthworm – Exotic and native species – South Indian and North Indian species used in Vermicomposting – Collection and Preservation of earthworms for vermicomposting – Culture techniques of earthworms – monoculture and polyculture techniques, factors affecting vermicomposting – pH, moisture, temperature etc.

UNIT III

Vermicompost production – Requirements – Different methods of Vermicomposting – Heap method – Pot method and Tray method – types of vermicomposting materials – general procedures in home – maintenance of vermicomposting beds – harvesting the worms – earthworm predators, parasites and pathogens.

UNIT IV

Role of Earthworms in soil fertility – Use of Vermicompost for crop production – Use of earthworms in land improvement and land reclamation – Economics of Vermicompost and vermishash production. Earthworms as animal feed – Medicinal value of earthworm meal – Role of Earthworms in Solid Waste, Sewage waste management and Vermifilters. Earthworms as bioreactors.

UNIT V

Interaction of earthworms with other organisms – Influence of chemical inputs on earthworm activities – Large scale manufacture of Vermicompost, packaging of vermicompost and its marketing – Financial supporting – Government and NGOs for vermiculture work

Course Out Comes (five outcomes for each units should be mentioned)

1.After studied unit-1, the student will be able to

- Understand the worm forming in modern forming.
- Understand potential vermin compost as an alternative to chemical fertilizer.
- Acquire knowledge about the maintaining health of soil and humans.

2. After studied unit-2, the student will be able to

- Understand a important role in Economics.
- Understand the role of vermiculture in protecting the environment.
- Student can learn and get the knowledge of composting.

3. After studied unit-3, the student will be

- By using vermicompost in their field can increase the crop yield.
- Student residing near by the cities using vermicompost used in small scale for garden.
- By propagating vermicomposting.

4. After studied unit-4, the student will be

- The student enables to generate income by supplying worms, vermiculture and vermicompost.
- By developing propagating vermicomposting technology to prevent environmental pollution.
- Learn towards organic farming and healthy food.

5. After studied unit-5, the student will be

- To study the interaction of earthworm in the organisms.
- To learn the production of vermicompost for Agriculture.
- To understand the financial support of the Governments.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)**Teaching Hours:**

- To understand the Earthworm taxonomy.
- To learn the classification of Earthworms.

Unit-2: (50 to 100 contents)**Teaching Hours:**

- To study the types of Earthworm species.
- Acquire knowledge in collection and preservation and cultural techniques.
- To learn the factors affecting the vermicomposting.

Unit-3: (50 to 100 contents)**Teaching Hours:**

- Study the methods of vermicomposting.
- Study the equipments of materials for compost materials.
- To study the earth worm predators, parasites and pathogens.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To study the role of earthworms in soils.
- To learn the land improvement techniques.
- To know the medicinal value of earthworms.
- Study the role of earthworm in sewage waste management and vermifilters.

Unit-5: (50 to 100 contents)

Teaching Hours:

- Understanding the role of worms in modern farming.
- To understand the potential of vermicompost as an alternative to chemical fertilizer.
- To understanding the Economical value of vermicompost techniques and Financial support by governments.

Text Books

1. Edwards CA & Bater JE. 1977. Biology of Earthworms. Chapman & Hall.2.Edwards CA. 1998. Earthworm Ecology. CRC Press.
2. Sultan A Ismail. 1997. Vermicology-the Biology of Earthworms. Orient Longman.
3. Earthworm in Agriculture – S.C. Talashikar and Dosani, Agrobios Publications, Near Nasarani Cinema, Jodhpur, 342 002.
4. Vermicompost for sustainable Agriculture – P.K. Gupta Agrobios 2nd Edition.

Reference Items: books, Journal

1. Edwards CA & Bater JE. 1977. Biology of Earthworms. Chapman & Hall.
2. Edwards CA. 1998. Earthworm Ecology. CRC Press.
3. Sultan A Ismail. 1997. Vermicology-the Biology of Earthworms. Orient Longman.
4. Earthworm in Agriculture – S.C. Talashikar and Dosani, Agrobios Publications, Near Nasarani Cinema, Jodhpur, 342 002.
5. Vermicompost for sustainable Agriculture – P.K. Gupta Agrobios 2nd Edition.
6. Earthworm ecology – Clive A. Edwards St. Lucie press – CRC Press Washington DC.
7. Biology of Earthworm - Edward and Lofti – Chapman and Hall Publication.

E-Materials

- <http://www.vermico.com/ebooks/>
- https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/E-Learning/Moocs/Solid_Waste/W4/Manual_On_Farm_Vermicomposting_Vermiculture.pdf
- <https://www.kobo.com/us/en/ebook/compost-vermicompost-and-compost-tea>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: II

Paper code: DOZO25

Credit: 3

Paper type: Open Elective (Non Major) 2

Name of the Paper: B. WILDLIFE MANAGEMENT & CONSERVATION

Total Hours per Week: 3

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Course Objectives

- The Course is framed to train the student about various wildlife techniques.
- To train the students to find job opportunities as biologists in reserves.

Unit I

Introduction to Wildlife

Scope and opportunities of Wildlife Sciences – Major types of forest types of India -Protected areas – Sanctuaries - National Parks – Tiger reserves – Biosphere Reserves and their role.

Unit II

Wildlife Conservation

IUCN Red Data list – CITES – Endangered Mammals of India & Conservation – Project Tiger & Project Elephant. Conservation of Indian rhino, lion & Thar. Importance of Zoo in Conservation

Unit III Ornithology

Terms used in description of Birds Plumage & parts – Types of Bills – Types of feet – Identification of birds in the field based on tail, bill, crest, leg & colour.

Unit IV

Indian Butterflies

Butterflies & Moths – Identification of types of Swallowtails: Club tails – Roses – Bird wings – Mime – Mormon – Raven - Helen - peacock – Jay – Blue bottles – Sword tails – Zebra. Whites, sulfurs and orange-tips.

Unit V

Important Reserves

History, Location, Habitats, Fauna and importance of Mudumalai Tiger Reserve – Sathyamangalam Tiger Reserve – Kalakkad Mundanthurai Tiger Reserve – Anamalai Tiger Reserve – Gulf of Mannar.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- Understand the factors affecting the need to find sustainable practices for producing food.
- How the environment influences plant growth and crop field?
- Learn to modify soil structure and drainage to reduce erosion to reduce the soil erosion.

2. After studied unit-2, the student will be able to

- Students can evaluate the current status of endangered mammals.
- Students learn the information of project tiger and project elephant.
- Apply knowledge to solve problems related to wildlife conservation.

3. After studied unit-3, the student will be able to

- Identify species, characteristics, habited requirement and life cycle of bird.
- Learn how wildlife conservation and management relates to economy both currently and in future.
- Understand the structure and types of plumage.

4. After studied unit-4, the student will be able to

- Identify the types of butterflies.
- Identify the types of moths.

5. After studied unit-5, the student will be able to

- Gain awareness and understanding of international forestry.
- Develop skills geographical analysis, basic surviving, mapping.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- Develop the knowledge of Ecology.
- Develop skill basis, Geological analysis and basic surviving.
- Understanding of forestry.

Unit-2: (50 to 100 contents)

Teaching Hours:

- Understand the IUCN data list.
- Understand the conservation of endangered mammal.
- Learn the importance of zoo in conservation.

Unit-3: (50 to 100 contents)

Teaching Hours:

- Description of bird plumage and parts.
- Learning of types of bills and types of feet.
- Identify the birds based on tail, bill and crest.

Unit-4: (50 to 100 contents)

Teaching Hours:

- Studying the type and characteristics of butterflies.
- Learning the structure and varieties of Indian butterflies

Unit-5: (50 to 100 contents)

Teaching Hours:

- To learn the habitats and importance of tiger reserve.
- Learn the forest management related to economy and environment.

Text Books

1. Ali S, Ripley SD. Handbook of the birds of India and Pakistan. Compact edition. Oxford University Press and BNHS, Mumbai. Ali, S. and SD Ripley.
2. Caughley G, Sinclair AR. Wildlife ecology and management. Blackwell Science.
3. Divan S, Rosencranz A. Environmental law and policy in India: Cases, materials and statutes. New Delhi: Oxford University Press.
4. Kehimkar ID. Book of Indian butterflies. Oxford University Press; 2008.
5. Prater SH, Barruel P. The book of Indian animals. Bombay: Bombay Natural History Society.

Reference Items: books, Journal

1. Ali S, Ripley SD. Handbook of the birds of India and Pakistan. Compact edition. Oxford University Press and BNHS, Mumbai. Ali, S. and SD Ripley.
2. Caughley G, Sinclair AR. Wildlife ecology and management. Blackwell Science.
3. Divan S, Rosencranz A. Environmental law and policy in India: Cases, materials and statutes. New Delhi: Oxford University Press.
4. Kehimkar ID. Book of Indian butterflies. Oxford University Press; 2008.
5. Prater SH, Barruel P. The book of Indian animals. Bombay: Bombay Natural History Society.
6. Sale JB, Berkmüller K. Manual of wildlife techniques for India.

E- Materials

- https://moodle.ufsc.br/pluginfile.php/822773/mod_resource/content/1/Wildlife%20Ecology%20and%20Conservation%20and%20Management%20-%20A.%20R.E.%20Sinclair%20J.%20M.%20Fryxell%20G.%20Caughley%20-%20Blackwell%20Publishing.pdf
- https://nndfw.org/Summit%20Presentations%202015/Intro%20to%20wildlife%20management_CSmith.pdf
- <http://ifs.nic.in/Dynamic/book/page7.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: III
Paper code: DZO31
Credit: 3

Paper type: Core Paper 7
Name of the Paper: ANIMAL PHYSIOLOGY
Total Hours per Week: 4

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Course Objectives

1. To acquire knowledge on different organs, organ system in detail
2. To gain knowledge about functional system.
3. To understand about nutrient.
4. To understand the function of Heart, Heart muscle and Heart beat and its function

UNIT-I: NUTRITION

Nutrition - nutrients - digestion and absorption of proteins, carbohydrates and lipids. Role of gastrointestinal hormones in digestion. Essential Basal Metabolic Rate (BMR).

UNIT-II: RESPIRATION AND CIRCULATION

Physiology of respiration in Man. Respiratory Pigments, nervous and chemical control of respiration.

Circulation - types of hearts - physiology of cardiac muscle - heart beat and its regulation – Hemopoiesis, Blood coagulation.

UNIT-III: EXCRETION AND OSMOREGULATION

Excretion – Renal excretion in vertebrates - physiology of excretion in Man.

Osmotic and Ionic regulation in brackish water and fresh water animals (Fishes and Amphibians). Regulation of body fluids in Terrestrial animals (Crustaceans, Gastropods and Annelids).

UNIT-IV: ANIMAL AND REPRODUCTION

Neuro muscular co-ordination - types of neurons, transmissions of nerve impulse and reflex action. Chemical composition of muscle fiber and physiology of muscle contraction. Myoneural Junction. Endocrine glands in mammals. Physiology of mammalian reproduction - reproductive cycle - hormonal control of reproduction.

UNIT-V: BEHAVIOURAL PHYSIOLOGY

Bioluminescence - chemistry and functional significance. Behaviour (types - tropism, taxis, kinesis, reflex, learning). Temperature regulation: Poikilotherms, homeotherms and heterotherms - hibernation, aestivation - diapause.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be

- Able to understand clearly about the nutrient materials.
- Able to understand clearly about digestion.
- Able to understand clearly about absorption of proteins
- Able to understand clearly about carbohydrates and lipids
- Able to understand gastro intestinal hormones in digestion

2. After studied unit-2, the student will be

- Able to understand clearly about physiology of respiration.
- Able to understand clearly about respiratory pigments.
- Able to understand clearly about nervous, chemical and BMR
- Able to understand types of Heart, Heart beat in vertebrates
- Able to understand clearly about blood coagulation and theories.

3. After studied unit-3, the student will be

- Able to understand about excretion.
- Able to understand about metabolic waste products.
- Able to understand about metabolic waste products in relation to environment
- Able to understand osmoionic regulation in invertebrates and vertebrates.
- Able to understand clearly about physiology of excretion of man.

4. After studied unit-4, the student will be

- Able to understand about neuromuscular coordination.
- Able to understand about types of neuron, transmission of nerve impulse and reflex action.
- Able to understand about muscle fiber and physiology of muscle contraction.
- Able to understand about endocrine glands in mammals.
- Able to understand about physiology of mammalian reproduction and hormonal control of reproduction.

5. After studied unit-5, the student will be

- Able to understand bioluminescence.
- Able to understand the functional importance.
- Able to understand the different types of behavior.
- Able to understand the trophism, taxis, kinesis, reflex, learning.
- Able to understand poikilotherms, homeotherms and heterotherms.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)**Teaching Hours:**

- To know about nutritional values.
- To understand different types of digestion.
- To know about absorption of proteins.
- To know about absorption of carbohydrates.
- To know about different gastro intestinal hormones.
- To know about role of hormones in digestion.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To understand clearly about physiology of respiration in man.
- To understand different respiratory pigments.
- To know about nervous control of respiration.
- To know about chemical control of respiration.
- To know about types of Heart, Heart beats and its regulation
- To gain knowledge about blood coagulation

Unit-3: (50 to 100 contents)

Teaching Hours:

- To gain knowledge about physiology of excretion in man
- To know about the metabolic waste products in relation to the environment.
- To know about osmoionic regulation in invertebrates
- To understand about osmoionic regulation in vertebrates.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To know about neuromuscular coordination.
- Types of neurons
- To understand about nerve impulse and reflex action
- To know about chemical composition of muscle fiber.
- To know about physiology of muscle contraction.
- To know about myoneural junction.
- To know about endocrine glands in mammals.
- To know about physiology of mammalian reproduction.
- To understand about hormonal control of reproduction

Unit-5: (50 to 100 contents)

Teaching Hours:

- To know about bioluminescence.
- To know about different behaviours of trophism, taxis, kinesis, reflex, learning.
- To know about poikilotherms, homeotherms, hibernation, aestivation and diapause.

Text Books

1. Herkat, P.C. and Mathur, P.N. 1976. Text Book of Animal Physiology. S. Chand Co. Pvt, Ltd., New Delhi.
2. Agarwal, R.A, Anil K. Srinvastava and Kaushal Kumar, 1998. Animal Physiology and Biochemistry, S. Chand and Company Ltd, New Delhi.
3. Parameswaran, R, Ananthakrishnan, T.N, and Ananthasubramanian, K.S. 1998. Outlines of Animal Physiology, S. Viswanathan (Printers and Publishers) Pvt. Ltd.

Reference Items: books, Journal

1. Hoar, W.S. 1991. General and Comparative Physiology. Prentice Hall of India, New Delhi.
2. Prosser, C.L. 1973. Comparative Animal Physiology, 3rd edn. W.B. Saunders & Co., Philadelphia.
3. Barrington, E.J.W. 1975. An Introduction to General and Comparative Endocrinology. Clarendon Press, Oxford
4. Bentley, P.J. 1971. Endocrine and osmoregulation, Springer Verlag, New York.

5. Palmen, J.D. Brown, I.R and Hastings, J.W. 1970. Biological clocks, Academic Press, London.
6. Welson, A. 1979. Principles of Animal Physiology. McMillan Publishing Co. Inc. New York.
7. Schmidt Nilssen, K. 1985. Animal Physiology. Adaptation and Environment Club, London.
8. Herkat, P.C. and Mathur, P.N. 1976. Text Book of Animal Physiology. S.Chand Co. Pvt, Ltd., New Delhi.
9. Sobti, R.C. 2008. Animal Physiology, Narosa Publishing Home, New Delhi.
10. Parameswaran, R, Ananthakrishnan, T.N, and Ananthasubramanian, K.S. 1998. Outlines of Animal Physiology, S. Viswanathan (Printers and Publishers) Pvt. Ltd.
11. Agarwal, R.A, Anil K. Srinivastava and Kaushal Kumar, 1998. Animal Physiology and Biochemistry, S. Chand and Company Ltd, New Delhi.

E- Materials

- https://www.researchgate.net/publication/286456096_DrPBReddy's_TEXT_BOOK_OF_ANIMAL_PHYSIOLOGY
- https://craftx.org/sites/all/themes/craft_blue/pdf/Anatomy_and_Physiology_of_Animals.pdf
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1328089/>
- <http://www.freebookcentre.net/biology-books-download/ANIMAL-PHYSIOLOGY.html>
- <https://archive.org/details/cu31924000353601>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: III
Paper code: DZO32
Credit: 3

Paper type: Core Paper 8
Name of the Paper: DEVELOPMENTAL BIOLOGY
Total Hours per Week: 4

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Course Objectives

1. To gain knowledge about developmental stages in experimental aspects.
2. To know the role of organisers.
3. To acquire the knowledge of interaction in tissues.
4. To understand the development of Heart and Kidney in different mammals.
5. To know the genes and development under the process of differentiation.

UNIT-I: EARLY DEVELOPMENT

Gastrulation – Gastrulation in Amphioxus, Amphibians, Birds and Mammals – Morphogenetic movements – Chemical changes during gastrulation – Significance of gastrulation.

UNIT-II: ORGANOGENESIS

Development of Heart and Kidney – Differentiation – types of differentiation, Differentiation effected in the genome, Organizer, Inductive tissue interaction in developments.

UNIT-III: NUCLEOCYTOPLASMIC INTERACTION, NUCLEAR TRANSPLANTATION AND REGENERATION

Transplantation – Cytoplasmic influence of Nucleus – Nuclear transplantation experiments in Amphibians. Regeneration in invertebrates and vertebrates.

UNIT-IV: REGULATION OF DEVELOPMENT

Metamorphosis - morphological and biochemical changes during amphibian metamorphosis. Hormonal control of metamorphosis in amphibians - Neuro endocrine control of insect metamorphosis - Biochemistry and mechanism of action of hormones during metamorphosis.

UNIT-V: EMBRYONIC NUTRITION

Nutritional requirements of Embryo- modes of embryonic nutrition –Food reserve and embryonic nutrition- embryonic nutrition from mother –physiology of placenta.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be

- Able to understand clearly about the different developmental stages.
- Able to understand gastrulation movements on the egg cortex.
- Able to understand cell communication.
- Able to understand chemotactic induced aggregation in sponges.
- Able to understand clearly development of echinoderms, amphibians and birds.

2. After studied unit-2, the student will be

- Able to understand Organ rudiments
- Able to understand development of Heart
- Able to understand development of Kidney in different mammals.
- Able to understand about organiser.
- Able to understand about tissue interactions in development

3. After studied unit-3, the student will be

- Able to understand nuclear transplantation in amphibians.
- Able to understand the results at the end of nuclear transplantation experiments.
- Able to understand role of genome in the transcription and translation levels.
- Able to understand genetic defects.
- Able to understand role of cell death during development.

4. After studied unit-4, the student will be

- Able to understand metamorphic changes.
- Able to understand metamorphic changes in amphibians
- Able to understand insect metamorphosis.
- Able to understand biochemistry of metamorphosis.
- Able to understand hormonal action during metamorphosis.

5. After studied unit-5, the student will be

- Able to understand nutritional requirements of embryo.
- Able to understand modes of embryonic nutrition.
- Able to understand transfer of food preserve from mother to embryo.
- Able to understand physiology of placenta.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)**Teaching Hours:**

- Knowing the details of gastrulation
- Movement of cells on the surface egg cortex
- Chemotactic induced aggregation in sponges.
- Experimental analysis in the early development of echinoderms, amphibians and birds.

Unit-2: (50 to 100 contents)

Teaching Hours:

- Formation of organ rudiments.
- To know about differentiation.
- Development of Heart and Kidney in different mammals.
- Tissue interaction in developments.

Unit-3: (50 to 100 contents)

Teaching Hours:

- Nuclear transplantation.
- Cellular differentiation and protein synthesis.
- Differential activation.
- Genetic defects
- Role of cell death in development.

Unit-4: (50 to 100 contents)

Teaching Hours:

- Different morphological and biochemical changes during amphibian metamorphosis
- Hormonal control in amphibians.
- Neuro endocrine control of insect metamorphosis.
- Mechanism of hormones during metamorphosis.

Unit-5: (50 to 100 contents)

Teaching Hours:

- Different nutritional requirements of embryo.
- Different modes of embryonic nutrition.
- Food preserve and embryonic nutrition.
- Physiology of placenta.

Text Books

1. Majumdar, N.M. 1988. Text Book of Vertebrate Embryology, Tata Mc-Graw – Hill Publishing Company, Ltd, New Delhi.
2. Veer Bala Rastogi and Jayaraj, M.S. 1992. Developmental Biology, Kedar Nath Ram Nath, Meerut, New Delhi.
3. Majumdar, N.M. 1988. Text Book of Vertebrate Embryology, Tata Mc-Graw – Hill Publishing Company, Ltd, New Delhi.
4. Majumdar, N.M. 1988. Text Book of Vertebrate Embryology, Tata Mc-Graw – Hill Publishing Company, Ltd, New Delhi.

Reference Items: books, Journal

1. Balinsky, B.I.1981 An Introduction to Embryology. W.B Saunders Co., Philadelphia.
2. Karp,G. and Berrill,N.J.1981. Development. McGraw Hill, New York.
3. Saunders, J.W.1982. Developmental Biology. MacMillan Co., London.
4. Nagabhushanam,R. and Sarojini,R.2002 Invertebrate Embryology. Oxford and IBA Publishing Co.
5. Tyagi,Rajiv and Shukla,A.N.2002. Development of Fishes. Jaya Publishing House, New Delhi.
6. Browder, W.1984.Developmental Physiology. Saunders College Publishing, Rinchert and Winston.
7. Gilbert, S.F.2003.Developmental Biology. Sinamer Associates Inc. Saunderland, Massachusetts, U.S.A.

8. Oppenheimer, S.B.1980.Introduction to Embryonic Development. Allyn and Bacon,Inc. U.S.A.
9. Mitra, S.1994. Genetics, A Blueprint of Life. Tata McGraw - Hill Publishing Company Ltd., New Delhi.
10. Veer Bala Rastogi and Jayaraj, M.S. 1992. Developmental Biology, Kedar Nath Ram Nath, Meerut, New Delhi.
11. Majumdar, N.M. 1988. Text Book of Vertebrate Embryology, Tata Mc-Graw – Hill Publishing Company, Ltd, New Delhi.

E- Materials

- <https://epdf.pub/developmental-biology-9th-edition.html>
- <https://www.freebookcentre.net/Biology/Developmental-Biology-Books.html>
- http://www.freebookcentre.net/medical_books_download/Developmental-Biology-Scott-F.-Gilbert.html
- <https://www.ncbi.nlm.nih.gov/books/NBK9983/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: III
Paper code: DZO33
Credit: 3

Paper type: Core Paper 9
Name of the Paper: IMMUNOLOGY
Total Hours per Week: 4

Course Objectives

1. To Understand the Structural and functional basis of immunology and immune system.
2. To understand the mechanism of antigen-antibody reaction
3. To understand the organization and expression of immunoglobulin genes
4. To understand the B - cell receptors and T – cell receptors
5. To understand the Tumour Immunology
6. To understand the Transplantation immunology

UNIT-I: IMMUNE BIOLOGY

Immunity - Major Targets of Defence system, Types of Immunity, cellular constituents of the lympho reticular system-phagocytic cells-polymorpho nuclear neutrophils, mono nuclear phagocytes stem cells, eosinophils and lymphocytes. Lymphoid organs and Antigens.

UNIT-II: IMMUNOGLOBULINS

Immunoglobulins-structure, Properties, Function and Classes of Immunoglobulin, Isotypes and biological function. Antigenic determinant on immunoglobulin-isotype, allotype and idio type. Immunoglobulin superfamily, monoclonal and polyconal antibodies. organization and expression of immunoglobulin genes. Synthesis of immunoglobulin and disorders of immunoglobulin synthesis.

UNIT-III: DETECTION AND APPLICATION OF ANITGEN AND ANTIBODY REACTION

Antigen-antibody reaction – Precipitation – Agglutination – Cytolysis – Complement Fixation – Flocculation – Opsonization _ Immuno assay using labelled reagents – Harmful effects of Antigen – Antibody reactions.

UNIT-IV: MECHANISM OF IMMUNE SYSTEM

Antigen-antibody interaction, MHC- Major Histocompatibility Complex, Function, Restriction Organization and Inheritance of MHC, Antigen processing and presentation HLA, Genetics of HLA. B - cell receptors, T – cell receptors, Cytokine, Adhesion molecules, Hypersensitivity reaction and Anaphylaxis – Tumour Immunology – Tumour Antigens, Immunotheraphy of Tumour.

UNIT-V: TRANSPLANTATION IMMUNOLOGY

Transplantation immunology. Types of Graft, Graft acceptance and rejection. Immuno deficiency diseases. Immuno prophylaxis. Immuno techniques. Immuno haematology. Biosynthesis of Antibody.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand

- Major targets of defence system.
- Phagocytic cells.
- Polymorpho nuclear neutrophils.
- Lymphoid organs.
- Antigens.

2. After studied unit-2, the student will be able to understand

- Immunoglobulins.
- Antigenic determinant.
- Isotopes and biological function.
- Monoclonal and polyconal antibodies.
- Immunoglobulin and disorders.

3. After studied unit-3, the student will be able to understand

- Antigen-antibody reaction.
- Cytolysis.
- Complement fixation.
- Immuno assay.
- Harmful effects of antigen.

4. After studied unit-4, the student will be able to understand

- Antigen-antibody interaction.
- Major Histocompatibility Complex.
- Genetics of HLA.
- Hypersensitivity.
- Tumour Immunology.

5. After studied unit-5, the student will be able to understand

- Transplantation immunology.
- Graft acceptance and rejection.
- Immuno deficiency.
- Immuno techniques.
- Biosynthesis of Antibody.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)**Teaching Hours:**

- To study and learn the Immunity, Major targets of defence system, types of Immunity, cellular constituents of the lympho reticular system-phagocytic
- To understand the cells-polymorpho nuclear neutrophils, mono nuclear phagocytes stem cells, eosinophils and lymphocytes.
- To acquire the knowledge of Lymphoid organs and Antigens.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To understand the Immunoglobulins-structure, Properties, and function and Classes of Immunoglobulin, and isotypes and biological function.
- To learn and understand the antigenic determinant on immunoglobulin-isotype, allotype and idiotype.
- To describe the Immunoglobulin superfamily, monoclonal and polyclonal antibodies.
- To understand the organization and expression of immunoglobulin genes.
- To study the synthesis of immunoglobulin and disorders of immunoglobulin synthesis.

Unit-3: (50 to 100 contents)

Teaching Hours:

- To learn and understand the antigen-antibody reaction, precipitation, agglutination, cytolysis and complement Fixation.
- To study the flocculation, opsonization.
- To learn the Immuno assay using labelled reagents.
- To acquire the knowledge of Harmful effects of Antigen – Antibody reactions.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To understand the antigen-antibody interaction, MHC- Major Histocompatibility Complex, Function, Restriction Organization and Inheritance of MHC, Antigen processing and presentation HLA, Genetics of HLA.
- To learn the B - cell receptors, T – cell receptors, Cytokine, Adhesion molecules.
- To understand the Hypersensitivity reaction and Anaphylaxis.
- To study the Tumour Immunology – Tumour Antigens, Immunotherapy of Tumour.

Unit-5: (50 to 100 contents)

Teaching Hours:

- To understand the transplantation immunology.
- To learn the Types of Graft, Graft acceptance and rejection.
- To understand the Immuno deficiency diseases, Immuno prophylaxis, Immuno techniques and Immuno haematology.
- To learn and understand the Biosynthesis of Antibody.

Text Book

1. Roitt, I.M. 1994. Essential Immunology. Blackwell Scientific, Oxford
2. Richard A. Goldsby, Thomas T. Kindt and Barbara A. Osborne. 2000. Kuby Immunology. Freeman and Co., New York
3. Stites, D.P., Terr, A.I. and Parslow, T.G. 1997. Medical Immunology. Prentice Hall, New Jersey
4. Paul, W.E.M. 1989. Fundamentals of Immunobiology. Raven Press, New York
5. Champion, M.D. and Cooke, A. 1987. Advanced Immunology. J.B. Lippincott Ltd., Philadelphia

Reference Items: books, Journal

1. Kuby Immunology W. H. Freeman & Company; 6th edition
2. Immunology Cancer Vaccines Experimental Methods in Immunology Goldsby RA, Kindt TK, Osborne BA and Kuby J (2003) Immunology, 5th Edition, W.H. Freeman and Company
3. Michael Behe presented with fifty-eight peer-reviewed publications, nine books, and several immunology textbook chapters about the evolution of the immune system

4. NIOSH Hazard Review: Carbonless Copy Paper/Other Publications Examined and Safety Letter, September, p. 22. American Academy of Allergy and Immunology, Executive Committee [1986]. Position statements: clinical ecology. J

E- Materials

- <https://onlinelibrary.wiley.com/journal/13652567>
- Journals in Immunology and Microbiology - Elsevier www.elsevier.com › Life Sciences › Immunology and Microbiology
- <http://www.elsevier.com/locate/molimm>. Molecular Immunology - Journal - Elsevier
- Clinical Immunology - Journal - Elsevier www.journals.elsevier.com › clinical-immunology
- <https://bookauthority.org/books/new-immunology-books>
- <https://home.liebertpub.com/publications/viral-immunology/57/overview>
- <https://biolympiads.com/wp-content/uploads/2018/09/Immunology-Notes.pdf>.

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: III

Paper code: DEZO34A

Credit: 3

Paper type: Core Elective 3

Name of the Paper: A) BIO-ETHICS AND BIO-SAFETY

Total Hours per Week: 3

Course Objectives

- To acquire knowledge on the ethical applications of biological principles.
- To acquire knowledge on the regulatory frameworks and good Laboratory practices for safety
- To Understand and make aware of the CPCSEA guidelines
- To learn the Intellectual Property Rights and patent filing.
- To learn the application of biotechnology in various fields.

Unit-I: Introduction to Bioethics and Bio-safety

Ethics in biotechnology- Positive effects – Negative effects - examples – Rice with Vitamin A - Slow Ripening Fruits - Saving the Banana - Virus Resistant Crops - Need for Fertilizers - Biological Pest Controls – Fast Growing Trees- Fast Growing fish - The Monarch Butterfly Story - Consumer traits – food safety- Environmental, Economic and Social Concerns.

Unit-II: Biotechnological Applications for Human Welfare

Production of secondary metabolites - Insulin, growth hormones and interferons. Production of biotechnological products - Food – SCP (algae, yeast, mushroom). Biofertiliser (Blue-green algae, Vesicular-arbuscular mycorrhiza) - Biopesticides (*Bacillus thuringiensis*).

Unit-III: Regulatory Framework and Good Laboratory Practices

Regulatory frameworks in USA and India - Good laboratory practice (GLP) - GLP authority functions - follow Good Laboratory Practices - The Aspiration – responsibility – Role of a Sponsor - Quality standards for Clinical Trials - Why is India a favorite destination for Clinical Trials world wide.

Unit-IV: CPCSEA (Committee for the Purpose of Control and Supervision of Experiments on Animals) Guidelines for Laboratory Animal Handling for Various Experiments

Veterinary care - Animal procurement - Quarantine, Sterilization and separation – Surveillance, diagnosis, treatment and control of disease - Animal care and technical personnel - Personal hygiene - Animal experimentation involving hazardous agent - Multiple surgical procedures on single animal - Duration of experiments - Physical restraint - Physical relationships of animal facilities to laboratories – Functional area - Physical facilities – Environment - Animal husbandry - Activity – Food - Bedding- Water- Sanitation and cleanliness – Waste disposal - Pest control - Emergency , weekend and holiday care.

Unit-V: Intellectual Property Rights

Origin of the Patent Regime – History of Indian Patent System - Indian Pharmaceutical Industry - The Present Scenario – Basis of Patentability – Patent Application Procedure in India - Patent Granted Under Convention Agreement - Who can apply for a patent - Patent Procedure – Opposition to Grant of Patent - Grant and Sealing - Exclusive Rights – Grant of Exclusive Rights - Special Provision for selling or distribution – Suits relating to infringements – Compulsory License - Termination of Compulsory License – Case study - Compulsory Licenses - Relief under Trade Related Aspects of Intellectual Property Rights (TRIPS) agreement.

Course Out Comes (five outcomes for each units should be mentioned)**1. After studied unit-1, the student will be able to understand**

- Study the positive and negative effects of Bio-ethics.
- Able to define Bio-ethics and explain the fundamental of ethical rights and principles that apply to
- Student learn the ethics in rice, vegetable, fruits, resistance crops, consumer traits.
- Environment and eco-safety makes the student to understand food school.

2. After studied unit-2, the student will be able to understand

- To understand the production of secondary metabolites.
- To understand the biotechnical food preparations.
- To explain the microbial degradation pesticides and bio-fertilizer.
- To know the practical use of biotechnology application medicine, agriculture, and food production.

3. After studied unit-3, the student will be able to understand

- To describe the regulatory frameworks in India and USA.
- To gain knowledge of the good laboratory practice.
- To understand the awareness of the clinical trials.

4. After studied unit-4, the student will be able to understand

- To understand the guide lines for laboratory animal handling.
- To know the concerns of animal welfare.
- To learn the condition and treatments which avoid mental suffering of test animals.
- To learn the facilities, provide for the experimental animals.

5. After studied unit-5, the student will be able to understand

- To encourage research scholarship and spirit of inquiry by generating new knowledge.
- To facilitate the transfer of knowledge and technology to intending users to promote utilizing resource for benefit of society.
- To create respect for other people IPR among the members of the institute.
- To learn the awareness on IPR through conducting seminars.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- To understand the Ethics, effects of the ethics.
- To learn the consumer traits.
- To acquire the knowledge about environmental, economical and social concern.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To study the secondary metabolites, growth hormones, and interferons.
- To acquire knowledge about the biotech food products.
- To learn the microbial degradation in Bioremediation process.

Unit-3: (50 to 100 contents)

Teaching Hours:

- To study the good laboratory practical.
- To learn the quality standards of clinical trials.
- To acquire knowledge of the World Wide Clinical trials.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To study the CPCSEA guideline for handling Experimental animals.
- To learn the physical relationships of animal facilities and laboratories.

Unit-5: (50 to 100 contents)

Teaching Hours:

- To learn the intellectual property rights and patent filing.
- To know the patent procedure in India.

Text Books

1. V. Srikrishna, 2007, Bioethics and Biosafety in Biotechnology, New Age International Publisher, New Delhi
2. Goel And Parashar, 2013, IPR, Biosafety and Bioethics, Pearson, Chennai.
3. Rajmohan Joshi, 2006, Biosafety and Bioethics, Gyan Publishing House, Delhi
4. V Sree Krishna, 2007, Bioethics and Biosafety in Biotechnology, New Age International, New Delhi.

Reference Items: books, Journal

1. Bioethics, by Shaleesha A. Stanley (2008). Published by Wisdom Educational service Chennai.
2. Dubey, R. C., 2008, A text book of Biotechnology, S. Chand Co., New Delhi
3. Gupta, P.K, 2008, Biotechnology and Genomics, Rastogi Publications, Meerut, India.
4. M. K. Sateesh, 2008, Bioethics and Biosafety, I. K. International Pvt Ltd, India
5. National Bioethics Committees in Action, 2010, United Nations Educational, Scientific and Cultural Organization, rue Miollis, 75732 Paris Cedex 15, France.
6. Henk ten Have, 2016, Encyclopedia of Global Bioethics. Springer.

E- Materials

- https://books.google.co.in/books/about/Bioethics_and_Biosafety.html?id=xP9dzbsBTZQC
- <http://access.in.pearson.com/store/store/product/896-IPR,-Biosafety-and-Bioethics?s=HigherE>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: III
Paper code: DEZO34B
Credit: 3

Paper type: Core Elective 3
Name of the Paper: B. BIOPHYSICS
Total Hours per Week: 3

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Course Objectives

1. To understand the principle and applications of various research instruments for Human life.
2. To understand the Biological importance of Biomolecules
3. To understand the Different types of Laws in Biophysics
4. To understand how the animals produce Bio-luminescence for food, protection and sexual attraction.
5. To understand how MRI scanner is working.
6. To understand the nuclear medicine for therapy, fiber optic endoscopy and mammography

UNIT-I: BIOMOLECULES AND BONDING

Electron configuration of an atom and Molecule. Bonds - Covalent bond, Ionic Bond, Hydrogen bond, Disulphide bond, Peptide bonds. Forces between Molecules - Electrostatic force, Van der Waal's forces - hydrophobic and hydrophilic - biological importance. Kinetic energy.

UNIT-II: THERMODYNAMICS AND BIOLOGICAL OXIDATION

Laws of Thermodynamics – First Law and Second Law - Concept of free energy and entropy - Exergonic and Endergonic reactions. Rate of reactions - Effect of sunlight and temperature on reactions. Energy of Activation - Arrhenius expression.

Diffusion - Fick's Laws, constant laws. Osmotic coefficient - Gibbs Donnan equilibrium.

Oxidation and reduction reactions - Redox potentials in biological system, High energy phosphate group.

Bioluminescence – Extra cellular, Intra cellular and Symbiotic. Bioluminescence in bacteria and Fire Fly.

Function of Bioluminescence – Food collection, Protection from Predators and Sexual attractions.

UNIT-III: MICROSCOPY

Principle and biological application of Light microscope, Electron microscope, Polarising microscope, Fluorescent microscope, Phase contrast microscope, Dark field microscope, Interference microscope and X-ray microscope.

UNIT-IV: PHOTO BIOPHYSICS

Electromagnetic spectrum - visible and invisible region. Principles involved in Photoelectric colorimetry. Principle of Spectroscopy - UV & IR Spectroscopy in biological investigation. Effects of UV on biological systems. Delayed effects of radiation - Ageing, reduction in life span, cancer. Radioactive isotopes - measurements - GM tubes, Liquid Scintillation counters. Autoradiography. Effects of radiation.

UNIT-V: BIOPHYSICAL PRINCIPLES APPLIED TO PHYSIOLOGY

Biophysical aspects of vision, hearing, nerve conduction and muscle contraction. Application of Radioimmuno assay (RIA) Magnetic Resonance Imaging (MRI) Laser Beam in Biology. Nuclear Medicine for Therapy, Fibre – Optic Endoscopy. Heart – Lung Machine (Cardio – Pulmonary Bypass (CPB)). Mammography.

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Course Out Comes (five outcomes for each units should be mentioned)

1.After studied unit-1, the student will be able to understand

- Electron configuration.
- Bonds.
- Electrostatic force.
- Hydrophobic and hydrophilic.
- Kinetic energy.

2.After studied unit-2, the student will be able to understand

- Laws of Thermodynamics.
- Concept of free energy.
- Rate of reactions.
- Bioluminescence.
- Fick's Laws.

3.After studied unit-3, the student will be able to understand

- Light microscope and Electron microscope.
- Polarising microscope and Fluorescent microscope.
- Phase contrast microscope and Dark field microscope.
- Interference microscope.
- X-ray microscope.

4.After studied unit-4, the student will be able to understand

- Electromagnetic spectrum.
- Principles involved in Photoelectric colorimetry.
- Principle of Spectroscopy and UV & IR Spectroscopy.
- GM tubes and Liquid Scintillation counters.
- Effects of radiation.

5.After studied unit-5, the student will be able to understand

- Biophysical aspects of vision, hearing and nerve.
- Application of Radioimmuno assay.
- Magnetic Resonance Imaging.
- Nuclear Medicine for Therapy.
- Mammography.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)**Teaching Hours:**

- To understand the basic principle of an electron configuration of an atom and Molecules.
- To gain knowledge about Bonds - Covalent bond, Ionic bond, Hydrogen bond etc.,
- To know the principle and biological importance of kinetic energy.

Unit-2: (50 to 100 contents)**Teaching Hours:**

- To understand the basic principle and Laws of Thermodynamics.
- To learn the concept of free energy and entropy.
- To gain knowledge about Different types of Laws in Biophysics.
- To understand how the animals, produce Bio-luminescence for food, protection and sexual attraction

Unit-3: (50 to 100 contents)**Teaching Hours:**

- To understand the basic Principle and biological application of microscopes.
- To aware the application of microscopes in biological sciences.

Unit-4: (50 to 100 contents)**Teaching Hours:**

- To understand the principle and application of Electromagnetic spectrum.
- To know the principle and concept of Photoelectric colorimetry, Spectroscopy and its application in biological sciences.
- To learn the Effects of UV on biological system.
- To gain knowledge about radioactive isotopes.
- To understand the basic concept of Autoradiography and its application.

Unit-5: (50 to 100 contents)**Teaching Hours:**

- To understand the Biophysical aspects of vision, hearing, nerve conduction and muscle contraction.
- To understand the working principle and application of Radioimmuno assay (RIA) and Magnetic Resonance Imaging (MRI) Laser Beam in Biology.
- To know about various techniques involved in Nuclear Medicine for Therapy.
- To understand the objectives of Pulmonary Bypass ND Mammography.

Text Books

1. Bose, S. 1982. Elementary Biophysics. Jyoth Books
2. Bums, D.M. and MacDonald, S.G.G. 1979. Physics for Biology and Premedical students. ELBS and Addison - Wesley Publishers Ltd., London
3. Das, D. 1982. Biophysics and Biophysical Chemistry. Academic Publishers. New Delhi.
4. Epstein, H.T. 1963. Elementary Biophysics, selected topics. Addison - Wesley Publishing Company Inc. London
5. Palanichamy, S and Shanmugavelu, M. 1991. Principles of Biophysics. Palani Paramount, Publication; Tamil Nadu.

Reference Items: books, Journal

- Rodney M. J. Cotterill (2002). Biophysics: An Introduction. Wiley. ISBN 978-0-471-48538-4.
- Sneppen K, Zocchi G (2005-10-17). Physics in Molecular Biology (1 ed.). Cambridge University Press. ISBN 978-0-521-84419-2.
- Glaser R (2004-11-23). Biophysics: An Introduction (Corrected ed.). Springer. ISBN 978-3-540-67088-9.
- Hobbie RK, Roth BJ (2006). Intermediate Physics for Medicine and Biology (4th ed.). Springer. ISBN 978-0-387-30942-2.
- Cooper WG (August 2009). "Evidence for transcriptase quantum processing implies entanglement and decoherence of superposition proton states". Bio Systems. 97 (2): 73–89. doi:10.1016/j.biosystems.2009.04.010. PMID 19427355.
- Cooper WG (December 2009). "Necessity of quantum coherence to account for the spectrum of time-dependent mutations exhibited by bacteriophage T4". Biochemical Genetics. 47 (11–12): 892–910. doi:10.1007/s10528-009-9293-8. PMID 19882244.
- Goldfarb D (2010). Biophysics Demystified. McGraw-Hill. ISBN 978-0-07-163365-9.

E- Materials

- <https://epdf.pub/biophysics.html>
- https://scholar.cu.edu.eg/?q=abdo_elfiky/files/dillon_p.f._biophysics.._a_physiological_approach_draft_cup_2012isbn_1107001447314s_b_.pdf
- <http://www.freebookcentre.net/Physics/BioPhysics-Books-Download.html>
- <https://typeset.io/formats/springer/european-biophysics-journal/062e2ab131e74d7ab83a9eff3c450897>
- Letter from the Archives of Biochemistry and Biophysics to Joshua Lederberg - Joshua Lederberg - Profiles in Science
- <https://profiles.nlm.nih.gov/.../nlm:nlmuid-101584906X1406-doc>
- <https://profiles.nlm.nih.gov/.../nlm:nlmuid-101584906X1404-doc>
- <https://profiles.nlm.nih.gov/.../nlm:nlmuid-101584906X1408-doc>
- <https://www.cell.com/biophysj/home>
- <https://www.annualreviews.org/journal/biophys>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: III
Paper code: DOZO35A
Credit: 3

Paper type: Open Elective Paper 3
Name of the Paper: A. AQUARIUM FISH KEEPING
Total Hours per Week: 3

.....
(to Choose either A or B)

Course Objectives

1. To impart basic knowledge on aquarium fish keeping
2. To teach the various technology used in the aquarium fish keeping
3. To understand the characteristic features of aquarium fishes
4. To explain the biology of aquarium fishes
5. To motivate self-employment opportunity

UNIT- I

Scope of Aquarium Fish Industry: Aquarium as cottage industry - Exotic and Endemic species of Aquarium fishes. Constructions of home aquarium- materials used, aerators and filters, net and other equipments.

UNIT - II

General Characters and sexual dimorphism:

Freshwater and Marine water Aquarium fishes- Guppy, Molly, Sward tail, Gold fish, Angel fish, Blue Morph, Anemone fish and Butterfly fish. Freshwater aquarium plants - Secondary sexual characters, breeding habits, spawning and parental care.

UNIT – III

Food and Feeding of Aquarium Fishes:

Different kinds of feeds - Culture of live feed organisms and separation of formulated fish feeds – feeding methods.

UNIT – IV

Transportation of Aquarium fishes:

Aquarium fish habitats, Methods of collection from the wild, Fish handling, packing and transportation techniques.

UNIT – IV

Maintenance of Aquarium: Cleaning of aquarium tank - maintenance of water quality - control of snails and algal growth in aquarium tank – disease diagnosis and treatment.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to

- a) Acquire basic knowledge about aquarium
- b) Learn about the exotic and endemic aquarium fish species
- c) Know about the construction of home aquarium
- d) Understand the materials requirement for setting up home aquarium
- e) Know the usage of minor equipment used in the aquarium

2. After studied unit-2, the student will be able to

- a) Acquire knowledge on freshwater and marine water aquarium fishes
- b) Know the fresh water aquarium plants used in the tank
- c) Learn their secondary sexual characters
- d) Know the breeding and spawning behavior of aquarium fishes
- e) Understand the parental care present in the aquarium fishes

3. After studied unit-3, the student will be able to

- a) Know the different kinds of feeds used for aquarium fish
- b) Understand how to cultivate live feed organisms?
- c) Learn the techniques of preparation of formulated feed
- d) Acquire knowledge on feed conversion ratio of feeds
- e) Know the feeding behavior of aquarium fishes

4. After studied unit-4, the student will be able to

- a) Understand the aquarium fish habitat
- b) Know the method of collection of aquarium fishes from wild
- c) How to handle the aquarium fishes?
- d) Acquire knowledge on packing of aquarium fishes
- e) Learn techniques used for transportation of aquarium fishes

5. After studied unit-5, the student will be able to

- a) Know the procedure of cleaning the aquarium tank
- b) Understand the water quality parameters and its importance
- c) Comprehend the control of snail and algal growth in the aquarium tank
- d) Acquire knowledge on disease diagnosis
- e) Get an idea of treatment of disease in aquarium fishes.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- To study the scope of aquarium fish industry and aquarium as cottage industry and exotic and endemic species of aquarium fishes.
- To understand and study the constructions of home aquarium, materials, used, aerators, filters, net and other equipment.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To learn and understand the general characters and sexual dimorphism, freshwater and marine water aquarium fishes- guppy- molly- sword tail- gold fish- angel fish- blue morph-anemone fish and butterfly fish.
- To understand the freshwater aquarium plants, secondary sexual characters, breeding habits- spawning - parental care.

Unit-3: (50 to 100 contents)

Teaching Hours:

- food and feeding of aquarium fishes: different kinds of feeds and culture of live feed organisms.
- To learn the preparation of formulated fish feeds – feeding methods.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To understand the transportation of aquarium fishes: aquarium fish habitats,
- To learn the methods of collection from the wild, Fish handling, packing, transportation techniques.

Unit-5: (50 to 100 contents)

Teaching Hours:

- To learn and study the maintenance of aquarium: cleaning of aquarium tank – and maintenance of water quality - control of snails - algal growth in aquarium tank.
- To study the disease diagnosis and treatment.

Text Books

- 1) Coffey, D.J., 1977. Encyclopedia of Aquarium Fishes in Colour. Acro Publications.
- 2) David Justin Smith- Introduction to Aquarium Keeping
- 3) Jhingran, V. G. 1982. Fish and Fisheries in India. Hindustan Publishing Corporation, New Delhi.
- 4) Shanmugam, K. 1992. Fishery Biology and Aquaculture. Leo Pathipagam, Chennai, India.
- 5) Mill Dick, 1993. Aquarium Fish. D.K. Publishing Corporation, New York, USA.
- 6) Yadav, B.N., 1997. Fish and Fisheries (Second Edition), Daya Publishing House, Delhi, India, pp. 366.
- 7) Day, F. 1978. Fishes of India, Vol. I & II. William Danisan & Sons, India.
- 8) Mill Dick, 1993. Aquarium Fish. D.K. Publishing Corporation, New York, USA.
- 9) Mill Dick, 1993. Aquarium Fish. D.K. Publishing Corporation, New York, USA.
- 10) The transport of live fish – A review - FAO
- 11) Fish Pathology - Fourth Edition (Roberts, R.J., ed.), 2012. Blackwell Publishing Ltd., UK. pp. 591.

Reference Items: books, Journal

1. David Justin Smith- Aquarium Keeping: The Aquarium Keeping Basics.
2. David Justin Smith- Aquarium Keeping: 25 Facts Every Aquarist Should know.
3. David Justin Smith- Aquarium Keeping: The Aquarium Keeping Guide Book.
4. David Justin Smith- Aquarium Keeping: The Aquarium Keeping Essentials.
5. Coffey, D.J., 1977. Encyclopedia of Aquarium Fishes in Colour. Acro Publications.
6. Fish Pathology - Fourth Edition (Roberts, R.J., ed.). 2012. Blackwell Publishing Ltd., UK. pp. 591.
7. Jhingran, V. G. 1982. Fish and Fisheries in India. Hindustan Publishing Corporation, New Delhi.
8. Shanmugam, K. 1992. Fishery Biology and Aquaculture. Leo Pathipagam, Chennai, India.
9. Mill Dick, 1993. Aquarium Fish. D.K. Publishing Corporation, New York, USA.

10. Yadav, B.N., 1997. Fish and Fisheries (Second Edition), Daya Publishing House, Delhi, India, pp. 366.
11. Day, F. 1978. Fishes of India, Vol. I & II. William Danisan & Sons, India.

E- Materials

- www.fao.org - The transport of live fish –A review – FAO
- www.fisheriesjournal.com – The design and construction of Aquaria.
- www.instructable.com – How to build Aquarium- 6 steps- instructable

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: III
Paper code: DOZO35B
Credit: 3

Paper type: Open Elective 3
Name of the Paper: B. MEDICAL LABORATORY TECHNOLOGY
Total Hours per Week: 3

Course Objectives

- To impart awareness on clinical lab-technology
- To create knowledge on self- employment opportunity

UNIT I

Medical Laboratory scope- general procedures- Laboratory requirements, Sterilization, Dry heat (Hot air oven), Moist heat (Autoclave, Pressure cooker), Laboratory equipments -Spectrophotometer, Incubator Refrigerator, Auto analyzer, Micro centrifuge, Automatic pipettes.

UNIT II

Collection of blood samples, Packed cell volume (PVC), Erythrocyte sedimentation Rate (ESR), RBC Count, WBC Count, Reticulocyte count, Total count, Differential Count, Pulse rate, Use of blood pressure Apparatus, Electrocardiogram, Echocardiogram, Estimation of Haemoglobin, Artificial pacemaker.

UNIT III

Blood cross matching – Hepatitis test – Haemolytic jaundice, ELISA, Estimation of blood glucose fasting two-hour post prandial – Diabetes mellitus, Estimation of blood Cholesterol, Blood Urea, Blood Uric Acid.

UNIT IV

Analysis of urine – Physical examination, Blood cells, Urine glucose, Urine albumin, Bile salts, Ketone bodies, Urine culture – Antibiotic susceptibility test. Pregnancy Test (Detection of HCG). Analysis of faeces – Components of faeces their characteristics, factors affecting faeces.composition. Analysis of sputum – Pathological conditions that can be detected in sputum – their causes – Detection of Group A – Streptococcus.

UNIT V

Cerebrospinal fluid – Formation, Composition function, Conditions altering its composition – their causes. Seminal fluid – Composition of seminal fluid, Sperm count, Abnormal sperms, Common pathological conditions detected in semen – their causes. Amniotic fluid – Sex determination, Diagnosis of pathological conditions of developing foetus through analysis of amniotic fluid.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be

- To perform the basic analytical techniques.
- To demonstrate the appropriate use of laboratory instrumentations.
- To select the appropriate trouble-shooting procedure.

2. After studied unit-2, the student will be

- To perform routine analysis of blood and body fluid samples.
- To demonstrate the ability to proper for the proper procedure for laboratory analysis.
- To learn and to understand the knowledge and skill in major areas of clinical laboratory diagnosis.

3. After studied unit-3, the student will be

- To understand and test the blood glucose estimation in diabetic patients.
- To study the process of immunohaematology trials.
- To learn and to understand the lab operations in blood culture, blood uric acid, etc.

4. After studied unit-4, the student will be

- To perform the analysis of Urine and blood.
- To understand the laboratory test diagnose treat the disease.
- To identify the immune haematology test.

5. After studied unit-5, the student will be

- To understand the clinical chemistry of CSF, SF, and amniotic fluid.
- To study the pathology conditions of the patients.
- To demonstrate a commitment to patients to the performance.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- To learn and study the laboratory equipment's.
- To understand the principles of Spectrometer, Refrigerator.
- To acquire the knowledge of dry heat and moist heat.

Unit-2: (50 to 100 contents)

Teaching Hours:

- To learn the blood parameters.
- To understand the medical application of the apparatus.
- To perform the routine analysis of blood/ body fluids.

Unit-3: (50 to 100 contents)

Teaching Hours:

- To learn the laboratory procedures of blood cross matching, Hepatitis, Haemolytic jaundice.
- To learn the estimation of Blood glucose, Blood cholesterol.
- To understand the procedure of urea, Uric acid.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To analysis the laboratory procedure for urine examination.
- To understand the knowledge of antibiotic susceptibility and detection of HCG.
- To provide basic analytical techniques.

Unit-5: (50 to 100 contents)

Teaching Hours:

- To identify the sources of pre analytic correlate the test result with disease process.
- To diagnosis the pathological conditions of developing embryo and amniotic fluid.
- To acquire knowledge about composition of abnormality in seminal fluid.

Text Books

1. Biswajit Mohanty and Sharbari Basu – Fundamentals of Practical Clinical Biochemistry, B.I. Publications PVT., LTD., 54, Janpath, New Delhi – 110001.
2. Estridge B.H. Raynold A.P and Walters N.J. Basic Medical Laboratory Techniques, 4th edition, Thomson Delmar Learning, Eastern press (Bangalore) Pvt., Ltd., Boommasandra Industrial Area, Hosur Road, Bangalore – 562158.
3. Kannai, L. Mukherjee, Medical Laboratory Technology Vol - I, Vol - II and Vol - III. Tata MC Graw Hill Publishing Company Limited, No: 444/1, Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai – 600116.

Reference Items: books, Journal

1. Ramnik Sood, Medical Laboratory Technology, Methods and Interpretations. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
2. Venkadesan, O. Essential of Medical Laboratory technology, Bicobas P.G and Research Department of Zoology, Loyola College, Madras – 60003

E- Materials

- <https://libguides.utoledo.edu/medlabsci/books>
- <https://guides.lib.uiowa.edu/c.php?g=131963&p=863302>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: IV
Paper code: DFS20
Credit: 2

Paper type:
Name of the Paper: FIELD STUDY
Total Hours: 30

USRR (FIELD STUDY REPORT) GUIDELINES

Field Study and USRR (University Social Responsibility Report)

The aim of the Field Study is to help students connect with the society in the respective discipline. Following are the important features of the Field Study and the USRR:

- 1. Aim:** The Field Study must aim at relating the subject of study with the society in so far as the application and the usefulness of the study are concerned
- 2. Topic selection:** The topic for the Field Study must be chosen by the student in the second semester in the month of February; the process for the same shall begin on 1st February and shall end on the last working day of the month of February. Students are free to select the topic for the Field Study in consultation with the Experts and Faculty Members of their choice, both from within and outside the University
- 3. Period and duration:** The Field Study shall be undertaken for a duration of 15 days in the summer vacation that falls immediately at the end of the second semester of the program and the same should be accounted for the Third Semester of the program
- 4. USRR:** The USSR (University Social Responsibility Report) must be prepared by every student of the program written in 50 to 75 pages. The report shall be written based on the standard research methodology.
- 5. Review and evaluation schedule:**
 - a. *Reviewing the Field work:* First week of July
 - b. *Report Review:* Second week of August
 - c. *Report submission:* First week of September
 - d. *Report Evaluation:* Third week of September
- 6. Faculty Composition:** The following members may be nominated for confirming the topic and for evaluating the USRR:
 - a. Professor and Head of the concerned Department
 - b. One Faculty member with related field of specialization from the concerned Department
 - c. One senior faculty member from the Department of Sociology from other Institution

Semester: IV
Paper code: DZO41
Credit: 4

Paper type: Core Paper 10
Name of the Paper: RESEARCH METHODOLOGY
Total Hours per Week: 5

Course Objectives

- To make the students, learning statistical and bioinformatics tools.
- To make the students, understand spectroscopic principle and application.
- To make the students, know various bio-molecule separation techniques.
- To make the students, operate various microscopes.
- To make the students, get experienced in research paper writing and publication.

UNIT-I: BIOSTATISTICS & BIOINFORMATICS

Collection and analysis of biological data - mean, median, mode, Standard deviation, Standard error, Coefficient of variation, Student 't' test, Skewness, Kurtosis, Chi - square, Correlation, Regression and ANOVA.
Internet - Worldwide Web - Search Engines - their functions. Boolean searching - file formats.
Biological data bases - sequence and structure – data retrieval - searching source data bases - sequence similarity searches - FASTA and BLAST, clustal and phylip.

UNIT-II: SPECTROSCOPY

Absorption and Emission principles - Principles and applications of UV-visible, Spectrofluorometer, flame photometer, Atomic Absorption and emission spectrophotometers, NMR and Mass spectrometer.

UNIT-III: CHROMATOGRAPHY & ELECTROPHORESIS

Principles and Application of Chromatography: Paper, Thin layer, column, Ion Exchange, Gel filtration, Gas Liquid, HPLC and affinity chromatography.
Principles and Application of Electrophoresis: AGE, PAGE, 2D gel and Iso-Electric focusing.

UNIT-IV: MICROSCOPY

Principles, construction and biological uses of phase contrast, fluorescence, scanning and transmission electron microscopes.

UNIT-V: PREPARATION OF MANUSCRIPTS

Preparation of index cards - Reference collection - preparation of thesis - preparation of Scientific paper for publication in a Journal. Internet and e-journals. Computer aided techniques for data analysis, data presentation and power point preparation.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be learning statistical methods.

- The student can able to works on Computers for Projects and Research.
- Student can able to understand search engines, Boolean searching, file formats etc.
- By learning data base, student can analyses the sequence similarities of the FAST and BLAST etc.

2. After studied unit-2, the student will be able to

- understand the different types of Spectrometers.
- They learn the principles of Nuclear Magnetic Resonance to identify the atomic elements of chemicals.

3. After studied unit-3, the student will be

- Understand to the different types of Spectrometer.
- Able to understand the separation of protein and DNA through Electrophoretic apparatus.

4. After studied unit-4, the student will be

- To understand principles, construction of different Microscope.
- Student can be able to understand the staining techniques.
- Student can be able to understand the diseases with live tissue by SEM and TEM microscopes.

5. After studied unit-5, the student will be

- To learn the principles of academic writing for scientific journals.
- To understand the knowledge of writing process selection of publication forum tips for writing.
- Student can be able to prepare their own scientific manuscripts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours: 1

- Perform statistical approach for Research.
- Describe analysis of Biological data.
- Learn the World Wide Web, search engines and file formats.
- To study the biological data bases, data retrieval, sequence sources.

Unit-2: (50 to 100 contents)

Teaching Hours: 1

- Study the Instrumentation of Biology.
- To under the working principles and application of Spectroscopy.

Unit-3: (50 to 100 contents)

Teaching Hours: 1

- To understand chromatography and its applications.
- To acquire the knowledge in separation of serum proteins.
- To understand the principles and application of Electrophoresis.

Unit-4: (50 to 100 contents)

Teaching Hours: 1

- To understand the Immunocytochemical techniques.
- Recognize the SEM, TEM, techniques.
- To study the types of Microscopes.

Unit-5: (50 to 100 contents)

Teaching Hours: 1

- To study the scientific research down into core argument.
- To learn the preparation of thesis.
- To study and acquire knowledge about the Publications of Journals, Internet, e- journals.
- Learn data preparation and ppt by computer aided techniques.

Text Books

1. Gupta, S.P. 1988. An easy approach to statistics. Chand & Co., New Delhi.
2. Gurumani, N. 2006. Research Methodology for Biological Sciences. MJP Publishers, Chennai.
3. Veerakumari, L. 2006. Bioinstrumentation. MJP Publishers, Chennai.

Reference Items: books, Journal

1. Anderson, Durston and Polle.1970. Thesis and Assignment writing. Wiley Eastern Ltd., New Delhi.
2. Comir and Peter Wood Ford.1979. Writing scientific papers in English. Pitman Medical Publishing Co., London.
3. Ewing, G.W. 1988. Instrumental methods of chemical analysis, McGraw Hill Book Company.
4. Daniel, M. 1989. Basic biophysics for biologists. Agro-Botanical Publishers, India.
5. Skoog, A., Douglas, J. and Leary, J.J. 1992. Principles of Instrumental Analysis. Sanders Golden Sunberst Series, Philadelphia.
6. Day, R.A. 1994. How to write and publish a scientific paper. Cambridge University Press, London.
7. Palanichamy, S. and M. Shanmugavelu.1997. Research methods in biological sciences. Palani Paramount Publications, Tamil Nadu, India.
8. Wilson and Walker. 2000. Practical biochemistry - principles and techniques.
9. Cambridge University Press.
10. Milton, J.S. 1992. Statistical methods in Biological and Health Sciences. McGraw Hill Inc., New York.

E- Materials

- <https://epdf.pub/research-methodology-methods-and-techniques.html>
- <https://stuvera.com/research-methodology-books-pdf-free-download/>
- https://groups.google.com/forum/#!topic/klubs_mba/e24oSszYJPI

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: IV
Paper code: DZO42
Credit: 4

Paper type: Core Paper 11
Name of the Paper: ENTOMOLOGY
Total Hours per Week: 5

Course Objectives

1. To gain knowledge of insects and their significance
2. To understand the economic importance of insects in related to beneficial insects.
3. To acquire knowledge on classification of insects.
4. To understand insect's pest and their control.
5. To understand different productive insects and their management
6. To understand different vector borne diseases.

UNIT-I: CLASSIFICATION

Classification of insects upto order with examples.

UNIT-II: BENEFICIAL INSECTS

Productive insects, lac insects and their management.

UNIT-III: SERICULTURE

Prospects of sericulture, Biology of silkworm (Nutrition, Genetics, Endocrinology, Reproduction, Pest and Diseases).

UNIT-IV: INSECT PESTS AND THEIR CONTROL

Insects – Pests of crops: Types of injuries and loss caused to plants in general. Factors governing the outbreak of pests.

Principles and methods of pest suppression: Natural, Cultural, mechanical, physical, chemical, Biological and Integrated pest management.

UNIT-V: INSECTS AS VECTORS

Vector borne diseases: Method of transmission of parasitic agents with special reference to mosquitoes and houseflies.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be

- Able to understand classification of insects.
- Able to understand about orders.
- Able to understand clearly about resemblances and difference between insects.
- Able to understand economic importance of insects.

2. After studied unit-2, the student will be

- Able to understand the biology of honeybees.
- Able to understand about lac insects
- Able to understand the management of beneficial insects.

3. After studied unit-3, the student will be

- Able to understand biology of silk worm
- Able to understand about nutrition of silk worm
- Able to understand the genetical importance
- Able to understand endocrinology of silk worm
- Able to understand the reproduction, pest and diseases of silk worm

4. After studied unit-4, the student will be

- Able to understand different pest crops.
- Able to understand types of injuries.
- Able to understand the causes of plants in general.
- Able to understand the pest control.
- Able to understand the integrated pest management.

5. After studied unit-5, the student will be

- Able to understand the vector borne diseases.
- Able to understand the method of transmission of parasitic agent.
- Able to understand the special reference to mosquitoes and housefly.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours: 1

- To acquire knowledge on classification of insects.
- To acquire knowledge on orders.
- To gain knowledge on 26 orders of insects.
- To know about different types of insects.
- To understand morphological and physiological significance of insects

Unit-2: (50 to 100 contents)

Teaching Hours: 1

- To understand about beneficial insects.
- To understand honeybee significant.
- To know lac insect significance.
- To understand the management of insects.

Unit-3: (50 to 100 contents)

Teaching Hours: 1

- To understand the biology of silk worm.
- To understand silk worm nutrition.
- To understand genetical changes
- To understand pest and diseases
- To understand endocrinology of silk worm

Unit-4: (50 to 100 contents)

Teaching Hours: 1

- To know about pest crops.
- To know about types of injuries.
- To know about loss of pauses to plan in general.
- To know about different pest control.
- To know about integrated pest management.

Unit-5: (50 to 100 contents)

Teaching Hours: 1

- To know about different vector borne disease.
- To know about method of transmission.
- To know the mode of transmission
- To understand the different parasitic agency.
- To know about mosquitoes and housefly

Text Books

1. Vanantharaj David, B and Kumaraswami, T, 1975. Elements of Economic Entomology, Popular Book Depot in Madras.
2. Ananthakrishnan, T.N. 2002. Insect Plant Interactions. Oxford and I.B.H, New Delhi.
3. P.G.Fenemore, Alkaprakash. 1992. Applied Entomology, Wiley Eastern Ltd., Delhi.
4. Nayar, K.K., Ananthakrishnan, T.N. and B.V.David. 1989. General and Applied Entomology. Tata McGraw Hill Publications, New Delhi.
5. Richards, O.W. and Davies, R.G. 1997. Imm's General Text Book of
6. Entomology Tenth Edition. Vol I and II. R.I Publications, New Delhi. Rajeev K.Upadhyay, Mukerjii K.G. Chanda, B.P. and Dubey, O.P. 1998. Integrated Pest and Disease Management. APH Publishing Corporation, New Delhi.
7. Saxena. A.B. 1996. Harmful Insects. Anmol Publications, New Delhi.
8. Patton. W.S. and Cragg F.W.1981. A Text Book of Medical Entomology. International Books and Periodicals Supply Service, New Delhi.
9. Rathinaswamy, T.K.1986. Medical Entomology. S.Viswanathan and Co., Madras.
10. Sundari, M.S.N. and Santhi, R. 2006. Entomology. MJP Publishers, Chennai.

Reference Items: books, Journal

1. William S. Romoser and John G. Stoffolano.W. M.1994. The Science of Entomology C.Brown Publishers, England.
2. Yataro Tazima, Kodarsha .1978. The silkworm. An important laboratory tool. Scientific Book Ltd., Japan.
3. Larry P.Pedigo. 1989. Entomology and Pest Mangement. Prentice Hall, New Jersey.

4. Metcalf, C.V. and Flint, W.P. 1979. Destructive and useful insects, their habitats and control. Tata McGraw Hill Publications, New Delhi.
5. Daniel Altman Robets. 1978. Fundamental of Plant Pest Control. C.R.S. Publishers and Distributors, Delhi,
6. Chapman, R.F. 1988. The insect structure and Function. Cambridge University Press, U.K.
7. David B.V., Muralirangan M.C. and Meera Murali Rangan. 1992. Harmful and Beneficial Insects. Popular Book Depot, Chennai.
8. Ramakrishna Ayyar T.V. 1989. Handbook of Economic Entomology for South India. Books and Periodicals Supply Service, New Delhi.
9. Frost S.W. 1994. General Entomology. Narendra Publishing House, Delhi.
10. Dennis S. Hill. 1993. Agricultural Insect Pests of the Tropics and their Control. Second Edition, Cambridge University Press, U.K.

E- Materials

- [https://www.freebookcentre.net/biology-books-download/A-Textbook-of-Entomology-\(PDF-762P\).html](https://www.freebookcentre.net/biology-books-download/A-Textbook-of-Entomology-(PDF-762P).html)
- <http://www.freebookcentre.net/Biology/Entomology-Books.html>
- http://www.programamoscamed.mx/EIS/biblioteca/libros/libros/Gullan%20P.J.,%20Cranston%20P.%20The%20Insects..%20line%20of%20Entomology%202010_.pdf
- <https://www.agrifunda.com/2018/01/fundamentals-of-entomology-free-pdf.html>
- <http://www.bio-nica.info/Biblioteca/Gillott2005ntomology.pdf>
- <https://archive.org/details/textbookofentomo00pack/page>
- <https://www.iaritoppers.com/2019/06/fundamentals-of-entomology-icar-ecourse-pdf-download.html>
- <https://feener.biology.utah.edu/courses/5445/Lecture/Bio5445%20Lecture%2001.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: IV
Paper code: DPZO47
Credit: 5

Paper type: Core Paper
Name of the Paper: PROJECT
Total Hours per Week: 5

PROJECT COMPULSORY

Objectives

To promote original thinking, insemination of knowledge, modulation and innovation of thought, as an exercise, in order to transport the young minds to the expanding horizon of their chosen area of knowledge and transform them into knowledge generators.

Project
Viva voce

75 Marks
25 Mark

Semester: IV

Paper code: DPZO45

Paper type: Core Practical 3

Name of the Paper: ANIMAL PHYSIOLOGY, DEVELOPMENTAL
BIOLOGY AND IMMUNOLOGY

Credit: 4

Total Hours per Week: 12

PHYSIOLOGY

1. Estimation of RQ in Fish with reference to Light and temperature.
2. Salt loss and salt gain in fish
3. Estimation of Proteins, Carbohydrates and Lipids in the tissues of Fish
4. Estimation of Blood Urea and Cholesterol.
5. Blood Clotting Time, Bleeding Time, Rouleaux Formation, Preparation of Haemin Crystal.
6. Principle and Application of Sphygmomanometer, Kymograph, Electrophoresis, Haemoglobinometer, ESR.
7. Estimation of Haemoglobin and ESR.

DEVELOPMENTAL BIOLOGY

1. Different stages in development - frog (egg, cleavage, Blastula, Gastrula, Yolk plug stage.
2. Chick embryo – primitive streak, 13 hrs, 24 hrs, 48 hrs, 72 hrs and 96 hrs.
3. Development of chick stage - slide showing C.S. of heart, kidney lens and limb.
4. Study of different types of placenta
5. Amphibia - identification of developmental stages.

IMMUNOLOGY

1. Haemagglutination - Quantitative analysis - haemagglutination titration.
2. Preparation of Antigen - RBC - Demonstration.
3. Ouchterlony technique - Demonstration.
4. Immunoelectrophoresis - Demonstration.
5. Slides showing T.S of Spleen, Thymus, lymphnodes and Bones

Semester: IV

Paper type: Core Practical 4

Paper code: DPZO46

Name of the Paper: RESEARCH METHODOLOGY AND ENTOMOLOGY

Credit: 4

Total Hours per Week: 5

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RESEARCH METHODOLOGY

1. Problems relating to test of significance (Chi - square test and t - test)
2. Problems relating to correlation, regression and ANOVA.
3. Familiarization of biological and bioinformatics web sites.
4. BLAST search for similar nucleotide sequences.
5. Spectrophotometric estimation of any biological constituent.
6. Electrophoresis - Paper / Agarose gel / PAGE
7. Preparation of index and reference cards.

ENTOMOLOGY

1. Study of morphology of insect (local 2 insects to be used).
2. Dissection of digestive, nervous, excretory, reproductive systems of any two insects.
3. Mounting of different types of mouthparts.
4. a. Field study of insect species
b. Identification of at least 10 insects belonging to different orders.
5. a. Field study for various methods of pest management.
b. Field visit to warehouses and Plant protection centres.

Semester: IV
Paper code: DEZO43A
Credit: 3

Paper type: Core Elective 4
Name of the Paper: A. SERICULTURE
Total Hours per Week: 3

(to Choose either A or B)

Course Objectives

1. To know the Biology of silkworm, their economic importance and methods practiced in sericulture. To develop sericulture as a skill based curriculum.

UNIT -I: ECONOMIC IMPORTANCE AND SILKWORM BIOLOGY

Prospects and status of sericulture in India and other major silk producing countries. Silk producing species - their distribution. *Bombyxmori* - life cycle - organization of larvae, pupae and moth - structure and function of the silk gland.

UNIT-II: MORICULTURE

Mulberry - varieties - distribution - methods of cultivation and preparation - Harvest - Transport and preservation of leaves. Feeding and nutrition - specificity of diet - Factors of nutrition - Diet and growth. Pest and diseases.

UNIT-III: SILKWORM REPRODUCTION AND GENETICS

Reproduction: Growth and Development of silkworms - Physiology of moulting in different varieties (Uni, bi and multivoltine) - Endocrinology of reproduction and development. Genetics: mutation breeding and development of new strains.

UNIT-IV: PATHOGENIC DISEASES AND PEST

Pathology: Viral, bacterial, fungal and protozoan diseases - causative organisms – modes of transmission – symptoms - control mechanisms. Uzi fly menace.

UNIT-V: SILKWORM REARING AND SILK REELING

Rearing operations - Selection and construction of rearing house - Incubation - Hatching - brooding, Harvesting. Reeling techniques - Re-reeling - Silk examination – lacing, skeining.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be

- To know the general development of sericulture research.
- Modern trends and Concepts in sericulture research.

2. After studied unit-2, the student will be

- The student will be involved in various aspects of egg production.

3. After studied unit-3, the student will be

- Able to understand silk health diagnosis, identification of deficiency symptoms.

4. After studied unit-4, the student will be

- The student involved in various product of silk.

5. After studied unit-5, the student will be

- The student involved in various product of silk.
- To develop highly qualified person and profession and manpower in silk and sericulture.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- By Learning the history of sericulture.
- Understanding the status of silk producing countries and sericulture in India.
- Basic terminologies of sericulture.
- Learning the nursery preparation and cultivating silkworms.

Unit-2: (50 to 100 contents)

Teaching Hours:

- By learning the morphology and variety of Mulberry.
- Study the harvest, transport and preparation of Leaves.
- By learning the establishment of mulberry garden.

Unit-3: (50 to 100 contents)

Teaching Hours:

- Study the external morphology and life cycle of silkworm.
- Learning the anatomy of physiology.
- Learning the endocrine system, hormones and its roles.
- Studying the breeding methods and importance.

Unit-4: (50 to 100 contents)

Teaching Hours:

- Learning Viral, Bacterial, Fungal, and Protozoan Diseases.
- Understanding the mode of transmission and control mechanisms.
- Learning the Uzi fly menace.

Unit-5: (50 to 100 contents)

Teaching Hours:

- By learning the silkworm rearing techniques.
- By understanding the differentiation of young age and old age rearing methods.
- Learning the reeling techniques and examination of silk reeling and skeining.

Text Books

1. Ganga, G. and Sulochana Chetty, J. 1997. An Introduction to Sericulture. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Ganga, G. 2003. Comprehensive Sericulture Vol-I: Moriculture. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

- Ganga, G. 2003. Comprehensive Sericulture Vol-II: Silkworm Rearing and Silk Reeling. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
- Madan Mohan Rao, M. 2019. An Introduction to Sericulture. 2nd edition, B.S. Publications. Andhra Pradesh, India.
- Amardev Singh. 2012. Text book on Sericulture Training. Bio-Green Books. New Delhi.

Reference Items: books, Journal

- Hisao Aruga. 1994. Principles of Sericulture (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- Veda, K., Nagai, I. and Horikomi, M. 1997. Silkworm Rearing (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- Otsuki, R. and Sato, S. 1997. Silkworm Egg Production (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- Eikichi Hiratsuka. 1999. Silkworm Breeding (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- Mahadevappa, D., Halliyal, V.G., Shankar D.G. and Bhandiwad, R., 2000. Mulberry Silk Reeling Technology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- Soo-Ho Lim, Young-Taek Kim, Sang-Poong Lee. 1990. Sericulture Training Manual – Published by FAO – USA. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- Wu Pang-Chuan and Chen Da-Chuang. 1994. Silkworm Rearing – Published by FAO – USA. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
- Lu Yup-Lian and Liu-Fu-an. 1991. Silkworm Diseases - Published by FAO – USA. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

E- Materials

- <https://archive.org/details/SericultureHandbook/page/n1/mode/2up>
- <http://www.csrtimys.res.in/books-0>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: IV
Paper code: DEZO43B
Credit: 3

Paper type: Core Elective 4
Name of the Paper: (B) MICROBIOLOGY
Total Hours per Week: 3

Course Objectives

- To know the structure, function and diversity of microorganisms.
- To gain knowledge on the various techniques of microbiology.
- To acquire a basic knowledge on environmental, medical and industrial microbiology.

UNIT-I: STRUCTURE AND CLASSIFICATION

History and Scope of Microbiology. Structure and classification of virus, bacteria and fungi.

UNIT-II: STERILIZATION AND CULTURE

Sterilization: Principles - dry heat, moist heat, filtration, tyndallization, pasteurization, Radiation - disinfection.

Culture techniques - media preparation - Aerobic and anaerobic culture techniques - Wet mount, hanging drop, staining methods, dyes, simple differential and special staining techniques - acid fast stain, spore stain, capsule stain, staining for pure and mixed cultures.

UNIT-III: ENVIRONMENTAL MICROBIOLOGY

Microbial ecology - role of microorganisms in the productivity of ecosystems - Interactions between microorganisms- and plants and animals. Microbiology of soil, water and air.

UNIT-IV: MEDICAL MICROBIOLOGY

Pathogenic microbes of bacterial, viral, fungal and protozoan diseases - cure, control and prevention. Antimicrobial chemotherapy - Antibiotics - Source – Classification- Mode of action.

UNIT-V: INDUSTRIAL MICROBIOLOGY

Industrial uses of microbes - bioconversions – bioremediation.

Products of industrial microbiology - Penicillin, fuel ethanol, vinegar, vitamin B12, citric acid, glutamic acid, protease.

Food and Dairy microbiology. Role of microbes in food production. Dairy and non-dairy products.

Course Out Comes (five outcomes for each units should be mentioned)

1.After studied unit-1, the student will be able to

- define the microbial organisms of the virus, bacteria, and fungi.
- Student can be able to explain the scope of microbiology.

2.After studied unit-2, the student will be

- Able to demonstrate the practical skill in sterilization and pasteurization techniques.
- Student can be able to explain the technical basis of tools, technological methods methodology.

3. After studied unit-3, the student will be

- Describe the basic concepts of legal, ethical, economical and regulatory dimension of health line and public health.
- To understand the interaction of microorganisms and organisms of soil.

4. After studied unit-4, the student will be

- Student will understand the anti-microbial interactions.
- Student will learn about the Pathogenic microbes and diseases.

5. After studied unit-5, the student will be

- Student can be able to gain knowledge in several field of applied microbiology.
- Student can work in research and development unit in microbial industries.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- Understanding the different bacterial morphologies.
- By learning the structure of virus, bacteria, and fungi.
- Learning the difference between Gram negative and Gram positive bacteria.

Unit-2: (50 to 100 contents)

Teaching Hours:

- Understanding the culture techniques of the bacteria and virus.
- Understand the sterilization techniques.
- By learning to compare sterilization and pasteurization techniques.

Unit-3: (50 to 100 contents)

Teaching Hours:

- Understand the microbial metabolisms.
- Understand the bacterial, viral and fungal diseases.
- Study the different types of microbes.

Unit-4: (50 to 100 contents)

Teaching Hours:

- To learn the pathogenic microbes.
- To understand the anti-microbial chemotherapy.

Unit-5: (50 to 100 contents)

Teaching Hours:

- To learn the industrial uses of microbes.
- To understand the food and dairy microbiology.

Text Books

1. Ananthanaryanan, T. and Paniker, J.C.K. 2000. Text Book of Microbiology. Orient Longman Ltd., Chennai.
2. Ahmed, M. and Basumatary, S.K. 2006. Applied Microbiology. M.J.P Publishers, Chennai.
3. Pelczar, M.J., Reid, R.D. and Chan, E.C.S. 1996. Microbiology. Tata McGraw Hill Co., Ltd. New Delhi.
4. Dubey, R.C. and Maheshwari, D.K. 2006. A Text Book of Microbiology. S. Chand and Company Ltd. New Delhi.
5. Patel, A.H. 2016. Industrial Microbiology. 2nd edition. Trinity Press. New Delhi.
6. Rajan, S. 2007. Medical Microbiology. M.J.P. Publishers. Chennai.
7. Powar, C.B. and Dagainawala, H.F. 2010. General Microbiology, Volume: 2. Himalaya Publishing House. Mumbai.

Reference Items: books, Journal

1. Tortora, G.J., Funke, R.B. and Case, C.L. 1992. Microbiology - An Introduction. The Benjamin / Cummings Publishing Co., Inc. Sydney.
2. Black, J.G. 1999. Microbiology - Principles and Explorations. John Wiley and Sons Inc. New York.
3. Atlas, R.M. 1995. Principles of Microbiology. Mosby - Year Book Inc.
4. Prescott L.M. Harley J.O. Klein D.A. 1990. Microbiology. WCB Publishers, Sydney.
5. Geo F. Brooks, Karen C. Carroll, Janet S. Butel, Stephen A. Morse. 2007. Medical Microbiology. 24th edition. Tata McGraw Hill, LANGE. New Delhi.
6. Roger Y. Stanier, John L. Ingraham, Mark L. Wheelis, Page R. Painter. 2008. General Microbiology. MacMillan Press Ltd. New York.

E- Materials

- <https://openstax.org/details/books/microbiology>
- <https://www.topfreebooks.org/medical-microbiology/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: IV
Paper code: DOZO44
Credit: 3

Paper type: Open Elective Paper 4
Name of the Paper: (A) SERICULTURE
Total Hours per Week: 3

(to Choose either A or B)

Course Objectives

1. To know the Biology of silkworm, their economic importance and methods practiced in sericulture.
2. To develop sericulture as a skill based curriculum.

UNIT -I: ECONOMIC IMPORTANCE AND SILKWORM BIOLOGY

Prospects and status of sericulture in India and other major silk producing countries. Silk producing species - their distribution. *Bombyxmori* - life cycle - organization of larvae, pupae and moth - structure and function of the silk gland.

UNIT-II: MORICULTURE

Mulberry - varieties - distribution - methods of cultivation and preparation - Harvest - Transport and preservation of leaves. Feeding and nutrition - specificity of diet - Factors of nutrition - Diet and growth. Pest and diseases.

UNIT-III: SILKWORM REPRODUCTION AND GENETICS

Reproduction: Growth and Development of silkworms - Physiology of moulting in different varieties (Uni, bi and multivoltine) - Endocrinology of reproduction and development. Genetics: mutation breeding and development of new strains.

UNIT-IV: PATHOGENIC DISEASES AND PEST

Pathology: Viral, bacterial, fungal and protozoan diseases - causative organisms – modes of transmission – symptoms - control mechanisms. Uzi fly menace.

UNIT-V: SILKWORM REARING AND SILK REELING

Rearing operations - Selection and construction of rearing house Incubation - Hatching - brooding, Harvesting. Reeling techniques - Re-reeling - Silk examination – lacing, skeining.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be

- To know the general and development of sericulture research.
- Modern trends and Concepts in sericulture research.

2. After studied unit-2, the student will be

- (1) The student will be involved in various aspects of egg production.

3. After studied unit-3, the student will be

- able to understand silk health diagnosis, identification of different system.

4. After studied unit-4, the student will be

- the student involved in various product of silk.

5. After studying unit-5, the student will be

- The student involved in various products of silk.
- To develop highly qualified personnel and profession and manpower in silk and sericulture.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

Teaching Hours:

- By learning the history of sericulture.
- Understanding the status of silk producing countries and sericulture in India.
- Basic terminologies of sericulture.
- Learning the nursery preparation and cultivating silkworms.

Unit-2: (50 to 100 contents)

Teaching Hours:

- By learning the morphology and varieties of Mulberry.
- Study the harvest, transport and preparation of leaves.
- By learning the establishment of mulberry garden.

Unit-3: (50 to 100 contents)

Teaching Hours:

- Study the external morphology and life cycle of silkworm.
- Learning the anatomy of physiology.
- Learning the endocrine system, hormones and its roles.
- Studying the breeding methods and importance.

Unit-4: (50 to 100 contents)

Teaching Hours:

- Learning Viral, Bacterial, Fungal, and Protozoan Diseases.
- Understanding the mode of transmission and control mechanisms.
- Learning the use of manure.

Unit-5: (50 to 100 contents)

Teaching Hours:

- By learning the silkworm rearing techniques.
- By understanding the differentiation of young age and old age rearing methods.
- Learning the reeling techniques and examination of silk reeling and skeining.

Text Books

1. Ganga, G. and Sulochana Chetty, J. 1997. An Introduction to Sericulture. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Ganga, G. 2003. Comprehensive Sericulture Vol-I: Moriculture. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Ganga, G. 2003. Comprehensive Sericulture Vol-II: Silkworm Rearing and Silk Reeling. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

4. Madan Mohan Rao, M. 2019. An Introduction to Sericulture. 2nd edition, B.S. Publications. Andhra Pradesh, India.
5. Amardev Singh. 2012. Text book on Sericulture Training. Bio-Green Books. New Delhi.

Reference Items: books, Journal

1. Hisao Aruga. 1994. Principles of Sericulture (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
2. Veda, K., Nagai, I. and Horikomi, M. 1997. Silkworm Rearing (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
3. Otsuki, R. and Sato, S. 1997. Silkworm Egg Production (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
4. Eikichi Hiratsuka. 1999. Silkworm Breeding (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
5. Mahadevappa, D., Halliyal, V.G., Shankar D.G. and Bhandiwad, R., 2000. Mulberry Silk Reeling Technology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
6. Soo-Ho Lim, Young-Taek Kim, Sang-Poong Lee. 1990. Sericulture Training Manual – Published by FAO – USA. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
7. Wu Pang-Chuan and Chen Da-Chuang. 1994. Silkworm Rearing – Published by FAO – USA. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.
8. Lu Yup-Lian and Liu-Fu-an. 1991. Silkworm Diseases - Published by FAO – USA. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

E- Materials

- <https://archive.org/details/SericultureHandbook/page/n1/mode/2up>
- <http://www.csrtimys.res.in/books-0>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

Semester: IV
Paper code: DOZO44
Credit: 3

Paper type: Open Elective Paper 4
Name of the Paper: (B) PEARL CULTURE
Total Hours per Week: 3

Course Objectives

- Learning the natural process of pearl formation.
- Study the Environmental parameters
- Studying the predators of pearl oyster.
- Study and maintaining the genic condition of culture units and post-operative tanks.
- Learning the techniques of implantation.

Unit 1:

Biology of Pearl oyster: Pearl producing molluscs. Morphology and anatomy of Pearl oyster, Life cycle of pearl oyster.

Unit 2:

Structure and Histology of mantle. Natural Process of Pearl formation. Chemical composition of Pearls. Economic importance of pearls.

Unit 3:

Pearl oyster culture: Techniques of pearl oyster culture (Fresh water and Marine water) for artificial production of pearls. Pearl culture techniques -Rafts, long lines, Pearls oyster baskets, under water platforms, mother oyster culture/Collection of oysters, rearing of oysters, Environmental parameters. Pearl Oyster surgery (Selection of Oyster, Graft tissue preparation, Nucleus insertion, Conditioning for surgery), Post-operative culture, harvesting of pearl, clearing of pearl.

Unit 4:

Diseases and Predators of Pearl oysters.

Unit 5:

Present status, prospects and problems of pearl industry in India.

UNIT V

Pearl Production: Overview of pearl trade, pearl oysters and mussels of commercial importance; anatomy, biology and seed production, techniques of implantation, method of rearing and harvesting of pearl, Mable pearl production, processing and quality evaluation of pearls, pearl production by tissue culture

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be

- Identify the characteristics of molluscs.
- Understand the how pearls are formed.
- Understand the role of pearl culture techniques.

1. After studied unit-2, the student will be

- Perform implantation.
- Learning the chemical composition.
- To know about culturing of pearls.

2. After studied unit-3, the student will be

- Understand the how to conserve the habitat of molluscs.
- Student will be able to understand the collection of oysters, theoretical based implantation.
- The student will be able to acquire the knowledge to perform surgical procedure of implantation.

3. After studied unit-4, the student will be

- Monitor the health of pearl oyster by provide sampling and maintaining hygienic condition of culture.
- To understand the disease of Pearl oysters.

4. After studied unit-5, the student will be

- Student will understand and apply the skill needed to achieve academic success.
- Student will understand the economical and moral values.
- Student will learn the workmanship to serve the society.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	No	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Unit-1: (50 to 100 contents)

- Identify the pearl producing oyster.
- Learning the soil profile and water quality for culture.
- To study the life cycle of the Pearl oyster.

Teaching Hours:

Unit-2: (50 to 100 contents)

- Study the structure and histology of mantle.
- Learning the natural process of pearl formation.
- Study the chemical composition of Pearls.

Teaching Hours:

Unit-3: (50 to 100 contents)

- Learning the pearl culture techniques.
- Study the Environmental parameters.
- By learning to identify species capable of producing pearls.
- Learning the anatomy and theoretical basis of surgical implantation.

Teaching Hours:

Unit-4: (50 to 100 contents)

- Learning the disease caused in pearl oyster.
- Studying the predators of pearl oyster.
- Study and maintaing the genic condition of culture units and post-operative tanks.

Teaching Hours:

Unit-5: (50 to 100 contents)

- Learning the overview of pearl trade.
- Learning the techniques of implantation.
- Method of rearing and harvesting of pearl.

Teaching Hours:

Text Books

- Paul Southgate, and John Lucas, 2008. The pearl oyster, Elsevier Science

Reference Items: books, Journal

- Paul Southgate, and John Lucas, 2008. The pearl oyster, Elsevier Science

E- Materials

- http://www.ctsa.org/files/publications/CTSA_1276316728619239483681.pdf
- http://eprints.cmfri.org.in/3208/1/Special_Publication_No_20.pdf
- https://krishi.icar.gov.in/PDF/Selected_Tech/fisheries/33-FS-Fresh%20water%20pearl%20culture.pdf
- <https://www.agrifarming.in/pearl-farming-project-report-cost-profits>
- <https://spo.nmfs.noaa.gov/sites/default/files/legacy-pdfs/leaflet357.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	M
CO3	S	M	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	M	M	S	S

THIRUVALLUVAR UNIVERSITY

BACHELOR OF SCIENCE B.Sc. PHYSICS DEGREE COURSE

(With effect from 2022 - 2023)

The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1.	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2.	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3.	III	Core Theory	Paper-1	6	4	Mechanics	25	75	100
	III	Core Practical	Paper-1	3	0		0	0	0
4.	III	Allied -1	Paper-1	4	3	Chemistry I or Biochemistry I	25	75	100
	III	Allied Practical	Practical-1	3	0		0	0	0
5.	III	PE	Paper 1	6	3	Professional English I	25	75	100
6.	IV	Environmental Studies		2	2	Environmental studies	25	75	100
		Sem. Total		36	20		150	450	600
SEMESTER II							CIA	Uni. Exam	Total
7.	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
8.	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
9.	III	Core Theory	Paper-2	4	4	Heat and Thermodynamics	25	75	100
10.	III	Core Practical	Practical-1	3	2	Practical - I	25	75	100
11.	III	Allied-1	Paper-2	4	3	Chemistry II or Biochemistry II	25	75	100
12.	III	Allied Practical	Practical-1	3	2	Practical-Allied	25	75	100
13.	III	PE	Paper 1	6	3	Professional English II	25	75	100
14.	IV	Value Education		2	2	Value Education	25	75	100
15.	IV	Soft Skill		2	1	Soft Skill	25	75	100
		Sem. Total		36	25		225	675	900
SEMESTER III							CIA	Uni. Exam	Total
16.	I	Language	Paper-3	6	4	Tamil/Other Languages	25	75	100
17.	II	English	Paper-3	6	4	English	25	75	100
18.	III	Core Theory	Paper-3	5	4	Electricity, Magnetism and Electromagnetism	25	75	100
	III	Core Practical	Paper-2	3	0		0	0	0
19.	III	Allied-2	Paper-3	6	3	Mathematics I	25	75	100

20.	IV	Skill Based Subject	Paper-1	2	2	Basic Electrical Technology	25	75	100
21.	IV	Non-Major Elective	Paper-1	2	2	Environmental Physics	25	75	100
		Sem. Total		30	19		150	450	600
SEMESTER IV									
22.	I	Language	Paper-4	6	4	Tamil/Other Languages	25	75	100
23.	II	English	Paper-4	6	4	English	25	75	100
24.	III	Core Theory	Paper-4	5	5	Waves and Optics	25	75	100
25.	III	Core Practical	Practical-2	3	3	Any 15 Experiments given in the syllabus	25	75	100
26.	III	Allied-2	Paper-4	6	5	Mathematics II	25	75	100
27.	IV	Skill Based Subject	Paper-2	2	2	Physics Workshop Skills	25	75	100
28.	IV	Non-Major Elective	Paper-2	2	2	Everyday Physics	25	75	100
		Sem. Total		30	25		175	525	700
SEMESTER V									
29.	III	Core Theory	Paper-5	6	6	Atomic and Molecular Physics	25	75	100
30.	III	Core Theory	Paper-6	6	6	Relativity and Quantum mechanics	25	75	100
31.	III	Core Theory	Paper-7	6	6	Basic and Applied Electronics	25	75	100
	III	Core Practical	Practical-3	3	0	General Practical	0	0	0
	III	Core Practical	Practical-4	3	0	Electronics Practical	0	0	0
32.	III	Elective	Paper-1	4	3	Group (A) or (B) or (C)	25	75	100
33.	IV	Skill Based Subject	Paper-3	2	2	Cell Phone Technology	25	75	100
		Sem. Total		30	23		125	375	500
SEMESTER VI									
34.	III	Core Theory	Paper-8	6	5	Nuclear and Particle Physics	25	75	100
35.	III	Core Theory	Paper-9	5	5	Solid State Physics	25	75	100
36.	III	Core Practical	Practical-3	3	3	General Practical	25	75	100
37.	III	Core Practical	Practical-4	3	3	Electronics Practical	25	75	100
38.	III	Elective	Paper-2	4	3	Group (A) or (B) or (C)	25	75	100
39.	III	Elective	Paper-3	4	3	Group (A) or (B) or (C)	25	75	100
40.	III	Compulsory Project	Paper-10	3	3	Group / Individual Project	25	75	100
41.	IV	Skill based Subject	Paper-4	2	2	Weather forecasting	25	75	100
42.	V	Extension Activities		0	1		100	0	100
		Sem. Total		30	28		300	600	900
		Grand Total			140				4200

Part	Subject	Papers	Credit	Total Credits	Marks	Total Marks
Part I	Languages	4	4	16	100	400
Part II	Communicative English & English	4	4	16	100	400
Part III	Allied (Odd Semester)	2	3	10	100	200
	Allied (Even Semester)	2	8		100	200
	Allied Practical	1	2		100	100
	Electives	3	3	9	100	300
	Core	9	(3-6)	45	100	900
	Core practical	4	(2-3)	11	100	400
	Professional English	2	3	6	100	200
	Compulsory Project (Group/Individual Project)	1	3	3	100	100
Part IV	Environmental Science	1	2	2	100	100
	Soft skill	1	1	1	100	100
	Value Education	1	2	2	100	100
	Lang. & Others /NME	2	2	4	100	200
	Skill Based	4	2	8	100	400
Part V	Extension Activities	1	1	1	100	100
	Total	42		140		4200

Note: Compulsory Project

The faculty/Guides are advised to give projects and suggest project titles focusing more on the current field of research/social relevance and ensure the level of innovation. Staff member cannot guide more than five students for a group project.

A student may be permitted to work on projects in an Industrial/Research Organization, on the recommendations of the Head of his/her Department. In such cases, the Project work shall be jointly guided by a guide of the department and an expert from the organization. The student shall be instructed to meet the respective guide periodically for evaluating the progress.

ELECTIVE SUBJECTS

Students can choose any one of the groups (Elective I, II & III)

GROUP A

Elective 1: Digital Electronics

Elective 2: Fundamentals of Microprocessor-8085

Elective 3: Nanophysics

GROUP B

Elective 1: Digital Electronics

Elective 2: Materials Science

Elective 3: Medical Physics

GROUP C

Elective 1: Digital Electronics

Elective 2: Radiation Safety

Elective 3: Astrophysics

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: I

Paper type: Core

Paper code:

Name of the Paper: Mechanics

Credit:4

Total Hours per Week:6

Lecture Hours: 90

Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To know the basics of vectors algebra and the dynamic of a system
2. To understand the dynamics of rigid bodies
3. To learn the concept of work, energy and collisions
4. To study the basics of elasticity
5. To expose the knowledge on gravitation and satellites

UNIT-I

Teaching Hours: 20

VECTORS AND DYNAMICS

Introduction to Vectors - Vector algebra-Scalar and vector products-Gradient of a scalar field- Divergence of a vector field - Line integral - Curl of a vector field - Surface and volume integrals -Stoke's theorem - Gauss theorem of divergence - Green's theorem - Newton's laws of motion-Principle of conservation of momentum-Impulse-Projectile-Range on an inclined plane- Range and Time of flight down an inclined plane-Two body problem and the reduced mass-Centre of mass-Centre of gravity-Centre of gravity of a solid tetrahedron-Analytical problems solving.

UNIT-II

Teaching Hours: 20

DYNAMICS OF RIGID BODIES

Rotational kinetic energy and moment of inertia-Angular acceleration and angular momentum-Law of conservation of angular momentum-Torque-Work done by a torque-Theorem of perpendicular and parallel axes-Moment of inertia of a thin uniform rod-rectangular lamina-uniform circular disc (through the centre of gravity for all)-Determination of acceleration due to gravity-Compound pendulum-Centre of suspension and centre of oscillation are interchangeable- Bifilar pendulum (parallel threads)- Analytical problems solving.

UNIT-III

Teaching Hours: 18

WORK, ENERGY & COLLISIONS

Work-Energy Theorem – Conservative forces - Potential Energy-Force as gradient of potential energy-Principle of conservation of energy of a freely falling body.

Elastic and inelastic collisions-Coefficient of restitution-Oblique impact of a smooth sphere on a fixed smooth plane-Oblique impact of two smooth spheres-Loss of kinetic energy due to oblique impact- Analytical problems solving.

UNIT-IV

Teaching Hours: 18

ELASTICITY

Elastic moduli-Hooke's law- Relation between elastic constants – Poisson's Ratio - Work done in stretching twisting a wire-Twisting couple on a cylinder-Rigidity modulus of a wire by Torsional pendulum-Rigidity modulus of a rod by Static torsion method-Bending of beams -Expression for bending moment – Cantilever -Expression for depression at the loaded end- Non-uniform bending-Determination of young's modulus pin & microscope and Koenig's method- Uniform bending-Expression for elevation – Experiment to determine young's modulus using optic lever method- Analytical problems solving,

UNIT-V

Teaching Hours: 14

GRAVITATION

Law of gravitation-Acceleration due to gravity- Inertial mass and gravitational mass-Gravitational field-Gravitational potential-Gravitational potential energy- Potential and field due to spherical shell and solid sphere.

Kepler's Laws-Basic principles of rocket motion-Rocket Equation, thrust and acceleration-Escape velocity-Orbital velocity-Satellite in circular orbit-Geosynchronous orbits-Weightlessness- Basic idea of global positioning system (GPS)-Physiological effects on astronauts- Analytical problems solving.

Text Books

Unit 1

1. R. Murugesan, Mechanics and Mathematical methods, S.Chand&Co.Ltd, New Delhi, 2016

Unit 2

1. BrijLal and N. Subrahmanyam, Properties of Matter, S.Chand&Co.Ltd, New Delhi, 2002

Unit 3

1. M. Narayanamurti and N.Nagartnam, Dynamics, The National Publishing Company, Chennai, 2005.
2. Prof. D.S. Mathur revised by Dr.P.S. Hemne, Mechanics, S. Chand and Company Limited, 2014
3. R. Murugesan, Mechanics and Mathematical methods, S.Chand&Co.Ltd, New Delhi, 2016

Unit 4

1. R. Murugesan, Properties of Matter and Acoustics, S.Chand&Co.Ltd, New Delhi, 2016
2. BrijLal and N. Subrahmanyam, Properties of Matter, S.Chand&Co.Ltd, New Delhi, 2002
3. K. Ilangovan, Properties of Matter and Sound, Ananda Book Depot, Chennai, 2018.
4. J.Jayachitra and M. Gunasekaran, Properties of Matter and Acoustics, KRU Publications, Kumbakonam, 2007.

Unit 5

1. BrijLal and N. Subrahmanyam, Properties of Matter, S.Chand&Co.Ltd, New Delhi, 2002
2. Prof. D.S. Mathur revised by Dr.P.S. Hemne, Mechanics, S. Chand and Company Limited, 2014

Reference Books

1. Introduction to Mechanics, Mahendra Verma, Universities Press, Hyderabad, 2016
2. Sathyaprakash, Mathematical Physics, Sultanchand& Sons, New Delhi, Revised Ed.
3. Resnick, Halliday and Walker, Physics, 8/e. 2008, Wiley
4. J.W. Jewett, R.A. Serway, Physics for scientists and Engineers with Modern Phys., , 2010, Cengage Learning
5. R.P.Feynman, R.B.Leighton, M.Sands, Feynman Lectures, Vol. I, , 2008, Pearson Education
6. M.R. Spiegel, Theoretical Mechanics, , 2006, Tata McGraw Hill.
7. C.Kittel, W.Knight, et.al, Mechanics, Berkeley Physics, vol.1. 2007, Tata McGraw-Hill.
8. G.R. Fowles and G.L. Cassiday, Analytical Mechanics,. 2005, Cengage Learning.
9. Higher Secondary Plus 1 and Plus 2 Physics Books- TN State Board and NCERT Books.
10. எந்திரவியல் மற்றும் பொருட்பண்பியல் & ஒலி-A சுந்தரவேலுசாமி ,பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு)

E-Materials

1. <https://sites.google.com/a/euhds.org/physics/>
2. https://en.wikipedia.org/wiki/Euclidean_vector
3. <https://www.youtube.com/watch?v=sXKiAKn0WCM>
4. https://en.wikipedia.org/wiki/Center_of_mass
5. https://en.wikipedia.org/wiki/Moment_of_inertia
6. <https://www.toppr.com/guides/physics/system-of-particles-and-rotational-dynamics/moment-of-inertia/>
7. <https://byjus.com/physics/work-energy-power/>
8. <https://www.physicsclassroom.com/class/energy>
9. https://en.wikipedia.org/wiki/Bending_moment
10. <https://www.youtube.com/watch?v=CQGlgu-8dmA> (Tamil video)
11. https://en.wikipedia.org/wiki/Newton%27s_law_of_universal_gravitation
12. <https://www.youtube.com/watch?v=kxkFaBG6a-A>
13. <http://hyperphysics.phy-astr.gsu.edu/hbase/rocket2.html>
14. https://en.wikipedia.org/wiki/Global_Positioning_System
15. <https://study.com/academy/lesson/the-global-positioning-system-and-its-uses.html>

16. https://www.nasa.gov/centers/johnson/pdf/584739main_Wings-ch5d-pgs370-407.pdf

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to know fundamentals of vectors and able to formulate the expression for projectiles.
2. After studied unit-2, the student will be able to study the dynamics of rigid bodies in terms of moment inertia and also able to find the moment of inertia of different systems.
3. After studied unit-3, the student will be able to define work, energy and also able to understand the oblique impact between smooth spheres.
4. After studied unit-4, the student will be able to learn the elastic property of the solid materials and also derive the relation between elastic moduli.
5. After studied unit-5, the student will be able to explain the concept of gravitation and able to know the principles of rocket and satellite.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	S	S	M	M	L
CO2	S	S	S	M	S	S	S	M	M	L
CO3	S	S	S	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	S	M	M	L
CO5	S	S	S	M	S	S	S	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: II

Paper type: Core

Paper code: Name of the Paper: Heat and Thermodynamics Credit: 4

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. Get clear idea about the specific heat capacity and kinetic theory of gases
2. Knowledge about the conduction, radiation and low temperature physics will be gained
3. To know the thermodynamic system and its laws
4. To learn the concept of entropy and Maxwell's thermodynamical relations
5. To study the basic ideas of statistical mechanics

Unit-I

Teaching Hours : 15

SPECIFIC HEAT & KINETIC THEORY OF GASES

Specific heat capacity-Principle of method of mixtures-Specific heat capacity of liquid by method of mixtures-Newton's law of cooling-Specific heat capacity of a liquid by the method of cooling- Specific heat capacity of a liquid by Callender and Barne's method-Specific heat capacity of gases- Meyer's relation between C_P and C_V .

Kinetic theory of gases-Expression of pressure of gas-Boyle's law-Charle's law-Perfect gas equation- Mean free path-Expression for mean free path-Maxwell's velocity distribution law-Transport phenomena-Diffusion-Law of equipartition energy- Application to specific heat of gases.

Unit-II

Teaching Hours : 15

TRANSMISSION OF HEAT & LOW TEMPERATURE PHYSICS

Conduction-Coefficient of thermal conductivity-thermal conductivity of a good conductor--Forbe's method – thermal conductivity of a poor conductor -Lee's disc method-Black body radiation-Stefan -Boltzmann law-determination of Stefan's constant -laboratory method-Solar energy-Solar cooker-solar constant- temperature of the Sun.

Joule-Kelvin effect-Porous plug experiment- liquefaction of hydrogen- liquefaction of helium-Kammerling-Onne's method-Helium I and II -Lambda point-Superconductivity-Type I and II superconductors -Meissner effect-applications of superconductors.

UNIT-III

Teaching Hours : 10

THERMODYNAMICS

Thermodynamic system- Zeroth law, First and Second law of thermodynamics -Carnot's theorem-Statement and proof-Otto (petrol) engine and Diesel engine –Construction, working and efficiency- Thermodynamic scale of temperature- Thermodynamic and perfect gas scale.

UNIT-IV

Teaching Hours : 10

ENTROPY & ENTHALPY

Entropy- Change in entropy in a reversible/irreversible process-Temperature entropy diagram -Entropy of perfect gas- Third law of thermodynamics-Maxwell's thermo dynamical relations--Clapeyron latent heat equation-Clausius latent heat equation-Helmholtz and Gibb's free energy-Enthalpy.

UNIT-V

Teaching Hours : 10

STATISTICAL MECHANICS

Phase space- Macrostate and Microstate- Entropy and Thermodynamic probability, Maxwell-Boltzmann law - distribution of velocity -Quantum statistics - Fermi-Dirac distribution law - electron gas - Bose-Einstein distribution law - photon gas - comparison of three statistics-Ensembles-Micro,canonical and grand canonical ensembles.

Text Books

Unit 1 to Unit 5

1. D. Jayaraman, K. Ilangoan, Thermal Physics & Stastical Mechanics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2016.
2. BrijLal and N Subrahmanyam, Heat Thermodynamics and Statistical Physics, S Chand & Company Pvt Ltd, New Delhi, 2016.

Reference Books

1. D.S. Mathur, Heat and Thermodynamics, S Chand & Company Pvt Ltd, 2008.
2. J.B. Rajam, Heat and thermodynamics, S Chand & Co., New Delhi, 1990.
3. R Murugesan and KiruthigaSivaprasad, Thermal Physics, S Chand & Co., New Delhi, 2002.
4. Gupta and Kumar, Elements of Statistical Mechanics, PragatiPrakashan, Meerut, 2000.
5. SathyaPrakash and J P Agarwal, Statistical Mechanics, KedarNath& Ram Nath& Co., Meerut, 2002.
6. வெப்ப இயற்பியல்-A சுந்தரவேலுசாமி, பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு)

E- Materials

1. <https://www.e-booksdirectory.com/details.php?ebook=1778>
2. <https://www.ugrad.math.ubc.ca/coursedoc/math100/notes/diffeqs/cool.html>
3. <https://www.youtube.com/watch?v=JLU0phEP7h4>
4. <https://www.youtube.com/watch?v=Q7qzc7-flMY> (Tamil Video)
5. https://www.youtube.com/watch?v=Atnjo7dD_bA
6. <https://www.youtube.com/watch?v=iENG9VnBeP0>
7. http://www.iiserpune.ac.in/~bhasbapat/phy221_files/Lee's%20Method.pdf
8. <https://vikaspedia.in/energy/energy-production/solar-energy/solar-cookers>
9. <https://www.youtube.com/watch?v=ZWDI1-oZLJQ> (Tamil Video)
10. <https://www.youtube.com/watch?v=6IRXVZKH6WQ>
11. <https://www.youtube.com/watch?v=DPjMPeU5OeM>
12. <https://statisticalphysics.openmetric.org/equilibrium/ensembles.html>

Course Out Comes

1. After studied unit-1, the student will be able to know fundamentals specific heat capacity and able to explain the kinetic theory of gases.
2. After studied unit-2, the student will be able to describe the conduction and radiation of heat and also able to study the Joule-Kelvin effect based on the low temperature phenomena and its applications.
3. After studied unit-3, the student will be able to cite the laws of thermodynamics and their applications.
4. After studied unit-4, the student will be able to explore the equations governing second law of thermodynamics and entropy.
5. After studied unit-5, the student will be able to explain Phase-space, micro and macrostates and able to distinguish MB,FD and BE statistics.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
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1	Yes	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	No	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	M	M	L
CO2	S	S	M	M	S	S	M	M	M	L
CO3	S	S	M	M	S	S	M	M	M	L
CO4	S	S	M	M	S	S	M	M	M	L
CO5	S	S	M	M	S	S	M	M	M	L

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(B.Sc Physics) – 2022-2023 onwards

Semester: II

Paper type: Core Practical

Paper code:

Name of the Paper: Practical –1

Credit: 2

Total Hours per Week: 3 Lecture Hours: Nil Tutorial Hours: Nil Practical Hours: 45

List of Experiments (Any 15 Experiments only)

- Compound Pendulum -Determination of 'g' and 'k'.
- Young's modulus –non-uniform bending -Pin and microscope.
- Young's modulus –non-uniform bending -Optic lever.
- Young's modulus cantilever- depression- dynamic method-Mirror, Scale and Telescope.
- Rigidity modulus -Torsional Pendulum -without masses.
- Rigidity modulus and moment of inertia -Torsional Pendulum -with identical masses.
- Rigidity modulus -Static torsion -Mirror, scale and telescope.
- Surface tension and Interfacial surface tension - drop weight method.
- Coefficient of viscosity of liquid-Graduated burette -Radius of capillary tube by using microscope.
- Thermal conductivity of a poor conductor -Lee's disc method.
- Specific heat capacity of liquid -Newton's law of cooling.
- Sonometer -Frequency of Tuning fork.
- Sonometer -Relative density of a solid and liquid.
- Focal length -R and μ of a convex lens [focal length i) u-v and ii) conjugate foci method; Radius of curvature by telescope method].
- Focal length -R and μ of a concave lens [focal length i) in contact and ii) auxiliary lens method; Radius of curvature by Boy's method].
- Spectrometer -Solid prism- Refractive index of material of a prism.

17. Spectrometer- Hollow prism – Refractive index of a liquid.
18. Potentiometer -Calibration of low range voltmeter.
19. Potentiometer - Internal resistance of a Cell.
20. Post office box -Temperature coefficient of resistance of a coil.

Text Books

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2018.
2. M.N.Srinivasan, S. Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015.

Reference Books

1. Samir Kumar Ghosh, A Textbook of Advanced Practical Physics, NCBA, Kolkatta, 2000.
2. D. Chattopadyay, P.C.Rakshit, An Advanced Course in Practical Physics, NCBA, Kolkatta, 2011
3. C.L.Arora, B.Sc., Practical Physics, S. Chand and Company., New Delhi.
4. D.P.Khandelwal, A Laboratory Manual of Physics for Undergraduate Classes, Vani Publications.
5. B.Saraf et al, Physics through Experiments, Vikas Publications.
6. Harnaam Singh., B.Sc., Practical Physics, S. Chand and Company., New Delhi.
7. D C Tayal, University Practical Physics, Himalaya Publishing House.
8. Gupta & Kumar, Practical Physics, Pragati Prakashan, Meerut

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: III

Paper type: Core

Paper code: Name of the Paper: Electricity, Magnetism & Electromagnetism Credit: 4

Total Hours per Week: 5 Lecture Hours: 75 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. Familiarize with the concept of electric flux, electric potential and capacitors.
2. To know the principles current and thermo electricity.
3. Understand the magnetic effects of electric current.
4. Study the unification of electric and magnetic phenomena.
5. To gain knowledge about Maxwell's equations.

UNIT-I

Teaching Hours: 17

ELECTROSTATICS

Coulomb's Law- Gauss's Law and its applications (Electric Field due to a uniformly charged sphere, hollow cylinder & solid cylinder)-Electric Potential - Potential at a point due to a uniformly charged conducting sphere-Principle of a capacitor-Capacity of a spherical and cylindrical capacitors- Capacitance of a parallel plate capacitor-Partially filled with dielectric-Energy stored in a charged capacitor-Loss of energy on sharing of charges between two capacitors-Problems solving.

UNIT-II

Teaching Hours: 17

CURRENT ELECTRICITY AND THERMO ELECTRICITY

Carey Foster's Bridge-Determination of temperature coefficient of resistance of a coil– Potentiometer-Calibration of Ammeter and Voltmeter (Low range and High range) - Comparison of Resistances- Seebeck, Peltier and Thomson effects -Peltier coefficient - Thomson coefficient - application of thermodynamics to a thermocouple and expressions for Peltier and Thomson coefficients - thermo electric power and thermo electric diagrams- Problems solving.

UNIT-III

Teaching Hours: 16

ELECTROMAGNETIC INDUCTION

Laws of electromagnetic induction- Self and mutual induction- Self-inductance of a solenoid- Mutual inductance of a pair of solenoids-Coefficient of coupling-Experimental determination of self (Rayleigh's method) and mutual inductance-Growth and decay of current in a circuit containing L and R-Growth and decay of charge in a circuit containing C and R-Measurement of High resistance by leakage-Problems solving.

UNIT-IV

Teaching Hours: 17

MAGNETISM

Intensity of Magnetization-Magnetic Susceptibility- Magnetic Permeability-Types of magnetic materials- Properties of para, dia and ferromagnetic materials-Langevin's theory of dia and para magnetism-Weiss's theory of ferromagnetism - B-H curve-Energy loss due to magnetic hysteresis- Ballistic Galvanometer method for plotting B-H curve - Magnetic properties of iron and steel-Problems solving.

UNIT-V

Teaching Hours: 08

MAXWELL'S EQUATIONS & ELECTROMAGNETIC THEORY

Introduction-Displacement Current-Maxwell's equations in material media-Plane electromagnetic waves in free space-velocity of light-Electromagnetic waves in isotropic non-conducting media-Index or refraction-Poynting vector-Problems solving

Text Books

Unit 1 to Unit 4

1. R Murugesan- Electricity and magnetism, S Chand & Co., New Delhi, 2006.

Unit 4 and Unit 5

1. R Murugesan- Electricity and magnetism, S Chand & Co., New Delhi, 2006
2. K KTewari, Electricity & Magnetism by, S Chand & Co.,2001.

Reference Books

1. BrijLal and N Subrahmanyam, Electricity and Magnetism, S Chand & Company Pvt Ltd, New Delhi, 2000.
2. D.C. Tayal, Electricity and Magnetism, Himalaya Publishing House, Bombay, 1992.
3. M Narayanamurthy & N Nagarathnam, Electricity & Magnetism, National Publishing Co., Meerut.
4. David J Griffiths, Introduction to Electrodynamics, Prentice Hall of India, Pvt. Ltd., New Delhi, 1997.
5. மின்னியலும் காந்தவியலும்-A சுந்தரவேலுசாமி ,பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு)

E-Materials

1. https://en.wikipedia.org/wiki/Coulomb%27s_law
2. <https://www.toppr.com/guides/physics/electric-charges-and-fields/coulombs-law/>
3. https://www.youtube.com/watch?v=rkntp3_cZl4
4. <https://ask.learncbse.in/t/derive-an-expression-for-the-capacitance-of-a-parallel-plate-capacitor/66928>
5. <http://egyankosh.ac.in/bitstream/123456789/18820/1/Experiment-6.pdf>
6. <https://www.youtube.com/watch?v=vGpXTq-ITCE>
7. https://en.wikipedia.org/wiki/Thermoelectric_effect
8. <https://www.topperlearning.com/answer/derive-the-formula-for-self-inductance-of-a-solenoid/8k8rlhzff>
9. https://www.brainkart.com/article/Self-inductance-of-a-long-solenoid_12109/
10. <https://byjus.com/physics/diamagnetic-paramagnetic-ferromagnetic/>
11. https://www.youtube.com/watch?v=yWa_2P6CDpw
12. <https://nptel.ac.in/courses/115/101/115101005/>
13. <https://www.youtube.com/watch?v=4vEeG-YmCJQ> (Tamil video)

Course Outcomes

1. After studied unit-1, the student will be able to know fundamentals coulomb's law and Gauss's law and also able to derive the expression for electric potential, capacitance of a parallel plate capacitor.
2. After studied unit-2, the student will be able to derive the expression for temperature coefficient resistance of a coil using Carey Foster's Bridge and able to know how to calibrate the ammeter and voltmeter. Also students will be able to learn the thermo electricity concepts.
3. After studied unit-3, the student will be able to explain the concepts of self and mutual inductance using electromagnetic induction phenomenon.
4. After studied unit-4, the student will be able to distinguish the dia, para and ferro magnetic materials based on different theories.
5. After studied unit-5, the student will be able to formulate the expression for displacement current and Maxwell's equations.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
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1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	Yes	Yes	Yes
3	Yes	Yes	No	Yes	Yes	Yes
4	Yes	Yes	No	Yes	No	Yes
5	Yes	Yes	Yes	No	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	M	M	L
CO2	S	S	M	M	S	S	M	M	M	L
CO3	S	M	M	M	S	S	S	S	M	L
CO4	S	S	M	M	M	S	M	M	M	M
CO5	S	S	M	M	S	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: III

Paper type: Skill Based Subject (SBS)-1

Paper code: Name of the Paper: Basic Electrical Technology

Credit: 2

Total Hours per Week: 2 Lecture Hours: 30 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. Students can know the basic principles of electricity.
2. To expose the knowledge on different kinds of cells and batteries.
3. To state the different theorems for DC circuits and know the function of DC generator/motor.
4. To know the principle of transformers and motors.
5. To acquire the basic ideas of alternating voltage and current.

UNIT-I

Teaching Hours: 07

BASIC ELECTRICITY PRINCIPLES

Voltage, Current, Resistance, and Power-Ohm's law- Resistors Series, parallel -combinations - Series-Parallel combinations - Charge-Coulomb's law-Capacitors-Capacitance of capacitor- AC Electricity-LT/HT Line-Concept of neutral and earth-Application of fuse- MCB, ELCB-relays -Electrical Safety- Safety Precautions of Electricity -Electric Shock-Preventive measures of Electrical Shock.

UNIT-II

Teaching Hours: 05

CELL AND BATTERIES

Dry Cell -Voltaic Cell-Daniel cell-Leclanche cell-Secondary Cell and its Classification-Lithium Ion Battery- Disparity between Lead Acid Battery and Lithium Ion Battery-Hydrogen battery-UPS Battery -Solar cell-Principle and design.

UNIT-III

Teaching Hours: 05

DC CIRCUITS

Kirchhoff's Current and Voltage Law-Wheatstone's bridge-Source conversion-Superposition theorem-Thevenin's theorem-Norton's theorem-Joule's law of electric heating-Electric power-D.C generator-Construction and working-D.C motor-Speed of a D.C motor.

UNIT-IV

Teaching Hours: 07

AC FUNDAMENTALS

Generation of Alternating voltages and alternating currents-Equations of the alternating voltages and currents-Simple waveforms - Cycle-Time Period - Frequency-Amplitude-Different forms of emf equation - Phase-Phase difference-RMS, Average and Peak values-RLC circuit in series-Resonance in RLC circuit-Graphic representation of series resonance-Single phase and three phase connections-Star and delta connection.

UNIT-V

Teaching Hours: 06

TRANSFORMERS AND MOTORS

Transformer-Step and Step down transformers-Construction and working-Losses in a transformer-Efficiency of a transformer-Types of a transformers-AC generator/alternator-Principle and construction-Single phase and three phase induction motors-Principle and construction.

Text Books

Unit-1 to Unit-5

1. B.L. Theraja, Fundamentals of Electrical Engineering and Electronics, S. Chand & Company Ltd., New Delhi, 2008.
2. B.L. Theraja and A.K. Theraja, A Text book of Electrical Technology, Volume I & II, Chand & Company Ltd., New Delhi, 2007.

Reference Books

1. V.K. Mehta and Rohit Mehta, Basic Electrical Engineering, S. Chand & Company Ltd., New Delhi, 2009.
2. Basic Electrical Engineering-Vocational Theory-Plus One Text Book-TN State Board.

E-Materials

1. <https://www.electrical4u.com/>
2. <https://www.youtube.com/watch?v=WtymNvcBdIU>
3. <https://www.atlantictraining.com/blog/15-safety-precautions-electricity/>
4. <https://www.explainthatstuff.com/solarcells.html>
5. https://www.youtube.com/watch?v=L_q6LRgKpTw
6. <https://www.youtube.com/watch?v=3rOvQ3qFZpI>
7. https://en.wikipedia.org/wiki/Wheatstone_bridge
8. <https://www.electronics-tutorials.ws/accircuits/series-resonance.html>
9. <https://www.youtube.com/watch?v=smXF1UeN0EI> (Tamil video)
10. <https://www.youtube.com/watch?v=hXLA5sdT9Cs>
11. <http://www.circuitstoday.com/transformer>

Course Outcomes

1. After studied unit-1, the student will be able to know principle of Voltage, Current, Resistance, Ohm's law and Electrical safety.
2. After studied unit-2, the student will be able to distinguish between cells and batteries and able to explain the different types of batteries.
3. After studied unit-3, the student will be able to understand the Wheatstone's bridge, Thevenin and Norton's theorem and also able to describe the function of DC generator and motor.
4. After studied unit-4, the student will be able to know the fundamentals of alternating currents and voltages and able to differentiate the single phase and three phase connections.

5. After studied unit-5, the student will be able to acquire the principle and construction of transformers and its types and also able to demonstrate the function of AC generator.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	No	Yes	Yes	No
4	Yes	Yes	No	Yes	No	Yes
5	Yes	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	M	M	L
CO2	S	S	M	M	S	S	M	M	M	L
CO3	M	M	M	M	S	M	S	S	M	L
CO4	S	S	M	M	M	S	M	M	M	L
CO5	S	S	M	M	S	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: III

Paper type: Non-Major Elective (NME)-1

Paper code: Name of the Paper: Environmental Physics

Credit: 2

Total Hours per Week: 2 Lecture Hours: 30 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. Students will have the basic knowledge about atmosphere, weather and cyclones.
2. To understand the reasons for climate change and global warming.
3. To analyse the need and usage of non-conventional energy resources.
4. To learn the concepts of Radiation detection.
5. To realise the importance of Radiation safety measures.

UNIT- I

Teaching Hours: 06

ATMOSPHERIC PHYSICS

Basics of the structure and composition of atmosphere - Layers of atmosphere - Measurement of atmospheric pressure and temperature - Weather patterns - Weather analysis and forecasting - Characteristics of cyclones and anti-cyclones.

UNIT- II

Teaching Hours: 06

CLIMATE CHANGE

Climate - Definition and classification - Basic reasons for climate change - Greenhouse effect and gases - Effects of global warming - Ozone depletion - Acid rain.

UNIT- III

Teaching Hours: 06

ENERGY RESOURCES

Need for non-conventional energy resources- Solar water heater - Solar cell - Merits and Demerits of Solar energy - Wind energy conversion systems - Bio mass energy - Bio gas generation - Industrial applications.

UNIT- IV

Teaching Hours: 06

RADIATION DETECTION

Nuclear reactions - Nuclear fission and fusion - Interaction between energetic particles and matter - Ionisation Chamber - Proportional counter - Geiger Muller Counter - Wilson cloud chamber - Diffusion cloud chamber - Bubble chamber - Nuclear emulsions - Scintillation counter - Cerenkov counter.

UNIT- V

Teaching Hours: 06

RADIATION SAFETY

Biological effects of nuclear radiations - Radiation hazards - Radiation protection standards - Radiation protection methods -Nuclear waste disposal management - Nuclear disasters - Chernobyl disaster - Hiroshima and Nagasaki disaster - Nuclear reactors in India - Radiation safety measures in India.

Text Books

Unit 1 and Unit 2

1. Frederick Lutgens K, Edward J Tarbuck, Dennis Tasa, Atmosphere- An Introduction to Meteorology, Prentice Hall of India.
2. S.R.Ghadekar, Meteorology, Agromet Publishers, 2001.
3. AnupChatterjee, Global Warming and Climate Change, Global publications.

Unit 3

1. B.H.Khan, Non-Conventional Energy Resources, McGraw Hill Publications.
2. Agarwal, Renewable and Sustainable Energy Sources,

Unit 4 and Unit 5

1. R.Murugesan, Modern Physics, KiruthigaSivaprasath, S.Chand&Co, New Delhi, 2007
2. S.N.Ghoshal, Nuclear Physics, S.Chand& Co, New Delhi, 2006
3. AN.Subrahmaniyam, Brijlal, Atomic and Nuclear Physics, S.Chand&Co, New Delhi, 2006
4. K.Gopalakrishnan, Atomic and Nuclear Physics, Mcmillan Publishers, 2006

Reference Books

1. I.C.Joshi, Aviation Meteorology, Himalayan Books, 2014
2. V.Devanathan, Nuclear Physics, Narosa Publishing House, New Delhi, 2013.
3. D.P. Kothari, K.C. Singal & Rakesh Ranjan, Renewable Energy Sources and Emerging Technologies, Prentice Hall of India pvt. Ltd., New Delhi, 2008.
4. A.Martin and S.A.Harbisor, An Introduction to Radiation Protection, John Wiley & Sons, 1981.
5. Atmospheric Science - An Introductory Survey, John M.Wallace, Peter V.Hobbs, Elsevier Publishers
6. NCRP, ICRP, ICRU, IAEA, AERB publications.
7. ஆற்றல் இயற்பியல்-A.சுந்தரவேலுசாமி, பிரியா பப்ளிகேஷன்ஸ், கரூர்.

E-Materials

1. <https://easyengineering.net/non-conventional-energy-resources-khan/>
2. <http://nap.edu/631>
3. <https://ocw.mit.edu/courses/nuclear-engineering/22-091-nuclear-reactor-safety-spring-2008/>
4. https://en.wikipedia.org/wiki/Atmosphere_of_Earth
5. <https://www.youtube.com/watch?v=zaQWhEtLxeU> (Tamil video)
6. <https://www.youtube.com/watch?v=Nf8cuvl62Vc>
7. https://en.wikipedia.org/wiki/Acid_rain
8. https://nptel.ac.in/content/storage2/courses/108108078/pdf/chap7/teach_slides07.pdf
9. <https://www.youtube.com/watch?v=Rf9whdycpLI>
10. <https://www.youtube.com/watch?v=WyyIuiV4rKE>

11. https://en.wikipedia.org/wiki/Geiger_counter

Course Outcomes

1. After studied unit-1, the student will be able to basic concepts of atmosphere and also able to know how it can be measured and study the characteristics of cyclones.
2. After studied unit-2, the student will be able to explain the details of climate, greenhouse effect and global warming.
3. After studied unit-3, the student will be able to describe the different renewable energy sources and its applications.
4. After studied unit-4, the student will be able to know how to detect the nuclear radiation with different instruments.
5. After studied unit-5, the student will be able to know how to saveourselves from nuclear radiation hazards.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	No	Yes	No	No
5	Yes	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	L
CO2	S	S	M	S	S	S	M	M	L	M
CO3	M	M	M	S	S	M	S	S	M	M
CO4	S	S	M	S	M	S	M	M	M	L
CO5	S	S	M	S	S	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: IV

Paper type: Core

Paper code:

Name of the Paper: Waves and Optics

Credit: 5

Total Hours per Week: 5 Lecture Hours: 75 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To expose the knowledge of different types of waves motion and oscillations.
2. To study the property of surface tension and viscosity of a liquid.
3. To learn the different types of aberrations and phenomenon of interference.
4. To teach the Fresnel's and Fraunhofer's class of diffraction and its applications.
5. To know the basics of polarization phenomenon.

UNIT- I

Teaching Hours: 17

WAVES & OSCILLATIONS

Progressive waves-Equation for progressive wave-Simple harmonic motion - Superposition of Two Perpendicular Harmonic Oscillations - Lissajous Figures -Forced oscillations-Differential equation and solution-Laws of transverse vibration of stretched string - Sonometer-Frequency of AC mains - Acoustics-Intensity and Loudness-Reverberation and reverberation time - Absorption coefficient - Sabine's formula -measurement of reverberation time - Acoustic aspects of halls and auditoria -Ultrasonics-Production-Piezoelectric oscillator - Applications-Non Destructive Testing (NDT)-B-Scan-Problems solving

UNIT- II

Teaching Hours: 13

FLUIDS

Surface Tension-Excess pressure inside a curved liquid surface-Synclastic and anticlastic surface - Surface tension-Jaeger's method-Drop weight method-Interfacial surface tension-Variation of surface tension with temperature - Viscosity-Poiseuille's formula - Determination of coefficient of viscosity of a liquid -Burette method- Variations of viscosity of a liquid with temperature and pressure - Lubrication-Problems solving

UNIT- III

Teaching Hours: 17

GEOMETRICAL OPTICS & INTERFERENCE

Spherical aberration in lenses -Condition for minimum spherical aberration in the case of two lenses separated by a distance-Chromatic aberration in lenses - Condition for achromatism of two thin lenses(in contact and out of contact) - Astigmatism-Huygen's and Ramsden's

eyepieces - Air wedge- Determination of diameter of a thin wire by air wedge- Fringes of equal thickness-Michelson's Interferometer-Determination of wave length- Thickness of thin transparent material-Refractive index of gases -Jamin's& Rayleigh's Interferometers-Problems solving

UNIT- IV

Teaching Hours: 14

DIFFRACTION

Fresnel's diffraction-Diffraction at circular aperture and straight edge- Fraunhofer's diffraction -Single slit-Theory of Plane diffraction grating -Experiment to determine wavelength-normal incidence- Determination of wavelengths-Missing orders-Overlapping spectra-Rayleigh's criteria -Resolving power of telescope-Microscope-Prism - Grating-Distinguish between prism and grating spectra-Problems solving

UNIT- V

Teaching Hours: 14

POLARISATION

Introduction to polarisation-Brewster's law- Double refraction-Huygen's explanation of double refraction in uniaxial crystal-Nicol Prism-Double image polarizing prisms-Dichroism -Polaroids and their uses-Production and detection of Plane, circularly and elliptically and polarized light -Optical Activity -Fresnel's explanation of optical activity -Specific Rotation-Laurent's Half Shade Polarimeter -Faraday effect-Problems solving

Text Books

Unit 1 to Unit 2

1. K. Ilangoan, Properties of Matter and Sound, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2018.
2. J.Jayachitra and M. Gunasekaran, Properties of Matter and Acoustics, KRU Publications, Kumbakonam, 2007.

Unit 3 to Unit 5

1. N.SubrahmanyamBrijlal and M.N Avadhanulu, A Text Book of Optics, S.Chand& Co.Ltd, New Delhi, 2015.
2. R. Murugesan, Optics & Spectroscopy, S.Chand&Co.Ltd, New Delhi, 2016.

Reference Books

1. R. Murugesan, Properties of Matter and Acoustics, S.Chand&Co.Ltd, New Delhi, 2016
2. BrijLal and N. Subrahmanyam, Properties of Matter, S.Chand&Co.Ltd, New Delhi, 2002
3. N.Subrahmanyam and BrijLal, A Text Book of Sound,Vikas Publications, New Delhi,1982.
4. C.L.Arora, Waves, Vibrations & Sound, S.Chand&Co.Ltd, New Delhi, 1984.
5. B.K. Mathur, Principles of Optics, Gopal Printing, 1995

6. H.R. Gulati and D.R. Khanna, Fundamentals of Optics, R. Chand Publication, 2011.
7. பொருட்பண்பியல் & ஒலி, ஒளியியல்-A சுந்தரவேலுசாமி ,பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு)

E-Materials

1. <http://hyperphysics.phy-astr.gsu.edu/hbase/shm.html>
2. <https://www.youtube.com/watch?v=tudxily5Qu0>
3. https://en.wikipedia.org/wiki/Surface_tension
4. <https://www.youtube.com/watch?v=CC7Q5cvmuTA> (Tamil video)
5. https://www.youtube.com/watch?v=aKY_GnwDyZc
6. https://ta.wikipedia.org/wiki/%E0%AE%AA%E0%AE%9F%E0%AE%BF%E0%AE%A%E0%AE%AE%E0%AF%8D:Chromatic_aberration_lens_diagram.svg (Tamil)
7. https://www.diffen.com/difference/Fraunhofer_Diffraction_vs_Fresnel_Diffraction
8. <https://www.youtube.com/watch?v=Q-oQKSLhLKw>
9. <https://www.slideshare.net/AnuroopAshok/polarization-birefringence-and-huygens-theory-of-double-refraction>
10. https://www.youtube.com/watch?v=lhUUGWA_uFE

Course Outcomes

1. After studied unit-1, the student will be able to formulate the equation for plane progressive wave and able to understand the concept of simple harmonic motion and other types of waves
2. After studied unit-2, the student will be able study the property of surface tension of a liquid and know how the surface tension varies with temperature and also able to explain the property of viscosity of a liquid.
3. After studied unit-3, the student will be able to describe the different optical of a lens system and able to design the eyepieces. Also able to know the phenomenon of interference and its applications.
4. After studied unit-4, the student will be able to distinguish between Fresnel class of diffraction and Fraunhofer class of diffraction. Also formulate the expression for resolving power of telescope, microscope, prism and grating.
5. After studied unit-5, the student will be able to explain the phenomenon of polarization and able to study the double refraction in uniaxial crystals. Also they can define optical activity, specific rotation and know the applications of polaroids.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	No	Yes	No	Yes
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	L

CO2	S	S	M	S	S	S	M	M	L	M
CO3	S	M	S	M	S	M	S	M	M	L
CO4	S	S	M	S	M	S	M	M	M	L
CO5	S	S	M	S	S	S	M	S	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: III

Paper type: Skill Based Subject (SBS)-2

Paper code: Name of the Paper: Physics Workshop SkillsCredit: 2

Total Hours per Week: 2 Lecture Hours: 30 Tutorial Hours: Nil Practical Hours: Nil

Course Objectives

1. Employ the specific skills in the testing of instruments.
2. Express the functions and working of different power supply system
3. To know the principle and working of different electrical and electronics appliances
4. State the concept of mobile Communication in real time process and digital communication.
5. Explain the Identification, classification, and working principle of various Biomedical Instruments and application of these instruments in diagnosis, therapeutic treatment and imaging fields

UNIT- I

Teaching Hours: 06

TESTING OF DISCRETE COMPONENTS

Resistors- types - Characteristics -Colour coding -resistors in series and parallel - Capacitors - types -Capacitor in Series and Parallel - Multimeter Analog and Digital - How to Use a Multimeter -Testing of Voltage - Current Continuity (Testing of Fuse) -Resistance -Diode and Transistor-Design of Bread board-Soldering Technique used in PCBs.

UNIT- II

Teaching Hours: 06

POWER SUPPLY

Power Supply Unit-Parts of Power Supply- Regulated power supply- Zener diode voltage regulator- IC Voltage - Regulators - Inverter-Uninterrupted power supply (UPS) - Switched mode power supply (SMPS)-Cathode Ray Oscilloscope (CRO) and measurement of time period and frequency - Function generator.

UNIT- III

Teaching Hours: 06

ELECTRICAL & ELECTRONICS APPLIANCES

Electric iron Box-Electric Fan-Construction and Working of Ceiling and Table fans-Water Heater - Types-Function -Wet Grinder-Mixer Grinder-Principle and Design.

Microwave Oven-Washing Machine - Function - Types-Semi and Fully Automatic-Top and Front loading-Fuzzy logic washing machine technology – Refrigerator-Air Conditioner-Principle and Design.

UNIT- IV

Teaching Hours: 06

MASS AND MEDIA COMMUNICATION

Mobile Communication (GSM) -Android version- USB - Various Types of USB Cable and Connectors - VGA- AV port - HDMI- DVI - S Video and Display port- Bluetooth - Wi-fi and Li-fi - Direct broadcast satellite (DBS)- DTH and DTT- Radar Communication System.

UNIT-5

Teaching Hours: 06

BIO-MEDICAL INSTRUMENTATION

Principle, description, function and recording of ECG, EMG and EEG -artificial pace maker-simulators -Heart lung machine –ventilators and nebulizers-Kidney dialysis machine- pH meter - Laser blood flow meter–Thermal scanner and pulse oximeter.

Text Books

Unit-1

1. B.L. Theraja, A Text book of Electrical Technology, S.Chand& Co., New Delhi, 2007.

Unit-2

1. I.Abraham, Switching Power Supply Design, Keith Billings, Taylor Morey -McGraw Hill.
2. Fundamentals of Power Supply Design: Technology from the Unitrode/Texas Instruments.
3. Robert A. Mammano, Power Supply Design Seminars, , Texas Instruments, 2017.

Unit-3

1. S.P. Bali, Consumer Electronics -, Pearson Education, New Delhi, 2005.
2. Basic Electrical Engineering -Vocational Theory-Plus One Text Book-TN State Board.

Unit-4

1. V.K. Metha, Principles of Electronics, S Chand&Co.,New Delhi, 2001.
2. V. JeyasriArokiasamy, Mobile Communications,Technical Publications, 2009.
3. John Vivianand Peter Maurin, The Media of Mass Communication,Pearson Education Canada, 2008.
4. R.R. Gulati, Modern Television Practice Principles, Technology & Servicing, New

Age International, 2007.

5. K. F. Ibrahim, Newness Guide to Television and Video Technology, Elsevier, 2007.
6. Richard Wise and Routledge, Multimedia: A Critical Introduction, 2005.
7. V.S.Bagad, Radar System, Technical Publications, 2009.

Unit-5

1. M.Arumugam M, Biomedical Instrumentation, Anuradha Publications, Kumbakonam, 2011.
2. V.Yuvaraj, Instrumentation Techniques, Sri Krishna Publications, 2020.
3. Webster, Bioinstrumentation, John Wiley & Sons, 2007.

Reference Items: books, Journal

1. I.J. Nagrath and D. P. Kothari, Electrical Machines, Tata McGraw Hill, 1997.
2. M. D. Singh, K. B.Khanchandani Power Electronics, Tata McGraw Hill, 2006.

E- Materials

1. <https://www.electronicsforu.com/>
2. <https://learnabout-electronics.org/>
3. <https://www.scienceabc.com/innovation/usb-type-c-different-usb-type-type-b.html>
4. <https://www.electronics-tutorials.ws/supplies/power-supplies-for-beginners-part-1.html>
4. <https://electronicspost.com/basic-electronics-tutorials/>
5. <https://www.electrical4u.com/>
6. <https://lecturenotes.in/subject/199/analytical-instrumentation-ai>
7. <https://blog.beaconstac.com/2016/05/li-fi-vs-wi-fi-vs-ibeacon-ble-technology/>
8. <https://www.makeuseof.com/tag/video-cables-explained-difference-vga-dvi-hdmi-ports/>
9. <https://www.ses.com/differences-between-dth-and-dtt>
10. <https://www.ifixit.com/Guide/How+To+Use+A+Multimeter/25632#s64987>
11. <http://electrotel.com.ar/handbook-of-analytical-instruments-r-s-khandpur-download-full-version.pdf>
12. <https://sidneymayireg.files.wordpress.com/2017/04/>
13. <https://en.wikipedia.org/wiki/Electrocardiography>
14. <https://www.youtube.com/watch?v=YbBSf8bnYgw>
15. <https://www.youtube.com/watch?v=IndqOnjxAU0> (Tamil video)

Course Outcomes

1. After studied unit-1, the student will be able to test the instruments with specific skills
2. After studied unit-2, the student will be able to express the functions and working of Linear power supply.
3. After studied unit-3, the student will be able to know the basics of analytical instruments and how to calibrate it.
4. After studied unit-4, the student will be able to explain mobile communication and radar communication system.
5. After studied unit-5, the student will be able to demonstrate the principle and working of various biomedical equipment.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	No	No	No
5	Yes	No	No	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	L
CO2	M	S	M	M	S	S	M	M	M	M
CO3	M	M	M	S	S	M	S	S	S	L
CO4	S	S	S	S	M	S	M	M	M	L
CO5	S	S	M	S	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(B.Sc Physics) – 2022-2023 onwards

Semester: IV

Paper type: Non-Major Elective (NME)-2

Paper code: Name of the Paper: Everyday Physics Credit: 2

Total Hours per Week: 2 Lecture Hours: 30 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. Students can able to understand the basic measurements and mechanics.
2. To learn the principle applied in Pressure cooker, Refrigerator and Air-conditioner.
3. To know the construction and working of various electrical appliances.
4. To study the fundamentals of laser and its applications.
5. To know the different biomedical instrumentation techniques.

UNIT- I

Teaching Hours: 07

MEASUREMENTS & MECHANICS

Fundamental quantities-System of Units-CGS,FPS,MKS and SI-Vernier calliper, Screw gauge and their utility-Measure the dimension of a solid block, volume of cylindrical beaker/glass, diameter of a thin wire, thickness of metal sheet-Newton's law of motion- Lever mechanism - Pulleys-Force -Weight -Work -Energy -Power- Horsepower -Circular motion-Banking of curved tracks.

UNIT-II

Teaching Hours: 05

THERMO AND HYDRODYNAMICS

Variation of boiling point with pressure - Pressure cooker - First and Second law of

thermodynamics-Refrigerator - Air Conditioner - Principle and construction-Bernoulli Theorem-Applications.

UNIT – III

Teaching Hours: 05

ELECTRICAL APPLIANCES

Electric iron Box-Electric Fan-Construction and Working of Ceiling and Table fans-Water Heater -Types-Function -Wet Grinder-Mixer Grinder-Principle and Design.

UNIT- IV

Teaching Hours: 07

LASER

Power of a Lens-Human eye- Defects of vision - Laser-Spontaneous emission -Stimulated emission -Meta stable state -Population inversion -Pumping - Laser Characteristics- Ruby Laser - Helium-Neon Laser-Applications of Laser-Laser cutting - Welding- Drilling -Lasers in Surgery - Lasers in ophthalmology.

UNIT- V

Teaching Hours: 06

BIOMEDICAL INSTRUMENTATION

Digital thermometer-Digital BP apparatus-One touch Glucometer-thermal scanner-pulse oximeter-Lipid profile test-pH meter-BMI calculator - Ventilator-Principle, description, function and recording of ECG, EMG and EEG- artificial pace maker.

Text Books

Unit 1& Unit 2

1. N. Subrahmanyam and BrijLal, Principles of Physics, S.Chand&Co.,Ltd, Chennai.
2. Plus one Physics Book-TN state Board and NCERT Books.
3. D. Jayaraman, K. Ilangoan, Thermal Physics & Stastical Mechanics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2016.
4. BrijLal and N Subrahmanyam, Heat and Thermodynamics, S Chand & Company Pvt Ltd, New Delhi, 2016.

Unit 3

1. S.P. Bali, Consumer Electronics -, Pearson Education, New Delhi, 2005.
2. Basic Electrical Engineering -Vocational Theory- Plus One Text Book-TN State Board.

Unit 4

1. R. Murugesan, Optics & Spectroscopy, S.Chand&Co.Ltd, New Delhi, 2016.

Unit 5

1. M.Arumugam , Biomedical Instrumentation, Anuradha Publications, Kumbakonam, 2011.
2. V.Yuvaraj, Instrumentation Techniques, Sri Krishna Publications, 2020.

Reference Books

1. Fundamentals of Physics by D. Hallidy, R. Rensick and J. Walker, 6th Edition, Wiley, NY, 2001.
2. BrijLal and N Subrahmanyam, Heat and Thermodynamics, S Chand & Company Pvt Ltd, New Delhi, 2016.
3. R. Murugesan, Optics & Spectroscopy, S.Chand&Co.Ltd, New Delhi, 2016.

E-materials

1. https://www.youtube.com/watch?v=M_kHKSKmT6o
2. <https://www.toppr.com/content/concept/fundamental-quantities-and-fundamental-units-208185/>
3. <https://www.youtube.com/watch?v=T-mRqCjv6ak> (Tamil video)
4. <https://www.jagranjosh.com/general-knowledge/the-human-eye-and-its-defects-1456386342-1>
5. https://www.youtube.com/watch?v=c4_5ftlYTbI
6. <https://en.wikipedia.org/wiki/Laser>
7. <https://www.youtube.com/watch?v=oUEbMjtWc-A>
8. <https://techblog.livongo.com/how-do-blood-pressure-monitors-work/>
9. <https://www.youtube.com/watch?v=7oKNewTSF7M>

10. <https://www.youtube.com/watch?v=-UJf-GHz7x4> (Tamil video)

11. <https://www.smartbmicalculator.com/>

Course Outcomes

1. After studied unit-1, the student will be able to know the fundamental quantities and units and able to some basic ideas of mechanics.
2. After studied unit-2, the student will be able to demonstrate the construction and working of pressure cooker, refrigerator, air conditioner devices.
3. After studied unit-3, the student will be fundamental principles applied in our day today life electrical appliances.
4. After studied unit-4, the student will be able to know the basic properties of laser and characteristics and able to design solid and gas lasers.
5. After studied unit-5, the student will be able to demonstrate the principle and working of biomedical equipment will be used in our daily life.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	No	Yes	No	No
5	Yes	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	S	S	L	M	M	S	L
CO2	S	S	S	S	S	M	M	M	S	L
CO3	S	M	S	S	S	M	S	S	S	M
CO4	S	S	S	S	M	L	M	M	S	L
CO5	S	S	S	S	S	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: II

Paper type: Core Practical

Paper code:

Name of the Paper: Practical –2

Credit: 3

Total Hours per Week: 3 Lecture Hours: Nil Tutorial Hours: Nil Practical Hours: 45

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List of Experiments (Any 15 Experiments only)

1. Young's modulus uniform bending –optic lever.
2. Young's modulus uniform bending-Pin and microscope.
3. Sonometer- Frequency of AC mains - Steel and Brass wires.
4. Spectrometer -i-d curve- μ of a Prism.
5. Spectrometer -Grating -N and λ -Normal incidence method.
6. Spectrometer -Grating -N and λ -Minimum deviation method.
7. Air wedge - Thickness of a thin wire.
8. Carey Foster's bridge - Temperature coefficient of resistance of a coil
9. Potentiometer -Calibration of low range Ammeter.
10. Potentiometer - Resistance and specific resistance of a wire.
11. Figure of merit- Table Galvanometer.
12. Field along the axis of a circular coil carrying current-Determination of B_H .
13. BG- Figure of merit - Charge sensitiveness.
14. BG- Comparison of capacitances of capacitors.
15. BG- Comparison of emf of two cells.
16. Deflection magnetometer and vibration magnetometer-Determination of m and B_H -
Tan C position.
17. Low range power pack –Bridge Rectifier.
18. Voltage regulator -Bridge Rectifier-Using a Zener diode.
19. Logic gates-AND, OR (using diodes) and NOT (using transistor).
20. NAND and NOR gates-Universal gates.

Text Books

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2018.
2. M.N.Srinivasan, S. Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015.

Reference Books

1. Samir Kumar Ghosh, A Textbook of Advanced Practical Physics, NCBA, Kolkatta, 2000.
2. D. Chattopadhyay, P.C.Rakshit, An Advanced Course in Practical Physics, NCBA, Kolkatta, 2011
3. C.L.Arora, B.Sc., Practical Physics, S. Chand and Company., New Delhi.
4. D.P.Khandelwal D.P., A Laboratory Manual of Physics for Undergraduate Classes. Vani Publications.
5. B.Saraf et al, Physics through Experiments, Vikas Publications.
6. Harnaam Singh., B.Sc., Practical Physics, S. Chand and Company., New Delhi.

7. D C Tayal, University Practical Physics, Himalaya Publishing House.
8. Gupta & Kumar, Practical Physics, Pragati Prakashan, Meerut.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: V

Paper type: Core

Paper code: Name of the Paper: Atomic and Molecular Physics

Credit: 6

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil Practical Hours: Nil

Course Objectives

1. To study the properties of cathode and positive rays and can formulate the expression for e/m
2. To know the structure of the atom and to understand the spectral lines.
3. To understand effects of magnetic field on atomic spectra
4. To acquire the knowledge about photoelectric effect and can derive the expression for Einstein's photoelectric equation.
5. To teach various energy levels viz., rotational, vibrational etc. and can understand the principle of Infrared spectroscopy, Raman effect and Laser

UNIT- I

Teaching Hours: 15

CATHODE AND POSITIVE RAYS

Properties of cathode rays-Mass of an electron-Determination of the electronic charge: Milikan's oil drop method-Dunnington's method for determining e/m -Properties of positive rays-Positive ray analysis-Thomson's parabola method-Aston's Mass spectrograph-Bain Bridge Mass spectrograph- Dempster's Mass Spectrograph-Mass defect and packing fraction.

UNIT - II

Teaching Hours: 20

ATOMIC STRUCTURE

Rutherford's Experiments on scattering of α -particle-Theory of α -particle Scattering-Rutherford formula-Bohr Atom model-Spectral series of hydrogen atom-Bohr Correspondence Principle-Critical potentials-Experimental determination of critical potentials-Drawbacks of Bohr Atom model- Sommerfeld's relativistic atom model-Vector atom model-Quantum numbers associated with the vector atom model-Coupling schemes

UNIT- III

Teaching Hours: 20

EFFECTS OF MAGNETIC FIELD ON ATOMIC SPECTRA

Pauli's exclusion principle - Periodic table- Magnetic dipole moment due to orbital motion of the electron-Magnetic dipole moment due to spin-Optical spectra-Fine structure of H_α line-Zeeman effect-Larmor's theorem-Quantum mechanical explanation of Zeeman effect-Anomalous Zeeman effect – Paschen-Back effect-Stark effect-Problems solving

UNIT- IV

Teaching Hours: 15

PHOTOELECTRIC EFFECT

Introduction-Lenard' method to determine e/m -Richardson and Compton experiment-Experimental investigations on the photoelectric effect-Laws of photoelectric emission-Einstein's photoelectric equation-Photo-emissive cell-Photo-voltaic cell-Photoconductive cell-Applications of photoelectric cells-Planck's quantum theory-Wien's displacement law-Derivation of Planck's law of radiation-Problems solving.

UNIT- V

Teaching Hours: 20

MOLECULAR PHYSICS

Introduction -Theory of the origin of pure rotational spectrum of a molecule-Non-Rigid Rotator-The energy of a diatomic molecule- Vibrating diatomic molecule as a harmonic oscillator-Infrared Radiation - Range of IR radiation-IR spectrometer – Instrumentation-Molecular vibrations of water molecule (H_2O)-Raman effect-Characteristics of Raman lines-Quantum theory of Raman effect-Raman spectrum of Nitrous oxide (N_2O) - Laser - Characteristics-Stimulated Emission-Population Inversion-Optical Pumping - He-Ne laser-Applications of Laser-Problems solving.

Text Books

Unit 1 to Unit 4

1. R. Murugesan and KiruthigaSivaprasath, ModernPhysics, S.Chand&Co.,Ltd, New Delhi,2016
2. B.L. Theraja, Modern Physics, S.Chand&CO.,Ltd, New Delhi,2016

Unit 4 and Unit 5

1. R. Murugesan and KiruthigaSivaprasath, Modern Physics, S.Chand&Co.,Ltd, New Delhi,2016
2. R. Murugesan, Optics & Spectroscopy, S.Chand&Co.Ltd, New Delhi, 2016

Reference Books

1. J.B. Rajam, Atomic Physics, S. Chand & Co Ltd., New Delhi, 2009.
2. Sehgal, Chopra and Sehgal, Modern physics, Sultan Chand & Sons, New Delhi.
3. S.N .Ghoshal, Atomic Physics, S. Chand & Co Ltd., New Delhi, 2004.
4. C.L.Arora, Modern Physics and Electronics, S. Chand & Co Ltd., New Delhi, 1992.
5. C.N. Banwell, Fundamentals of Molecular Spectroscopy,McGraw Hill Education; Fourth edition, 2017.
6. G. Aruldas, Molecular structure and Spectroscopy, Prentice Hall of India, New Delhi, 2005.
7. William T. Silfvast, Laser fundamentals, University Press, Published in South Asia by Foundation books, New Delhi, 1998.
8. K. Thyagarajan and A.K. Ghatak, LASER Theory and Application, McMillan, India

Ltd, 1984.

9. அனு இயற்பியல்-A சுந்தரவேலுசாமி ,பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு)
10. நிறமாலையியலும் லேசர் இயற்பியலும்-A சுந்தரவேலுசாமி ,பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு).

E-Materials

1. <https://www.youtube.com/watch?v=wSe3oBZDTUI>
2. <https://vlab.amrita.edu/?sub=1&brch=195&sim=357&cnt=1>
3. https://en.wikipedia.org/wiki/Vector_model_of_the_atom
4. <https://www.youtube.com/watch?v=CBUjVHq6Grs>
5. <https://www.youtube.com/watch?v=Ju-3Eu133KE>
6. https://en.wikipedia.org/wiki/Zeeman_effect
7. https://en.wikipedia.org/wiki/Photoelectric_effect
8. https://www.youtube.com/watch?v=O0wchw_Mi30
9. http://www.iiserpune.ac.in/~bhasapat/phy420_files/Demtroeder_rotovibrazioni.pdf
10. https://www.youtube.com/watch?v=gJc4_6NNIhM
11. <https://www.youtube.com/watch?v=djMVjULfRII> (Tamil video)

Course Outcomes

1. After studied unit-1, the student will be able to know the properties of cathode rays and positive rays. Also will be able to study the determination of specific charge of an electron.
2. After studied unit-2, the student will be know the different atom models and can get an idea about coupling schemes..
3. After studied unit-3, the student will be able to study the Zeeman effect, Paschen Back effect and Stark effect.
4. After studied unit-4, the student will be able to know the basic idea of photoelectric effect and can able to derive the equation for Einstein's photoelectric equation.
5. After studied unit-5, the student will be able to study the rotational and vibrational energy of a molecule and also learn the Infrared spectra, Raman Effect and Laser.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	No	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	S	M	L
CO2	S	M	M	M	S	S	M	M	M	L
CO3	S	S	M	M	S	S	M	M	M	M

CO4	M	S	S	M	M	S	M	S	M	L
CO5	S	S	M	M	S	L	M	S	M	L

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: V

Paper type: Core

Paper code: Name of the Paper: Relativity and Quantum Mechanics Credit: 6

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil Practical Hours: Nil

Course Outcomes

1. To teach the fundamental aspects of relativity and special theory of relativity.
2. Ability to understand the concepts of matter waves and to study the phase velocity and group velocity.
3. To learn the Heisenberg's Uncertainty Principle and to derive the time dependent and time independent Schrödinger equation.
4. To apply the Schrödinger's equation to various quantum mechanical systems.
5. To expose the ideas of postulates of quantum mechanics and operators.

UNIT- I

Teaching Hours: 20

RELATIVITY

Introduction - Frame of reference - Newtonian relativity - Galilean Transformation equations - The Ether hypothesis - The Michelson -Morley experiment - Special theory of relativity - The Lorentz Transformation equations - Length contraction - Time Dilation - relativity of simultaneity- addition of velocities - variation of mass with velocity - Mass Energy equivalence -Minkowski's Four dimensional Space-Time continuum-General theory of relativity-Gravitational red shift.

UNIT- II

Teaching Hours: 15

WAVE MECHANICS

Inadequacy of classical mechanics -Matter waves - de Broglie wavelength - Expression for de Broglie wavelength-Other expressions for de Broglie wavelength- Phase velocity (wave velocity) of de Broglie waves-Group Velocity- Expression for Group velocity-Group velocity of de Broglie waves- Relation between group velocity and phase velocity-Davisson and Germer's experiment-G.P.Thomson's experiment.

UNIT- III

Teaching Hours: 20

SCHRODINGER EQUATION

Electron microscope-Heisenberg's Uncertainty Principle-Determination of position with γ -ray microscope-Diffraction of a beam of electrons by a slit-Elementary proof between Displacement and Momentum, Energy and Time- Derivation of time dependent form of Schrödinger equation-Time independent form of Schrödinger equation-Eigenvalues and Eigenfunctions-Physical significance of wave function-Orthogonal wave function-Normalized wave function.

UNIT-4

Teaching Hours: 15

APPLICATIONS OF SCHRÖDINGER EQUATION

The free particle-Particle in a box: Infinite square well potential-Rectangular Potential well-The Barrier Penetration problem-Tunnel effect-Linear harmonic oscillator-Energy levels-Zero point energy-Rigid rotator-Schrödinger's equation for the hydrogen atom-Separation of variables-Equations only.

UNIT-5

Teaching Hours: 20

OPERATOR FORMALISM OF QUANTUM MECHANICS

Postulates of quantum mechanics-Operator for momentum, Kinetic energy, Total energy, Angular momentum-Commuting operators-Commutator algebra-Hermitian operator-Properties of Hermitian operator-Parity operator-Properties of Parity operator-Probability density-Probability current density-Wave packet-Ehrenfest's theorem-Hilbert space-Dirac's Bra and Ket notation-Properties of Bra and Ket notation.

Text Book

Unit 1 to Unit 5

1. R.Murugesan and KiruthigaSivaprasath, Modern Physics, S Chand & Co, New Delhi, 2016.

Reference Books

1. P.M Mathew and K.Venkatesan, A Text Book of Quantum Mechanics, Tata McGraw Hill Publishing Co.Ltd., New Delhi, 2016.
2. Gupta, Kumar and Sharma, Quantum Mechanics, Jai PrakashNath Publications, Meerut, Sathyaprakash, Quantum Mechanics, PragatiPrakashan, Meerut.
3. G. Aruldas, Quantum Mechanics, Prentice-Hall Of India Pvt. Limited, 2008.
4. G.R.Chatwal and S.K.Anand, Quantum Mechanics, Himalaya Publishing House, Mumbai, 2010.
5. V. Devanathan, Quantum Mechanics, Narosa, Chennai.
6. V.K. Thangappan, Quantum mechanics, New Age International, 1993.
7. AjoyGhatak & S. Loganathan, Quantum Mechanics, Springer, 2004.

E-Materials

1. http://psi.phys.wits.ac.za/teaching/Connell/phys284/2005/lecture-01/lecture_01/node5.html
2. https://www.youtube.com/watch?v=NH3_1IkSB9s
3. https://en.wikipedia.org/wiki/Matter_wave

4. https://www.youtube.com/watch?v=X-m9L0_pKU8 (Tamil video)
5. <https://www.youtube.com/watch?v=cH5QexEN0sk>
6. https://en.wikipedia.org/wiki/Schr%C3%B6dinger_equation
7. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-007-electromagnetic-energy-from-motors-to-lasers-spring-2011/lecture-notes/MIT6_007S11_lec40.pdf
8. <https://www.youtube.com/watch?v=uK60QAKooyM>
9. <https://www.youtube.com/watch?v=r2NMWEsNcTs>
10. https://en.wikipedia.org/wiki/Bra%E2%80%93ket_notation

Course Outcomes

1. After studied unit-1, the student will be able to know the frames of reference and able to formulate the Galilean Transformation equations and Lorentz Transformation equations.
2. After studied unit-2, the student will be understand the matter waves and can derive an equation for de Broglie wavelength. Also able to distinguish between phase velocity and group velocity and demonstrate Davison & Germer experiment.
3. After studied unit-3, the student will be able to state the Heisenberg's Uncertainty Principle and able to derive the time dependent and time independent Schrödinger's equations.
4. After studied unit-4, the student will be able to know the basic idea of photoelectric effect and can able to derive the equation for Einstein's photoelectric equation.
5. After studied unit-5, the student will be able to learn postulates of quantum mechanics, operators and also able to acquire knowledge on Dirac's bra and ket notations.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	No	Yes	Yes	No
4	Yes	Yes	No	No	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	M	M	L
CO2	S	S	M	M	M	S	S	M	M	L
CO3	S	M	M	S	S	S	M	S	M	M
CO4	M	S	M	M	S	M	M	S	S	L
CO5	S	M	M	M	S	S	M	S	M	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: V

Paper type: Core

Paper code: Name of the Paper: Basic and Applied Electronics Credit: 6

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. Students will gain knowledge about semiconducting diodes and transistors.
2. To teach the different types of amplifiers and oscillators.
3. To learn the working multivibrators and wave shaping circuits.
4. To study the basics of fabrication of integrated circuits and fundamentals of operational amplifiers.
5. To expose the various applications of OP-AMP and 555 Timer.

UNIT- I

Teaching Hours: 18

SEMICONDUCTING DIODES & TRANSISTORS

Classification of solids and energy bands- PN Junction Diode-Full wave Bridge Rectifier-Zener Diode-Voltage Regulated Power supply-Tunnel diode - Characteristics-Tunnel diode as an oscillator-Construction and working of Photo diode -Photo transistor -Solar Cell-LED-FET-Construction and working-FET as an amplifier-Output Characteristics and parameters of FET-MOSFET-Construction and working Principle-SCR-Working of SCR-SCR as a switch and half wave rectifier- UJT-Equivalent circuit and V-I characteristics of UJT - UJT as relaxation oscillator.

UNIT- II

Teaching Hours: 18

AMPLIFIERS & OSCILLATORS

R-C coupled amplifier (Two stage)-Power amplifiers-Class A,B and C-Push-Pull amplifier-Feedback amplifier-Principles of negative feedback in amplifier-Gain of negative feedback amplifier-Hybrid parameters-Determination of h parameters-h parameter equivalent circuit-Performance of a linear circuit in h parameters-h parameters for a transistor in CE mode - Sinusoidal oscillators -Circuit operation and frequency of oscillation of -Hartley, Colpitt's, Phase shift, Wein bridge and Crystal oscillator.

UNIT- III

Teaching Hours: 18

MULTIVIBRATORS& WAVE SHAPING CIRCUITS

Multivibrators-Types of multivibrators-Transistor astable, monostable and bistablemultivibrators - Differentiating and Integrating-Circuits-Clipping circuits-Positive clipper-Biased clipper-Combination clipper-Clamping circuits-Positive clamper-Negative clamper.

UNIT- IV

Teaching Hours: 18

INTEGRATED CIRCUITS & OP-AMP

Integrated circuit-Classification of ICs-Advantages-Limitations-Integrated circuit technology- Fabrication of Transistors, diodes, capacitors and resistors - Symbol and Terminals of an OP-AMP- Parameters - Inverting and Non-inverting amplifier - Gain - Miller effect - Virtual ground - Offset voltage - offset current - PSRR - CMRR.

UNIT- V

Teaching Hours: 18

OP-AMP APPLICATIONS & TIMER

OPAMP -Sign and Scale changer -Adder, subtractor and average-Integrator and differentiator -OP AMP Logarithmic amplifier -Antilogarithmic amplifier-OP-AMP-Comparator-Schmitt Trigger OP-AMP-Astablemultivibrator-Monostablemultivibrator-Bistablemultivibrator - 555 Timer-Internal structure- Pin configuration of 555 Timer-555 Timer as Schmitt Trigger-555 Timer as Astablemultivibrator.

Text Books

Unit 1 to Unit 5

1. V.K. Mehta and Rohit Mehta, Principles of Electronics, S Chand &Co., New Delhi, 2007.
2. M Arul Thalpathi, Basic and Applied Electronics, Comptek, Publishers, Chennai 2005.

Reference Books

1. B.L. Theraja, Fundamentals of Electrical Engineering and Electronics, S Chand &Co., New Delhi, 2008.
2. R.S.Sedha, A Text Book of Applied Electronics, S Chand &Co., New Delhi, 2010.
3. V. Vijayendran, Introduction to Integrated Electronics (Digital & Analog), S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007
4. Hand Book of Electronics - Gupta & Kumar, PragatiPrakashan, Meerut, 2014.
5. மின்னணுவியல்-A சுந்தரவேலுசாமி ,பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு)

E-Materials

1. https://www.electronics-tutorials.ws/diode/diode_6.html?nab=0&utm_referrer=https%3A%2F%2Fwww.google.com%2F
2. <https://www.youtube.com/watch?v=EkHch86UXpY>
3. <https://www.youtube.com/watch?v=jZ-pD8nVD6s&app=desktop>
4. <https://www.electrical4u.com/hybrid-parameters-or-h-parameters/>
5. <http://www.circuitstoday.com/category/clipping-and-clamping-circuits>
6. <https://www.youtube.com/watch?v=XsawrtWmm9M>
7. https://www.youtube.com/watch?v=ek_H6efvwxA (Tamil video)
8. <https://www.electronicsforu.com/resources/learn-electronics/555-timer-working-specifications>
9. <https://www.youtube.com/watch?v=yBVGU02rlAg>
10. https://www.electronics-tutorials.ws/waveforms/555_timer.html

Course Outcomes

1. After studied unit-1, the student will be able to classification of solids on the basis of band theory and know the construction, working and applications of semiconducting diodes and transistors.
2. After studied unit-2, the student will be able to design the RC-coupled amplifier and to study its frequency response curve. Also students will be able to classify the power amplifiers, to learn the h-parameters and to able to design oscillator circuits.
3. After studied unit-3, the student will be able to understand the multivibrators using transistors and can able to study the different wave shaping circuits.
4. After studied unit-4, the student will be able to know the basic idea of integrating circuits and able to fabricate diode, transistors, resistor and capacitors. Also students will be study the structure of operational amplifier and its parameters.
5. After studied unit-5, the student will be able to analyze the different applications of op-amp circuits like adder, subtractoretc.and also able to demonstrate 555 Timer and its applications.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	Yes	No
2	Yes	No	Yes	Yes	Yes	No
3	Yes	Yes	No	Yes	No	No
4	Yes	Yes	No	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	L	M	M	M	M
CO2	S	S	M	M	S	M	M	S	M	S
CO3	S	M	S	S	S	M	M	S	S	S
CO4	S	S	M	M	S	M	S	S	M	M
CO5	S	S	M	S	M	S	M	S	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: III

Paper type: Skill Based Subject (SBS)-3

Paper code: Name of the Paper: Cell Phone Technology

Credit: 2

Total Hours per Week: 2 Lecture Hours: 30 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To learn the back ground information about cellular system.
2. To study the various mobile standards.
3. To teach the chip level information of mobile phones.
4. To expose the idea about trouble shooting of problems in mobile phones.
5. To acquire the knowledge about mobile service tools.

UNIT- I

Teaching Hours: 06

CELLULAR SYSTEM

Background - The cellular concept - interference Vs capacity, cell splitting, sectorisation. The cellular system-mobile location, in call handover and power control in cell planning. TACS standard. The cellular network - Base stations, MSC, services.

UNIT - II

Teaching Hours: 06

MOBILE STANDARDS

SmartPhones (Android, IOS, Windows) APPs - Mobile Software (PC suite)-WPAN standards - IrDA, Bluetooth, 1G, 2G standards, 2.5G applications. 3G devices and applications. Network protocols - TDMA(2G), GSM(2G), cdma one(2G), PDC 2(G), GPRS(2.5G), CDMA 2000 1x(2.5G), EDGE(3G), CDMA 2000 1xEV(3G), WCDMA(G)-WiMax (4G)

UNIT- III

Teaching Hours: 06

CHIP LEVEL STUDY

Block Diagrams -Schematic Diagrams - Chip Level Information of Mobile -Phones - BGA - SMD Reworking Station - Soldering lead -Soldering paste -De- Soldering wire - Identification of IC's - Assembling &Disassembling ofSmart Phones.

UNIT- IV

Teaching Hours: 06

TROUBLE SHOOTING

Causes for various problems & Troubleshooting of Problems in a SmartPhone - Network Problems - Display Problems -Touch Problems - Sim CardProblems -Charging problems - Battery Problems - Software Problems -IMEI information - Problems related to mobile phonehandsets - replacement of Various components ICS.

UNIT- V

Teaching Hours: 06

MOBILE SERVICE TOOLS

Ultrasonic Cleaner - Computer Connectors - SIM Card Reader – MemoryCard Reader - Mobile Virus - Virus Prevention - Removing Virus – HealthHazards with Mobiles - SAR.

Text Book

Unit 1 to Unit 5

1. ManaharLotia , Modern Mobile phone Introduction & Servicing, BPB Publications, 2017

Reference Books

1. ManaharLotia, Modern Mobile Phone Repair using Computer Software & Service Devices , BPB Publications, 2017.
2. ManaharLotia, Modern Mobile Phone Unlocking & Utility Codes For GSM & CDMA Phones, BPB Publications, 2017
3. Mobile Telephony, Digit Magazine, Jasubhai Digital Media Publications.
4. Raj Pandya, Mobile & Personal Communication Systems & Services, PHI Publications
5. William C.Y.Lee, Mobile Cellular Telecommunications (Analog & Digital Systems), McGraw Hill, New Delhi,1995
6. Andy Dornan, The Essential Guide to Wireless Communications & Applications, Prentice Hall, New Delhi, 2002.

E-Materials

1. <https://www.slideshare.net/priyahada/cellular-concepts-41556741>
2. <https://www.youtube.com/watch?v=whYljse4Abc>
3. <https://electronics.howstuffworks.com/cell-phone7.htm>
4. <https://www.youtube.com/watch?v=IvWYk3FAVak>
5. https://www.youtube.com/watch?v=eRe_nD2t0Hk
6. [https://en.wikipedia.org/wiki/Rework_\(electronics\)](https://en.wikipedia.org/wiki/Rework_(electronics))
7. <https://www.mobiledic.com/android-tips/sim-card-can-not-be-detected.html>
8. <https://www.youtube.com/watch?v=MZz5zrNnAec> (Tamil video)
9. <https://www.youtube.com/watch?v=JmDz0HOzvVU>
10. <https://www.who.int/news-room/q-a-detail/what-are-the-health-risks-associated-with-mobile-phones-and-their-base-stations>

Course Outcomes

1. After studied unit-1, the student will be able understand the cellular communication system.
2. After studied unit-2, the student will be able to study the smart phones and various mobile standards like 1G,2G, etc.
3. After studied unit-3, the student will be able to learn chip level information and soldering and desoldering the various components.
4. After studied unit-3, the student will be able to understand the network problems and SIM card problems and to learn the trouble shooting process.
5. After studied unit-5, the student will be able to know how to use the ultrasonic cleaner, mobile virus and other service tools.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	No	No	Yes
5	Yes	No	No	No	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	S	M	M	M	L
CO2	M	S	M	M	S	S	M	M	S	M
CO3	M	M	M	M	S	M	S	S	S	S
CO4	S	S	S	S	M	S	M	M	M	S
CO5	S	S	M	S	S	S	M	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core

Paper code: Name of the Paper: Nuclear and Particle Physics Credit: 5

Total Hours per Week: 6 Lecture Hours: 90 Tutorial Hours: Nil Practical Hours: Nil

Course Objectives

1. To have a clear idea about the fundamentals of nucleus and its structure.
2. To understand the concept of radioactivity.
3. To have a clear understanding of the design and working of particle accelerators and detectors.
4. To understand the nuclear reactions and the nuclear reactors.
5. To gain knowledge about the elementary particles

UNIT- I

Teaching Hours: 20

GENERAL PROPERTIES OF NUCLEI AND NUCLEAR MODELS

Constituents of nuclei - Classification of nuclei - Nuclear mass and binding energy - Stability of nucleus, Mass defect and Packing fraction, Binding fraction Vs Mass number curve - Nuclear size - Nuclear spin - Nuclear energy levels - Nuclear magnetic moment --Parity of nuclei - Nuclear forces - Yukawa's model of nuclear forces.

Nuclear models - Liquid drop model, Semi-empirical mass formula - Shell model - Salient features of shell model-Problems solving.

UNIT- II

Teaching Hours: 20

RADIOACTIVITY

Radioactive decay law - Half life and Average life - Activity or strength of a radioactive sample- Successive transformation - Radioactive chain- Radioactive equilibrium - Radioactive dating - α -decay - Geiger-Nuttall law - Tunnel effect - Gamow's theory of α -decay - β -decay - energetics of β -decay - Continuous β -spectrum - Inverse β -decay -Parity violation in β -decay - Neutrino hypothesis - Properties of neutrino - Gamma rays - Origin of the gamma rays - Internal conversion-Problems solving.

UNIT- III

Teaching Hours: 15

PARTICLE ACCELERATORS AND DETECTORS

Linear accelerator - Cyclotron -Betatron - Electron synchrotron - Accelerators in India

Radiation detectors - Ionisation chamber - Proportional counter - G.M. Counter - Cloud chamber - Scintillation counter - Solid state track detector - Semiconductor detector- Problems solving.

UNIT- IV

Teaching Hours: 20

NUCLEAR REACTIONS AND NUCLEAR REACTORS

Nuclear reactions - Types of nuclear reactions - Conservation laws in nuclear reactions - Energetics of nuclear reactions - Kinematics of nuclear reactions -Threshold energy of nuclear reactions - Solution of the Q-value equation - Cross-section of nuclear reactions.

Nuclear fission - Fission of light nuclei - Prompt and delayed neutrons - Neutron speed, Classifications - Nuclear chain reaction - Neutron cycle - Nuclear reactor - Types of reactor - Fission bomb - Nuclear power in India- Fusion -Thermonuclear reaction - Hydrogen bomb - Possibility of fusion reactor-Problems solving.

UNIT- V

Teaching Hours: 15

ELEMENTARY PARTICLES

Classification of elementary particles -Pions and Muons - K-mesons -Hyperons - Conservation laws - Exact laws - Approximate conservative laws- Fundamental interactions - Antiparticles - Resonance particles -Hypernucleus - Symmetry classification of elementary particles - Quark model.

Text Books

Unit 1 to Unit 5

1. R. Murugesan and KiruthigaSivaprasath, Modern Physics,S Chand &Co.New Delhi,2006.
2. Gupta and Roy., Physics of the Nucleus, Books and Allied (P) Ltd. Kolkatta, 2011
3. J. B. Rajam, Nuclear Physics, S Chand Publishing Co.
4. D.C.Tayal, Nuclear Physics, Himalaya Publishing House, 2009

Reference Books

1. SatyaPrakash, Nuclear Physics, APragatiPrakasan Publication, 2011.
2. S. N. Ghoshal, Nuclear Physics, S. Chand & Co., Edition, 2003
3. M. L. Pandya& R.P.S. Yadav, Elements of Nuclear Physics, KedarNath& Ram Nath, 2000
4. Jahan Singh, Fundamentals of Nuclear Physics, APragati Publication, 2012.
5. V.Devanathan, Nuclear Physics, Narosa Publications, New Delhi, 2016.
6. அணுக்கரு இயற்பியல்-A சுந்தரவேலுசாமி ,பிரியா பப்ளிகேஷன்ஸ், கரூர் (தமிழ் வழியில் பயிலும் மாணவர்களுக்கு)

E-Materials

1. <https://courses.lumenlearning.com/introchem/chapter/nuclear-binding-energy-and-mass-defect/>
2. <https://www.khanacademy.org/science/physics/quantum-physics/in-in-nuclei/v/mass-defect-and-binding-energy>
3. <https://www.youtube.com/watch?v=ZqdxGZOipD4>

4. <http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/halfli2.html>
5. <https://www.slideshare.net/sailakshmipullookkar/linac-ppt>
6. <https://www.youtube.com/watch?v=jSgnWfbEx1A>
7. https://en.wikipedia.org/wiki/Nuclear_fission
8. <https://www.youtube.com/watch?v=vurL9UVa95A> (Tamil video)
9. <https://www.youtube.com/watch?v=2zZ1kv6vlq0>
10. https://en.wikipedia.org/wiki/Elementary_particle

Course Outcomes

1. After studying Unit 1, the student will have a clear idea about the fundamentals of nucleus and its structure.
2. After studying Unit 2, the student would have understood the concept of radioactivity.
3. After studying Unit 3, the student will be having a clear understanding of the design and working of particle accelerators and detectors.
4. After studying Unit 4, the student will be having a thorough understanding about the nuclear reactions and nuclear reactors.
5. After studying Unit 5, the student would have gained adequate knowledge about the elementary particles like pions, muons, hyperons etc.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	Yes	Yes	Yes	No
4	Yes	Yes	Yes	No	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	S	M	M	S	S	M	M	M	L
CO2	S	S	M	M	S	M	S	M	M	L
CO3	S	M	M	S	M	S	M	M	M	M
CO4	S	S	M	M	S	M	M	S	S	L
CO5	S	M	M	M	S	S	M	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core

Paper code: Name of the Paper: Solid State Physics

Credit: 5

Total Hours per Week: 5

Lecture Hours: 75

Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To gain the knowledge of the crystal system and to know the different crystal structure.
2. To know the different types of bonding in crystals and to know the basics of superconductors and their applications.
3. To learn how the X-ray diffraction helps to know the crystal structure and to know the defects present in the crystals
4. To know the different types of magnetism and their theories.
5. To understand the electric polarization in a dielectric material.

UNIT- I

Teaching Hours: 15

CRYSTALLOGRAPHY

Crystalline and amorphous solids -Crystal lattice -Basis -Unit cell -Primitive and non-primitive unit cell -Elements of Symmetry - Seven Classes of Crystals - Bravais lattices - Miller indices -Calculation of atomic radius, coordination number and atomic packing factor for SC, FCC, BCC and HCP structures- simple numerical problems- Structure of KCl, NaCl and diamond crystals .

UNIT- II

Teaching Hours: 15

DIFFRACTION IN CRYSTALS & CRYSTAL DEFECTS

Bragg's law- conditions for X-ray diffraction - Experimental Method- Laue Method, Rotating Crystal Method - Powder Photograph Method - Crystal defects - point, line, surface and volume defects - effects of crystal imperfections.

UNIT- III

Teaching Hours: 15

CHEMICAL BONDS & SPECIFIC HEAT CAPACITY

Types of bonding in crystals - ionic, valence, metallic, Vanderwaal's and hydrogen bonding-optical properties -Specific heat capacity -Dulong and Pettit's law -Einstein's and Debye's theory of specific heat capacity

UNIT- IV

Teaching Hours: 15

MAGNETISM IN SOLIDS& SUPER CONDUCTIVITY

Basic terms in magnetism -Classification of magnetic materials -Weiss theory of Paramagnetism- Domain theory of ferromagnetism- Hysteresis- Soft and hard magnetic materials - Superconductivity - Properties of Superconductors - Types of Superconductors - Meissner effect-BCS theory of superconductivity- Cooper Pair- First and Second London equation-Josephson effect-Application of Superconductors.

UNIT- V

Teaching Hours: 15

DIELECTRIC IN SOLIDS

Introduction to dielectrics- Basic definitions- - Different types of Electric polarization - dependency on frequency and temperature - Dielectric Loss -Local or Internal Field- Clausius-Mosotti Relation -Determination of dielectric constant- Dielectric Breakdown-Uses of dielectric materials.

Text Books

Unit 1 to Unit 5

1. K. Elangovan, Solid State Physics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007.
2. S.O.Pillari, Solid State Physics, New Age International Publishers, New Delhi, 2015

Reference Books

1. Gupta and Kumar, Solid State Physics,
2. R. Murugesan and KiruthigaSivaprasath, Modern Physics, S Chand & Co., 2006
3. M. Arumugam, Material Science, Anuradha Publishers.
4. Kittel, Introduction to Solid State Physics, Wiley and Sons,

E- Materials

1. https://www3.nd.edu/~amoukasi/CBE30361/Lecture_crystallography_A.pdf
2. <https://ocw.mit.edu/courses/chemistry/5-069-crystal-structure-analysis-spring-2010/lecture-notes/>
3. http://www.issp.ac.ru/ebooks/books/open/Superconductivity_Theory_and_Applications.pdf
4. <https://www.iitk.ac.in/che/pdf/resources/XRD-reading-material.pdf>
5. https://nptel.ac.in/content/storage2/courses/112108150/pdf/Lecture_Notes/MLN_03.pdf
6. <http://tiicmitm.com/profanurag/Physics-Class/Unit-2-DM.pdf>
7. <https://www.youtube.com/watch?v=D81zc-LK6fc>
8. https://en.wikipedia.org/wiki/Crystallographic_defect
9. <https://www.youtube.com/watch?v=D-9M3GWOBrw>
10. <https://www.youtube.com/watch?v=ByViA0H--5c> (Tamil video)

Course Out Comes

1. After studied unit-1, the student will be able to Distinguish between crystalline and amorphous solids, Classify the crystal systems and able to understand the crystal structure
2. After studied unit-2, the student will be able to Relate the X-ray diffraction with crystal structure and explain the various differences in properties of solids due to crystal imperfections
3. After studied unit-3, the student will be able to understand the different types of bonding in crystals, apply this to understand the optical, specific heat capacity of solids
4. After studied unit-4, the student will be able to gain the knowledge of magnetism in

materials and able to distinguish different magnetic materials. Also able to understand the phenomena of superconductivity and their applications

5. After studying unit-5, the student will be able to explain the electric polarization in dielectric materials and also gain the knowledge in dielectric breakdown mechanisms in a dielectric material.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	No	No	Yes	Yes	No
4	Yes	Yes	No	No	Yes	No
5	Yes	No	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	S	M	M	M	S
CO2	M	S	M	M	M	S	S	M	S	L
CO3	M	M	S	S	S	S	M	S	M	M
CO4	M	S	M	M	S	S	M	S	S	L
CO5	S	M	S	S	S	S	M	M	M	S

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Skill Based Subject (SBS)-4

Paper code: Name of the Paper: Weather forecasting Credit: 2

Total Hours per Week: 2 Lecture Hours: 30 Tutorial Hours: Nil Practical Hours: Nil

Course Objectives

1. To learn about the elementary idea of atmosphere, atmospheric pressure etc.
2. To study how to measure wind speed, direction, rain fall etc.
3. To teach the different weather systems and hurricanes
4. To explain the climate and environmental issues related to climate
5. To give an idea about weather forecasting

UNIT- I

Teaching Hours: 06

INTRODUCTION TO ATMOSPHERE

Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement; cyclones and anticyclones: its characteristics.

UNIT- II

Teaching Hours: 06

MEASURING THE WEATHER

Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.

UNIT- III

Teaching Hours: 06

WEATHER SYSTEMS

Global wind systems; air masses and fronts: classifications; jet streams; local thunderstorms; tropical cyclones: classification; naming tropical cyclones; tornadoes; hurricanes

UNIT- IV

Teaching Hours: 06

CLIMATE AND CLIMATE CHANGE

Climate: its classification; causes of climate change; global warming and its outcomes; air pollution; aerosols, ozone depletion, acid rain, environmental issues related to climate.

UNIT- V

Teaching Hours: 06

BASICS OF WEATHER FORECASTING

Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.

Text Books

Unit 1 to Unit 5

1. Chandrasekar, Basics of Atmospheric Science, PHI Learning Pvt Ltd, New Delhi, 2010.
2. Howard J Critchfield, General Climatology, Prentice Hall of India, Pvt Ltd, New Delhi, 1975.

Reference Books

1. I.C. Joshi, Aviation Meteorology, Himalayan Books, 2014.
2. Stephen Burt, The weather Observers Hand book, Cambridge University Press, 2012.
3. S.R. Ghadekar, Meteorology, Agromet Publishers, Nagpur, 2001.
4. S.R. Ghadekar, Text Book of Agrometeorology, Agromet Publishers, Nagpur, 2005.
5. Charles Franklin Brooks Why the weather, Chapman & Hall, London. 1924.
6. John G. Harvey, Atmosphere and Ocean, The Artemis Press, 1995.

E-Materials

1. <https://en.wikipedia.org/wiki/Atmosphere>
2. <https://www.youtube.com/watch?v=6LkmD6B2ncs>
3. <https://www.youtube.com/watch?v=jTWwnUIygc8>
4. <https://weatherstationguide.com/measure-wind-speed/>
5. <https://en.wikipedia.org/wiki/Thunderstorm>
6. <https://en.wikipedia.org/wiki/Cyclone>
7. <https://www.toppr.com/guides/science/winds-storms-and-cyclones/thunderstorms-and-cyclones/>
8. <https://climatekids.nasa.gov/weather-climate/>
9. <https://en.wikipedia.org/wiki/Climate>
10. https://en.wikipedia.org/wiki/Weather_forecasting
11. <https://www.skymetweather.com/15-days-rainfall-forecast-for-india/>
12. <https://www.youtube.com/watch?v=Q4-Ufqv6kLo> (Tamil video)

Course Outcomes

1. After studied unit-1, the student will be able to study the atmosphere and its physical structure and also to know the variation of pressure and temperature with height.
2. After studied unit-2, the student will be able to describe the measurement of wind speed, direction humidity, rainfall and can state the radiation laws.

3. After studied unit-3, the student will be able to explain the global wind systems and able to know thunderstorms and cyclones.
4. After studied unit-4, the student will be able to conceptualize the classification of climate, ozone depletion, acid rain and environmental hazards due to climate change.
5. After studied unit-5, the student will be able to understand the analysis and historical Background of weather forecasting and know the predictability, probability of forecasts.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	No	No	No
5	Yes	No	No	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	S	M	M	M	M	L
CO2	S	S	M	M	S	M	M	M	S	L
CO3	S	S	M	M	S	M	S	S	S	L
CO4	S	S	M	S	S	M	M	M	M	L
CO5	S	S	M	S	S	M	M	M	S	M

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium L – Low (may be avoided)

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 1 – Group (A)

Paper code: Name of the Paper: Digital Electronics

Credit: 3

Total Hours per Week: 4

Lecture Hours: 60

Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. Understanding the different number systems and conversion between them and also to study the basic logic gates.
2. To teach the laws of Boolean Algebra, De Morgan's theorems and other logic circuits.
3. To Study combination of logic circuits and understanding concepts of various flip-flops.
4. To expose the knowledge on various registers and counters.
5. To learn the digital to analog and analog to digital converters.

UNIT – I

Teaching Hours: 14

NUMBER SYSTEMS AND BASIC LOGIC GATES

Number systems -Decimal, Binary, Octal and Hexadecimal system - Conversion from one number system to another- Binary Arithmetic -Addition -Subtraction-Multiplication-Division- 1's and 2's complement - Subtraction using Complements-Signed Binary Numbers-Binary codes- BCD code - Excess 3 code, Gray code - ASCII code - Basic logic gates- NOT,OR,AND-Design of AND, OR gates using diodes and NOT gate using transistor-Logic circuits and logic expressions-Sum of Products-Product of Sum- NAND, NOR and EX-OR - functions and truth tables.

UNIT- II

Teaching Hours: 14

BOOLEAN ALGEBRA AND LOGIC CIRCUITS

Laws of Boolean algebra - De Morgan's theorems-NAND & NOR as Universal gates (AND,OR and NOT only)-Karnaugh map - Minterms-Relationship between K-Map and truth table- 2,3 and 4 variable K Map using minterms- Simplification of Boolean function using K Map - Arithmetic Circuits-Half adder and Full adder- Four Bit Adder-BCD Adder- Half subtractor and Full subtractor-Four Bit Adder/subtractor.

UNIT- III

Teaching Hours: 12

COMBINATION OF CIRCUITS & FLIP-FLOPS

Multiplexer-Demultiplexer- Decoder- 2 to 4 and 3 to 8 Decoder-BCD to seven segment decoder- BCD to decimal decoder-Encoder-Programmable Logic Array (PLA)-Binary to Gray and Gray to Binary Conversion using EX-OR gates-Parity Generator and Checker - Flip Flops -SR Flip Flop -Clocked SR-Edge triggered Flip – Flops- D Flip-Flop - JK Flip-Flop -JK Master-Slave Flip - Flop-T Flip-Flop.

UNIT- IV

Teaching Hours: 10

REGISTERS & COUNTERS

Registers-Shift Registers- Shift Right and Shift Left Shift Registers-Ring Counter-Johnson's Counter-Asynchronous/Ripple Counter-Mod-2, Mod-4, Mod-8 and Mod-16 Counter-4-Bit Binary Up/Down Counter-Synchronous Counters-Design of Synchronous Counters-Mod-3, Mod-5 Counter- Synchronous BCD counter.

UNIT- V

Teaching Hours: 10

D/A AND A/D CONVERTERS

Binary weighted resistors D/A converter-R-2R Resistive Ladder - Analog to Digital Converter (ADC)-Counter Type A/D Converter-Successive Approximation A/D Converter-Dual Slope A/D Converter-Parallel Comparator A/D Converter.

Text Book

Unit 1 to Unit 5

1. V.Vijayendran, Introduction to Integrated Electronics (Digital & Analog), S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007.

Reference Books

1. Malvino and Leech, Digital Principles and Application, 4th Edition, Tata McGraw Hill, New Delhi, 2000.
2. V.Vijayendran, Digital Fundamentals, S.Viswanathan, Printers & Publishers PrivateLtd, Chennai,2004.
3. R.P. Jain, Modern Digital Electronics, 2/e, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. H. Taub and D. Schilling , Digital Integrated Electronics -, McGraw-Hill Book Company.
5. T.L. Floyd , Digital Fundamentals -, Pearson Education, 8/e.
6. W.H. Gothmann , Digital Electronics -, Prentice Hall of India Private Limited, 2/e.

E-Materials

1. <https://www.youtube.com/watch?v=4ae9sJBBkvw>
2. <https://learnabout-electronics.org/Digital/dig11.php>
3. <https://www.youtube.com/watch?v=RrynEQ7sG5A>
4. <https://www.sciencedirect.com/topics/computer-science/de-morgans-theorem>
5. [https://en.wikipedia.org/wiki/Flip-flop_\(electronics\)](https://en.wikipedia.org/wiki/Flip-flop_(electronics))
6. <https://www.youtube.com/watch?v=tSti91b6qec>
7. <https://www.youtube.com/watch?v=vRBnZMJA0LY>
8. https://en.wikipedia.org/wiki/Shift_register
9. https://www.tutorialspoint.com/linear_integrated_circuits_applications/linear_integrated_circuits_applications_digital_to_analog_converters.htm
10. <https://www.youtube.com/watch?v=Y2OPnrgb0pY>
11. <https://www.youtube.com/watch?v=xxQZEVbPwU> (Tamil video)

Course Outcomes

1. After studied unit-1, the student will be able to gain knowledge between different types of number systems, and their conversions. Also able to study the various Binary codes and to design basic logic gates.
2. After studied unit-2, the student will be able to describe laws of Boolean Algebra, De Morgan's theorems. Also able to demonstrate K-Map and simplification of logic expressions and to design universal gates using NAND and NOR gates.
3. After studied unit-3, the student will be able to explain the Multiplexer, Demultiplexer and Decoder. Students can know the functions of various Flip-Flop circuits.
4. After studied unit-4, the student will be able to conceptualize the classification of registers and counters.
5. After studied unit-5, the student will be able to know how to convert digital to analog and analog to digital using different methods.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	L	M	M	M	M
CO2	S	S	M	M	S	M	M	S	M	S
CO3	S	M	S	S	S	M	M	S	S	S
CO4	S	S	M	M	S	M	S	S	M	M
CO5	S	S	M	S	M	S	M	S	S	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 2 – Group (A)

Paper code: Name of the Paper: Fundamentals of Microprocessor-8085 Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Couse Objectives

1. To know the complete basic details and architecture of microprocessor 8085
2. To study the different types of instructions and addressing modes
3. To write the simple assembly language programs for arithmetic operations and to learn about the instruction cycles
4. To understand the functions of ROM/RAM memory devices and peripheral devices
5. To expose the idea of pin function, working and interacting of peripheral devices with microprocessor

UNIT- I

Teaching Hours: 12

MICROPROCESSOR ARCHITECTURE

Evolution of Microprocessor-Applications of Microprocessors of Different Generations-The system bus and bus structure-Execution of an instruction-Pin functions of 8085- Architecture of 8085-Block diagram-Register array-ALU and associated circuitry -Instruction Register and Decoder-Timing and Control Unit- Interrupt and Serial I/O units-Types of Interrupts-Programmer's model of 8085.

UNIT- II

Teaching Hours: 12

INSTRUCTIONS & ADDRESSING MODES

Data transfer/ copy Instructions-Arithmetic, Logical- Two examples each instructions-Branch instructions-Unconditional and conditional jump- Call and Return instructions-Stack and Stack related instructions- I/O and Machine control instructions- Addressing modes.

UNIT- III

Teaching Hours: 12

ALP & INSTRUCTION TIMINGS

Assembly language programs-Addition, Subtraction, Multiplication and Division (8-bit only)-Largest/smallest in an array-Sum of series of a set- T-State-Machine cycle-Instruction cycle-Memory read cycle-Memory write cycle-Wait state-Halt state-Hold state- Delay calculations-Time delay using a single register.

UNIT- IV

Teaching Hours: 12

MEMORY AND I/O INTERFACE

Memory interface basics-Demultiplexing address/data bus-Generation control signals- $2K \times 8$ ROM/RAM Interface - Direct I/O Interface-IN FE_H instruction and its timing diagram-Design of Output Port using octal latch only-Memory mapped I/O- Difference between

Direct I/O and Memory mapped interface.

UNIT- V

Teaching Hours: 12

PERIPHERAL DEVICES & APPLICATIONS

Hand shake signals-Single Handshake I/O and Double Handshake I/O- Pin function and Block diagram and working of 8255-Pin function and Block diagram and working of 8279-LED Interface-Temperature Controller.

Text Books

Unit 1 to Unit 5

1. Fundamental of Microprocessor - 8085 - Architecture, Programming and interfacing – V. Vijayendran, S. Viswanathan, Pvt. Ltd., 2003.
2. A. NagoorKani, 8085 Microprocessor and its Applications, Tata McGraw Hill, New Delhi, 2013.

Reference Books

1. R.S. Goankar , Microprocessor Architecture, Programming and Applications with the 8085, 3rdEdn. Prentice Hall,
2. B.Ram, Fundamentals of Microprocessors and Microcomputers,DhanpatRai Publications, New Delhi.
3. Aditya P Mathur, Introduction to Microprocessors, Tata McGraw Hill Publishing Company Ltd., New Delhi,

E-Materials

1. <https://www.youtube.com/watch?v=ii7PCV2zvms>
2. https://www.tutorialspoint.com/microprocessor/microprocessor_8085_pin_configuration.htm
3. <https://www.youtube.com/watch?v=7nWt5dixiX0> (Tamil video)
4. https://www.tutorialspoint.com/microprocessor/microprocessor_8085_instruction_set
5. <https://www.youtube.com/watch?v=G3iUO96XhC4>
6. <https://www.youtube.com/watch?v=MIx6khOFFoU> (Tamil video)
7. <https://www.geeksforgeeks.org/8085-program-to-divide-two-8-bit-numbers/>
8. <http://www.psnacet.edu.in/courses/ECE/Microcontroller%20and%20Microprocessor/lecture4.pdf>
9. https://www.youtube.com/watch?v=-FGw_MPlfbk&vl=en
10. <https://www.youtube.com/watch?v=M8hDkRAL6M&vl=en>
11. <https://www.geeksforgeeks.org/programmable-peripheral-interface-8255/>

Course Outcomes

1. After studied unit-1, the student will be able to know the evolution of microprocessor, pin and architecture of 8085 microprocessor in detail.
2. After studied unit-2, the student will be able to describe different types of instructions like data transfer, arithmetic, logical and branching instructions with examples and it will be used for writing the assembly language programs.
3. After studied unit-3, the student will be able to write assembly language programs for simple arithmetic operations and hence they can apply it for interfacing applications.
4. After studied unit-4, the student will be able to learn the memory interface and

peripheral interface devices.

5. After studied unit-5, the student will be able to know how to interface the peripheral device with microprocessor 8085 and they are able to write the programs for LED and Temperature control interface system.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	No	Yes	Yes	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	No	Yes	No	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	S	M	M	M	M	M	M
CO2	S	S	M	S	S	M	M	S	M	L
CO3	S	M	S	S	S	M	M	S	S	S
CO4	S	S	M	S	S	S	S	S	M	L
CO5	S	S	M	S	M	M	M	S	S	L

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 3 – Group (A)

Paper code: Name of the Paper: Nanophysics

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. To know the fundamentals of nanotechnology.
2. To learn about carbon nanostructures and its properties.
3. To study the preparation of nanomaterial by different methods.
4. To analyse the synthesized nanomaterial by various characterization techniques.
5. To understand the various applications of nanotechnology.

UNIT- I

Teaching Hours: 12

INTRODUCTION TO NANO AND TYPES OF NANOMATERIAL

Need and origin of nano - Emergence of nanotechnology with special reference to Feynman. Size & Scales: definition of nanostructures; Top-down and bottom-up approaches- Introductory ideas of 1D, 2D and 3D nanostructured material- Quantum dots - Quantum wire - Quantum well - Exciton confinement in quantum dots-surface to volume ratio- semiconducting and magnetic nanoparticles.

UNIT- II

Teaching Hours: 12

CARBON NANOTUBES

Carbon materials – Allotropes of carbon – Structure of carbon nanotubes – Types of CNTs – Electronic properties of CNTs – Band structure of Graphene – Band structure of SWNT from graphene – Electron transport properties of SWNTs – Scattering in SWNTs – Carrier mobility in SWNTs.

UNIT- III

Teaching Hours: 12

FABRICATION OF NANOMATERIAL

Synthesis of nanoparticles- Co-precipitation method-sol-gel method –Hydrothermal method- Ball milling method-Physical vapor deposition-thin film deposition method-spray pyrolysis- Molecular beam epitaxy –Pulsed laser deposition-Chemical vapor deposition-Plasma

enhanced CVD- Laser induced CVD-Chemical beam epitaxy.

UNIT- IV

Teaching Hours: 12

CHARACTERIZATION OF NANOMATERIAL

Principle, Design and utility-XRD (X-ray diffraction)-particle size analysis using Scherer formula-UV-Visible spectroscopy-Band gap energy-Tau plot-FTIR spectroscopy-structural analysis-EDAX-elemental analysis-Scanning electron microscopy (SEM)- Transmission electron microscopy (TEM)-morphology.

UNIT – V

Teaching Hours: 12

APPLICATIONS

Nanoelectronics–OLEDs-OTFTs-SWNTFETs-Nanorobots–Nanomedicine-bio sensors-targeted drug delivery-Energy storage applications-nanosilicon for solar cells-MEMS and NEMS-Photonic crystals.

Text Books

Unit 1 to Unit 5

1. T.Pradeep et al., A Textbook of Nanoscience and Nanotechnology, Tata McGraw Hill, New Delhi, 2012.
2. T.Pradeep , Nano: The Essentials, Tata McGraw Hill, New Delhi, 2012.
3. R.W. Kelsall, I.W. Hamley and M. Geoghegan, Nanoscale Science and Nanotechnology (John-Wiley & Sons, Chichester, 2005.
4. G. Cao, Nanostructures and Nanomaterials, Imperial College Press, London, 2004.
5. C.P. Poole and F.J. Owens, Introduction to Nanotechnology, Wiley, New Delhi, 2003.

Reference Books

1. H.S. Nalwa, Nanostructured Materials and Nanotechnology, Academic Press, San Diego, 2002.
2. M. Wilson, K. Kannangara, G. Smith, M. Simmons, B. Raguse, Nanotechnology: Basic Science and Emerging Technologies, Overseas Press, New Delhi, 2005.

E-Materials

1. <https://en.wikipedia.org/wiki/Nanotechnology>
2. https://en.wikipedia.org/wiki/Carbon_nanotube
3. https://www.nanowerk.com/nanotechnology/introduction/introduction_to_nanotechnology_22.php
4. <https://www.youtube.com/watch?v=sbuIluJhT4A> (Tamil video)
5. <https://www.youtube.com/watch?v=14DqBIG96W0>
6. <https://www.sciencedirect.com/topics/chemistry/sol-gel-process> (Journal)
7. <https://www.slideshare.net/RamalingamGopal/sol-gel-synthesis-of-nanoparticles>
8. https://en.wikipedia.org/wiki/Scanning_electron_microscope
9. <https://www.youtube.com/watch?v=kdb6dHEHCA0>

10. <https://interestingengineering.com/15-medical-robots-that-are-changing-the-world>
11. <https://en.wikipedia.org/wiki/Nanorobotics>

Course Outcomes

1. After studied unit-1, the student will be able to know the origin and emergence of nanotechnology and also able to define different nanostructures.
2. After studied unit-2, the student will be able to describe carbon nanostructures and its fabrication. Also they can know the electrical, vibrational and mechanical properties of carbon nanostructure and its applications.
3. After studied unit-3, the student will be able to know how to fabricate the Nanomaterials by different methods.
4. After studied unit-4, the student will be able to learn the characterization techniques like XRD, UV-Vis, FTIR, EDAX, SEM, TEM etc for the synthesized nanostructures.
5. After studied unit-5, the student will be able to know the applications of nanotechnology in different field.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	No	No	Yes	Yes	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	No	No	No	No	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	M	M	M	M	M	M
CO2	S	M	S	S	S	M	M	S	M	L
CO3	S	M	S	S	S	M	M	S	S	S
CO4	S	S	S	S	S	S	S	S	M	L
CO5	S	M	S	S	M	M	M	S	S	L

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 1 – Group (B)

Paper code: Name of the Paper: Digital Electronics

Credit: 3

Total Hours per Week: 4

Lecture Hours: 60

Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. Understanding the different number systems and conversion between them and also to study the basic logic gates.
2. To teach the laws of Boolean Algebra, De Morgan's theorems and other logic circuits.
3. To Study combination of logic circuits and understanding concepts of various flip- flops.
4. To expose the knowledge on various registers and counters.
5. To learn the digital to analog and analog to digital converters.

UNIT – I

Teaching Hours: 14

NUMBER SYSTEMS AND BASIC LOGIC GATES

Number systems -Decimal, Binary, Octal and Hexadecimal system - Conversion from one number system to another- Binary Arithmetic -Addition -Subtraction-Multiplication-Division- 1's and 2's complement - Subtraction using Complements-Signed Binary Numbers- Binary codes- BCD code - Excess 3 code, Gray code - ASCII code - Basic logic gates- NOT,OR,AND-Design of AND, OR gates using diodes and NOT gate using transistor-Logic circuits and logic expressions-Sum of Products-Product of Sum- NAND, NOR and EX-OR - functions and truth tables.

UNIT- II

Teaching Hours: 14

BOOLEAN ALGEBRA AND LOGIC CIRCUITS

Laws of Boolean algebra - De Morgan's theorems-NAND & NOR as Universal gates (AND,OR and NOT only)-Karnaugh map - Minterms-Relationship between K-Map and truth table- 2,3 and 4 variable K Map using minterms- Simplification of Boolean function using K Map - Arithmetic Circuits-Half adder and Full adder- Four Bit Adder-BCD Adder- Half subtractor and Full subtractor-Four Bit Adder/subtractor.

UNIT- III

Teaching Hours: 12

COMBINATION OF CIRCUITS & FLIP-FLOPS

Multiplexer-Demultiplexer- Decoder- 2 to 4 and 3 to 8 Decoder-BCD to seven segment decoder- BCD to decimal decoder-Encoder-Programmable Logic Array (PLA)-Binary to Gray and Gray to Binary Conversion using EX-OR gates-Parity Generator and Checker - Flip Flops -SR Flip Flop -Clocked SR-Edge triggered Flip – Flops- D Flip-Flop - JK Flip-Flop -JK Master-Slave Flip - Flop-T Flip-Flop.

UNIT- IV

Teaching Hours: 10

REGISTERS & COUNTERS

Registers-Shift Registers- Shift Right and Shift Left Shift Registers-Ring Counter-Johnson's Counter-Asynchronous/Ripple Counter-Mod-2, Mod-4, Mod-8 and Mod-16 Counter-4-Bit Binary Up/Down Counter-Synchronous Counters-Design of Synchronous Counters-Mod-3, Mod-5 Counter- Synchronous BCD counter.

UNIT- V

Teaching Hours: 10

D/A AND A/D CONVERTERS

Binary weighted resistors D/A converter-R-2R Resistive Ladder - Analog to Digital Converter (ADC)-Counter Type A/D Converter-Successive Approximation A/D Converter-Dual Slope A/D Converter-Parallel Comparator A/D Converter.

Text Book

Unit 1 to Unit 5

1. V.Vijayendran, Introduction to Integrated Electronics (Digital & Analog), S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007.

Reference Books

1. Malvino and Leech, Digital Principles and Application, 4th Edition, Tata McGraw Hill, New Delhi, 2000.
2. V.Vijayendran, Digital Fundamentals, S.Viswanathan, Printers & Publishers Private Ltd, Chennai, 2004.
3. R.P. Jain, Modern Digital Electronics, 2/e, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. H. Taub and D. Schilling, Digital Integrated Electronics -, McGraw-Hill Book Company.
5. T.L. Floyd, Digital Fundamentals -, Pearson Education, 8/e.
6. W.H. Gothmann, Digital Electronics -, Prentice Hall of India Private Limited, 2/e.

E-Materials

1. <https://www.youtube.com/watch?v=4ae9sJBBkvw>
2. <https://learnabout-electronics.org/Digital/dig11.php>
3. <https://www.youtube.com/watch?v=RrynEQ7sG5A>
4. <https://www.sciencedirect.com/topics/computer-science/de-morgans-theorem>
5. [https://en.wikipedia.org/wiki/Flip-flop_\(electronics\)](https://en.wikipedia.org/wiki/Flip-flop_(electronics))
6. <https://www.youtube.com/watch?v=tSti91b6qec>
7. <https://www.youtube.com/watch?v=vRBnZMJA0LY>
8. https://en.wikipedia.org/wiki/Shift_register
9. https://www.tutorialspoint.com/linear_integrated_circuits_applications/linear_integrated_circuits_applications_digital_to_analog_converters.htm
10. <https://www.youtube.com/watch?v=Y2OPnrgb0pY>
11. https://www.youtube.com/watch?v=_xxQZEVbPwU (Tamil video)

Course Outcomes

1. After studied unit-1, the student will be able to gain knowledge between different types of number systems, and their conversions. Also able to study the various binary codes and to design basic logic gates.
2. After studied unit-2, the student will be able to describe laws of Boolean Algebra, De Morgan's theorems. Also able to demonstrate K-Map and simplification of logic expressions and to design universal gates using NAND and NOR gates.
3. After studied unit-3, the student will be able to explain the Multiplexer, Demultiplexer and Decoder. Students can know the functions of various Flip-Flop circuits.
4. After studied unit-4, the student will be able to conceptualize the classification of registers and counters.
5. After studied unit-5, the student will be able to know how to convert digital to analog and analog to digital using different methods.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	L	M	M	M	M
CO2	S	S	M	M	S	M	M	S	M	S
CO3	S	M	S	S	S	M	M	S	S	S
CO4	S	S	M	M	S	M	S	S	M	M
CO5	S	S	M	S	M	S	M	S	S	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 2 – Group (B)

Paper code: Name of the Paper: Materials Science

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course Contents

1. To teach the classification of engineering materials and properties.
2. To discuss the mechanical and thermal behavior of materials.
3. To expose the knowledge on polymers, ceramics and nanomaterial.
4. To study the basics of smart materials.
5. To learn the idea of energy storage materials.

UNIT – I

Teaching Hours: 12

ENGINEERING MATERIALS AND CHEMICAL BONDING

Classification of engineering materials- levels of structure - structure-property relationship in materials-stability and metastability- bond energy- bond type and bond length- ionic and covalent bonding -Metallic bonding-secondary bonding-lattice energy-Born Haber cycle - cohesive energy -variation in bonding character and properties.

UNIT- II

Teaching Hours: 12

MECHANICAL AND THERMAL BEHAVIOUR OF MATERIALS

Elastic behaviour -atomic model of elastic behaviour -Young's modulus -Poisson's ratio - shear modulus- bulk modulus-composite materials - the modulus as a parameter of design- rubber like elasticity -plastic deformation -tensile -yield strength -toughness -elongation - hardness- impact strength -stress - strain curve -Heat capacity, thermal conductivity, thermal expansion of materials.

UNIT- III

Teaching Hours: 12

POLYMERS, CERAMICS AND NANOMATERIAL

Polymers - Polymerization mechanism - Polymer structures - Deformation of polymers - Behaviour of polymers-Ceramics-Ceramic phases - Structure - classes - Effect of structure on the behaviour of ceramic phases - composites - Nanomaterial-Need and origin of nano-Introductory ideas of 1D, 2D and 3D nanostructured material-Synthesis of oxide

nanoparticles by sol-gel method -fullerences-Carbon nanotubes- Fabrication and structure of carbon nanotubes

UNIT- IV

Teaching Hours: 12

SMART MATERIALS

Definition of smart materials- Types -Piezoelectric materials-Materials for MEMS and NEMS- Ferro fluid- Magnetic shapememoryalloys (MSMAs)- Shape memory alloy (SMA)- Oneway and Two way memory effect- Dielectric elastomers (DEs).

UNIT- V

Teaching Hours: 12

ENERGY STORAGE MATERIALS

Solar cells: Organic solar cells - Polymer composites for solar cells-Polymer membranes for fuel cells - Acid/ alkaline fuel cells -design of fuel cells-Carbon Nanotubes for energy storage - Hydrogen Storage in Carbon Nanotubes.

Text Books

Unit 1 to Unit 5

1. V. Raghavan V, Materials science and engineering - A First Course, 5th Ed, Prentice Hall India, New Delhi, 2012.
2. M. Arumugam, Materials Science - Anuradha Agencies, 1990.

Reference Books

1. V. Rajendran, Material Science, Tata McGraw Hill Ltd, New Delhi, 2001.
2. Dr. M.N. Avadhanulu, Material science, S.Chand & Company, New Delhi, 2014.
3. G.K.Narula, K.S. Narula, V.K. Gupta Materials Science, Tata McGraw Hill Publishing, New Delhi, 1994.
4. M V Gandhi and B S Thompson B S, Smart Materials and Structures. Chapman & Hall 1992.

E-Materials

1. <https://www.learnpick.in/prime/documents/ppts/details/729/classification-of-engineering-materials-part-1>
2. <https://www.youtube.com/watch?v=5hJhRFCUilo>
3. <https://www.youtube.com/watch?v=iegJ76DS3lc>
4. https://nptel.ac.in/content/storage2/courses/112108150/pdf/Web_Pages/WEBP_M15.pdf
5. <https://plastics.americanchemistry.com/plastics/The-Basics/>
6. <https://study.com/academy/lesson/what-are-polymers-properties-applications-examples.html>
7. <https://internetofthingsagenda.techtarget.com/definition/micro-electromechanical-systems-MEMS>

8. https://en.wikipedia.org/wiki/Microelectromechanical_systems
9. <https://www.iitk.ac.in/reach/2008/Energy/REACH2008-SolarCells-SundarIyer.pdf>
10. <https://www.youtube.com/watch?v=zMLrhgSAPHc>
11. https://www.youtube.com/watch?v=4Homfj_ne0Q (Tamil video)

Course Objectives

1. After studied unit-1, the student will be able to know the origin engineering materials and its classification. Also students will be able to learn the bonding character and its Properties
2. After studied unit-2, the student will be able to describe mechanical properties like elastic behavior and thermal properties like heat capacity, thermal conductivity etc.
3. After studied unit-3, the student will be able to know the basics of polymers, ceramics and nanomaterial.
4. After studied unit-4, the student will be able to explain definition and types of smart materials.
5. After studied unit-5, the student will be able to conceptualize the energy storage materials.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	No	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	No	No
5	Yes	No	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	L	M	M	M	M
CO2	S	M	M	M	M	M	M	S	M	L
CO3	S	M	S	S	S	M	M	S	S	S
CO4	S	M	M	M	S	M	S	S	M	M
CO5	S	S	M	S	M	S	M	S	S	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 3 – Group (B)

Paper code: Name of the Paper: Medical Physics

Credit: 3

Total Hours per Week: 4

Lecture Hours: 60

Tutorial Hours: Nil

Practical Hours: Nil

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Course Objectives

1. To have a fundamental knowledge about the characteristics and production of X-rays.
2. To understand the concept of radiation physics.
3. To have a clear understanding of the design and working of Medical imaging techniques.
4. To understand the concepts and ideas behind radiation therapy.
5. To gain knowledge about the protective measures in radiation therapy.

UNIT- I

Teaching Hours: 12

X - RAYS

Electromagnetic spectrum, production of x-rays, x-ray spectra-Bremsstrahlung, Characteristic x-ray- Coolidge tube, x-ray tube design, tube cooling stationary mode, Rotating anode x-ray tube, Tube rating, quality and intensity of x-ray. X-ray generator circuits, half wave and full wave rectification, filament circuit, kilo voltage circuit, types of X-Ray Generator, high frequency generator, exposure timers and switches, HT cables, HT generation.

UNIT- II

Teaching Hours: 12

RADIATION PHYSICS

Radiation units exposure, absorbed dose, units: rad, gray, relative biological effectiveness, effective dose, inverse square law- Interaction of radiation with matter Compton & photoelectric effect, Rem & Sievert, linear attenuation coefficient - Radiation Detectors: Thimble chamber, condenser chambers, Geiger Muller counter, Scintillation counters and Solid State detectors, ionization chamber, Dosimeters, survey methods, area monitors, TLD, Semiconductor detectors.

UNIT- III

Teaching Hours: 12

MEDICAL IMAGING PHYSICS

Evolution of Medical Imaging, X-ray diagnostics and imaging, Physics of nuclear magnetic resonance (NMR), NMR imaging, MRI Radiological imaging, Ultrasound imaging, Physics of Doppler with applications and modes, Vascular Doppler. Radiography: Filters, grids, cassette, X-ray film, film processing, fluoroscopy- Computed tomography scanner- principle & function, display, generations, mammography. Thyroid uptake system and Gamma camera (only Principle, function and display)

UNIT- IV

Teaching Hours: 12

RADIATION THERAPY PHYSICS

Diagnostic nuclear medicine: Radiopharmaceuticals for radioisotope imaging, -Radioisotope imaging equipment, Single photon and positron emission tomography- Therapeutic nuclear medicine: Interaction between radiation and matter -Dose and isodose in radiation treatment - Medical Instrumentation: Basic Ideas of Endoscope and Caution, Sleep Apnea and Cpap Machines, Ventilator and its modes

UNIT- V

Teaching Hours: 12

RADIATION PROTECTION

Principles of radiation protection, protective materials-radiation effects, somatic, genetic stochastic and deterministic effect. Personal monitoring devices: TLD film badge -pocket dosimeter, OSL dosimeter- Radiation dosimeter- Natural radioactivity, Biological effects of radiation, Radiation monitors-Steps to reduce radiation to Patient, Staff and Public- Dose Limits for Occupational workers and Public-AERB: Existence and Purpose.

Text Books

Unit 1 to Unit 5

1. Dr. K. Thayalan, Basic Radiological Physics, Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi, 2003.
2. Curry, Dowdey and Murrey, Christensen's Physics of Diagnostic Radiology, Lippincott Williams and Wilkins, 1990.
3. FM Khan-Williams and Wilkins, Physics of Radiation Therapy, Third edition, 2003.

Reference Books

1. Chandra-Lippincott Williams and Wilkins, Nuclear Medicine Physics, 1998.
2. William R Hendee-Mosby Medical Imaging Physics, 3rd edition, 1992.
3. K.N. Govindarajan, Advanced Medical Radiation Dosimetry, Prentice Hall of India Pvt. Ltd. New Delhi, 1992.
4. Muhammad Maqbool, Introduction to Medical Physics, Springer International Publishing, 2017.

E-Materials

1. https://www.youtube.com/watch?v=T1WwHh4b_M
2. <https://en.wikipedia.org/wiki/X-ray>
3. <https://www.studyandscore.com/studymaterial-detail/geiger-muller-counter-construction-principle-working-plateau-graph-and-applications>
4. <https://www.youtube.com/watch?v=Sr1BdM89RnA>
5. https://en.wikipedia.org/wiki/Magnetic_resonance_imaging
6. <https://www.youtube.com/watch?v=Q9-X4uV8ymk>
7. <https://www.adacap.com/nuclear-medicine/>
8. <http://jnm.snmjournals.org/content/57/1/163.full>

9. https://www.youtube.com/watch?v=gXR5Wdmeu_s (Tamil video)
10. <https://www.healthline.com/health/endoscopy>

Course Outcomes

1. After studying Unit 1, the student will have a clear idea about the fundamentals of the production and characteristics of X-rays.
2. After studying Unit 2, the student would have understood the concept of radiation units and radiation detectors.
3. After studying Unit 3, the student will have a clear understanding of the design and working of Medical imaging techniques and computer tomography scanner.
4. After studying Unit 4, the student will be having a thorough understanding about the diagnostic nuclear medicine and some medical instrumentation.
5. After studying Unit 5, the student would have gained adequate knowledge about the protective measures to be undertaken in radiation therapy.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	L	S	S	M	M
CO2	S	S	M	M	S	M	S	S	M	S
CO3	S	M	S	S	S	M	S	S	S	S
CO4	S	S	M	M	S	M	S	S	M	L
CO5	S	S	M	S	M	S	M	S	S	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 1 – Group (C)

Paper code: Name of the Paper: Digital Electronics

Credit: 3

Total Hours per Week: 4 Lecture Hours: 60 Tutorial Hours: Nil Practical Hours: Nil

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Course Objectives

1. Understanding the different number systems and conversion between them and also to study the basic logic gates.
2. To teach the laws of Boolean Algebra, De Morgan's theorems and other logic circuits.
3. To Study combination of logic circuits and understanding concepts of various flip-flops.
4. To expose the knowledge on various registers and counters.
5. To learn the digital to analog and analog to digital converters.

UNIT – I

Teaching Hours: 14

NUMBER SYSTEMS AND BASIC LOGIC GATES

Number systems -Decimal, Binary, Octal and Hexadecimal system - Conversion from one number system to another- Binary Arithmetic -Addition -Subtraction-Multiplication-Division- 1's and 2's complement - Subtraction using Complements-Signed Binary Numbers-Binary codes- BCD code - Excess 3 code, Gray code - ASCII code - Basic logic gates- NOT,OR,AND-Design of AND, OR gates using diodes and NOT gate using transistor-Logic circuits and logic expressions-Sum of Products-Product of Sum- NAND, NOR and EX-OR - functions and truth tables.

UNIT- II

Teaching Hours: 14

BOOLEAN ALGEBRA AND LOGIC CIRCUITS

Laws of Boolean algebra - De Morgan's theorems-NAND & NOR as Universal gates (AND,OR and NOT only)-Karnaugh map - Minterms-Relationship between K-Map and truth table- 2,3 and 4 variable K Map using minterms- Simplification of Boolean function using K Map - Arithmetic Circuits-Half adder and Full adder- Four Bit Adder-BCD Adder- Half subtractor and Full subtractor-Four Bit Adder/subtractor.

UNIT- III

Teaching Hours: 12

COMBINATION OF CIRCUITS & FLIP-FLOPS

Multiplexer-Demultiplexer- Decoder- 2 to 4 and 3 to 8 Decoder-BCD to seven segment decoder- BCD to decimal decoder-Encoder-Programmable Logic Array (PLA)-Binary to Gray and Gray to Binary Conversion using EX-OR gates-Parity Generator and Checker - Flip Flops -SR Flip Flop -Clocked SR-Edge triggered Flip – Flops- D Flip-Flop - JK Flip-Flop -JK Master-Slave Flip - Flop-T Flip-Flop.

UNIT- IV

Teaching Hours: 10

REGISTERS & COUNTERS

Registers-Shift Registers- Shift Right and Shift Left Shift Registers-Ring Counter - Johnson's Counter-Asynchronous/Ripple Counter-Mod-2, Mod-4, Mod-8 and Mod-16 Counter-4-Bit Binary Up/Down Counter-Synchronous Counters-Design of Synchronous Counters-Mod-3, Mod-5 Counter- Synchronous BCD counter.

UNIT- V

Teaching Hours: 10

D/A AND A/D CONVERTERS

Binary weighted resistors D/A converter-R-2R Resistive Ladder - Analog to Digital Converter (ADC)-Counter Type A/D Converter-Successive Approximation A/D Converter-Dual Slope A/D Converter-Parallel Comparator A/D Converter.

Text Book

Unit 1 to Unit 5

1. V.Vijayendran, Introduction to Integrated Electronics (Digital & Analog), S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2007.

Reference Books

1. Malvino and Leech, Digital Principles and Application, 4th Edition, Tata McGraw Hill, New Delhi, 2000.
2. V.Vijayendran, Digital Fundamentals, S.Viswanathan, Printers & Publishers Private Ltd, Chennai, 2004.
3. R.P. Jain, Modern Digital Electronics, 2/e, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. H. Taub and D. Schilling, Digital Integrated Electronics -, McGraw-Hill Book Company.
5. T.L. Floyd, Digital Fundamentals -, Pearson Education, 8/e.
6. W.H. Gothmann, Digital Electronics -, Prentice Hall of India Private Limited, 2/e.

E-Materials

1. <https://www.youtube.com/watch?v=4ae9sJBBkvw>
2. <https://learnabout-electronics.org/Digital/dig11.php>
3. <https://www.youtube.com/watch?v=RrynEQ7sG5A>
4. <https://www.sciencedirect.com/topics/computer-science/de-morgans-theorem>
5. [https://en.wikipedia.org/wiki/Flip-flop_\(electronics\)](https://en.wikipedia.org/wiki/Flip-flop_(electronics))
6. <https://www.youtube.com/watch?v=tSti91b6qec>

7. <https://www.youtube.com/watch?v=vRBnZMJA0LY>
8. https://en.wikipedia.org/wiki/Shift_register
9. https://www.tutorialspoint.com/linear_integrated_circuits_applications/linear_integrated_circuits_applications_digital_to_analog_converters.htm
10. <https://www.youtube.com/watch?v=Y2OPnrgb0pY>
11. https://www.youtube.com/watch?v=_xxQZEVbPwU (Tamil video)

Course Outcomes

1. After studied unit-1, the student will be able to gain knowledge between different types of number systems, and their conversions. Also able to study the various binary codes and to design basic logic gates.
2. After studied unit-2, the student will be able to describe laws of Boolean Algebra, De Morgan's theorems. Also able to demonstrate K-Map and simplification of logic expressions and to design universal gates using NAND and NOR gates.
3. After studied unit-3, the student will be able to explain the Multiplexer, Demultiplexer and Decoder. Students can know the functions of various Flip-Flop circuits.
4. After studied unit-4, the student will be able to conceptualize the classification of registers and counters.
5. After studied unit-5, the student will be able to know how to convert digital to analog and analog to digital using different methods.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	L	M	M	M	M
CO2	S	S	M	M	S	M	M	S	M	S
CO3	S	M	S	S	S	M	M	S	S	S
CO4	S	S	M	M	S	M	S	S	M	M
CO5	S	S	M	S	M	S	M	S	S	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 2 – Group (C)

Paper code: Name of the Paper: Radiation Safety

Credit: 3

Total Hours per Week: 4

Lecture Hours: 60

Tutorial Hours: Nil

Practical Hours: Nil

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Course Objectives

1. The students can learn the basic concepts of atomic and nuclear physics
2. To teach the different types of radiation and interaction of charged particles
3. To study the basic idea of different units of activity and working principle of radiation detectors
4. To understand the concept of radiation safety management
5. To give the application of nuclear techniques

UNIT- I

Teaching Hours: 12

BASICS OF ATOMIC AND NUCLEAR PHYSICS

Basic concept of atomic structure; X rays characteristic and production; concept of bremsstrahlung and auger electron-The composition of nucleus and its properties, mass number, isotopes of element, spin, binding energy, stable and unstable isotopes, law of radioactive decay- Mean life and half-life, -Basic concept of alpha, beta and gamma decay, concept of cross section and kinematics of nuclear reactions- Types of nuclear reaction, fusion, fission.

UNIT- II

Teaching Hours: 12

INTERACTION OF RADIATION WITH MATTER

Types of Radiation: Alpha, Beta, Gamma and Neutron and their sources, sealed and unsealed sources, Interaction of Photons - Photoelectric effect, Compton Scattering, Pair Production- Linear and Mass Attenuation Coefficients- Interaction of Charged Particles: Heavy charged particles - Beth-Bloch Formula, Scaling laws, Mass Stopping Power, Range, Straggling, Channeling and Cherenkov radiation- Beta Particles- Collision and Radiation loss (Bremsstrahlung)-Interaction of Neutrons- Collision, slowing down and Moderation.

UNIT- III

Teaching Hours: 12

RADIATION DETECTION AND MONITORING DEVICES

Radiation Quantities and Units: Basic idea of different units of activity, KERMA, exposure, absorbed dose, equivalent dose, effective dose, collective equivalent dose, Annual Limit of Intake (ALI) and derived Air Concentration (DAC) - Radiation detection: Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter, Multi-Wire Proportional Counters (MWPC) and Gieger Muller Counter), Scintillation Detectors (Inorganic and Organic Scintillators), Solid States Detectors and Neutron Detectors, Thermoluminescent Dosimeter.

UNIT- IV

Teaching Hours: 12

RADIATION SAFETY MANAGEMENT

Biological effects of ionizing radiations - Operational limits and basics of radiation hazards evaluation and control: radiation protection standards - International Commission on Radiological Protection (ICRP) principles, justification, optimization, limitation, introduction of safety and risk management of radiation. Nuclear waste and disposal management. Brief idea about Accelerator driven Sub-critical system (ADS) for waste management.

UNIT-V

Teaching Hours: 12

APPLICATION OF NUCLEAR TECHNIQUES

Application in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy), Archaeology, Art, Crime detection, Mining and oil - Industrial Uses: Tracing, Gauging, Material Modification, Sterilization, Food preservation.

Text Books

Unit 1 to Unit 5

1. R. Murugesan and Kiruthiga Sivaprasath, Modern Physics, S Chand & Co. New Delhi, 2006.
2. H. Cember and T. E. Johnson, Introduction to Health Physics, 4th Ed., McGraw Hill, 2008.
3. K. Thyalan, Handbook of Radiological Safety, Jaypee Brothers, Medical, Publishers, 2009.

Reference Books

1. Dr. K. Thyalan, Basic Radiological Physics, Jaypee Brothers Medical Publishing Pvt. Ltd. New Delhi, 2003.
2. R. F. Mould Radiation Protection in Hospital (Adam Hilger Ltd., Bristol, 1985).
3. Martin, S. Harbison, K. Beach and P. Cole, An Introduction to Radiation Protection, 6th Ed. CRC Press, 2013.
4. AERB Radiation Protection Rules, 2004.
5. IAEA Safety Series 41

E-Materials

1. https://en.wikipedia.org/wiki/Radioactive_decay
2. <https://www.toppr.com/guides/physics/nuclei/radioactivity-law-of-radioactive-decay/>
3. <https://www.youtube.com/watch?v=9UhmFr2WctU> (Tamil video)
4. https://ta.wikipedia.org/wiki/%E0%AE%92%E0%AE%B3%E0%AE%BF%E0%AE%AE%E0%AE%BF%E0%AE%A9%E0%AF%8D_%E0%AE%B5%E0%AE%BF%E0%AE%B3%E0%AF%88%E0%AE%B5%E0%AF%81
5. <https://www2.lbl.gov/abc/wallchart/chapters/15/2.html>
6. https://www.radiologyinfo.org/en/info.cfm?pg=safety-hiw_09
7. <https://www.youtube.com/watch?v=DvSNlmGu55c>
8. http://webfiles.ehs.ufl.edu/rssc_std_y_chp_5.pdf
9. <https://www.world-nuclear.org/information-library/non-power-nuclear-applications/overview/the-many-uses-of-nuclear-technology.aspx>
10. <https://www.youtube.com/watch?v=ySnG4JZa7Go>

Course Outcomes

1. After studied unit-1, the student will be able to study the basics of atomic structure and nuclear composition.
2. After studied unit-2, the student will be able to describe properties of alpha, beta and gamma rays and also to study the interaction of charged particles.
3. After studied unit-3, the student will be able to explain radiation quantities and units and also able to know the principle and working of radiation detectors.
4. After studied unit-4, the student will be able to conceptualize the radiation safety management.
5. After studied unit-5, the student will be able to know the application of nuclear techniques in medicinal science.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	No	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	No	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	No

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	L	M	M	M	M
CO2	S	S	M	M	S	M	M	M	M	L
CO3	S	M	S	S	S	M	M	M	S	L
CO4	S	S	M	M	S	M	S	M	M	M

CO5	S	S	M	S	M	S	M	S	S	S
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THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Elective 3 – Group (C)

Paper code: Name of the Paper: Astrophysics

Credit: 3

Total Hours per Week: 4

Lecture Hours: 60

Tutorial Hours: Nil

Practical Hours: Nil

Course Objectives

1. To give basic principle and types of astronomical instruments.
2. To study the big bang theory, types of galaxies and to astronomical units.
3. To learn the birth and age of stars and to know about comets.
4. To teach the structure of the sun and other planets.
5. To give the overview of India's space programme and calendars.

UNIT- I

Teaching Hours: 12

ASTRONOMICAL INSTRUMENTS

Optical telescope - reflecting telescope - types of reflecting telescope - advantages of reflecting telescopes - radio telescope - astronomical spectrographs - photographic photometry - photoelectric spectrometry- detectors and image processing.

UNIT- II

Teaching Hours: 12

SPACE

Introduction -Hubble's Law -Big bang theory - Shape of Universe -Expanding universe in space - Galaxies- Types of Galaxies- Spiral, Elliptical and Irregular Galaxies - Clusters of Galaxies - Milky Way - Quasars - Cislunar space -Translunar space - Inter planetary distance

-Interstellar space - Inter galactic space - Light Year - Astronomical Unit- Astronomical Map.Astronomical Systems -Astronomical co-ordinates - Celestial Sphere - Celestial Equators - Celestial Poles.

UNIT- III

Teaching Hours: 12

STARS

Birth of Stars -Colour and Age- Life of Stars - Red giant stars - White dwarf star - Neutron Star -Black hole - Supernovae - Constellations - Zodiac - Asteroids - Meteors -Meteorites-Comets.

UNIT- IV

Teaching Hours: 12

SOLAR SYSTEM

Introduction - Sun - Structure of Sun - Nuclear reactions in sun - Sun spot and solar flares- Earth - Structure of earth - Atmosphere - Moon and its structure - Inner planets Outer planets - Introduction - Sidereal month - Synodic month - daily motion of the moon- age of moon - phase of moon - position of moon at rising and setting-Eclipses-Introduction - umbra and penumbra - lunar eclipse - solar eclipse -durationof lunar and solar eclipse - comparison of solar and lunar eclipses.

UNIT- V

Teaching Hours: 12

INDIA'S SPACE PROGRAMME

Overview - Methodological issues in cost beneficial analysis of spaceprogramme - The INSAT system - Broadcasting - Telecommunication -Meteorology - Indian remote sensing programme-Geoinformatics (basic idea only) - The launching program-Latest Launchers-PSLV and GSLV - Mission-Chandrayan 2 - Lunar and Solar calendars - Egyptian - Mayan - Roman - Julian andGregorian calendars - Indian National calendar - Tamil and Malayalamcalendars.

Text Books

1. BaidyanathBasu, An introduction to Astrophysics,Pentice Hall of India Private Ltd., New Delhi - 2001.
2. A.Hewish, Physics of the Universe , CSIR publication, New Delhi, 1992.
3. BimanBasu, Inside Stars, CSIR Publication, New Delhi, 1992.
4. K.S.Krishnasamy, Astro Physics a Modern Perspective, New Age International, New Delhi.
5. R. Murugesan, Modern Physics, S. Chand &Co.,New Delhi, 2003.

Reference Books

1. Prof. P. Devadas, The fascinating Astronomy, Devadas Telescopes, Chennai.
2. S. Kumaravelu and SusheelaKumaravelu,Astronomy,2013.
3. Textbook of astronomy an astrophysics with elements of cosmology, V.B.Bhatia, Narosapublishing house, 2001.
4. Astrophysics - Stars and Galaxies, K. D. Abhyankar, University Press, 2001.
5. Theoretical Astrophysics (Vols. I,II,III) - T. Padmanavan (CUP)

6. Black Holes, White Dwarfs and Neutron Stars -S.L.Shapiro and S.A.Teukolsky (John Wiley, 1983).

E-Materials

1. <https://www.youtube.com/watch?v=zlioUjguQk8>
2. https://en.wikipedia.org/wiki/Reflecting_telescope
3. https://en.wikipedia.org/wiki/Milky_Way
4. <https://www.youtube.com/watch?v=BcjmoEspoRI>
5. <https://www.youtube.com/watch?v=ZrS3Ye8p61Y>
6. <https://en.wikipedia.org/wiki/Star>
7. https://en.wikipedia.org/wiki/Solar_System
8. <https://www.youtube.com/watch?v=AC0HdUD1RfA> (Tamil video)
9. <https://www.youtube.com/watch?v=eeS7byxWDM4>
10. https://en.wikipedia.org/wiki/Indian_National_Satellite_System

Course Outcomes

1. After studied unit-1, the student will be able to study the different types of optical instruments like telescopes and spectrographs will be used for observing/recording the space objects.
2. After studied unit-2, the student will be able to describe big bang theory, different types of galaxies, milky way and astronomical unit.
3. After studied unit-3, the student will be able to explain about stars, constellations, asteroids, meteorites and comets.
4. After studied unit-4, the student will be able to know the details of solar system and able to know the formation eclipse due to sun, moon and earth.
5. After studied unit-5, the student will be able to understanding the different space programmers/missions carried out by our Indian Space Research Organization (ISRO) and also to study the lunar and solar calendars.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	M	L	M	M	M	L
CO2	S	S	S	S	S	M	M	S	M	S
CO3	M	M	S	S	S	M	M	S	S	S
CO4	S	S	S	S	S	M	S	M	M	M
CO5	M	S	S	S	M	S	M	S	S	M

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
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Semester: VI

Paper type: Core Practical

Paper code:

Name of the Paper: Practical –3

Credit: 3

Total Hours per Week: 3 Lecture Hours: Nil Tutorial Hours: Nil Practical Hours: 45

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List of Experiments (Any 15 Experiments only)

1. Bifilar Pendulum - Parallel Threads - Verification of Parallel and Perpendicular axes theorems.
2. Young's modulus - Koenig's method - non- uniform bending.
3. Young's modulus -Koenig's method - uniform bending.
4. Newton's rings -Refractive index of material a convex lines.
5. Spectrometer i- i' Curve.
6. Spectrometer -Narrow angled prism - angle of deviation - normal incidence and normal emergence - refractive index.
7. Spectrometer-Dispersive power of a prism.
8. Spectrometer-Dispersive power of a grating.
9. Field along the axis of circular coil -Deflection magnetometer -M and B_H - Null Deflection Method.
10. Field along the axis of circular coil –Vibration magnetometer -Determination of B_H .
11. Potentiometer –Calibration of high range Voltmeter.
12. Potentiometer – EMF of a thermo couple.
13. Potentiometer - Conversion of galvanometer into Voltmeter.
14. Potentiometer - Conversion of galvanometer into Ammeter.
15. BG - Absolute capacitance of a capacitor.
16. BG - Comparison mutual inductances.
17. BG - Internal resistance of a cell.
18. Voltage regulator -Bridge Rectifier-Using IC 7805
19. Transistor Characteristics-CE mode
20. FET -Characteristics.
21. UJT - Characteristics.
22. SCR- Characteristics
23. RC Coupled Amplifier- Single stage.
24. Colpitt's Oscillator- Using transistor.
25. Hartley oscillator-Using transistor.

Text Books

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2018.
2. M.N.Srinivasan, S. Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015.

Reference Books

1. Samir Kumar Ghosh, A Textbook of Advanced Practical Physics, NCBA, Kolkatta, 2000.

2. D. Chattopadhyay, P.C.Rakshit, An Advanced Course in Practical Physics, NCBA, Kolkatta, 2011
3. C.L.Arora, B.Sc., Practical Physics,S. Chand and Company., New Delhi.
4. D.P..Khandelwal D.P., A Laboratory Manual of Physics for Undergraduate Classes. Vani Publications.
5. B.Saraf et al, Physics through Experiments,Vikas Publications.
6. Harnaam Singh., B.Sc., Practical Physics,S. Chand and Company., New Delhi.
7. D C Tayal, University Practical Physics, Himalaya Publishing House.
8. Gupta & Kumar, Practical Physics, Pragatiprakashan, Meerut.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Core Practical

Paper code:

Name of the Paper: Practical -4

Credit: 3

Total Hours per Week: 3 Lecture Hours: Nil Tutorial Hours: Nil Practical Hours: 45

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List of Experiments (Any 12 Experiments only)

1. Transistor - Phase shift oscillator.
2. Transistor - Wien bridge oscillator.
3. FET-Amplifier.
4. Verification of associative laws for AND and OR gates
5. K-Map reduction and logic circuit implementation.
6. Verification of DeMorgan's Laws.
7. Half adder and Full adder - using NAND gate.
8. Half subtractor and Full subtractor- using NAND gate.
9. RS, Clocked RS, and D Flip Flops using NAND gate.
10. Shift Register using IC 7473
11. Four bit ring and Johnson's counter using IC 7473
12. Four bit BCD up/down counter using IC 7473
13. D/A converter-4-bit binary weighted resistor method.
14. OP-AMP-Voltage follower, Adder, Subtractor, Averager (inverting mode).
15. OP-AMP- Differentiator and Integrator
16. OP-AMP- Inverting amplifier with frequency gain response.
17. OP-AMP-Astablemultivibrator.
18. Microprocessor 8085-ALP for 8 bit addition and Subtraction
19. Microprocessor 8085-ALP for 8 bit Multiplication and Division
20. Microprocessor 8085- ALP Largest/Smallest Number in an array

Text Books

1. C.C. Ouseph, U.J. Rao, V. Vijayendran, Practical Physics and Electronics, S. Viswanathan, Printers & Publishers Private Ltd, Chennai, 2018.
2. M.N.Srinivasan, S. Balasubramanian, R.Ranganathan, A Text Book of Practical Physics, Sultan Chand & Sons, New Delhi, 2015.

Reference Books

1. Samir Kumar Ghosh, A Textbook of Advanced Practical Physics, NCBA, Kolkatta, 2000.
2. D. Chattopadhyay, P.C.Rakshit, An Advanced Course in Practical Physics, NCBA, Kolkatta, 2011
3. C.L.Arora, B.Sc., Practical Physics, S. Chand and Company., New Delhi.
4. D.P..Khandelwal D.P., A Laboratory Manual of Physics for Undergraduate Classes. Vani Publications.
5. B.Saraf et al, Physics through Experiments, Vikas Publications.
6. Harnaam Singh., B.Sc., Practical Physics, S. Chand and Company., New Delhi.
7. D C Tayal, University Practical Physics, Himalaya Publishing House.

8. Gupta & Kumar, Practical Physics, Pragatiprakashan, Meerut.

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Physics) – 2022-2023 onwards

Semester: VI

Paper type: Project

Paper code:

Name of the Paper: Compulsory Project Credit: 3

Total Hours per Week: 3 Lecture Hours: Nil Tutorial Hours: Nil Practical Hours: 45

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Preamble

The concept of introducing the project will help the student community to learn and apply the principles of Physics and explore the new research avenues - In the course of the project the student will refer books, Journals or collect literature / data by the way of visiting research institutes/ industries or social relevance problem. He/she may even do experimental /theoretical work in his/her college and submit a dissertation report with a minimum of 25 pages not exceeding 30 pages.

Format for Preparation of Project

The sequence in which project should be arranged and bound should be as follows

1. Cover Page and title Page
2. Declaration
3. Certificate
4. Acknowledgement (not exceeding one page)
5. Contents (12 Font size, Times new Roman with double line spacing)
6. Chapters
7. References

Distribution of marks for Project: (25+75 = 100 Marks)

Internal : 25 Marks

External : 75 Marks

- | | |
|---|------------|
| (a) For Organization and presentation of Project | - 40 marks |
| (b) For the novelty /Social relevance | - 10 marks |
| (c) Presentation of work /Participation in state/
National level Seminar/publication | - 5 marks |
| (d) Viva voce (Preparation, Presentation of
work and Response to questions) | - 20 marks |



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Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) - 2022-2023 onwards

Semester: I

Paper type: core

Paper code: CZO11 Name of the Paper: Invertebrata

Credit: 4

Total Hours per Week: 6 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. To acquire wide knowledge on the biological diversity of invertebrata.
2. To understand the systematic and functional morphology of invertebrates.
3. To impart knowledge on parasitic forms of lower invertebrates.
4. To study the Economic importance, Affinities and various adaptive features of invertebrates.
5. To understand evolutionary significance of invertebrates

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied Unit I : Students will be able to summarise the general characters, classify the animals of the phylum Protozoa. Understand and illustrates life history of Protozoans parasites.
2. After studied Unit II : Students will be able to summarise the general characters, classify the animals of the phylum Porifera and Coelenterata. Understands and illustrates life history of Sycon and Obelia. Narrates Polymorphism in Coelenterata.
3. After studied Unit III : Students will be able to summarise the general characters, Classify the animals of the phylum Helminthes and Annelida. Understands and illustrates parasitic adaptations and life history of Taenia solium - able to explain all the systems in Neries.

4. After studied Unit IV : Students will be able to summarise the general characters, classify the animals of the phylum Arthropoda. Narrates all the systems of Prawn. Illustrate the affinities of Peripatus.
5. After studied Unit V : Students will be able to summarise the general characters, classify the animals of the phylum Mollusca and Echinodermata. Understands and illustrates life history of Freshwater mussel and Sea star. Illustrate the larval forms of Echinodermata and their significance.

Matching Table (put Yes / No in the appropriate box)

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	YES	YES	YES	YES	NO	NO
2	YES	YES	YES	YES	NO	NO
3	YES	YES	YES	YES	NO	NO
4	YES	YES	YES	YES	NO	NO
5	YES	YES	YES	YES	NO	NO

Unit-1: Principles of Taxonomy – Binomial nomenclature-rules of nomenclature – classification of the animal kingdom. PROTOZOA: General characters and classification up to classes with examples. Type study- paramecium, parasitic protozoans [Entamoeba, Trypanosoma and plasmodium]

Teaching Hours: 12

Unit-2: PORIFERA: General characters and classification up to classes with examples. Type study - sycon, spicules and canal system in sponges. COELENTERATA: General characters and classification up to classes with examples. Type study – Obelia, polymorphism in coelenterates – corals and coral reefs.

Teaching Hours: 12

Unit-3: HELMINTHES: General characters and classification up to classes with examples. Type study – Taenia solium. helminthes parasites (Wuchereriabancrofti, Ascaris and Faciola). ANNELIDA: General characters and classification up to classes with examples. Type study: Nereis, metamerism in Annelids, parasitic adaptations of Leech. Teaching Hours: 12

Unit-4: ARTHROPODA: General characters and classification up to classes with examples. Type study – Prawn, Peripatus and its affinities, Mouth parts of insects. Teaching Hours: 12

Unit-5: MOLLUSCA: General characters and classification up to classes with examples. Type study – Fresh water Mussel, Economic importance of mollusca. **ECHINODERMATA:** General characters and classification up to classes with examples. Type Study- Sea star, Echinoderm larvae and their significance. Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. EkambaraathaAyyar. M. and T.N. Anantha Krishnan, 1992 Mannual of zoology Vol. 1 (Invertebrata
2. E.L. Jordan &Dr. P.S. Verma - Invertebrate Zoology.
3. R.L. Kotpal - Modern Text book of Zoology – Invertebrates.
4. N. Arumugam, M.G. Ragunathan. - A text book of Invertebrates.
5. Dr. Dev Bhattacharya - Text book of Invertebrate Zoology.
6. S. Chand - Invertebrate Zoology.
7. S.S. Lal - Invertebrate Zoology.
8. Rajesh Kumar Shal - Invertebrate Zoology.
9. P.S. Dhami and J.K. Dhami – Invertebrate Zoology.
10. Dr. Veer Bala Rastogi – Invertebrate Zoology.

Reference Book:

1. Viswanathan (Printers and Publishers) pvt. Ltd, Madras
2. Kotpal, R.L. 1988-1992 Protozoa, Porifera, Coelenterata, Helminthes, Annelida, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. L.A Borrandile and F.A. Pott. The invertebrates. Cambridge university press. UK.
4. Adam Sedgwick 1972. A student text book of zoology Vol. I and II. Central book Depot. Allahabad.
5. Hyman L.H. The invertebrate Vol. I – IV, 1995 MCGraw Hill co. New York.
6. Barrington, E J W 1969 – Invertebrate structure and function. ELBS Publication.
7. Barnes. Invertebrate Zoology. Toppan International Co.
8. Marshall & Williams - Text book of Invertebrate zoology – 8th Edition.
9. Jan A. Pechenik - Biology of the Invertebrates.
10. Parker and Haswell - Text book of Invertebrate Zoology.

Course Material: website links, e-Books and e-journals

1. Error! Hyperlink reference not valid.>
2. Error! Hyperlink reference not valid.
3. <https://www.merriam-webster.com>
4. Error! Hyperlink reference not valid.
5. <https://www.biodiversitylibrary.org>>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	M	M	M	S	S	M
CO2	S	S	S	-	M	M		S	S	M
CO3	S	S	-	M	-	M		S	S	M
CO4	S	S	S	-	M	M	M	S	S	M
CO5	S	S	S	M	M	M	M	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: I

Paper type: Allied

Paper code:

Name of the Paper: Economic Entomology-I

Credit: 3....

Total Hours per Week: ...4.. Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1.To enable learners to categorize insects on the basis of morphological characteristics
- 2.To study the general anatomy and physiology of specific useful and harmful insects.
- 3.To study the different life processes of harmful insects
- 4.To study the versatile roles of insects in agriculture
- 5.To study the economic importance of insects as vectors, pollinators, predators & parasites

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand basis of classification
2. After studied unit-2, the student will be able to be able to understand the difference in the life cycles of insects
3. After studied unit-3, the student will be able to understand life processes of certain harmful insects
4. After studied unit-4, the student will be able to understand the various ecological importance of insects
5. After studied unit-5, the student will be able to understand need for conservation of insects

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	Yes	No

4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	No	Yes

Unit-1:Classification of insects [Major orders]

Biology of Butterfly

Teaching Hours: 12

Unit-2: Beneficial insects. Mode of life, economic importance and development of Honey bee Silk worm (Bombyx Mori) - Silk worm [Bombyx mori] rearing Equipment required

Rearing procedure for harvesting of cocoons.

Teaching Hours: 12

Unit-3: Harmful insects

An account of any three pests of :

1. Rice 2. Cotton 3. Coconut

Teaching Hours: 12

Unit-4: Principles and method of pest control – conventional, Physical, Mechanical, Chemical and Biological control

Teaching Hours: 12

Unit-5: Vector borne diseases. A brief account of insect vectors affecting the health of man and domestic animals.

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. B. Vasantharaj David and T. Kumaraswami 1982. Elements of Economic Entomology, Popular book Depot, Chennai.
2. Nayar, K.K., Ananthakrishnan, T.N. and B.V. David, V 1992 General and Applied Entomology Tata McGraw, New Delhi
3. P.G. Fenemore Manual. Silkworm Rearing. FAO Agricultural Service Bulletin, Rome
4. A General textbook of entomology -- A D Imms. Asia Publication
5. Agricultural insect pests and their control. V.B. Awasthi. Scientific Publication.
6. . Economic Zoology- Shukla, Upaddhaya and Srivastava. S. Chand Publication

Reference Book:

1. Entomology and Pest Management –Larry P. Pedigo. Pearson Education.
2. .General and applied Entomology – David and Ananthakrishnan. Tata McGraw Hill
3. Irwin, M. E. and Kampmeier, G. E. (2002): Commercial products, from Insect. In V. H. Resh and R. Carde (eds.) Encyclopedia of insects. Academic press, San Diego.
4. Text book of Entomology—Ross – John Wiley publ.
5. The Insects - Structure and Function - 4th Edition, R. F. Chapman (ed.). CambridgeUniversity Press 1998.
6. Photographic Atlas of Entomology and guide to insect identification.-Castner. Seline press Florida. Marketed by Scientific Publication

Course Material: website links, e-Books and e-journals

1. <https://doi.org/10.1093/jee/toac095>
2. https://www.researchgate.net/publication/327282644_A_Text-book_of_Economic_Entomology_M_Dayib
3. <https://drive.google.com/file/d/1dcPkKmGl9QJTtMNqHw2hY7F3gAKmWEp/view?usp=sharing>
4. https://drive.google.com/file/d/1cZ8Y_B3Ofau2ir6CMoGZDMBc2STfflF1/view?usp=sharing
5. https://drive.google.com/file/d/1w6ViPEOLbFz3o8_U-dqFArFN50ihZZF9/view?usp=sharing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	M	M	M	M
CO2	S	M	S	M	M	M	M	S	S	M
CO3	M	M	M	S	M	S	S	M	S	M
CO4	M	S	M	M	S	M	M	M	S	S
CO5	S	M	S	M	M	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



Thiruvalluvar University
SERKKADU, VELLORE - 632 115

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(Name of the Programme) – 2022-2023 onwards

Semester: I Paper type: Core

Paper code: Name of the Paper: CHORDATA Credit: 4

Total Hours per Week: 4 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. To understand the animal kingdom .
2. To understand the taxonomic position of Animals.
3. To understand the general characteristics of animals belonging to different classes.
4. To understand the body organization of chordate animals.
5. To understand the origin and evolutionary relationship of different classes of chordata.

Course Outcome

1. After studied unit-1, the student will be able to facilitate the students to understand basics of Phylum Chordata upto orders..
2. After studied unit-2, the student will be able to learn the General characters and classification of Pisces up to orders
3. After studied unit-3, the student will be able to make the students Familiar with General characters and classification up to order level
4. After studied unit-4, the student will be able learn the General characters and classification of Aves up to orders.
5. After studied unit-5, the student will be able to make the students Familiar with General characters and classification of Mammals up to order level

UNIT-I 1. UNIT-II UNIT-III. UNIT-V

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	No	Yes	Yes	Yes
5	Yes	Yes	Yes	No	No	No

Unit-1: (50 to 100 contents)**Teaching Hours:15**

Salient Features, General classification of Phylum Chordata upto orders. 2. Origin of Chordata. 3. Prochordata: General Characters and affinities of Hemichordata, Cephalochordata& Urochordata **Unit-2: (50 to 100 contents)**

Teaching Hours:15

PISCES 1. General characters and classification up to orders. 2. Type study : Shark. 3. Parental care. AMPHIBIA 1. General characters and classification up to orders. 2. Type study : frog 3. Adaptive features of Anura, urodela& Apoda. 4. Parental care in Amphibia

Unit-3: (50 to 100 contents)**Teaching Hours:15**

REPTILIA 1. General characters and classification up to order level. 2. Type study-Calotes. 3. Poison apparatus and biting mechanism of poisonous snakes. 4. Identification of poisonous and non-poisonous snakes

Unit-4: (50 to 100 contents)**Teaching Hours:15 AVES**

1. General characters and classification upto orders 2. Type study-Pigeon 3. Characters of Archaeopteryx. 4. Ratitae. 5. Flight adaptation.

Unit-5: (50 to 100 contents)**Teaching Hours:15**

MAMMALIA 1. General characters and classification upto orders. 2. Type study-Rabbit. 10 3. Flying Mammals. 4. Dentition in mammals. 5. Aquatic mammals.

Internal Assessment Methods: (refer the instructions)**Text Books:**

1. EkambaranthaAyyar, M and T.N Ananthakrishnan 1992, A manual of Zoology Vol. II[Chordata]. S. Viswanaathan (Printers and Publishers] Pvt. Ltd., Madras.
2. Jordan E.L. and P.S. Verma 1995. Chordata Zoology and elements of Animal Physiology. S. Chand and Co., New Delhi.

Reference Books : 1. Kotpal R.L. 1992. Vertebrata, Rastogi Publications, Meerut 2. Nigam.H.C. 1983 Zoology of chordates, Vishal publications, Jalandhar. 3. Waterman, Allyn J.et al.1971, Chordate Structure and functions. Mac.Millan and Co., New York. 4. Jollie. M. 1968. Chordate Morphology. East west press Pvt. Ltd., New Delhi. 5. Hyman. L.H. Comparative vertebrate Zoology. McGraw Hill Co., New York.

Course Material: website links, e-Books and e-journals

<https://www.vedantu.com/question-answer/connecting-link-between-chordates-and-class-12-biology-cbse-5f70e8fdc8f93c434adb7ad6>

<https://manoa.hawaii.edu/exploringourfluidearth/biological/invertebrates/phylum-chordata>

https://link.springer.com/10.1007/3-540-31078-9_33

<https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=7711>

<https://royalsocietypublishing.org/doi/10.1098/rspb.2014.1729>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	M	M	S	M
CO2	M	S	S	M	M	S	M	S	S	M
CO3	M	M	M	M	S	M	M	M	M	M
CO4	S	M	S	M	M	S	M	S	M	M
CO5	M	M	S	M	S	M	M	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: II

Paper type: Core Practical I

Paper code: **Name of the Paper:** INVERTEBRATA AND CHORDATA **Credit:** 2

Total Hours per Week: 6 **Lecture Hours:** **Tutorial Hours:** **Practical Hours:**

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Course Objectives

1. Learn and be familiar with the Laboratory techniques
2. To understand the taxonomic position, body organization and evolutionary relationship of animals
3. To inculcate the significance of various non chordates and chordates.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to dessect and display various systems of invertebrates an chordates
2. After studied unit-2, the student will be able to mount the mouth parts, appendages of prawn, boy setae of earthworm an placoid scales of shark.
3. After studied unit-3, the student will be able to understand the adaptations of animals to their respective modes of life
4. After studied unit-4, the student will be able to understand the biological significance of animals
5. After studied unit-5, the student will be able to understand the osteology

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	No

Unit-1: DISSECTIONS

Cockroach – Digestive and Nervous system, **Prawn** – Nervous system, **Fish** (any one) – Digestive and Arterial system **Teaching Hours: 12**

Unit-2: MINOR PRACTICAL

MOUNTING -Insect Mouth parts :Cockroach, Honey bee, House Fly and Mosquito
Prawn – Appendages, Shark - Placoid scales, Earthworm – Body setae Teaching Hours:12
Unit-3: SPOTTERS

Study of the following specimens

1.Classify by giving reasons

Paramecium, Sycon, Obelia, Taenia solium, Neries, Prawn, Freshwater mussel, Seastar
Amphioxus, Shark, Hyla, Rhacophorus, Calotes, Pigeon, Rat/Rabbit.

2.Adaptations to their respective modes of life

Entamoeba, Trypanosoma, Plasmodium, Corals [any 2], Ascaris, Fasciola, Wuchereriabancrofti,
Cheatopterus, Leech, Limulus, Nauplius, Mysis, Zoea, Balanoglossus, Ascidian, Ichthyophis,
Draco, sea snake and Bat.

Teaching Hours: 12

Unit-4: SPOTTERS

Study of the following specimens

3.Biological significance:

Paramecium conjugation and binary fission, physalia, Trochophore Larva, Peripatus,
Sacculina On Crab, Sea Anemone on Hermit Crab, Pearl Oyster, Bipinnaria Larva, Anabas,
Hippocampus, Narcine, Echeneis, Arius, Exocoetus, Eel, Amblystoma, Axolotl Larva, Bufo,
Cobra, Krait, Russels Viper, EchisCarinata, Turtle, Parrot, Woodpecker, King Fisher and Ant
eater

4. Relate structure and function:

Sponge Spicules, Obelia Polyp, Taenia Scolex, Nereis - Parapodium, Book lungs of
scorpion/Honey bee sting apparatus, Pedicellaria of Sea star, Ctenoid Scale and Quill Feather of
pigeon.

Teaching Hours:12

Unit-5: SPOTTERS

Study of the following specimens

5.Draw labeled sketches:

T.S. of Nereis, T.S. of Leech, Obelia medusa, T.S. of Amphioxus through Pharynx, T.S. through
arm of Sea star.

6.Osteology

Skeleton - Pectoral girdles of Frog and Pigeon., Pelvic Girdles of Frog and Pigeon.

Fore and Hind limbs of Frog and Pigeon., Synsacrum of Pigeon. **Dentition -** Dog, Rabbit and
Man

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Verma. P.S. 2011 A Manual of Practical Zoology INVERTEBRATES Chand & Co, Ltd,
Ram Nagar -New Delhi.
2. Verma. P.S. 2011 A Manual of Practical Zoology CHORDATES, Chand & co, Ltd. Ram
Nagar – New Delhi.
3. JayanpaSinha . 2010 Advanced Practical Zoology, Books & Allied (p) Ltd. No.1. Subham Plaza
IFloor, Calcutta.

4. Practical Zoology- Invertebrates S.S. Lal
5. Practical Zoology - Invertebrates K.P. Kurl

Reference Book:

1. A manual of Zoology - Part I, Invertebrata; Ayyar, M. Ekambaranath
2. Modern text book of Zoology - Invertebrates; Eleventh; Edition Professor R.L. Kotpal; Rastogi publication
3. Invertebrate Zoology by Fatik Baran 2012, PHI Learning
4. Biology of the invertebrates by Jan A. Pechenik, 7th edition, 2014 publications McGraw Hill
5. An introduction to the invertebrates by Janet Moore, 2nd edition 2006, publications Cambridge

Course Material: website links, e-Books and e-journals

1. <https://www.earthlife.net/inverts/an-phyla.html>
2. <http://www.biologydiscussion.com/invertebrate-zoology/invertebrates-phyla/study-notes-/>
3. <http://www.asfa.k12.al.us/ourpages/auto/2014/4/23/64232119/invertebrate-animal-/>
4. <http://instruction2.mtsac.edu/mcooper/biology%202/labs/protistalab1.pdf/>
5. <https://portals.iucn.org/library/sites/library/files/documents/2012-064.pdf/>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	M	M
CO2	S	M	M	S	M	S	M	S	M	M
CO3	S	S	S	S	S	M	S	M	M	M
CO4	S	S	M	M	M	M	S	S	M	M
CO5	S	S	S	M	S	S	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)



திருவள்ளுவர்பல்கலைக்கழகம்
THIRUVALLUVAR UNIVERSITY
SERKKADU, VELLORE - 632 115

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: II

Paper type: Allied

Paper code: Name of the Paper: Economic Entomology-II Credit: 3

Total Hours per Week: 4 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1.To study the basic concepts of pesticides and integrated pest control
2. To acquaint the students with external morphology and internal systems of the insect's body.
- 3.To Attain mastery of the essential aspects of practice and study in the field of agricultural entomology and pest management
- 4.To understand the ecological interactions among crops, pests and their natural enemies
5. To familiarize the students with principles of insect pest management, including concept and philosophy of IPM

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the economic, ecological, and sociological benefits of IPM.
2. After studied unit-2, the student will be able to Distinguish positive and negative impacts of pesticide use.
3. After studied unit-3, the student will be able to Understand problems resulting from misuse, overuse, and abuse of chemical pesticides
4. After studied unit-4, the student will be able to Define and describe pesticide resistance and how it develops.
5. After studied unit-5, the student will be able to Identify ecological and biological characteristics important in development of pest populations.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	No	Yes

Unit-1: Insects and their interrelations with environments, insects as Pollinators parasitoids, Scavengers and weed killers.

Teaching Hours: 12

Unit-2: Classification of insecticides – based on mode of action, contact, systemic, fumigants, nerve and stomach poison. Biological control. Integrated pest control
Teaching Hours: 12

Unit-3: Basic principles of insecticide formulation and their application in pest control – plant protection appliances used – working and application
Teaching Hours: 12

Unit-4: Precautions in handling of pesticides. Pesticides and environmental pollution
Teaching Hours: 12

Unit-5: Assessment to pest population, Estimation of pest damage – pest outbreak – pest surveillance.
Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Entomology and Pest Management –Larry P. Pedigo. Pearson Education.
2. .General and applied Entomology – David and Ananthakrishnan. Tata McGraw Hill
3. Irwin, M. E. and Kampmeier, G. E. (2002): Commercial products, from Insect. In V. H. Resh and R. Carde (eds.) Encyclopedia of insects. Academic press, San Diego.
4. Text book of Entomology—Ross – John Wiley publ.
5. The Insects - Structure and Function - 4th Edition, R. F. Chapman (ed.). CambridgeUniversity Press 1998.
6. Photographic Atlas of Entomology and guide to insect identification.-Castner. Seline press Florida. Marketed by Scientific Publication

Reference Book:

1. Entomology and Pest Management –Larry P. Pedigo. Pearson Education.
2. .General and applied Entomology – David and Ananthakrishnan. Tata McGraw Hill
3. Irwin, M. E. and Kampmeier, G. E. (2002): Commercial products, from Insect. In V. H. Resh and R. Carde (eds.) Encyclopedia of insects. Academic press, San Diego.
4. Text book of Entomology—Ross – John Wiley publ.
5. The Insects - Structure and Function - 4th Edition, R. F. Chapman (ed.). CambridgeUniversity Press 1998.
6. Photographic Atlas of Entomology and guide to insect identification.-Castner. Seline press Florida. Marketed by Scientific Publication

Course Material: website links, e-Books and e-journals

1. <https://doi.org/10.1093/jee/toac095>
2. https://www.researchgate.net/publication/327282644_A_Text-book_of_Economic_Entomology_M_Dayib
3. <https://drive.google.com/file/d/1dcPkKmGl9QJTtMNqHw2hY7F3gAKmWEp/view?usp=sharing>

4. https://drive.google.com/file/d/1cZ8Y_B3Ofau2ir6CMoGZDMBc2STfflF1/view?usp=sharing
5. https://drive.google.com/file/d/1w6ViPEOLbFz3o8_U-dqFArFN50ihZZF9/view?usp=sharing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	M	M	M	M
CO2	S	M	S	M	M	M	M	S	S	M
CO3	M	M	M	S	M	S	S	M	S	M
CO4	M	S	M	M	S	M	M	M	S	S
CO5	S	M	S	M	M	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
 (Name of the Programme) – 2022-2023 onwards

Semester: II

Paper type: ALLIED PRACTICAL

Paper code: Name of the Paper: ECONOMIC ENTOMOLOGY – I & II Credit: 2

Total Hours per Week: 2 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1.To attain knowledge about the life cycle of various insects
- 2.To attain knowledge about the structure of mouthparts an sting
- 3.To attain knowledge about the pest of agricultureimportance
- 4.To attain knowledge about the pest of medical importance
- 5.To attain knowledge about the collection anpreparation of insect box

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to the life cycle of various insects
2. After studied unit-2, the student will be able to understand the structure of mouthparts an sting
3. After studied unit-3, the student will be able to understand the pest of agriculture
4. After studied unit-4, the student will be able to understand the pest of medical importance
5. After studied unit-5, the student will be able to prepare insect box

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	Yes	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	Yes	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	No	Yes	Yes

Unit-1: MAJOR PRACTICAL

1. Model / chart – Draw and comment
2. Life cycle of Holometabolous, Hemimetabolous and Ametbolous Insects [Atleast one example in each]

3. Insect formulations and plant protection appliances **Teaching Hours: 10**

Unit-2: MINOR PRACTICAL

1. Mounting -Mouth parts – Bed Bug, Mosquito and House fly
2. Sting apparatus of Honeybee **Teaching Hours: 10**

Unit-3: SPOTTERS

Pests of agricultural Importance – citrus Butterfly, Rhinoceros beetle, Stem borer – Rice, Sugar cane, maize, Cotton, Fruit borer, Root borer, six spotted beetle, grasshopper, Crickets, Pod Borer [pulses], Rice weevil, Mango nut weevil.

Teaching Hours: 10

Unit-4: SPOTTERS

Pest of Medical Importance – Mosquito, Housefly, cockroach, Ticks, Mites, Louse, Bed Bug, Plasmodium, Filarial Worm, Loa Loa, Dust mite. **Teaching Hours: 10**

Unit-5: RECORD

Collection and preservation of insects – insect store box

Note: The Students may be asked to submit a minimum of 10 whole mounts of the insects

Teaching Hours: 10

Internal Assessment Methods: (refer the instructions)

Text book:

1. A manual of practical entomology. – M MTrigunayat. Scientific Publication.
2. .Laboratory manual of entomology – Alaka Prakash. New Age Publishers.
3. Photographic Atlas of Entomology and guide to insect identification.-Castner. Seline press Florida. Marketed by Scientific Publication.
4. The Insects - Structure and Function - 4th Edition, R. F. Chapman (ed.). CambridgeUniversity Press 1998.
5. A Text book of insect morphology, physiology and endocrinology – Tembhare D. B.– Chand Publication.

Reference Book:

7. Entomology and Pest Management –Larry P. Pedigo. Pearson Education.
8. .General and applied Entomology – David and Ananthakrishnan. Tata McGraw Hill
9. Irwin, M. E. and Kampmeier, G. E. (2002): Commercial products, from Insect. In V. H. Resh and R. Carde (eds.) Encyclopedia of insects. Academic press, San Diego.
10. Text book of Entomology—Ross – John Wiley publ.
11. The Insects - Structure and Function - 4th Edition, R. F. Chapman (ed.). CambridgeUniversity Press 1998.

12. Photographic Atlas of Entomology and guide to insect identification.-Castner. Seline press Florida. Marketed by Scientific Publication

Course Material: website links, e-Books and e-journals

1. <https://doi.org/10.1093/jee/toac095>
2. https://www.researchgate.net/publication/327282644_A_Text-book_of_Economic_Entomology_M_Davib
3. <https://drive.google.com/file/d/1dcPkKmGl9QJTfMNqHw2hY7F3gAKmWEp/view?usp=sharing>
4. https://drive.google.com/file/d/1cZ8Y_B3Ofau2ir6CMoGZDMBc2STfflF1/view?usp=sharing
5. https://drive.google.com/file/d/1w6ViPEOLbFz3o8_U-dqFArFN50ihZZF9/view?usp=sharing

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	S	M	M	M	M
CO2	S	M	S	M	M	M	M	S	S	M
CO3	M	M	M	S	M	S	S	M	S	M
CO4	M	S	M	M	S	M	M	M	S	S
CO5	S	M	S	M	M	S	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: II Paper type: Core

Paper code:Name of the Paper: CELL AND MOLECULAR BIOLOGYCredit: 4

Total Hours per Week: 4 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1.To Have an enhanced knowledge on microscopes, cytological techniques.
- 2.To provide a basic information on structure and functions of cell and cell organelles.
- 3.To gain an understanding of chemical and molecular processes that occur in and between cells.
- 4.To provide the basic knowledge on biochemical and cell culture techniques .
- 5.To give in-depth knowledge of biological and medicinal processes through the investigation of the underlying molecular mechanisms.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the Principles of microscopes ,Cytological techniques and to describe theCell theory, Ultra structure of animal cell .
2. After studied unit-2, the student will be able to recognize the properties of cytoplasm ,cell cycle , cell division, Ultra structure andfunctions cell organelles.
3. After studied unit-3, the student will be able to get knowledge on biochemical and cell culture techniques
4. After studied unit-4, the student will be able to understand the structure and function of chromosomes,giant chromosomes, DNA andtypes of RNA.
5. After studied unit-5, the student will be able to describe the mechanism of DNA replication and Protein synthesis.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	No	Yes	No	Yes
5	Yes	Yes	No	Yes	No	Yes

Unit-1: History of Cell and Molecular Biology - Principles of microscopes light and electron, Cytological techniques - cell fractionation, Homogenization Centrifugation, Isolation of Sub-

cellular components. Biochemical techniques - Electrophoresis and their applications. Cell culture techniques and applications

Teaching Hours:12

Unit-2: Cell - Cell theory, Ultra structure of animal cell - structure, composition and functions - cell components - Plasma Membrane - Endoplasmic reticulum, Ribosomes, Golgi Complex, Lysosomes, Peroxisomes, Centrioles and Mitochondria.

Teaching Hours: 12

Unit-3: Cytoplasm - Physical, chemical and biological properties. Nucleus - Ultrastructure, Composition and Function - Chromosomes - Giant chromosomes (Polytene and Lamp brush chromosomes).

Teaching Hours: 12

Unit-4: Cell cycle and cell division - Amitosis, Mitosis and meiosis and their significance. Cancer biology - structure of cancer cell, carcinogenesis. Aging - Cell death and apoptosis.

Teaching Hours: 12

Unit-5: Structure and functions of DNA & types of RNA [mRNA, tRNA, rRNA]. Semi conservative replication, mechanism and enzymology of DNA replication. Protein synthesis.

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Cohn, N.S., 1979, Elements of Cytology, Freeman Book co., New Delhi.
2. De Robertis, E.D.P. and E.M.F. De Robertis, 1988. Cell and molecular Biology, 8th Edition, International edition Informes Hongkong.
3. Gies, A.C., 1979. Cell Physiology, Saunders co., Philadelphila, London, Toronto.
4. Powar, C.B.,1989.Essentials of Cytology, Himalaya Publishing House, Bombay.
5. Verma, P.S., and V.K. Agarwal, 1995. Cell and Molecular Biology, 8th Edition, S. Chand & Co., NewDelhi.
6. Rastogi. S.C. Cell and Molecular Biology, 2008 2nd Edition, New Age International (p) Ltd., New Delhi.
7. G.P. Jayanthi 2009 Molecular Biology, M.J P Publ. Chennai.
8. Philip Sheeler, Donald E. Bianchi, 1987.Cell and Molecular Biology - John Wiley and Sons, Inc, 3rd Edition.
9. M. Prakash, C.K. Arora,1998- Microscopical Methods - Anmol Publications Pvt. Ltd., First Edition.
10. M. Prakash, C.K. Arora, 1998 - Laboratory Instrumentation - Anmol Publications Pvt. Ltd. First edition

Reference Book:

1. Lehninger, Nelson and Micheal Cox (2017). Principles of Biochemistry 7 th Edition. W. H. Freeman and Macmillan Learning, New York
2. Lewin B. Micheal Stone (2008). Genes IX. Jones and Barlett Publishers Ltd.
3. Russell P. (2010). iGenetics: A Molecular Approach 3rd Edition. Pearson Publishlers
4. Benjamin Pierce (2013). Genetics: A conceptual Approach 5th Edition. W. H. Freeman And Company

5. Geoffrey Cooper (2018). The Cell: A Molecular Approach 8th Edition. Oxford University Press
6. Brown T. A (2021). Gene Cloning and DNA Analysis: An Introduction. 8th Edition. Wiley and Sons
7. Walker John M. and Ralph Rapley (2015). Molecular Biology and Biotechnology 6th Edition. RSC Publishing
8. . K. Gerald (2007) Cell and Molecular Biology, Concept and Experiment, 5thEdn., Wiley.
9. .B. Alberts et al. (2010) Essential Cell Biology, 3rdEdn., Garland Science.
10. K. Roberts, J. Lewis, B. Alberts, P. Walter, A. Johnson and M. Raff. (2008) Molecular Biology of the Cell, 5thEdn., Garland Publishing Inc. New York.

Course Material: website links, e-Books and e-journals

1. <https://www.edx.org/learn/molecular-biology>
2. <https://www.uou.ac.in/sites/default/files/slm/BSCZO-102.pdf>
3. <https://www.common sense.org/education/top-picks/best-molecular-and-cell-biology-apps-and-websites>
4. <https://www.tru.ca/distance/courses/biol2131.html>
5. <https://www.cdc.gov/labtraining/training-courses/basic-molecular-biology/index.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	S	S	S	S	S
CO2	M	S	S	S	M	S	M	M	M	S
CO3	S	M	M	M	S	M	S	S	S	S
CO4	S	S	S	S	M	S	M	M	M	M
CO5	S	S	S	S	M	S	M	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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THIRUVALLUVAR UNIVERSITY
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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(Name of the Programme) – 2022-2023 onwards

Semester: III Paper type: Skill Based Subject

Paper code: Name of the Paper: VermicultureCredit: 2

Total Hours per Week: 2 Lecture Hours: Tutorial Hours: Practical Hours:

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Course Objectives

1. To acquire knowledge about biofertilizer
2. To impart training on Earthworm culture technology
3. To create knowledge on Self - Employment opportunity

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to Learn about the characteristics and biology of earthworm.
2. After studied unit-2, the student will be able to Get an in depth knowledge about the culture techniques.
3. After studied unit-3, the student will be able to Understand about the methods of composting.
4. After studied unit-4, the student will be able to Learn the factors for proper maintenance of the vermicomposting beds.
- 5 After studied unit-5, the student will be able to Learn about the application and marketing of the compost.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

Unit-1:Eathworm types – Morphological and Anatomical characteristics. Biology of *Lampito*

maruitti

Teaching Hours:12

Unit-2:Vermicompost process -Types of Vermicomposting materials. Monoculture and polyculture techniques, factors affecting vermicomposting - pH, Moisture, temperature etc

Teaching Hours: 12

Unit-3:Vermicomposting methods – Small scale and large scale pit method, heap method, Wind row method and bin method. Vermiwash.

Teaching Hours: 12

Unit-4:Vermicomposting: General procedure in Homes. Maintenance of vermicomposting beds. Harvesting the worms. Earthworm Predators, parasites and pathogens **Teaching Hours: 12**

Unit-5: Nutrients availability- Application of Vermicomposting in Agriculture and Horticultural practices. Advantages of Vermicompost and marketing. **Teaching Hours: 12**

Internal Assessment Methods: (refer the instructions)

Text book:

1. Edwards, C.A., and Bother, B. 1996: Biology of Earthworms – Chapman Hall Publ. Co., London.
2. Ismail, S.A. 1997: Vermitechnology – the Biology of Earthworms – Orient Longman Publ. – India.
3. Ranganathan, L.S. 2006: Vermibiotechnology from soil health to Human health – Agrobios – India.
4. Talashikar, S.C. 2008: Earthworms in Agriculture – Agrobios - India
5. Gupta, P.K. 2008: Vermicomposting for sustainable agriculture [2nd edition] – Agrobios – India.
6. EIRI Board, 2015: Handbook of Biofertilizers and Vermiculture, New Delhi, India.
7. NIIR Board: The complete technology book on Biofertilizers and organic farming New Delhi, India.
8. Mary Violet Christy, A. 2008: Vermitechnology - MJP Publishers, Chennai , India.
9. Rajeev Prathap Singh. 2012: Organic Fertilizers: Types, Production and Environmental Impact Nova Science Inc. New York.
10. Keshav Singh, 2014: A textbook on Vermicompost, Vermiwash and Biopesticide. Biotech Books, Astral International, New Delhi, India.

Reference Book:

Course Material: website links, e-Books and e-journals

1. https://www.researchgate.net/publication/333892881_Vermiculture_and_Vermicomposting
2. https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/E-Learning/Moocs/Solid_Waste/W4/Manual_On_Farm_Vermicomposting_Vermiculture.pdf
3. <http://faunaofindia.nic.in/PDFVolumes/spb/022/index.pdf>
4. [https://www.bbau.ac.in/dept/dz/TM/ZL\(OE\)-02%20Vermicomposting.pdf](https://www.bbau.ac.in/dept/dz/TM/ZL(OE)-02%20Vermicomposting.pdf)
5. <https://mgsubikaner.ac.in/wp-content/uploads/2020/10/Vermicomposting-GKM.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	M	S	S
CO3	S	S	S	S	M
CO4	S	S	S	S	S
CO5	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
 (Name of the Programme) – 2022-2023 onwards

Semester: III Paper type: Skill Based Subject

Paper code: **Name of the Paper:** Single Cell Protein Culture

Credit: 2

Total Hours per Week: 2 **Lecture Hours:** **Tutorial Hours:** **Practical Hours:**

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Course Objectives

1. To have knowledge and importance of Single cell protein (SCP) culture techniques.
2. To emphasize the importance of integrating new knowledge of Food Biotechnology.
3. To update the technological innovations of Microbial organisms and its applications in Nutrition

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to Acquire knowledge about the scope and organisms used in SCP.
2. After studied unit-2, the student will be able to Get an in-depth knowledge about the Algal SCP.
3. After studied unit-3, the student will be able to Understand about the culture and extraction of Bacterial SCP.
4. After studied unit-4, the student will be able to Understand the culture techniques of Fungal SCP.
5. After studied unit-5, the student will be able to Learn about the application of SCP.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

Unit-1: The scope of food biotechnology- characterization, classification and identification of Microorganisms employed in single cell protein (SCP) cultivation. **Teaching Hours: 12**

Unit-2: Algal sources of single cell proteins – Culture and extraction of SCP From spirulina Maxima, chlorella species. **Teaching Hours: 12**

Unit-3: Bacterial sources of single cell proteins – culture and extraction of SCP from Bacillus species and *Methylococcus capsulatus* **Teaching Hours: 12**

Unit-4: Fungal sources of single cell proteins – Culture and extraction from yeasts - Candida species. Extraction from filamentous fungi - Agaricus species **Teaching Hours: 12**

Unit-5: General account on the production of SCP from Biomass and Waste Materials. Nutritive values of SCP – Dietary supplements for Human, Cattle and Birds. **Teaching Hours: 12**

Internal Assessment Methods: (refer the instructions)

Text book:

1 – 10

Reference Book:

1. Arumugam, N. 2006: Microbiology, Saras Publ. Nagercoil – India.
2. Kumarasan, V. 2001: Biotechnology, Saras Publ Nagercoil – india.
3. Agarwal, A.K. and Parihar, P.2006: Industrial microbiology – student edition –India.
4. Dubey, R.C and Maheswari, D.K. 2005: A Text Book of Microbiology – S. Chand & co., New Delhi.
5. Rao, A.S. 1997: Introduction to Microbiology – prentice – Hall, New Delhi, New Delhi- India.
6. Sullia, S.B. and Shantharam, S.2005: General Microbiology, Oxford IBH – Publ.. New Delhi – India.
7. Krishnan, A. 2005: Students Dictionary of Microbiology – Student edition – India.
8. Dubey R.C. 2013.- A textbook of Biotechnology, S.Chand and Company Pvt. Ltd. New Delhi.
9. Israel Goldberg, 1985: Single Cell Protein Springer , New York.
10. Steven R. Tannenbaum and Daniel I-chyau Wang, 1975: Single Cell Protein – II-M I T press, London

Course Material: website links, e-Books and e-journals

1. <https://www.slideshare.net/FIRDOUS88/single-cell-protein>
2. <https://nitsri.ac.in/Department/Chemical%20Engineering/BRTL9.pdf>
3. <https://www.slideserve.com/teenie/single-cell-protein>
4. http://www.brahmanandcollege.org.in/pg_biochemistry/Single-cell-protein.pdf
5. <https://www.basu.org.in/wp-content/uploads/2020/06/19th-PPT-of-Foods-and-Industrial-MicrobiologyCourse-No.-DTM-321.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	S	S	S	S	M
CO4	S	S	S	S	M

CO5	S	S	S	S	S
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PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Course Structure

Thiruvalluvar University, Vellore - 632115

Course writing format

Name of the course/subject: ZOOLOGY

Semester: III

Name of the Paper: PUBLIC HEALTH AND HYGINE

Credits: 3 Hours of teaching:

Paper type: Skilled Based subject

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Course Objectives

1. To impart awareness on public health, Hygiene and diseases.
- 2 To educate and emphasize on preventive measures of diseases.
3. To create knowledge on Health Education.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand Scope of Public Health and Hygiene – Nutrition and health – classification of foods.
2. After studied unit-2, the student will be able to understand Environment and Health Hazards.
3. After studied unit-3, the student will be able to understand Communicable diseases and their control measures.
4. After studied unit-4, To acquire the knowledge about Non – communicable diseases and their preventive measures.
5. After studied unit-5, the student to acquire the knowledge Health Education and Health programmes in India and WHO programmes.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	No	Yes	Yes	No	No	No
5	No	Yes	Yes	No	No	No

UNIT – I

Scope of Public Health and Hygiene – Nutrition and health – classification of foods – Balanced Diet – malnutrition – Kwashiorkor, Marasmus, Obesity, Anaemias,– Vitamin deficiencies. Nutritional requirements of special groups.

UNIT – II

Environment and Health Hazards – Causes and effects of Environmental degradation – pollution and associated health Hazards – Health problems due to industrializations – Hospital waste management.

UNIT – III

Communicable diseases and their control measures such as Cholera, Hepatitis, Measles, Polio, Chikungunya, Rabies, Plague, Leprosy and AIDS.

UNIT – IV

Non – communicable diseases and their preventive measures such as Cancer, Chronic kidney diseases, Chronic respiratory diseases, Hypertension, Coronary Heart Diseases, Stroke, Diabetes, and Obesity. Alcoholism and drug dependence.

UNIT – V

Health Education and Health programmes in India – WHO programmes – government and voluntary Organizations and their health service – Precautions first Aid and awareness on sporadic diseases.

Text Books

Unit-1: Park and Park, 1995: Text book of preventive and social medicine – BanarsidasBhanot Publ. jodhpur- India.

Unit-2 Verma, S. 1998: Medical zoology, Rastogi Publ.- Meerut- India

Unit-3 Singh, H.s. and Rastogi, P. 2009: Parasitology, Rastogi Publ. India.

Unit-4 Dubey, R.C and Maheswari, D.K. 2007: Text Book of Microbiology – S. Chand & co. Publ. New Delhi– India.

Unit-5 Park and Park, 1995: Text book of preventive and social medicine – BanarsidasBhanot Publ. jodhpur- India.

E- Materials

1. <https://www.perlego.com/browse/biological-sciences/zoology>
2. <http://www.freebookcentre.net/Biology/Zoology-Books.html>
3. <https://www.pdfdrive.com/zoology-textbooks-online-e10983221.html>
4. <http://www.freebookcentre.net/biology-books-download/Textbook-of-zoology.html>
5. <https://www.e-booksdirectory.com/listing.php?category=134>
6. <https://www.ikbooks.com/subject/life-sciences/zoology/151>
7. <http://rastogipublications.com/index.php?route=product/category&path=25>
8. <https://bookwindow.in/zoology-textbooks>
9. <https://www.routledge.com/life-science/zoology>
10. <https://www.fullonstudy.com/bsc-1st-year-zoology-books>
11. <https://link.springer.com/book/10.1007/978-1-349-00198-9>

12. <https://vertebrate-zoology.arphahub.com/>
13. <https://www.quora.com/From-which-websites-can-I-download-free-e-books-in-PDF-format-botany-microbiology-zoology>
14. <https://www.mheducation.com/highered/category.12255.zoology.html>
15. <https://library.si.edu/research/vertebrate-zoology>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	s	M	M	M	S	S	M	M
CO2	S	S	s	M	S	S	M	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	M	M	s	S	S	M	s	M	S	M
CO5	S	S	M	M	s	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
 (Name of the Programme) – 2022-2023 onwards

Semester: III Paper type: Non-Major Elective Paper -I

Paper code: Name of the Paper: POULTRY FARMING Credit: 2

Total Hours per Week: 2 Lecture Hours: Tutorial Hours: Practical Hours:

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Course Objectives

- 1.To understand the poultry industry based on the past, present and emphasis of future growth
2. To study the statistical data and various functions involved in poultry industry.
3. To identify many types of poultry that exist other than chickens
4. To understand the biology, nutritional needs and reproductive traits of poultry
5. To understand the equipment utilized in a poultry operation

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will have a Knowledge about the Prospects Of Poultry Industry
2. After studied unit-2, the student will have a Knowledge about the poultry production systems, housing, automation and equipments
3. After studied unit-3, the student will have a Knowledge about the food and feeding of poultry farming
4. After studied unit-4, the student will have a Knowledge about the incubation and hatchery management
5. After studied unit-5, the student will have a Knowledge about the environment, poultry production and diseases

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	No	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	No	No

Unit-1: PROSPECTS OF POULTRY INDUSTRY

Introduction - definition of poultry - broiler, layer and breeder - common terms related to poultry - development of poultry industry in India. Past and present scenario of poultry

industry -domestication of poultry. Role of government/private agencies in poultry development. Importance of broiler and layer production under Indian scenario - poultry population and other poultry related statistics, per capita meat and egg availability in India.
Teaching Hours: 12

Unit-2:POULTRY PRODUCTION SYSTEMS, HOUSING, AUTOMATION AND EQUIPMENTS

Selection of site and location of poultry farm - importance of poultry housing and equipment.Principles of housing - location of poultry houses - basic principles of construction. System of rearing - backyard system, semi-intensive system, intensive system - cage, deep litter and slat system, floor space, watering and feeding space requirements for different age groups and rearing conditions. Advantages and disadvantages. Rearing of Turkeys, Ducks, Japanese Quails, Guinea fowls and Geese for meat and egg production

Teaching Hours: 12

Unit-3: FOOD AND FEEDING OF POULTRY FARMING

Feed ingredients, processing of feed - forms of feed - mash, pellet and crumble feed preparation and feeding methods. Feeding chicks, growers, layers, broiler and breeders – feeding in different seasons - nutritional and metabolic disorders in poultry. Physical and sensory evaluation of feed ingredients - sampling techniques - proximate analysis - poultry feed formulae. Commonly occurring anti nutrients and toxicants in poultry feed ingredients -Mycotoxins and their prevention

Teaching Hours: 12

Unit-4: INCUBATION AND HATCHERY MANAGEMENT

Layout, design and location of hatchery; Methods of incubation; Physical requirements of incubation - collection, selection, cleaning and sanitation of eggs. Storage of hatching eggs -incubation methods - single and multi stage incubators. Hatchery operations - setting, candling, transfer, hatching, pedigree hatching, chicks pull out, grading, packing and chick dispatch - In-ovo and in-hatch vaccinations and medications.
Teaching Hours: 12

Unit-5: ENVIRONMENT, POULTRY PRODUCTION AND DISEASES

Climatic differentiation for avian production: micro & macro climate - temperature, temperature zones, air - composition, speed and movement, relative humidity and light. Climatic factors affecting poultry production in housed conditions. Definition of disease, Classification of poultry diseases - Viral, Bacterial, Fungal and Parasitic. Nutritional deficiency diseases
Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Bell D. Donald and Weaver D. William Jr., 2007. Commercial Chicken Meat and Egg Production. 5th Edition. Springer India Pvt. Ltd., Noida.

2. Colin G. Scanes., 2015. *Sturkie's Avian Physiology*. 6th Edition. Academic Press, Elsevier Inc., New York.
3. Hurd M. Louis, 2003. *Modern Poultry Farming*. 1st Edition. International Book Distributing Company, Lucknow
4. Leeson S., & Summers J. D., 2001. *Scott's Nutrition of the Chicken*. 4th Edition. University Books, Canada.
5. Mahajan Naresh, 2015. *Poultry Nutrition and Management*. 1st Edition. Anmol Publications Pvt. Ltd., New Delhi.
6. Mountney J. George and Parkhurst R. Carmen, 2001. *Poultry Products Technology*. 1st Edition. The Harworth Press Inc., USA.
7. Narahari D., and Kumararaj R., 2008. *Handbook of Applied Broiler Production*. 1st Edition. Poultry Punch Publication (I) Pvt. Ltd., New Delhi, India.
8. Prasab Sushil, 2012. *Handbook of Poultry Production*. 1st Edition. Enkay Publishing House, New Delhi.
9. Reddy Ramasubba V., and Bhosale T. Dinesh, 2004. *Handbook of Poultry Nutrition*. 1st Edition. International Book Distribution Co., Lucknow, India.
10. Saif., Y. M., et al., 2013. *Diseases of Poultry*. 12th Edition. Blackwell Publishing, USA.
11. Sathapathy S., Singh M. K., and Joshi S. K., 2015. *A Handbook on Anatomy & Physiology of Domestic Animals and Birds*. Sathish Serial Publishing House, New Delhi, India.
12. Susan E. Aiello and Michael a. Moses, 2014. *Merck Veterinary Manual*. 11th Edition. Merck Vet Manual.
13. Taylor W. Lewts, 2003. *Fertility and Hatchability of Chicken & Turkey Eggs*. 1st Edition. International book Distributing Co., Lucknow, India.
14. Vegad J. L., 2004. *Poultry Diseases: a guide for farmers and poultry professionals*. 2nd Edition. International Book Distributing Co., Lucknow, UP.

Reference Book:

1. Ensmiger. M. E., 2015. *Poultry Science*. 3rd Edition. International Book Distribution Co., Lucknow, India.
2. Bell D. Donald and Weaver D. William Jr., 2007. *Commercial Chicken Meat and Egg Production*. 5th Edition. Springer India Pvt. Ltd., Noida.
3. Singh, R. A., 2011. *Poultry Production*. 3rd Edition. Kalyani Publishers, New Delhi.
4. Sreenivasaiah., P. V., 2015. *Textbook of Poultry Science*. 1st Edition. Write & Print Publications, New Delhi
5. Jull A. Morley, 2007. *Successful Poultry Management*. 2nd Edition. Biotech Books, New Delhi.
6. Jadhav N. V., and Siddique M. F., 2007. *Handbook of Poultry Production and Management*. 2nd Edition. Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi.

7. Bell D. Donald and Weaver D. William Jr., 2007. Commercial Chicken Meat and Egg Production. 5th Edition. Springer India Pvt. Ltd., Noida.
8. Wiseman. J, and Garnsworthy. P. C., 1999. Recent Development in Poultry Nutrition.
9. Titus Harry. W, and Fritz James. C, 1971. The Scientific Feeding of Chickens. 5th Edition.
10. Sreenivasaiah., P. V., 2015. Textbook of Poultry Science. 1st Edition. Write & Print Publications, New Delhi
11. Rajini Asha R., 2011. Simply....Poultry Science. 1st Edition. Alfa Publications, New Delhi.
12. Suguna Management System: Standard Operating Manual - Feed Lab, 2012. Suguna Foods Pvt. Ltd.
13. Sreenivasaiah., P. V., 2006. Scientific Poultry Production-A unique encyclopedia. International Book Distributing Co., Lucknow, India.
14. Sreenivasaiah., P. V., 2015. Textbook of Poultry Science. 1st Edition. Write & Print Publications, New Delhi
15. Jadhav N. V., and Siddique M. F., 2007. Handbook of Poultry Production and Management. 2nd Edition. Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi.
16. Sreenivasaiah., P. V., 2015. Textbook of Poultry Science. 1st Edition. Write & Print Publications, New Delhi
17. Thyagarajan. D., 2011. Diseases of Poultry. 1st Edition. Satish Serial Publishing House, New Delhi, India.
18. Narahari D., and Kumararaj R., 2008. Handbook of applied Broiler Production. 1st Edition. Poultry Punch Publication (I) Pvt. Ltd., New Delhi.

Course Material: website links, e-Books and e-journals

1. <https://www.classcentral.com/course/swayam-introduction-to-poultry-farming-14160>
2. <http://lms.tanuv.ac.in/course/view.php?id=32>
3. <http://ecoursesonline.iasri.res.in/course/view.php?id=335>
4. <https://iproject.com.ng/computer-science/e-learning-system-development-for-poultry-farming/index.html>
5. <https://core.ac.uk/download/pdf/343499189.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	S	M	S	M	S	S	S	M
CO2	S	S	S	S	M	S	M	S	M	S

CO3	M	M	S	M	S	M	S	S	S	S
CO4	M	S	M	S	M	S	S	M	S	S
CO5	S	S	S	M	S	M	M	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
 (Name of the Programme) – 2022-2023 onwards

Semester: IV Paper type: Core

Paper code: Name of the Paper: Genetics and Biotechnology Credit: 4

Total Hours per Week: 4 Lecture Hours: Tutorial Hours: Practical Hours:

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Course Objectives

1. To enable the students understand the basic principles of inheritance.
2. To learn polygenic inheritance, linkage and crossing over.
3. To understand genetics of Sex determination and sex linked inheritance.
4. To determining the applicability of different kind of cloning vectors.
5. To understand recombinant DNA technology

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to explain the key concepts in genes and its expression and Interpret phenotypic expressions based on genotype.
2. After studied unit-2, the student will be able to Interpret genetics of sex determination and inheritance.
3. After studied unit-3, the student will be able to Understand the gene structure, expression and regulation and understand the alterations of chromosome number arise during mitosis and meiosis.
4. After studied unit-4, the student will be able to determine the applicability of difference kinds of cloning vectors, techniques of genetic engineering, illustrating the use of genomic libraries in gene detection and characterization.
5. After studied unit-5, the student will be able to analyse the function of applied genetic research in technology, nature and society, understanding the applications of rDNA technology, and identifying the ethical issues related to gene manipulation.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	No	Yes	Yes	No
4	Yes	Yes	Yes	Yes	No	Yes
5	Yes	Yes	Yes	No	No	Yes

Unit-1: Introduction to genetics – Basis of Mendelian Inheritance and Mendelian Laws–Genetic Interaction of Genes – Non-Epistatic Interaction, Epistasis, Meiotic drive, Segregation, distortion

and Selfish genes. Multiple Alleles – Blood Groups and their Inheritance in Human, Tissue Typing.

Teaching Hours: 12

Unit-2: Linkage and crossing over – Drosophila – Morgan's Experiments – Cytological Evidence for Crossing Over. Sex determining mechanisms-Genetical, Metabolical, and Environmental. Sex determination in human beings - Cytoplasmic Inheritance–, Fine Structure of Gene – Cistron – Recon, Mutoon – Gene Regulation – Operon concept – Lac Operon.

Teaching Hours: 12

Unit-3: Gene Mutation-Types of mutation-Physical and Chemical mutagens, DNA Repair. Applied Genetics – Animal Breeding – Heterosis, Inbreeding, Out breeding, Out Crossing, Hybrid Vigour. Population Genetics: Hardy weinberg Law – Genetic Polymorphism.

Teaching Hours: 12

Unit-4: Definition – Scope and applications – Molecular tools for gene cloning experiments. Cloning vectors, [plasmids, pBr322, Phage vector, Cosmids and phagemids]. Techniques of Genetic Engineering – recombinant DNA Technology and gene Cloning in prokaryotes [cDNA and Genomic Library].

Teaching Hours: 12

Unit-5: Transgenic plants and animals – DNA finger printing – gene therapy – biosensors– biochips - Application of Recombinant DNA technology in Medicine & Agriculture – Legal and Ethical issues in Biotechnology

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Verma, P.S. and V.K. Agarwal, 1995 Genectis, 8th edition, S. Chand & Co, New Delhi - 110 055.580pp.
2. Verma, P.S. and V.K. Agarwal, 2009.9th edition, S. Chand & Co, New Delhi.
3. S.C. Rastogi Biotechnology, Principles and Applications 2007 Narosa Publishing house, Pvt.Ltd.
4. Verma.P.S and Agarwal.V.K (2004) Genetics, S.Chand& Co., New Delhi .
5. Dalela.R.C and Verma.S.R (1970) A Textbook of Genetics, Jaiprakash Nath and Company., Meerut.
6. Gunther S. Stent, 1986. Molecular Genetics. Macmillan Publishing Co Inc. 773pp.
7. Higgins II, Best GJ and Jones J [1996] Biotechnology - Principles and application Black well scientific Publication Oxford London.
8. Gupta P.K. Elements of Biotechnology [2001] Rastogi publication, Meerut.
9. Dubey 2006 Text Book of Biotechnology S. Chand & co. New Delhi.
10. Gardener. 1991. Principles of Genetics. 8th edition. John Wiley & sons Inc. New York. Chichester, Brisbane, Toronto, Singapore. .

Reference Book:

1. Robert Tamarin. (2017). Principles of Genetics. McGraw Hill, USA.
2. James D. Watson, A. Baker Tania and P. Bell Stephen.(2017). Molecular Biology of the Gene. Pearson Education, New Delhi.
3. Gangane S.D. (2017). Human Genetics. Elsevier India.
4. William S. Klug, Michael R. Cummings and Chariotte A. Spencer. (2016). Genetics. a. Pearson Education, New Delhi.
5. Gardener, E.J. & M.J. Simmons. 2009. Principles of Genetics. John Wiley & Sons.Inc. New York.
6. Monroe. W. Strick Berger 2004 Genetics.Printice Hall of India New Delhi.
7. Kumar H. D.1998 A text book of Biotechnology, affiliated East West pvt. Ltd., New Delhi.
8. Nicholls. 2002 Genetic Engineering, Cambridge University Press. UK.
9. S. Gladis Helen Hepsyba and CR. Hemalatha 2009 Basic Bioinformatics MJP Publ. Chennai.
10. Vijayaraman, Chellammal K.S and Manikkili.P 1998.Uyiriyae Thozhilnutpam. Chimeeraa, Trichy

Course Material: website links, e-Books and e-journals

1. <https://www.melioeducation.com/academic-programmes/biotechnology-genetics/>
2. <https://online.stanford.edu/courses/xgen203-genetic-engineering-and-biotechnology>
3. <https://unacademy.com/batch/rank-booster-batch-for-biology-with-experts/82N0ZD72/topics/NLMON/courses/OGUGK>
4. <https://ocw.mit.edu/courses/7-03-genetics-fall-2004/>
5. <https://www.classcentral.com/tag/genetics>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	S	M	S	S	M
CO2	S	S	S	S	S	M	M	S	M	S
CO3	M	S	M	S	M	S	S	M	S	M
CO4	S	S	S	S	M	S	S	S	M	M
CO5	M	S	M	M	M	M	M	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: IV Paper type: Core / Practical

Paper code: Name of the Paper: Core Practical II Credit: 3

Total Hours per Week: 3. Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. To understand the cytometrical analysis
2. To perform blood related analysis
3. To study the histological slides
4. To do Genetics experiments
5. To understand the biotechnological techniques

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to do cytometrical analysis
2. After studied unit-2, the student will be able to perform blood smear preparation
3. After studied unit-3, the student will be able to study the histological slides
4. After studied unit-4, the student will be able to do Genetics experiments
5. After studied unit-5, the student will be able to understand the biotechnological techniques

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	No	No	Yes
4	Yes	Yes	Yes	No	No	Yes
5	Yes	Yes	Yes	No	No	Yes

Unit-1: CELL AND MOLECULAR BIOLOGY

Cytometry

Compound microscope, camera Lucida, Stage and Ocular Micrometers

Blood Smear Preparation - Differential count of W.B.C.

Total count of RBC using Haemocytometer.

Total count of WBC using Haemocytometer.

Teaching Hours: 12

Unit-2: Slide Preparation

Mounting of Buccal Epithelium.

Mitosis in onion root tip squash.

Squash preparation of Grass hopper testes

Teaching Hours: 12

Unit-3: Study of prepared slides of histology.

Columnar Epithelium, Ciliated epithelium, Glandular Epithelium. Cartilage T.S., Bone T.S., Cardiac Muscle, Striated muscle, Non Striated muscle, Neuron, Male germ cell, Female germ cell. **Teaching Hours: 12**

Unit-4: GENETICS

Squash preparation of Salivary glands of chironomous larva.

Male & Female identification.

Observation of common Mutants of Drosophila.

Human Blood Grouping analysis

Teaching Hours: 12

Unit-5:BIOTECHNOLOGY**Study of prepared slides, Models or specimen.**

Escherichia coli, Bacteriophage, Plasmid.

Demonstration of P.C.R technique: Southern blot, Electrophoresis.

Visit to Biotechnology lab and Report - compulsory.

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Cohn, N.S., 1979, Elements of Cytology, Freeman Book co., New Delhi.
2. De Robertis, E.D.P. and E.M.F. De Robertis, 1988. Cell and molecular Biology, 8th Edition, International edition Informes Hongkong.
3. Philip Sheeler, Donald E. Bianchi, 1987.Cell and Molecular Biology - John Wiley and Sons, Inc, 3rd Edition.
4. M. Prakash, C.K. Arora,1998 - Microscopical Methods - Anmol Publications Pvt. Ltd., First Edition.
5. M. Prakash, C.K. Arora, 1998 - Laboratory Instrumentation - Anmol Publications Pvt. Ltd. First edition.
6. : Verma, P.S. and V.K. Agarwal, 1995 Genectis, 8th edition, S. Chand &Co, New Delhi - 110 055.580pp.
7. Verma, P.S. and V.K. Agarwal, 2009.9th edition, S. Chand & Co, New Delhi.
8. S.C. Rastogi Biotechnology, Principles and Applications 2007 Narosa Publishing house, Pvt.Ltd.
9. Verma.P.S and Agarwal.V.K (2004) Genetics, S.Chand& Co., New Delhi .

Reference Book:

1. . Gies, A.C., 1979. Cell Physiology, Saunders co., Philiadelphia, London, Toronto.
2. 4. Powar, C.B.,1989.Essentials of Cytology, Himalaya Publishing House, Bombay.
3. Verma, P.S., and V.K. Agarwal, 1995. Cell and Molecular Biology, 8th Edition, S. Chand & Co., NewDelhi.

4. Rastogi. S.C. Cell and Molecular Biology, 2008 2nd Edition, New Age International (p) Ltd., New Delhi
5. Dalela.R.C and Verma.S.R (1970) A Textbook of Genetics,Jaiprakash Nath and Company., Meerut.
6. Gunther S. Stent, 1986. Molecular Genetics.Macmillan Publishing Co Inc. 773pp.
7. Higgins II, Best GJ and Jones J [1996] Biotechnology - Principles and application Black well scientific Publication Oxford London.
8. Gupta P.K. Elements of Biotechnology [2001] Rastogi publication, Meerut.
9. Dubey 2006 Text Book of Biotechnology S. Chand & co. New Delhi.

Course Material: website links, e-Books and e-journals

1. https://www.bjcancer.org/Sites_OldFiles/Library/UserFiles/pdf/Cell_Biology_Laboratory_Manual.pdf
2. http://webstor.srmist.edu.in/web_assets/srm_mainsite/files/files/BT0213%20-%20CELL%20BIOLOGY%20PRACTICAL%20MANUAL.pdf
3. <https://sjce.ac.in/wp-content/uploads/2018/04/Cell-Biology-Genetics-Laboratory-Manual-17-18.pdf>
4. https://www.deanza.edu/faculty/heverbruce/b6b_pdf/Bio6B-Manual_W19.pdf
5. <https://cellbiolady.com/wp-content/uploads/2019/05/CellBioLab-Manual-1.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	M	S
CO2	M	M	S	S	M	M	S	M	S	M
CO3	S	S	S	M	S	S	S	S	S	S
CO4	M	S	S	S	S	S	M	S	S	M
CO5	S	M	M	S	S	M	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: IV **Paper type: SKILL BASED SUBJECT**

Paper code: **Name of the Paper: SERICULTURE** **Credit: 2**

Total Hours per Week: 2 Lecture Hours: Tutorial Hours: Practical Hours:

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Course Objectives

- 1.To enable students to understand the economic importance and silkworm biology
- 2.To understand about themoriculture
- 3.To understand about the silkworm reproduction and genetics
- 4.To understand about the pathogenic diseases and pest
- 5.To understand about the silkworm rearing and silk reeling

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will have a Knowledge about the economic importance and silkworm biology
2. After studied unit-2, the student will have a Knowledge about themoriculture
3. After studied unit-3, the student will have a Knowledge about the silkworm reproduction and genetics
4. After studied unit-4, the student will have a Knowledge about the pathogenic diseases and pest
5. After studied unit-5, the student will have a Knowledge about the silkworm rearing and silk reeling

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	No	No	Yes
4	Yes	Yes	No	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: ECONOMIC IMPORTANCE AND SILKWORM BIOLOGY

Introduction to Sericulture-Origin and history of Sericulture- Silk road, spread of Sericulture to Europe, South Korea, Japan, India and other countries. Sericulture map of India and World: Components of Sericulture. Types of silkworms, their food plants - Silk producing species - their distribution - Bombyx mori - life cycle - organization of larvae, pupae and moth - structure of the silk gland. Prospectus of Sericulture in India: Sericulture industry in different states, Employment generation in sericulture-Role of women in sericulture employment, potential in mulberry and non-mulberry sericulture.

Teaching Hours: 12

Unit-2: MORICULTURE

Silk production: Importance of soils with reference to mulberry cultivation; soil analysis- soil sampling, soil pH, organic carbon and NPK level. Mulberry and non-mulberry cocoon and yarn - Mulberry species: Classification, distribution and common varieties used in Sericulture in India. Requirement for Mulberry Cultivation - methods of cultivation and preparation - Harvest - Transport and preservation of leaves. Feeding and nutrition - specificity of diet - Factors of nutrition - Diet and growth. Pest and diseases. Vegetative morphology : Characters of root, stem, bud and leaf. Reproductive morphology: Male and female reproductive organs, pollination, fertilization and development of seed, structure of seed and fruit. Leaf storage - Leaf yield: Mulberry management and Economics.

Teaching Hours: 12

Unit-3: SILKWORM REPRODUCTION AND GENETICS

Reproduction - Growth and Development of silkworms - Physiology of molting in different varieties (Uni, bi and multivoltine) - factors affecting Growth and Development = Endocrinology of reproduction and development. Genetics - mutation breeding and development of new strains. Mendelism and quantitative genetics - Silkworm heredity and environment - Inheritance and Sex determination.

Teaching Hours: 12

Unit-4: PATHOGENIC DISEASES AND PEST

Pathology: Basic concepts of silkworm diseases - Viral, bacterial, Protozoan, and Fungal Diseases diseases (Etiology, Structure, Symptoms, lesions and Pathogenesis) - control mechanisms. Pests of mulberry (Classification, Biology, Nature of damage and control measures) - Uzi fly menace. Prospects of sericulture, Biology of silkworm (Nutrition, Genetics, Endocrinology, Reproduction, Pest and Diseases).

Teaching Hours: 12

Unit-5: SILKWORM REARING AND SILK REELING

Rearing operations - Selection and construction of rearing house Incubation - Hatching - brooding, Harvesting and storage of cocoons: Harvesting, preservation, assessment, storage - Transportation: Cocoons, record maintenance, cost of cocoon production, leaf-cocoon ratio. Disinfectants and feeding appliances - Reeling techniques - lacing skinning. Re-reeling etc.

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Ganga, G. and Sulochana Chetty, J. 1997. An Introduction to Sericulture. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Ganga, G. 2003. Comprehensive Sericulture Vol-II: Silkworm Rearing and Silk Reeling. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Hisao Aruga. 1994. Principles of Sericulture (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
4. Veda, K., Nagai, I. and Horikomi, M. 1997. Silkworm Rearing (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Otsuki, R. and Sato, S. 1997. Silkworm Egg Production (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
6. Eikichi Hiratsuka. 1999. Silkworm Breeding (Translated from Japanese). Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

7. Mahadevappa, D., Halliyal, V.G., Shankar, D.G. and Bhandiwad, R., 2000. Mulberry Silk Reeling Technology Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
8. Soo-Ho Lim, Young-Taek Kim, Sang-Poong Lee. 1990. Sericulture Training Manual - Published by FAO - USA. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
9. Wu Pang-Chuan and Chen Da-Chuang. 1994. Silkworm Rearing - Published by FAO - USA. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
10. Lu Yup-Lian and Liu-Fu-an. 1991. Silkworm Diseases - Published by FAO - USA. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Reference Book:

1. Charsley, s.r. (1982). culture and sericulture. academic press inc., new york, u.s.a
2. Fao manuals- i mulberry cultivation. faorome.
3. Foth, h.d. (1984) fundamentals of soil science. 7th edn. john wiley& sons, new york.
4. Ganga, g., and j. sulochanachetty. (1991) an introduction to sericulture. oxford &ibh publishing company.
5. Hasaoaruga (1994). principles of sericulture (translated from japanese) oxford &ibh publishing co., pvt. ltd. new delhi.
6. Kichisaburo m. (1997) moriculture – science of mulberry cultivation. oxford &ibh
7. Krishnaswami, s.; narasimhanna, m.n.; suryanarayan, s.k and kumararaj, s. (1973) sericulture manual-2 - silkworm rearing. agriculture service bulletin, fao, rome.
8. Rajanna, l., das, p.k., ravindran, s., bhogेशa, k., mishra, r.k., singhvi, n.r., katiyar, r.s. and jayaram, h. (2005) mulberry cultivation and physiology. central silk board, bangalore.
9. Rangaswami, g.; narasimhanna, m.n.; kasiviswanathan, k., sastry, c.r. and jolly, m.s. (1976) sericulture manual-1- mulberry cultivation. agriculture services bulletin, fao, rome

Course Material: website links, e-Books and e-journals

1. <https://www.dsource.in/resource/silk-weaving-and-sericulture-chintamani-karnataka/tools-and-raw-materials/sericulture>
2. <https://byjus.com/chemistry/sericulture/>
3. <https://rltsc.edu.in/wp-content/uploads/2020/11/Diploma-Course-in-Sericulture.pdf>
4. https://agritech.tnau.ac.in/sericulture/seri_mulberry%20cultivation.html
5. https://agritech.tnau.ac.in/sericulture/seri_silkworm5_pest%20cocoon%20tec.html

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO1	S	S	S	M	S	S	S	S	M	S
CO2	M	S	M	S	S	S	M	S	M	M
CO3	S	S	S	M	S	S	M	M	S	S
CO4	S	M	M	S	M	S	M	S	M	M
CO5	S	S	S	M	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
 (Name of the Programme) – 2022-2023 onwards

Semester: IV Paper type: SKILL BASED SUBJECT

Paper code: Name of the Paper: APICULTURE Credit: 2

Total Hours per Week: 2 Lecture Hours: Tutorial Hours: Practical Hours:

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 Course Objectives

- 1.To understand the Basics of beekeeping
- 2.To understand the role of Bee hive
3. To understand the Bee enemies, diseases, pesticide poisoning
- 4.Tounderstand the Products of bee keeping
5. Tounderstand the Economics and Marketing

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the Basics of beekeeping
2. After studied unit-2, the student will be able to understand the role of Bee hive
3. After studied unit-3, the student will be able to understand the Bee enemies, diseases, pesticide poisoning
4. After studied unit-4, the student will be able to understand the Products of bee keeping
5. After studied unit-5, the student will be able to understand the Economics and Marketing

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	No	No	No	No
4	Yes	Yes	Yes	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: BASICS OF BEEKEEPING

History -History of bee keeping: Definition, Bee keeping in worldwide, In India. Traditional bee keeping, Modern beekeeping, Urban or backyard beekeeping. Honey bee species and identification - Origin, systematics and distribution; Types of honey bees, Species of honey bees. Bee identification. Social organization of honey bees - Colony life and social organization - Queen, drone, worker. Annual biological cycle op the bee colony. Institute. Biology and classification of honey bee, species of honey bees, Social organization of honey bee colony - Swarming and pheromones

Teaching Hours: 12

Unit-2: BEE HIVE

Flora for apiculture - Role of Central Honey Bee Research and Training selection of Bees for apiculture, Method of bee keeping - Indigenous method of extraction of honey. Care and management of honey bee hive. Seasonal management of honey bees: Honey bees on Canola, Spring management of bees, Wintering bees, Apiary management for winter/early spring pollination. Summer management of honey production.

Teaching Hours: 12

Unit-3: BEE ENEMIES, DISEASES, PESTICIDE POISONING

Bee enemies and diseases: An introduction, Bee enemies - Wax Moth, Ants, Wasps, Microorganisms, Pests. Diagnosis and Identification. Bacterial, viral, fungal & protozoan diseases: Bacterial disease - American Foulbrood, European Foulbrood, Viral disease - Deformed Wing Virus, Sacbrood Virus, Black Queen Cell Virus, Kashmir Bee Virus, Acute Bee Paralysis Virus; Fungal disease - Chalkbrood, Stonebrood; Protozoan disease - Nosemosis, Nosema ceranae-appliances for modern method, Diseases of honey bee and control measures.

Teaching Hours: 12

Unit-4: PRODUCTS OF BEE KEEPING

Bee products - An introduction, honey, pollen, royal jelly, bees wax, propolis & venom, Significance of bee products - Bee products - An introduction, honey, pollen, royal jelly, bees wax, propolis & venom, Marketing of bee products: Definition of marketing, Marketing Honey Comb and Honey, Marketing Pollination Services, Marketing Wax, Marketing Propolis Honey - bee wax bee venom - Honey. Production, chemical composition - Economic importance of Honey bee wax.

Teaching

Hours: 12

Unit-5: ECONOMICS AND MARKETING

Marketing Pollen, Marketing Royal Jelly, Marketing Bee Venom, Marketing Adult and Larval bees, Costing and Financing the Marketing Activities. Significance of bee products. Recent Efforts - Modern method in employing honey bees for cross pollination in horticultural gardens. Role of Central Honey Bee Research & Training

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Jayashree, Tharadevi and Arumugam. (2018). Apiculture. Saras publications, Nagarkoil, India.
2. Tamilselvi, M. and Abdul Ali. (2018). A text book for Apiculture. Vijay Nicole publications, Chennai, India.
3. Abrol, D.P. (2013). Beekeeping: A Comprehensive guide to bee and beekeeping. Scientific Publishers, India.
4. T.V. Sathe (2006), Fundamentals of Beekeeping. Dayapublish's house. Delhi.
5. M.S. Nalina Sundari 2006, Entomology M.J.P Publications, Chennai
6. Sardar Singh, Bee keeping in India.
7. Sharma.P.L., & Singh S. Hand Book of Bee Keeping.
8. Honey - A Comprehensive survey - International Bee Research Association for House - CNRC [England]

9. Roger. A. Morse, 1990. The ABC & XYZ of Bee culture, 40th ed., A.I Root & Co, Medina, Ohio 44256. 516pp 19

Reference Book:

1. Mahindru. S.N. (2014). Beekeeping. APH. Publishing Corporation, New Delhi, India.
2. Stuart. F.S, (2010). Beekeeping practice, Axis Books, India.
3. Wheeler, W.M. (2006). Social Insects their origin and evolution. Discovery publishing house, New Delhi.
4. George. A, Carter, (2004). Beekeeping. A guide to the better understanding of Bees, their disease and the chemistry of Beekeeping. Biotech Books. Delhi.
5. Mishra, R. C. and R. Garg. (2002). Perspectives in Indian Apiculture. Agrobios Publication, India.
6. Phillips, E.F. (2001). Beekeeping. Agrobios Publication, Jodhpur, India.

Course Material: website links, e-Books and e-journals

1. [https://www.researchgate.net/publication/266740418 DEVELOPMENT OF E-LEARNING PLATFORM FOR BEEKEEPERS](https://www.researchgate.net/publication/266740418_DEVELOPMENT_OF_E-LEARNING_PLATFORM_FOR_BEEKEEPERS)
2. <http://ecoursesonline.iasri.res.in/course/view.php?id=166>
3. <https://drive.google.com/open?id=1rpz8Qhqv6UoOOVpLjIVDZP3ZXqjNBte>
4. <https://www.apo-elearning.org/course/view.php?id=126>
5. <https://icar.org.in/content/virtual-training-programme-scientific-bee-keeping-organized>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	M	S	S	M	S	S
CO2	S	M	S	S	M	M	S	S	M	M
CO3	M	S	M	M	S	S	M	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	M	M	M	S	S	M	S	M	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: IV Paper type: Non Major Elective

A. Paper code: Name of the Paper: Biofertilizer Production Credit: 2
Total Hours per Week: 2 Non Major Elective . Lecture Hours: Tutorial Hours: Practical
Hours:

.....

Course Objectives

1. To impart awareness on Bio fertilizer Technology
2. .To exploit the microbial diversity in various agro-ecologies for biofertilizer application in diversified systems.
3. To study the impact of soil management practices on microbial functions and soil health.
4. To improve biofertilizer technology to ensure high quality and improved delivery.
5. To diversify biofertilizer research and application in drylands, degraded soils and tribal areas.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to facilitate the students to understand basics of biofertilizers
2. After studied unit-2, the student will be able to learn the use of biofertilizers is being emphasized along with chemical fertilizers and organic manures
3. After studied unit-3, the student will be able to learn about Biofertilizer Production: Media preparation, sterilization, microbial propagation, mass-scale production
4. After studied unit-4, the student will be able to promote organic farming in the region through technical capacity building of all stakeholders.
5. After studied unit-5, the student will be able to improve the professional competencies and upgrade the knowledge and develop technical skills of biofertilizer production

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	No	Yes	No	No
4	Yes	Yes	No	Yes	No	No
5	Yes	Yes	Yes	No	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: 9

Scope of Bio fertilizers - Types of soil - Physical and Chemical composition of Soil. Types of microorganisms in soil.

Unit-2: (50 to 100 contents)

Teaching

Hours:9 Production of Bacterial bio fertilizers - Mass production and utilization of different strains of Cyanobacteria. Mass cultivation of Azolla and its utilization.

Unit-3: (50 to 100 contents)

Teaching Hours: 9

Isolation and identification of Endophytic nitrogen fixers. Rhizobium and Legume root nodulation and nitrification process.

Unit-4: (50 to 100 contents)

Teaching

Hours:9 Production of Micorrhizal bio fertilizer - Phosphate solubilising microorganisms - VAM - Vesicular Arbuscular Mycorrhizal Fungi and its applications as bio fertilizers.

Unit-5: (50 to 100 contents)

Teaching Hours:9

Use of Composite Bio fertilizers - Methods for enhancing soil fertility. Renewable properties of bio fertilizers. The cost / benefit analysis of production and application of bio fertilizers. .

Internal Assessment Methods: (refer the instructions)

Text Books:

1. Singh, T. and Purohit, S.S. 2008: Bio fertilizer technology, Agrobio - India
2. Sharma, A.K. 2007 : Bio fertilizer for sustainable Agriculture - Agrobios-India.

Reference Books :

1. Pandiyarajan, P. 2008 : Techniques in Agricultural Microbiology- Agrobios-India
2. Purohit, S.S. 2005 : Microbiology - Fundamentals and Applications (6th Edition) Student Edition - Jodhpur - India.
3. Dubey, R.C., and Maheswari, D.K. 2007 : A Text Book of Microbiology - S. Chand & Co., New Delhi, India.

Course Material: website links, e-Books and e-journals

1. <https://www.indiastudychannel.com/courses/2893-diploma-biopesticides-technology-biofertilizer-production>
2. <https://www.mouthshut.com/websites/Indiastudychannel-com-reviews-925641113>
3. <https://www.crunchbase.com/organization/indiastudychannel-com>
4. <https://www.zoominfo.com/c/indiastudychannel/347498412>
5. <https://targetstudy.com/colleges/certificate-course-in-bio-fertilizer-production-certificate-colleges-in-india.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	S	M	M	M	S	S
CO2	S	M	M	S	M	M	S	S	M	M
CO3	M	M	S	S	M	S	M	S	S	M
CO4	M	S	S	S	M	S	M	S	S	M
CO5	S	S	M	S	S	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: IV Paper type: NON-MAJOR ELECTIVE

Paper code: Name of the Paper: AQUARIUM FISH KEEPING Credit: 2

Total Hours per Week: 2 Lecture Hours: Tutorial Hours: Practical Hours:

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Course Objectives

1. To understand the basic knowledge of Aquarium fish keeping

- 2.To know how to maintain an aquarium
- 3.To get knowledge about different varieties of ornamental fish.
- 4.To acquire knowledge about disease management in aquarium fish culture.
- 5.To acquire knowledge about the feeding techniques of aquarium fishes.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the basic knowledge of Aquarium fish keeping
2. After studied unit-2, the student will be able to know how to maintain an aquarium
3. After studied unit-3, the student will be able to get knowledge about different varieties of ornamental fish.
4. After studied unit-4, the student will be able to acquire knowledge about disease management in aquarium fish culture.
5. After studied unit-5, the student will be able to acquire knowledge about the feeding techniques of aquarium fishes.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	Yes
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	No	No	No	Yes
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Fish Aquarium - Introduction - Types of aquarium - Importance of aquarium - Accessories of aquarium - Aquarium fabrication- Setting of aquarium **Teaching Hours: 12**

Unit-2: Care and maintenance of aquarium - Aquarium water quality and management - Aquarium plants - Food for Aquarium fishes. **Teaching Hours: 12**

Unit-3: Study of ornamental fishes (Taxonomy general characters, food and feeding and breeding habits) A. Egg Layers i) Gold fish ii) Zebra fish iii) Koi carp vi) Angel fish v) Gourami B. Live Bearers i) Guppy ii) Mollies iii)Sword tail iv) Platies - Breeding and rearing of ornamental fishes: i) Identification of brooders ii) Breeding behaviour iii) Induced breeding iv) Management of water quality In breeding and rearing of fishes. v) Transportation of ornamental fishes **Teaching Hours: 12**

Unit-4: Disease management of ornamental fishes (Symptoms, life cycle, and control measures)
i. protozoan disease ii. Bacterial disease iii. Crustacean disease iv. Fungal disease and v. Helminth disease
Teaching Hours: 12

Unit-5: Food and feeding of Aquarium fishes - use of live fish feed organisms. Preparation and composition of formulated fish feeds- Live fish transport - fish handling, packing and forwarding techniques - General aquarium maintenance - budget for setting up an aquarium fish as a cottage industry
Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Jingran V.G., 1991: Fish and fisheries in India - Hindustan Publ. co New Delhi - India.
2. Shanmugam K. 1992, Fishery Biology and Aqua Culture - Leo Pathipagam - Chennai-India.
3. Mill Dick, 1993: Aquarium fish, DK Publ.Co,Inc. New York -USA
4. Yadav. 1995: Fish and fisheries, Daya publ. co., New Delhi - India
5. Hall, C.B. 2005: Ponds and Fish culture - Agrobios - Jodhpur - India.
6. Day,F. 1978: Fishes of India Vol. I & II, William Danisan& Sons, India
7. Alappat, H.J. & A. Biju Kumar 1996. Aquarium Fishes (A Colourful Profile). B.R. Publ., Delhi, 106 pp.
8. Alderton, D., 2019. Encyclopedia of aquarium and pond fish. DK Publishers, UK. 400 pp.
9. Bailey M., & Sanford, G., 2017. Aquarium fish- a definitive guide to identify and keeping freshwater and marine fishes. Smithmark Publishers, USA. 256 pp.
10. Biju Kumar, A. & Alappat, H.J., 1996. A Complete Guide to Aquarium Keeping. Books for All, Delhi, 80 pp.
11. Dholakia, A.D., 2009. Ornamental fish Culture & Aquarium Management. Daya Publishing House, Delhi, 313 pp.
12. Favre, H., 1977. Dictionary of the Freshwater Aquarium. Wardlock Ltd., London, 160 pp.
13. Frey, H., 1961. Illustrated Dictionary of Tropical Fish. TFH. Publ. Inc., NJ, 768 pp.
14. Geck, J., 2010. Nano-aquarium: A Complete Pet Owners Manual. Barrons Educational Series, USA. 128 pp.

Reference Book:

1. Aquarium : Fish Keeping C B L Srivastava Published by Kitab Mahal
2. Marine Aquarium (Fish: Keeping and Breeding Them in Captivity) Boruchowitz, Davie. Published by Chelsea House Publications (1998)
3. Aquarium Setting Up (Fish: Keeping and Breeding Them in Captivity) Axelrod, Herbert R. Published by Chelsea House Publications (1998)
4. The Tropical Freshwater Aquarium Problem Solver: Practical and Expert Advice on Keeping Fish and Plants Sand ford, Gina Published by Voyageur Press (MN) (1998)

5. Aquariums: The Complete Guide to Freshwater and Saltwater Aquariums, Jan 2009 by Thierry Maitre-alain (Author), ChrisitanPiednoir (Author)

Course Material: website links, e-Books and e-journals

1. <https://www.kopykitab.com/ZOO-506-B-Aquarium-Fish-Keeping-KBCNMU-by-Prof-Dr-S-S-Patole-Dr-V-R-Borane-Dr-R-K-Petare>
2. [https://www.lkouniv.ac.in/site/writereaddata/siteContent/202004150935214277sptrivedi MAINTENANCE OF FISHES.pdf](https://www.lkouniv.ac.in/site/writereaddata/siteContent/202004150935214277sptrivedi%20MAINTENANCE%20OF%20FISHES.pdf)
3. <https://www.acs.edu.au/courses/aquarium-management-636.aspx>
4. <http://ecoursesonline.iasri.res.in/course/view.php?id=297>
5. <https://www.learndirect.com/course/aquarium-and-fishkeeping>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	S	S	M
CO2	S	S	S	S	S	M	S	S	M	S
CO3	S	M	S	M	S	S	S	M	S	S
CO4	M	S	M	S	M	S	M	S	S	S
CO5	M	S	S	S	S	S	S	M	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: V Paper type: Core

Paper code: Name of the Paper: Biostatistics And Bioinformatics

Credit: 6

Total Hours per Week: 6. Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. To get a basic knowledge of statistical methods and computations in biology.
2. To study the application of information sciences (mathematics, statistics and computer sciences) in biology.
3. To study the application of information technology to the management and analysis of biological data.
4. To get a basic knowledge of Bioinformatics and Literature databases.
5. 5.To study the statistics of alignment.

Course Out Comes

1. After studied unit-1, the student will be able to understand about Biostatistics - Definition and Scope
2. After studied unit-2, the student will be able to understand about Measures of Central tendency
3. After studied unit-3, the student will be able to learn about Use of Internet, Messenger and e-mail-Basic knowledge of Medical transcription and Bio-informatics
4. After studied unit-4, the student will be able to learn about structure visualization Tools
5. After studied unit-5, the student will be able to get the knowledge about Pairwise sequence Alignment

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	No	Yes	Yes	Yes
4	Yes	No	No	Yes	No	No
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: 15

Biostatistics - Definition and Scope - Census and sampling methods - collection and presentation of Data. Diagrams and graphs; bar, pie Histogram, line graph - Concept of Statistical population and sample characteristics of frequency distribution sampling.

Unit-2: (50 to 100 contents)

Teaching Hours: 15

Measures of Central tendency: mean, median mode and Measures of Dispersion, Range, Quartile deviation, Mean deviation & Standard deviation.

Unit-3: (50 to 100 contents)**Teaching Hours:15**

MS-WORD: File Operations New, Save & Print - Editing: Cut, copy, Paste, Find and Replace - Insert: Page numbers and Pictures - Format: Font, Bullet & Numbering, Paragraph and Background Tools: Spelling and Grammar - Data: Sort - MS. EXCEL: Presentation of Bio statistical data using Excel: Auto sum, Paste function, Chart wizard, sort function and Drawing - Use of Internet, Messenger and e-mail-Basic knowledge of Medical transcription and Bio-informatics.

Unit-4: (50 to 100 contents)**Teaching Hours: 15**

Bioinformatics - Definition - Literature databases - NCBI-Pubmed, Medline, Protein and nucleic sequence databases - PIR, Swiss-prot, GeneBank, DDBJ - structure databases - PDB, SCOP, CATH, structure visualization Tools, RasMol, Swiss PDB viewer.

Unit-5: (50 to 100 contents)**Teaching Hours:15**

Pairwise sequence Alignment - Scoring Matrice - PAM and BLOSUM - Statistics of alignment scored Dot plot - local and global alignment - Database Searching - FASTA and BLAST multiple sequence alignment clustal W-Phylogenetic trees-PHYLIP.

Internal Assessment Methods: (refer the instructions)**Text Books:**

1. Biostatistics P. Ramakrishnan Saras Publications 1996 A.R.P. Camp Road, Kottar, Nagarkoil, Kanyakumari District.
2. Elements of Biostatistics by Gurumani ,Nithi Publishers 1998.
3. Developing Bioinformatics Computer Skills Cynthia Gibbs, Sheoff Publishers & Distributors Pvt. Ltd., Mumbai.
Arthur. M. Lesk, Introduction to Bioinformatics, Oxford University Press, New Delhi, 2003.

Reference Books:

1. Statistics - SP Gupta 1996 S. Chand and Co., New Delhi.
2. Jerold H. Zar Bio statistical analysis [2nd Edition] Printice Hall of International edition, 1984 [Relevant portions]
3. Goutham Roy. Introduction to Computing and Computing lab and Cad[2002] Books and allied [pvt] Ltd. Kolkata
4. MS. OFFICE for Win-Microsoft office press.
5. Developing Application with MS. OFFICE - Christine. Solomon- Microsoft Office Press.
8. Arthur. M. Lesk, Introduction to Protein Structures Oxford University Press, New Delhi, 2000
9. Baxevanis, A and Outlette. Bioinformatics a practical guide to the analysis of genes and proteins, Wiley - Interscience, Hoboken, NJ. USA 2005.

Course Material: website links, e-Books and e-journals

<https://www.yoh.com/blog/bioinformatics-vs-biostatistics>

<https://link.springer.com/book/10.1007/978-3-319-99389-8>

https://link.springer.com/chapter/10.1007/978-3-642-35686-5_2

<https://cellcarta.com/bioinformaticsandbiostatistics/>

<https://www.labtoo.com/en/page/bioinformatics-and-biostatistics-analysis-of-biological-data>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	M	M	M	S
CO2	S	M	S	M	M	S	M	S	S	S
CO3	M	M	M		M	M	M	M	M	S
CO4	M	S	M	S	M	M	S	M	S	M
CO5	S	M	S	M	M	S	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



திருவள்ளூர் பல்கலைக்கழகம்
THIRUVALLUVAR UNIVERSITY
SERKKADU, VELLORE - 632 115

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115

(Name of the Programme) – 2022-2023 onwards

Semester: V Paper type: Core

Paper code: Name of the Paper: Developmental biology & Immunology

Credit:

....

Total Hours per Week: Lecture Hours: Tutorial Hours: Practical Hours:

.....

Course Objectives

1. To understand the mechanisms of reproduction and types of eggs
2. To understand the development of organogenesis of brain and eye in chick and frog
3. To understand the embryonic membranes/placentations in chick and mammals
4. To understand the structure of lymphoid organs
5. To learn types of immunoglobulins and prevention of diseases

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to study ontogenesis, the development of animals including parthenogenesis.
2. After studied unit-2, the student will be able to study embryonic adaptations, human reproduction and reproductive technology in man.
3. After studied unit-3, the student will be able to study the process of immune response and mechanism
4. After studied unit-4, the student will be able to understand the advances in Immunology
5. After studied unit-5, the student will be able to understand the role of development in defining biological process

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	No	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	No	No	No

Unit-1: Gametogenesis – Fertilization - polarity & symmetry of eggs – types of eggs – Fertilization Mechanism, Physiology & theories – parthenogenesis – Natural – artificial – Experiments on Artificial Parthenogenesis

Teaching Hours: ...

Unit-2: Cleavage – Factors influencing cleavage – fate map – blastulation and gastrulation in amphioxus, morphogenetic movements in frog and chick – Experimental works of Spemann and Mangold- Development of brain and eye in frog. **Teaching Hours: ...**

Unit-3: Embryonic adaptations; Embryonic membranes and their functions in chick – placentation in mammals. Puberty – Menstrual cycle-contraception – family welfare reproductive technology; Artificial insemination - cryopreservation - IVF - Embryo transfer – Test tube babies – Bioethics **Teaching Hours: ...**

Unit-4: Introduction - Lymphoid organs, cells of immune system – their role in immune response –Antigen – Antibody reaction. Types of immunity –immunity to infections, Transplantation Immunology **Teaching Hours: ...**

Unit-5: Immunoglobulin – types, structure, Physico chemical and biological properties – Immunoprophylaxis – Immunization schedule of children. Immuno deficiency –AIDS, Immunotechniques **Teaching Hours: ...**

Internal Assessment Methods: (refer the instructions)

Text book:

1. Balinsky, B.L., 1981. Introduction to embryology Saunders, Philadelphia. Berrill & Corp Developmental Biology. McGraw Hill Book Company, MC., New York.
2. M.S. Jayaraj An Introduction to embryology Veer Bala Rastogi Publication.
3. Verma, P.S., V.K. Agarwal and Tyagi, 1995. Chordate embryology. S. Chand & co., New Delhi.
4. Nandhini Shetty 2003 published by K.K. Gupta for New Age International Publication.
5. Madhavi Latha. P, 2012. Text book of Immunology, S. Chand & Company.

Reference Book:

1. Balinsky, B.L., 1981. Introduction to embryology Saunders, Philadelphia.
2. Berrill & Corp Developmental Biology. McGraw Hill Book Company, MC., New York.
3. M.S. Jayaraj An Introduction to embryology Veer Bala Rastogi Publication.
4. Verma, P.S., V.K. Agarwal and Tyagi, 1995. Chordate embryology. S. Chand & co., New Delhi.
5. Majumdar, N.N. 1990. Text Book of Vertebrate embryology. Tata McGraw - hill Publishing company Ltd. New Delhi.
6. McEwen, R.S., 1969. Vertebrate Embryology. Oxford and IBH Publishing Co., New Delhi.
7. Jain, P.C 1998, Elements of Developmental Biology. Vishal Publication, New Delhi.
8. Dubey 2006 Text book of Biotechnology S. Chand and Co., New Delhi.
9. Roitt, I.M 2000 Essential Immunology, Blackwell Scientific Publishers.
10. Paul, W.E.M. 1989, Fundamental Immunology, Raven Press, New York.
11. Kuby, J. 1999, Immunology. W. H. Freeman and Co. New York.
12. Current protocols in Immunology - 3 Volumes 1994 Wiley Publications.

13. Roitt, I., Brostoff, J. and Male, D. 2002. Immunology, Mosby, New York.
14. Richard, A. Golds, Thomas I, Kindt & Barbara A. Osborne 2000 Kuby Immunology, Freeman and Co. New York.

Course Material: website links, e-Books and e-journals

1. <https://examstime.in/development-biology-study-materials/>
2. <http://bgc.ac.in/pdf/study-material/developmental-biology-7th-ed-sf-gilbert.pdf>
3. https://www.sdbonline.org/sites/archive/other/VL_DB_EducaRes.html
4. <https://journals.physiology.org/doi/full/10.1152/advan.00116.2018>
5. <http://www.helmberg.at/immunology.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	S	S	S
CO2	M	S	S	S	M	S	M	M	S	M
CO3	S	M	S	S	S	S	S	S	M	S
CO4	M	S	M	S	M	S	S	M	S	M
CO5	S	M	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong, M – Medium, L – Low (may be avoided)

Course Structure

Thiruvalluvar University, Vellore - 632115

Course writing format

Name of the course/subject: ZOOLOGY

Semester: V

Name of the Paper: ANIMAL PHYSIOLOGY

Credits: 6 Hours of teaching:

Paper type: Core

Course Objectives

1. To emphasize the basic needs of macromolecules of food and their importance
2. To study the basic principles of animal Physiology
3. To understand the physiology of various organs and organ systems.
4. To understand the energy metabolism
5. To understand the cardio vascular diseases
6. To understand the Chemical co-ordination

Course Outcomes:

1. After studied unit-1, the student will be able to understand importance of food and digestion.
2. After studied unit-2, the student will be able to gain knowledge on respiration and circulation.
3. After studied unit-3, the student will be able to understand the how to formation of urine and Kidney failure.
4. After studied unit-4, the student will be able to understand different theories of muscle contraction and transmission of nerve impulses.
5. After studied unit-5, the student will be able to acquire knowledge on Receptors and Endocrine system

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT – I**Nutrition and Digestion (18 Hours)**

Introduction– Definition of food, Classification of food constituents – Carbohydrates, proteins, fats, minerals, water and vitamins. Types of nutrition, Ingestion, Feeding mechanisms, Digestion, Enzymes, Physiology of digestion – absorption, assimilation, egestion or defaecation. Metabolism- Definition of metabolism -Carbohydrate metabolism

UNIT – II**Respiration and Circulation(18 Hours)**

Definition of Respiration, Respiratory Pigments and functions. Respiratory mechanism- inspiration, Expiration. Transport of gases [Co₂ and O₂] – Respiratory quotient.

Circulation Types of hearts-Myogenic heart, Neurogenic heart, Composition, Properties and Function of Blood – Coagulation of Blood, Human – Cardiac Cycle – Cardiac Rhythm – Origin of heart Beat – Regulation of heart Beat – ECG – Blood Pressure – Factors Contributing to heart Problems – Coronary circulation.

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UNIT – III**Excretion and Osmoionoregulation(18 Hours)**

Definition of Excretion– kinds of excretory products- Ammonotelism, Ureotelism, Uricotelism, Environmental influence on Excretion. Kidney of man, Nephron structure

and formation of urine in mammals- ultrafiltration, reabsorption, secretion hormonal regulation of excretion. Kidney failure and Transplantation. **Osmoionoregulation** Definition; Types of medium, Osmosis, Osmoregulation in fishes and mammals.

UNIT – IV

Neuromuscular Co-ordination (18 Hours)

Nervous tissue – Neuron – Structure, types of neurons. Nerve impulse – Synapse – Synaptic transmission, neuromuscular junction, Reflex actions transmission of impulses – Neurotransmitters. Muscles – Types of muscles –Chemistry of Muscles – Ultrastructure of muscle fiber, Types of muscle contraction – Physical and chemical changes of muscle contraction – Theories of muscle contraction.

UNIT – V

Receptors and Endocrine system (18 Hours)

Receptors – Photoreceptor – mammalian eye –structure of retina – visual pigments – physiology of vision – phonoreceptors – mammalian ear.

Endocrine glands – structure, secretions and functions of endocrine glands of vertebrates –Pituitary-Hormones of the Adenohypophysis, Hormones of the Neurohypophysis and disorders, Hypothalamus, -Thyroid- Hormones of the thyroid gland and disorders – Parathyroid- Hormones of the parathyroid gland and disorders, Adrenal- Hormones of the adrenal gland and disorders, Thymus, Islets of Langerhans- Hormones of the Islets of Langerhans and disorders, Sex organs-testis, ovary.

Text Books

Unit-1: Sambasivaiah, Kamalakara Rao and Augustine Chellappa 1990. A Text book of Animal physiology and ecology, S. Chand & co., Ltd., New Delhi – 110 055.

Unit-2 Parameswaran, Anantakrishnan and Ananta Subramanyam, 1975. Outlines of Animal Physiology, S. Viswanathan [printers &Publishers] Pvt. Ltd.

Unit-3 Sambasivaiah, Kamalakara Rao and Augustine Chellappa 1990. A Text book of Animal physiology and ecology, S. Chand & co., Ltd., New Delhi – 110 055.

Unit-4 A Text Book of Animal physiology Saras Publication Nagercoil Tamil Nadu

Unit-5 Sambasivaiah, Kamalakara Rao and Augustine Chellappa 1990. A Text book of Animal physiology and ecology, S. Chand & co., Ltd., New Delhi – 110 055.

Reference Items: books, Journal

1 - William S. Hoar, 1976. General and comparative physiology, prentice Hall of India Pvt. Ltd., New Delhi. 110 001.

2. Wood. D.W, 1983, Principles of Animal Physiology 3rd Ed.,

3. Prosser, C.L. Brown, 1985, Comparative Animal Physiology, Satish Book Enterprise, Agra – 282 003.

E- Materials

1. <https://www.perlego.com/browse/biological-sciences/zoology>
2. <http://www.freebookcentre.net/Biology/Zoology-Books.html>
3. <https://www.pdfdrive.com/zoology-textbooks-online-e10983221.html>
4. <http://www.freebookcentre.net/biology-books-download/Textbook-of-zoology.html>
5. <https://www.e-booksdirectory.com/listing.php?category=134>
6. <https://www.ikbooks.com/subject/life-sciences/zoology/151>
7. <http://rastogipublications.com/index.php?route=product/category&path=25>
8. <https://bookwindow.in/zoology-textbooks>
9. <https://www.routledge.com/life-science/zoology>
10. <https://www.fullonstudy.com/bsc-1st-year-zoology-books>
11. <https://link.springer.com/book/10.1007/978-1-349-00198-9>
12. <https://vertebrate-zoology.arphahub.com/>
13. <https://www.quora.com/From-which-websites-can-I-download-free-e-books-in-PDF-format-botany-microbiology-zoology>
14. <https://www.mheducation.com/highered/category.12255.zoology.html>
15. <https://library.si.edu/research/vertebrate-zoology>
16. <https://www.kopykitab.com/Zoology-eBooks>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	M	S	M	M

CO2	M	S	M	S	M	M	S	M	M	M
CO3	M	S	S	M	S	M	S	M	M	M
CO4	M	M	M	S	S	S	M	m	S	M
CO5	S	M	S	S	M	M	S	s	M	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)

Course Structure
THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Zoology) – 2022-2023 onwards
Semester: III Paper type: Internal Elective

Paper code: Name of the Paper: NANOTECHNOLOGY IN LIFE SCIENCE

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

ELECTIVE
PAPER – 3
A. NANOTECHNOLOGY IN LIFE SCIENCE

Objectives:

1. To impart current knowledge in Nanotechnology.
2. To create fundamental understanding of usage of Nanomaterial in life science.

COURSE OUTCOME: After completion of the course the student will ..

1. After studied unit-1, the student will be able to Understand the basics of nanotechnology.
2. After studied unit-2, the student will be able to Get knowledge about the levels and devices in nanotechnology.

3. After studied unit-3, the student will be able to Acquire knowledge about nanotechniques at molecular level.
4. After studied unit-4, the student will be able to Learn the evaluation of nanomaterials.
5. After studied unit-5, the student will be able to Learn about the application of nanomaterials in various fields.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT – I

Scope – Fundamental Understanding of concepts and Methods of Nanotechnology – overview on Nanotechnology and Interdisciplinary field.

UNIT – II

Basic and structural Nanotechnology. Molecular and Macromolecular Levels – Nanoscales – devices and systems developed in Nanotechnology.

UNIT – III

Nanotechnology adopted in DNA computing, Molecular Nanotechnology, Quantum Nanotechnology, Optical and Particles used in Nanotechnology.

UNIT – IV

Use of carbon nanotubes, Better and cheaper nanomaterials – Evaluation of nanomaterials and nanosystems by using conventional materials.

UNIT – V

Application of nanotechnology in the fields of Agriculture, Medicine. Future perspectives of Nanotechnology in life Sciences.

Reference Books:

1. Shanmugam, S.2009 : Nanotechnology, MJP-Publ. Chennai – India.
2. Kumar,U, 2008 : Nanotechnology – A Fundamental Approach – Agrobios – India.
3. Ratner, 2008 : Nanotechnology-A Gentle Introduction to next big idea Tamilnadu Book House, Chennai – India.
4. Goodshell, D.S, 2004 – Biotechnology : Lessons from Nature – John Wiley & Sons (Asia) Publ.Ltd, Singapore.
5. Jeremy Ramsden, 2016: Nanotechnology 2nd edition, William Andrew, Cranfield University

6. Murty, B.S., Shankar, P., Raj, B., Rath, B.B., Murday, J, 2012: .Textbook of Nanoscience and Nanotechnology, Orient Blackswan Private Limited - New Delhi.
7. T. Pradeep A, 2017: Textbook of Nanoscience and Nanotechnology- McGraw Hill Education; 1 edition.
8. Gabor L Hornyak., Harry F. Tibbals., Joydeep Dutta and John J. Moore.,2011: Introduction to Nanoscience and Nanotechnology CRC Press Taylor And Francis Group Boca Raton, New York.
9. Guozhong Cao, 2004: Nanostructures and Nanomaterials Synthesis, Properties and Applications, Imperial College Press, London.
10. Michael S Ashby, Paulo J.Ferreira., Daniel L. Schodek, 2009: Nanomaterials, Nanotechnologies and Design. An Introduction for Engineers and Architects. Elsevier, Oxford, UK.

Course Material: website links, e-Books and e-journals

1. https://www.researchgate.net/publication/261638569_Biological_Applications_of_Nanobiotechnology
2. <https://web.pdx.edu/~pmoeck/phy381/intro-nanotech.pdf>
3. <https://onlinelibrary.wiley.com/doi/abs/10.1002/9781119509868.ch17>
4. <https://www.hilarispublisher.com/open-access/novel-applications-of-nanotechnology-in-life-sciences-1948-593X.S11-001.pdf>
5. https://www.aist.go.jp/Portals/0/resource_images/aist_e/research_results/publications/pamphlet/today/nanotechnology_e.pdf

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	M	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Course Structure
THIRUVALLUVAR UNIVERSITY, VELLORE – 632 115
(B.Sc Zoology) – 2022-2023 onwards
Semester: III Paper type: Internal Elective

Paper code: Name of the Paper: HUMAN ENDOCRINOLOGY
Credit: 3

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

B. HUMAN ENDOCRINOLOGY

Objectives:

1. To understand the structure and functions of endocrine glands in human.
2. To learn about the hormonal regulation and their defects in human.

COURSE OUTCOME: After completion of the course the student will ..

1. After studied unit-1, the student will be able to Learn about the structure and function of Pituitary.
2. After studied unit-2, the student will be able to Understand the biological actions of the thyroid and parathyroid.
3. After studied unit-3, the student will be able to Know about the emergency hormones.

4. After studied unit-4, the student will be able to Learn the Mechanism of action and regulation of pancreatic hormones.

5. After studied unit-5, the student will be able to Understand about the function of the male and female reproductive hormones.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	No
2	Yes	Yes	Yes	Yes	No	No
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	No	No
5	Yes	Yes	Yes	Yes	No	No

UNIT – I

Pituitary Gland: Classification and characteristic features of hormones. Structure of hypothalamus and pituitary Gland – Hormones of Adenohypophysis, Pars intermedia and Neurohypophysis. Effects of hypo and hyper secretions - Hypothalamic regulation for release of pituitary hormones.

UNIT – II

Thyroid and Parathyroid: Structure of thyroid Gland – Biosynthesis of thyroid hormones. Biological functions of Thyroxine, Regulation of Thyroid secretion-Thyroid Dysfunction – Parathyroid Glands- Biological Action of parathyroid Hormones – Parathyroid Dysfunction

UNIT – III

Adrenal gland: Structural features- hormones of Adrenal medulla and Cortex and their functions - Biological Action of Adrenaline and Noradrenalin – Emergency Hormones.

UNIT – IV

Islets of Langerhans: Histology – hormones Insulin and Glucagon – Biosynthesis of Insulin- Regulation and Mechanism of Action.

UNIT – V

Testes and ovaries: Male reproductive system – Hormonal control of testes Chemistry and Biosynthesis of Testosterone – functions of testosterone Female reproduction system – role of Hormones in Female sexual Cycle Placental hormones – parturition – Lactation.

Reference Books:

1. Mac E Hadley, 1992 Endocrinology, Third edition, prentice Hall, New Delhi.

2. Matsumoto A. and Ishi S., 1992. Atlas of endocrine organs, vertebrates and invertebrates Springer Verlag, Germany.
3. Wilson J.D and Foster D.W 1992, William's textbook of endocrinology, 8th edition, WB saunders company, Philadelphia.
4. World health organization Technical report series, 1992, Oral contraceptives and Neoplasia WHO, Geneva.
5. Turnerm C.D and Bagnarr, J.T., 1994, General Endocrinology, 6th edition, WB saunder's company, Philadelphia [saunder's international students edition]
6. Lamming, G.E. 1984. Marshall's Physiology of Reproduction; Reproductive cycles of vertebrates. Churchill livingstone, Edinburgh.
7. Prakash S Lohar Endocrinology, Hormones and Human Health.
8. Parameswaran, Anantakrishnan and Ananta Subramanian, 1975- Outlines of Animal Physiology - S. Viswanathan (Printers and Publishers) Pvt. Ltd.,
9. William S.Hoar, 1976- General and Comparative Physiology - Prentice Hall of India Pvt., Ltd., New Delhi.
10. Guyton, A. 2001. Textbook of Medical physiology, Tenth Edition, W.B. Saunders, London.

Course Material: website links, e-Books and e-journals

1. <https://www.uc.edu/content/dam/uc/ce/docs/OLLI/Page%20Content/The%20Endocrine%20System.pdf>
2. <https://pubs.niaaa.nih.gov/publications/arh22-3/153.pdf>
3. http://acbrdu.edu/ClassNotes/Human_physiology16032020.pdf
4. [http://www.uop.edu.pk/ocontents/Lec%20no%203\(3\).pdf](http://www.uop.edu.pk/ocontents/Lec%20no%203(3).pdf)
5. https://www.researchgate.net/publication/325680983_Endocrine_System

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	S
CO5	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome
 S – Strong , M – Medium, L – Low (may be avoided)



திருவள்ளுவர் பல்கலைக்கழகம்
THIRUVALLUVAR UNIVERSITY
SERKKADU, VELLORE - 632 115

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: V Paper type: SKILL BASED SUBJECT

Paper code Name of the Paper: ANIMAL BEHAVIOUR Credit: 2

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. Distinguish between the four major categories (mechanism, ontogeny, adaptive value, and phylogeny) of explanations for animal behaviour
2. Explain how behavioural hypotheses are created and formulate hypotheses that explain a given behaviour

3. Understand the role of natural and sexual selection in the evolution of behaviour
4. Understand the ecological context of an animal's behavioural sequence
5. Understand some of the mechanisms involved in the production of a behavioural sequence by an animal

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be capable of understanding and identify behaviour in a variety of taxa.
2. After studied unit-2, the student will be able to competently discuss the evolutionary origins of various behaviours
3. After studied unit-3, the student will be able to design and implement experiment to test hypothesis relating to animal behaviour
4. After studied unit-4, the student will be able to demonstrate knowledge of key concepts in animal behaviour
5. After studied unit-5, the student will be able to exhibit quantitative research skills.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Introduction and mechanisms of behaviour -origin and history of Ethology - types of behaviour - proximate and ultimate behaviour - objective of behaviour- behaviour as a basis of evolution - behaviour as a discipline of science
Teaching Hours: 12

Unit-2: Patterns of behaviour reflexes - reflex path, characteristics of reflexes latency, after discharge, summation, fatigue, inhibition and its comparison with complex behaviour-orientation- primary and secondary orientation - learning - associative learning, classical and conditioning, habituation and imprinting
Teaching Hours: 12

Unit-3: Social behaviour with reference to insect society, Honey bee - society organization, polyethism foraging, round dance - waggle dance - experiment to prove distance and direction compound of dance, learning ability in honey bee -formation of new hive/queen, supersedure, reciprocal altruism, Hamiltons rule and include fitness with suitable example
Teaching Hours: 12

Unit-4: Sexual behaviour, asymmetry of sex, sexual dimorphism-intra sexual selection (male rivalry) intersexual selection (female choice) infanticide, consequence of mate choice for female fitness, sexual conflict for male versus female - parental care and courtship behaviour in three spine stickleback

Teaching Hours: 12

Unit-5: Biology rhythm - types and characteristics of biological rhythms - short and long term rhythms -circadian rhythm- lunar rhythms- circannual rhythm- photoperiod and regulation seasonal reproduction of vertebrates - biological adaptive significance of biological clock.

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Dugatkin, L.A. 2013. Principles of Animal Behavior. 3rd Edition.WW Norton and Co.
2. R. Dukas& J.M. Ratcliffe. 2009. Cognitive ecology II. University of Chicago Press, 2009
3. Kappeler, P.M. 2010. Animal Behaviour: Evolution and Mechanisms (electronic resource).
4. Berlin, Heidelberg : Springer-Verlag Berlin Heidelberg. Grier, J.W. and T. Burk. 1992. Biology of Animal Behaviour. 2nd Edition, Mosby.
5. Alcock, J. 2009. Animal Behavior: An Evolutionary Approach. 9th Edition, Sinauer.
6. Drickamer, L.C., Vessey, S.H. and Meikle, D. 2002. Animal Behavior: Mechanisms, Ecology and Evolution. WMC Brown Publishers.
7. Goodenough, J., McGuire, B., and Jakob, E. 2010. Perspectives on Animal Behavior. 3rd Edition. John Wiley and Sons.
8. Martin, P. and Bateson, P. 1986. Measuring Behaviour: An Introductory Guide. Cambridge University Press.

Reference Book:

1. Animal behavior - an evolutionary approach by JOHN ALCOCK - Ninth edition.
2. Animal behaviour (ETHOLOGY) V.K. Agarwal - S. Chand publishers.
3. Animal behaviour - a very short introduction -wyattTristram D- oxford publishers.
4. Altmann, J. 1974. Observational study of behavior: sampling methods. Behaviour 49:227-266.
5. Sherman, P.W. and J. Alcock. 2013. Exploring Animal Behavior: Readings from American Scientist. Sixth Edition. ISBN-13: 978-1605351957
6. Nordell SE and Valone, TJ. 2017. Animal Behavior: Concepts, Methods, and Application. Second edition. Oxford University Press: New York

Course Material: website links, e-Books and e-journals

1. <http://www.exeter.ac.uk/undergraduate/degrees/biosciences/animal/>
2. <https://www.coursera.org/lecture/animal-welfare/welcome-QNEYh>
3. <https://www.studyandscore.com/study-material/animal-behaviour>
4. <https://www.bbau.ac.in/dept/dz/TM/ZL%20202%20Animal%20Behaviour.pdf>
5. <https://www.ias.ac.in/Publications/e-Books/Experiments in Animal Behaviour>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	S	M	S
CO2	S	S	M	M	M	S	M	M	S	S
CO3	M	M	S	S	S	M	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	M
CO5	S	S	M	S	S	S	S	M	M	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLOVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: IV Paper type: SKILL BASED SUBJECT

Paper code: Name of the Paper: VEGETABLE MEAT CULTURE Credit: 2

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1.To understand the principles of mushroom cultivation
- 2.To acquire the practical knowledge to grow several species of fungi,
3. To have the confidence to approach the mushroom industry for potential employment opportunities
4. To procure knowledge about the nutritive values of mushroom.

5. To understand the medicinal values of mushrooms

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the principles of mushroom cultivation
2. After studied unit-2, the student will be able to acquire the practical knowledge to grow several species of fungi,
3. After studied unit-3, the student will have the confidence to approach the mushroom industry for potential employment opportunities
4. After studied unit-4, the student will be able to procure knowledge about the nutritive values of mushroom.
5. After studied unit-5, the student will be able to understand the medicinal values of mushrooms

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Introduction, history and scope of mushroom cultivation; biology of mushrooms; Nutritional value: (Proteins, amino acids, mineral elements, carbohydrates, fibers, vitamins); Medicinal value of mushrooms; Poisonous mushrooms and mushroom poisoning; edible mushrooms and cultivation in India and world
Teaching Hours: 12

Unit-2: Structure and key for identification of edible mushrooms-Button mushroom (*Agaricus bisporus*), Milky mushroom (*Calocybe indica*), Oyster mushroom (*Pleurotus sajorajju*) and paddy straw mushroom (*Volvariella volvacea*). Structure and key for identification of poisonous mushrooms-Truffles (*Tuber elanosporem*), Amanitas, *Galerina marginata*, and *Chlorophyllum molybdites*
Teaching Hours: 12

Unit-3: Cultivation Technology: Infrastructure, equipments and substrates in mushroom cultivation: Polythene bags, vessels, inoculation hook, inoculation loop, culture racks, mushroom unit or mushroom house, water sprayer, tray, boilers, driers, pure culture, Spawn: types of spawn, preparation of spawn, mushroom bed preparation and factors affecting mushroom bed preparation; Compost: materials used for compost preparation, compost technology in mushroom production
Teaching Hours: 12

Unit-4: Nutrient Profile of Mushroom: Protein, amino acids, calorific values, carbohydrates, fats, vitamins & minerals- Nutrient supplements for human consumption as vegetable meat. Nature,

Medicinal and nutritional value, Health benefits: Microbicidal effects. Therapeutic Aspects:
Antitumour effect

Teaching Hours: 12

Unit-5: Factors influence contamination, diseases in mushrooms in mushroom cultivation-
Environmental, fungal, bacterial, viral, insect pests, Nematode diseases, and competitor moulds.
National level and regional level, Marketing of mushrooms in India and world

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

- 1.Nita Bhal. (2000). Handbook on Mushrooms. 2nd ed. Vol. I and II. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- 2.Marimuthu, T. et al. (1991). Oyster Mushroom. Department of Plant Pathology. Tamil Nadu Agricultural University, Coimbatore.
- 3.Tewari Pankaj Kapoor, S. C. (1988). Mushroom Cultivation. Mittal Publication, New Delhi.
- 4.Pathak, V. N. and Yadav, N. (1998). Mushroom Production and Processing Technology. Agrobios, Jodhpur.
- 5.Kannaiyan,S.Ramasamy,K. (1980). A hand book of edible mushroom, Today & Tomorrows Printers &Publishers, New Delhi.
- 6.Mushroom Cultivation, Tripathi, D.P.(2005) Oxford & IBH Publishing Co. PVT.LTD, New Delhi.
7. Mushroom Production and Processing Technology, PathakYadavGour (2010) Published by Agrobios (India).

Reference Book:

1. Pandey R.K, S. K Ghosh, 1996. A Hand Book on Mushroom Cultivation. Emkey Publications.
2. Tripathi, D.P. (2005) Mushroom Cultivation, Oxford & IBH Publishing Co. PVT.LTD, New Delhi.
3. V.N. Pathak, Nagendra Yadav and Maneesha Gaur, Mushroom Production and Processing Technology/ VedamsEbooks Pvt Ltd., New Delhi (2000)
4. Paul Stamets, J.S. and Chilton, J.S. 2004. Mushroom cultivation A practical guide to growing mushrooms at home, Agarikon Press.
5. Shu Fing Chang, Philip G. Miles and Chang, S.T. 2004. Mushrooms Cultivation, nutritional value, medicinal effect and environmental impact. 2nd ed., CRC press

Course Material: website links, e-Books and e-journals

1. <https://extension.psu.edu/six-steps-to-mushroom-farming>
2. <https://www.mushroomoffice.com/mushroom-cultivation/>
3. https://www.researchgate.net/publication/339616804_MUSHROOM_CULTIVATION_A_BEGINNERS_GUIDE_SECOND_EDITION
4. <https://vikaspedia.in/agriculture/farm-based-enterprises/mushroom-production/button-mushroom-production>

5. <https://www.kolhapur-mushrooms.in/2021/01/what-are-equipment-required-for.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	S	S	S
CO2	M	S	S	M	S	S	S	M	S	S
CO3	S	S	M	S	S	M	S	S	S	M
CO4	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	S	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Course Structure

Thiruvalluvar University, Vellore - 632115

Course writing format

Name of the course/subject: ZOOLOGY

Semester: VI

Name of the Paper: ENVIRONMENTAL BIOLOGY

Credits: 5 Hours of teaching: 5

Paper type: Core

.....
Course Objectives

1. To emphasize the basic needs of abiotic factors
2. To study the basic fundamental units of ecosystem and different habitats
3. To realize the importance of inter relationship between every organism and environment
4. To understand the population and community ecology
5. To understand the Natural resources
6. To create awareness towards recent changes in the environment and preventive measures.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand Scope, concept, Branches in ecology and Environmental factors (soil, light, temperature, water and air).
2. After studied unit-2, the student will be able to understand fundamental units of ecosystem, Tropic levels of ecosystem and Food chain.
3. After studied unit-3, the student will be able to understand Biogeochemical cycles and importance of inter relationship between every organism and environment
4. After studied unit-4, To acquire the knowledge about population and community ecology, ecological succession, aims of wild life conservation and Natural resources.
5. After studied unit-5, the student to acquire the knowledge environmental hazards, Environmental ethics and laws.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	No	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT – I

Definition of Ecology, (18 Hours)

Derivation of the term, Scope – concept – Branches in ecology. **Environmental factors--**
Soil -Types, soil formation, Soil group of India, Soil components, Soil chemistry, soil pH, Soil air, Soil organisms. **Light**—Spectrum, Light on land, Light in water, Biological effects of light. **Temperature**—Range of temperature Homeiothermic and poikilothermic organism, Methods of meeting temperature extremes, Effect of temperature. **Water:** Properties of water, Soft and hard water, Composition of natural waters, Water problem in different habitats, Effects of humidity on growth and distribution of animals, Precipitation. **Air** composition – properties

UNIT – II

Definition of ecosystem, Abiotic substances, Producer, Consumers, Decomposers, Transformers, Tropic levels in an ecosystem, Food chain, Food web, Ecological pyramids, pyramid of numbers, pyramid of biomass,
Habitat ecology—Freshwater Habitats, Types of freshwater Habitats –Lentic habitats, Lotic habitats, freshwater adaptations. Marine habitats -- Types of marine water habitats, pelagic adaptations, adaptations of deep sea.

UNIT – III

Biogeochemical cycles – gaseous cycle [Carbon cycle, Nitrogen cycle] sedimentary cycle, [phosphates].

Animal association - Intra specific and inter specific - colony formation, social organization, predation, parasitism, commensalisms, mutualism, inter specific competition – competitive principle or Gause's principle.

UNIT – IV

Population: Definition – characteristics – Natality, Mortality, age distribution of Population growth forms, population fluctuation. Community Ecotone and edge effects– ecological succession.

Wild life Conservation-aims of wild life conservation, methods of conservation, endangered species– sanctuaries and National parks.

Natural resources –types of resources, forest resources.

UNIT – V

Environmental degradation – deforestation, urbanization, population explosion and other environmental hazards – Environmental ethics and laws – Earth summits – role of governmental agencies for environmental monitoring.

Space ecology—environmental problems of space travel.

Text Books

Unit-1:Sambasivaiah, Kamalakararao and Augustine chellappa 1990. A Text book of Animal physiology and ecology, S. Chand & co., Ltd., New Delhi – 110 055.

Unit-2Kotpal. R.L, and N.P. Bali, 1986. Concepts of Ecology, Vishal Publications, New Delhi – 7

Unit-3 Rastogi V.B, and M.S. Jayaraji, 1988 – 1989. Animal Ecology and Distribution of animals, Kedarnath, Ram Nath Meerut – 250 001.
110 055.

Unit-4 Concepts of Ecology Saras Publication Nagercoil Tamil Nadu.

Unit-5 Verma, P.S and Agarwal 1986, Environmental Biology, S. Chand & Co Ltd.
Richard, Manual of wild life conservation.

Reference Items: books, Journal

- 1 - Clark, G.L. 1954, Elements of Ecology, John Wiley & Sons Inc., New York, London
2. Eugene P. Odum, 1971. Fundamentals of ecology, Saunders International Student Edition, W.B. Saunders Company, Philadelphia London, Toronto
3. Sunakar Panda, Environmental & Ecology.

E- Materials

1. <https://www.perlego.com/browse/biological-sciences/zoology>
2. <http://www.freebookcentre.net/Biology/Zoology-Books.html>
3. <https://www.pdfdrive.com/zoology-textbooks-online-e10983221.html>
4. <http://www.freebookcentre.net/biology-books-download/Textbook-of-zoology.html>
5. <https://www.e-booksdirectory.com/listing.php?category=134>
6. <https://www.ikbooks.com/subject/life-sciences/zoology/151>
7. <http://rastogipublications.com/index.php?route=product/category&path=25>
8. <https://bookwindow.in/zoology-textbooks>
9. <https://www.routledge.com/life-science/zoology>
10. <https://www.fullonstudy.com/bsc-1st-year-zoology-books>
11. <https://link.springer.com/book/10.1007/978-1-349-00198-9>
12. <https://vertebrate-zoology.arphahub.com/>
13. <https://www.quora.com/From-which-websites-can-I-download-free-e-books-in-PDF-format-botany-microbiology-zoology>
14. <https://www.mheducation.com/highered/category.12255.zoology.html>
15. <https://library.si.edu/research/vertebrate-zoology>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	M	S	M	M

CO2	M	S	M	S	M	M	S	M	M	M
CO3	M	S	S	M	S	M	S	M	M	M
CO4	M	M	M	S	S	S	M	m	S	M
CO5	S	M	S	S	M	M	S	s	M	M

PO – Programme Outcome, CO – Course outcome S – Strong, M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: VI Paper type: Core

Paper code: Name of the Paper: ECONOMIC ZOOLOGY Credit: 5

Total Hours per Week: 5 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. To encourage young learners to take up the small scale industries
2. To generate motivation for Self-Employment
3. To disseminate information on economic aspects of Zoology
4. To inculcate knowledge on useful animals to Mankind
5. To satisfy the learners with modern techniques of Animal culture

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to will be able to understand Vermiculture
2. After studied unit-2, the student will be able to learn about Pisciculture - Techniques
3. After studied unit-3, the student will be able to learn about Economics of Poultry keeping.
4. After studied unit-4, the student will be able to learn about Dairy farm management
5. After studied unit-5, the student will be able to learn about Future strategies for Livestock Development

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	No	Yes
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	No	No	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: (50 to 100 contents)

Teaching Hours: 15

A) Vermiculture and Composting

Economic Entomology: Useful Insects of commercial values,

B) Apiculture - Species of Honeybees - Honey extraction - Economics of Apiculture and management.

C) Sericulture - Nature and economic importance of Sericulture in India

Unit-2: (50 to 100 contents)

Teaching Hours: 15

Economics of aquaculture-

A) Pisciculture - Techniques of induced breeding Commercial culture of catla & cat fish By-Products of Fishing and its commercial values.

B) Prawn culture - Culture techniques of fresh water (*Macrobrachium rosenbergii*) & Marine water (*Penaeus monodon*) preservation - processing and export techniques adopted in Prawn fishery.

C) Pearl culture: Formation and nature of Pearls - Commercial importance of Pearl Culture in India.

Unit-3: (50 to 100 contents)

Teaching Hours: 15

Economics of Poultry keeping: Morphology of different breeds of Chicken - Brooding and Rearing of Chicks-Processing of Egg, Meat and By-Products of Poultry.

Unit-4: (50 to 100 contents)

Teaching Hours: 15

A): Dairy farm management, Milch breeds. Draught breeds, Dual purpose breeds and New Cross breeds of Cows and Buffaloes in India.

B): Sheep farming: Indigenous and Exotic breeds of Sheep.

Unit-5: (50 to 100 contents)**Teaching**

Hours:15Future strategies for Livestock Development - Transgenic Animal Technology - Genetic Improvement for best breeds - Economic importance of Dairy, Leather, Wool, Fur and Pharmaceutical Industries in India.

Internal Assessment Methods: (refer the instructions)

Text Books:

1. Sukla, G.S. and Upadhyay, V.B., 2000 Economic Zoology - ISBN - 81-7133-137-8
2. Rastogi Publications, Meerut, India.
3. Jawaid Ahsan and Subhas Prasad Sinha, 2000 A Handbook on Economic Zoology-ISBN-81-219-0876-O S. Chand & Co., Ltd., New Delhi.

Reference Books:

1. Ashok Kumar and Prem mohan Nigam, 1991 Economic and Applied Entomology Emkay Publications, New Delhi.
2. Shammi, Q.J. and Bhatnagar, S., 2002 Applied Fisheries: ISBN-81-7754-114-5 Agrobios (India), Jodhpur - India.
3. Major Hall, C.B. 2005 Ponds and Fish culture - ISBN-81-7754-146-3 Agrobios (India), Jodhpur - India.
4. Keith Wilson, N.D.P., 2005 A Handbook of Poultry Practice - ISBN-81-7754-O-69-6 Agrobios (India), Jodhpur - India.
5. Banerjee, G.C. 1992 Poultry - III- Edition - ISBN-81-204-008-4 Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
6. Banerjee, 1988 A Text Book of Animal husbandry-VIII-Edition-ISBN-81-204-1260-5 Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
7. Kaushish, S.K., 2001 Trends in Livestock Research - ISBN-81-7754-112-9 Agrobios (India), Jodhpur - India.
8. Ismail, S.A. 1997. Vermicology the Biology of Earth worm Orient Longman, India
9. A. Mary violet Christy 2008 vermy technology MJP Publ. Chennai

Course Material: website links, e-Books and e-journals

https://onlinecourses.swayam2.ac.in/cec20_ge23/preview

<https://www.classcentral.com/course/swayam-applied-and-economic-zoology-20222>

<https://programs.online/top-basic-sciences-programs/p/cec/applied-and-economic-zoology>

<https://unacademy.com/lesson/branch-of-economic-zoology-in-hindi/XMLCXRN9>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	M	M	M	M	M	M	S	M
CO2	M	S	M	S	M	M	S	M	S	M
CO3	M	M	S	M	S	M	M	M	M	M
CO4	S	M	M	M	S	M	S	M	M	M
CO5	M	S	M	M	M	S	M	S	M	M

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: VI Paper type: PRACTICAL

Paper code: Name of the Paper: CORE PRACTICAL - III

Credit: 3

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1.To give students competent lab skills in Biostatistics
2. To give students competent lab skills in animal physiology.
3. To give students competent lab skills in developmental biology
4. Use experimental techniques to address immunological questions.
5. To give students competent recording skills

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to solve biostatistic problems
2. After studied unit-2, the student will be able to understand experimental physiology
3. After studied unit-3, the student will be able to understand experimental Developmental biology
4. After studied unit-4, the student will be able to understand Immunological techniques
5. After studied unit-5, the student will be able to record the experimental findings

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	No	No	No	No

Unit-1: BIOSTATISTICS:

Biological data - calculation of mean, median, mode, Mean and standard deviation.

Graphical representation - Bar, Pie, frequency distribution.

Demonstration of MS- word, MS-Excel and MS-PPT.

Teaching Hours: 12

Unit-2: ANIMAL PHYSIOLOGY:

Activity of human salivary amylase in relation to Ph, Enzyme concentrate and Temperature.

Estimation of Oxygen consumption in a fish with reference to body weight.

Detection of nitrogenous waste products in fish tank water, frog tank water, bird excreta and mammalian urine/ Kidney.

Use of Kymograph Unit, B.P. apparatus, stethoscope.

Teaching Hours: 12

Unit-3: DEVELOPMENT BIOLOGY:

Study of the following prepared slides / museum specimens.

Section of testis and Ovary [Mammalian].

Slides of Mammalian sperm and ovum.

Study of Egg types - Frog's Egg, Hen's Egg.

Study of cleavage stages 2 Cell, 4Cell, 8Cell - Blastula and gastrula of Frog.

Slides of different stages of chick embryo - 18 hours [primitive streak stage], 24 hours, 48 hours 72 hours and 96 hours.

Placenta of Sheep, Pig and Man.

Teaching Hours: 12

Unit-4: IMMUNOLOGY:

Study of Antigen - Antibody reaction - Human Blood grouping [ABO and Rh].

Study of prepared slides of histology: Thymus, Spleen, Bone marrow, Lymph node.

Teaching Hours: 12

Unit-5: Record Note

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata
2. Textbook - Principles Of Animal Physiology 3/e By Moyes & Schulte Published by Pearson.
3. Developmental Biology – Scott F. Gilbert – 8 th Edition, Sinauer Associates Inc., 2006
4. Practical immunology, Frank Hay, 4th Edition , Blackwell Science
5. A Handbook of Practical Immunology – G P Talkwar

Reference Book:

1. Mood, A.M. Graybill, F.A. and Boes, D.C. (2007): Introduction to the Theory of Statistics, 3rd Edn., (Reprint), Tata McGraw-Hill Pub. Co.Ltd.
2. Tortora, G.J. and Derrickson, B.H. (2009). Principles of Anatomy and Physiology, XII Edition, John Wiley & Sons, Inc.
3. Principles of Development – L. Wolpert – 4 th Edition, Oxford University Press, 2011.
4. Fundamental Immunology 5th edition (August 2003): by William E., Md. Paul (Editor) By Lippincott Williams & Wilkins Publishers
5. Lab Manual: Cell/Immunology Laboratory Manual

Course Material: website links, e-Books and e-journals

1. https://bioboot.github.io/bioinf525_w16/class-material/BI525W16Lec2.1.pdf
2. <https://ctools.umich.edu/access/content/group/cd806bd4-a051-4873-9be1-4a158109a66b/Module%202/Labs/Lab1%20with%20Key.pdf>
3. <https://www.slideshare.net/vidhyakalaivani29/animal-physiology-and-biochemistry-lab-manual-64718095>
4. https://www.researchgate.net/publication/241594386_Key_Experiments_in_Practical_Developmental_Biology
5. <https://www.urmc.rochester.edu/MediaLibraries/URMCMedia/labs/frelinger-lab/documents/Immunology-Lab-Manual.pdf>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO1	S	S	M	M	S	S	M	S	M	S
CO2	M	S	S	S	M	M	S	S	S	S
CO3	S	M	S	M	S	S	S	S	S	M
CO4	S	S	S	S	M	S	M	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



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ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: IV Paper type: Core Practical

Paper code: Name of the Paper: Core Practical IV Credit: 3

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1.To introduce the basics of Ecology and Environmental Sciences to students
- 2.To study the economic importance of apiculture
- 3.To know practices and economic importance of vermiculture
- 4.To understand the evidences of evolution and theories of evolution
- 5.The study of evolution will enable the student to gain knowledge about adaptations

behavioral pattern of animals and their role in evolution.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to perform ecological experiments
2. After studied unit-2, the student will be able to identify the parasites of fish and cultivable earthworms
3. After studied unit-3, the student will be able to identify the larvivorous fish and pest
4. After studied unit-4, the student will be able to identify the fossils of evolutionary importance
5. After studied unit-5, the student will be able to Record their findings

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	Yes	No	Yes	Yes
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5						

Unit-1: ENVIRONMENTAL BIOLOGY

Estimation of Dissolved oxygen, salinity, pH, Free Co₂, Carbonate and Bicarbonates in water samples.

Use of rain gauge, Maximum and Minimum thermometer, Hygrometer and Anemometer.

Plankton study - fresh water and Marine plankton.

Study of natural ecosystem and field report.

Teaching Hours: 12

Unit-2: ECONOMIC ZOOLOGY

Study of the following prepared slides / specimens

Earthworm types [any two] - [vermiculture].

Megacolexmauriti- south Indian species - surface crawlers.

Drawidamodesta- Redsoil with calciferous gland.

Pheretimaposthuma- North Indian - Large specimen.

Eudrilus eugenia - Redworm, Exotic.

Fish parasites [Lernea, Argulus

Teaching Hours: 12

Unit-3: ECONOMIC ZOOLOGY

Study of the following prepared slides / specimens

Larvivorousfishes :

Poecelia reticulate - Guppy.

Gambusia Affinis-Gambusi.

Colisa labia - Dwarf gowrami.

Different stage of **Silk worm**.

Types of **Bees**.

Common **Pests**.

Teaching Hours: 12

Unit-4: EVOLUTION

Study of the following prepared slides / specimens

EVOLUTION

Fossils - ammonite.

Living fossils - Limulus, sphenodon.

Conneting link -peripatus, archaeopteryx.

Evolutionary significance -exocoetus, draco, hippocampus.

Mimicry - monarch butterfly.

Camouflage - chameleon.

Teaching Hours: 12

Unit-5: Record Work

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders.
2. Purohit, S.S. & Ranjan, R. 2007. Ecology, Environment & Pollution. Agrobios Publications.
3. Freeman, A.M. 2003. Millennium Ecosystem Assessment: Conceptual Framework. Island Press.
4. Shukla, G.S. &Upadhyay, V.B. : Economic Zoology, 4e, 2002, Rastogi.
5. Shukla, G.S. &Upadhyay, V.B. : Economic Zoology, 4e, 2002, Rastogi.
6. Singh, S. : Bee keeping in India, ICAR.
7. Srivastava, C.B.L. : Fishery Science and Indian Fisheries, 2002, Kitab Mahal
- 8.

Reference Book:

1. Singh, J.S., S.P & Gupta, S.R. 2006. Ecology, Environment and Resource conservation. Anamaya Publ., New Delhi, 688 pp.
2. Miller. G.T. 2004. Environmental Science. Thomson, California. 538 pgs.

3. Chapman, J.L.& M.J. Reiss. 1998. Ecology: Principles and Applications. Cambridge Univ. press. 2 nd edition. 336 pgs.
4. Krebs, C.J. 2008. Ecology: The experimental Analysis of Distribution and Abundance (6th Edition), Benjamin Cummings Publ. 688pgs

Course Material: website links, e-Books and e-journals

1. http://bioweb.uwlax.edu/bio203/s2008/kroun_bria/hostinteractions.htm
2. <http://www.biologydiscussion.com/invertebrate-zoology/phylum-nemathelminthes/wuchereria-bancrofti-structure-morphology-and-pathogenesis/34293>
3. https://nptel.ac.in/courses/126104003/LectureNotes/Week-1_04_Pest.pdf
4. <https://www.khanacademy.org/science/high-school-biology/hs-evolution/hs-evolution-and-natural-selection/a/hs-evolution-and-natural-selection-review>
5. <https://www.jagranjosh.com/general-knowledge/environment-ecology-a-complete-study-material-1464852780-1>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	S	M	S	S	S	S
CO2	M	S	S	S	M	S	S	M	S	M
CO3	S	S	M	S	M	S	S	S	S	S
CO4	S	S	S	M	S	S	M	S	M	S
CO5	S	M	S	S	S	M	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Thiruvalluvar University vellore – 632 115

2022 – 2023 onwards

Course structure

B.Sc., ZOOLOGY EVOLUTION

Semester	: VI	Paper type	: Core
Paper Code	: CEZO 63A	Name of the Paper:	Evolution
Credit	: 03		
Total Hours Per Week	: 3	Lecture Hours	: 45
		Tutorial Hours	:
		Practical Hours	:

COURSE OBJECTIVE:

1. To understand and acquire knowledge about the concepts of origin of life

2. To construct the phylogenetic tree of evolution
3. To demonstrate the origin of speciation
4. To understand the evidences of evolution and theories of evolution
5. The study of evolution will enable the student to gain knowledge about adaptations behavioral pattern of animals and their role in evolution.

COURSE OUT COMES (FIVE OUTCOMES FOR EACH UNITS SHOULD BE MENTIONED)

1. After studied Unit I: Students will be able to understand the origin of life from various evidences of evolution.
2. After studied Unit II: Students will be able to explain the various theories of evolution.
3. After studied Unit III: Students will be able to analyze the Natural selection and Role of variation in evolution.
4. After studied Unit IV: Students will be able to evaluate the animal behavior and its distribution and their role in evolutions.
5. After studied Unit V: Students will be able to understand and analyze the knowledge on Mechanism of isolation for speciation and evolution of Man.

MATCHING TABLE (Put YES/ NO in the appropriate box)

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	YES	YES	YES	YES	-	-
2	YES	YES	YES	YES	-	-
3	YES	YES	-	YES	-	-
4	YES	YES	-	YES	YES	-
5	YES	YES	YES	YES	-	YES

Unit 1 : Evidences: The need of evidences for the fact of evolution – Morphological, anatomical, Embryological, Physiological and Biochemical evidences.

Teaching Hours : 9 Hrs

Unit 2 : Theories: Lamarckism, Neolamarckism, Darwinism, NeoDarwinism, Devries concept of Mutation.

Teaching Hours : 9 Hrs

Unit 3 : Natural selection: Types, stabilizing and diversifying directional selection. Variation: Types of variation

Teaching Hours : 9 Hrs

Unit 4 : Mimicry – Batesian and mullerian mimicry and evolution, living fossils.
Distribution of animals Teaching Hours : 9 Hrs

Unit 5 : Isolation – Premating and post mating isolating mechanism, speciation. Evolution of man– Biological and cultural Teaching Hours : 9 Hrs

Internal Assessment Methods:

Text Book : 1 – 10

1. Edward J. Larson - Evolution .
2. Veer Bala Rastogi. Organic Evolution, Meerut Publications.
3. Arumuganm. N. Organic evolution, 2009 Saras. Publ. Nagarcoil, Kanyakumari Dt.
4. Carl Zimmer - Evolution
5. Agarwal, V.K and Usha Gupta- Evolution and animal distribution, Chand and Co.,
6. Gopalakrishnan. T. S. Itta Sambasivaiah and A.P. Kamalakara Rao. Principles of organic Evolution.
7. T.K. Ranganathan, Evolution. 1994 Rainbow Printers, Palayankottai.
8. Tomar. Singh - Evolutionary Biology 9th Edition.
9. Dr. Manoj Kumar Jha – Theories of Evolution East and West.
10. Kailash Choudhary and Ram Prakash Saran – Evolution Animal Behaviour.

Reference Book 1 – 10

1. Charles Darwin - The origin of species
2. Strickberger's - Evolution
3. Veer Bala Rastogi - The story of life By Katie Scott organic evolution.
4. Richard Dawkins - The greatest show on earth – The evidences of evolution.
5. Allen D. Macneill - Evolutionary Biology I.
6. Dobzhansky, Ayala etc., Evolution, Freeman and Co., 1977.
7. Dodson, E.o. Evolution Process and Product. Reinhold Pnb, Co., 1990
8. Matt Ridley - The evolution of everything.
9. Roger Lewin - Human evolution an illustrated introduction fifth edition.
10. Richard Milner- The encyclopedia of evolution

Course Material : Website Links, / e- Books and e- Journals

1. www.Natcensci.org
2. <http://evolution.Berkely.Edu>
3. www.Ucmp.berkeley.Edu/exhibite/eduxhibits.html
4. <http://www.pbs.org/wgbh/evolution>
5. <http://www.tolweb.org>

e- Journals

1. Journal of evolutionary Biology – by eseb featured in Journal of Evolutionary Biology
Daniel Berner, Valentin Amrhein.
2. Journal of Zoological systematic and evolutionary research – Alexander Blanke,
Elisabeth Haring, Martin Husemann, Stephan Koblmuller, Barna Pall-Gergely,
ThamasStach.

MAPPING WITH PROGRAM OUTCOME

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	M	S	M	
CO2	S	S	M	S						
CO3	S	S		M		S		M		
CO4	S	S			M			M	M	
CO5	S	S	M	M	S		M			

PO – Programme Outcome, CO – Course Outcome

S- Strong, M – Medium, L- Low (May be avoided)



திருவள்ளூர் பல்கலைக்கழகம்

THIRUVALLUVAR UNIVERSITY

SERKKADU, VELLORE - 632 115

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115

(Name of the Programme) – 2022-2023 onwards

Semester: VI Paper type: Internal Elective

Paper code:

Name of the Paper: MICRO-BIOLOGY

Credit: 3

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. To emphasize the importance of integrating new knowledge on Microorganisms.
2. To update the Technology innovations of Microbial genetics and its Application.
3. To understand the general morphology of micro organism
4. To understand the epidemiology of various infectious diseases
5. To understand the role of micro organisms in Agriculture, Industry and environment

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the importance of Microorganisms
2. After studied unit-2, the student will be able to understand the Technology innovations of Microbial genetics and its Application.
3. After studied unit-3, the student will be able to understand the general morphology of micro organism
4. After studied unit-4, the student will be able to the epidemiology of various infectious diseases
5. After studied unit-5, the student will be able to understand the role of micro organisms in Agriculture, Industry and environment

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	No	No	No	No
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: The scope of microbiology – characterization, classification and identification of Microorganisms

Teaching Hours: 12

Unit-2: Bacteria – General morphology, and physiology – pathogenic and non – pathogenic bacteria, economic importance

Teaching Hours: 12

Unit-3: Micro organisms – general morphology of Fungi – Moulds and yeasts, Algae, Protozoa and Viruses.

Teaching Hours: 12

Unit-4: Epidemiology of infectious diseases with reference to Human – such as Bacterial [Tuberculosis], Viral [Hepatitis], protozoan [Amoebiasis] and Fungal [any one] diseases -Host. Microbe interaction – immune responses – Antibiotics and other Chemotherapeutic agents.

Teaching Hours: 12

Unit-5: Applied Microbiology in the fields of food, Agriculture, Industry and environment

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Mani, A., Selvaraj, A.M, Narayanan, L.M & Arumugam, N. 1996 : Microbiology – Saras Publications – Nagercoil – India.
2. Sharma, P.D 1998 : Microbiology – Rastogi Publ. Meerut, India.
3. Subba Rao, N.S, 1999 : Soil Microbiology, Oxford IBH Co. New Delhi, India.
4. Sullia, S.B. & Santharam, S. 2004 – General Microbiology, Oxford IBH, India.
5. Meenakumari, S. Microbial Physiology, MJB-Publ. – Chennai, India.
6. Purushotam Kaushik, 2005 : Microbiology – S.Chand & Co., New Delhi, India.
7. Vijaya Ramesh, 2005 : Environmental Microbiology, MJP. publ, Chennai, India.
8. Vijaya Ramesh, 2007 : Food Microbiology, MJP. Publ. Chennai, India.
9. Rajan, S 2007 : Medical Microbiology – MJP. Publ. Chennai, India.
10. Mosharaffudin, Ahmed & Basumatary 2006 : Applied Microbiology – MJP Publ. India.

Reference Book:

1. Purohit, S.S. 2007 : Microbiology – Agrobios Publ. India.
2. Trivedi, P.C. 2008 : Applied Microbiology – Agrobios Publ. India.
3. Prescott, 2009 : Industrial Microbiology – Agrobios Publ. India.
4. Parihar, L. 2008 : Advances in Applied Microbiology – Agrobios Publ. India.
5. Agarwal, A.K 2008 : Industrial Microbiology, Agrobios Publ. India.
6. Bohra, A. 2006 : Food Microbiology, Agrobios Publ. India.

Course Material: website links, e-Books and e-journals

1. <https://sites.google.com/a/uasd.in/ecourse/agricultural-microbiology>
2. <http://www.ignouhelp.in/ignou-mfn-03-study-material/>
3. <https://mltcollege.org/wp-content/uploads/2020/07/microbiology.pdf>
4. <https://microbiologysociety.org/why-microbiology-matters/what-is-microbiology/viruses.html>
5. <https://www.iaritoppers.com/2019/06/fundamentals-of-microbiology-icar-ecourse-pdf-book-download.html>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	M	S	S	M	S
CO2	S	M	S	S	M	S	S	S	S	M

CO3	M	S	S	S	S	S	S	S	S	S
CO4	S	S	S	M	S	M	M	S	M	M
CO5	S	S	M	S	M	S	S	M	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

Thiruvalluvar University vellore – 632 115

2022 – 2023 onwardS

Course structure

B.Sc., ZOOLOGY BIOCHEMISTRY

Semester : VI **Paper type :** Elective

Paper Code : CEZO 64A **Name of the Paper:** Biochemistry
Credit : 3

Total Hours Per Week : 3 **Lecture Hours :** 45

Tutorial Hours :

Practical Hours :

Course Objectives:

1. This course will define explain the basic concepts and principles of Biochemistry.
2. To understand the biomolecules structure and their importance.
3. To demonstrate the basic knowledge of the bioenergetics.

4. To acquire deep knowledge about the classification, metabolism and biological significance of Carbohydrates, Lipids, and Protein.
5. To emphasize the need to understand enzymes and its role.

COURSE OUT COMES (FIVE OUTCOMES FOR EACH UNITS SHOULD BE MENTIONED)

1. After studied Unit I: The students will be able to understand acid, base, buffer, pH and their biological importance.
2. After studied Unit II: The students will be able to analyze different forms of energy and Bioenergetics.
3. After studied Unit III: The students will be able to classify Biomolecules, and explain the structure of Carbohydrates, Lipids, Proteins and their metabolism.
4. After studied Unit IV : The students should be able to explain the properties , classifications the mechanism of enzyme Action.
5. After studied Unit V: The students should be able to understand the biochemistry of antibiotics and analyze the principles and application of technologies for biomolecules separations.

MATCHING TABLE (Put YES/ NO in the appropriate box)

Unit	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	YES	YES	YES	YES	YES	-
2	YES	YES	-	-	-	-
3	YES	YES	-	-	-	-
4	YES	YES	-	-	-	YES
5	YES	YES	YES	YES	-	-

Unit 1 :Aqueous solutions - properties of water - hydrogen ion concentration, acids bases and their concept - buffers and electrolytes and functions - acidity, alkalinity and pH determination.

Teaching Hours : 9 Hrs

Unit 2 :**Bioenergetics** - energy and its forms - free energy - laws of thermodynamics - enthalpy and entropy - redox coupling and ATP bioenergetics

Teaching Hours : 9 Hrs

Unit 3 :Classification, metabolism and biological significance of carbohydrates, lipids, protein - primary, secondary, tertiary and quaternary structure and characteristics of proteins, vitamin types - source & deficiency.

Classification, structure and biological significance of carbohydrates, lipids, protein.
Metabolism of carbohydrate Teaching Hours : 9 Hrs

Unit 4 :Enzymes: classification and nomenclature - Physico-chemical - properties of enzymes - enzyme kinetics - mechanism of enzyme action - factors affecting enzyme activity.
Teaching Hours : 9 Hrs

Unit 5 :A brief account on the biochemistry of antibiotics & their mode of action.
Fractionation of Biological materials by chromatography [PC, TLC] electrophoresis [Principle & types] centrifugation [Principle & Types]. Teaching Hours : 9 Hrs

Internal Assessment Methods:

Text Book : 1 – 10

1. Prasad R. Manjeshwar fifth Edition 2019-2020 Text Book of Biochemistry.
2. DM. Vasudevan Sreekumari S. Kannan Vaidyanathan Text Book of Biochemistry.
3. R.P. Maurya, Shilpa Maurya, Biochemistry and Clinical Pathology.
4. Ambika Shanmugam's , Fundamentals of Biochemistry for Medical students, Editor K. Ramadevi.
5. N. Arumugam, S. Prasanna Kumar. L.M. Narayanan, R.P. Meyyan.K, Biochemistry, Saras Publication.
6. U. Satyanarayana, U. Chakrapani, Biochemistry.
7. L. Veerakumari – Biochemistry.
8. Dr. J.L. Jain, Dr.Sanjai Jain and Nitin Jain – Fundamentals of Biochemistry
9. Seema paggiUpadhye, Text Book of Biochemistry.
10. Raji MD, Text Book of Biochemistry for Undergraduates, 3rd Edition.

Reference Book

1. L. Stryer, 1999 Biochemistry IV Edition. Freeman Company, New York.
2. Lehninger. 1992 Biochemistry worth Publication Inc., CBS Publication New Delhi.
3. H.S. Srivastava Elements of Biochemistry, Rastogi Publications.
4. Outline of Biochemistry, Corn & Stump.
5. G.P. Talwar & L.M. Srivastava , 2003 Text Book of Biochemistry and Human Biology Eastern Economy Edition Prentice Half of India. New Delhi.
6. Namrata Chhabra, Sahil Chhabra, Hand Book of Biochemistry Spotting.
7. Denise R. Ferrier, LippincottIllustrated Reviews Biochemistry, South Asian Edition.
8. David A. Bender, Nutritional Biochemistry of the vitamins, Second Edition.
9. Kenneth P. Murphy, Protein structure stability and folding.
10. John L. Tymoczko Jeremy M. Berg Biochemistry third Edition.

Course Material : Website Links, e- Books and e- Journals

Links:

1. <https://onlinelearning.hms.harvard.edu/biochemistry>
2. <https://www.organic-chemistry.org>
3. <https://www.qmul.ac.uk>
4. <https://biochem.oregonstate.edu>
5. <https://themedicalbiochemistrypage.org>

e- Books

1. Introduction to Biochemistry and Metabolism (D.Anandhi -2014)
books.google.co.in>books.
2. Text book of Medical Biochemistry (Rajinder Chawla - 2017)
books.google.co.in>books.
3. Biochemistry – e-book – (U. Satyanarayana. 2017. Preview)
books.google.com>books.
4. Guide to Biochemistry (James C. Black stock-2014)
books.google.co.in.>books.
5. Clinical Biochemistry: An illustrated colour Text
books.google.co.in.>books.

E- Journals:

1. International Journal of Science and Research (IJSR)
2. The journal of Biochemistry (JB).
3. Advances in Biochemistry.
4. Biochemistry and Molecular Biology.

MAPPING WITH PROGRAM OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M		M			S		
CO2	S	S	M		M			S		M
CO3	S	S	M			M	S	S	M	
CO4	S	S	M					S		
CO5	S	S	S	S			M	S		S

PO – Programme Outcome, CO – Course Outcome

S- Strong, M – Medium, L- Low (May be avoided)

Course Structure

Thiruvalluvar University, Vellore - 632115

Course writing format

Name of the course/subject: ZOOLOGY

Semester: VI

Name of the Paper: APPLIED ENTOMOLOGY

Credits: 3 Hours of teaching: 3

Paper type: Internal Elective

.....

Course Objectives

1. To study the insect morphology and types of pest.
2. To study the insect species causing damage to the crops in the field as well as under storage condition and the effective control measure against them.
3. To realize the importance of pest in relation to public health-Houseflies diseases and their control measures.
4. To understand Recent trends in pest control and Integrated pest management, its importance & applications
5. To study Household pests effective control measure against them.
6. To create awareness towards insect borne diseases.

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the insect morphology and types of pest.
2. After studied unit-2, the student will be able to understand insect species causing damage to the crops in the field as well as under storage condition and the effective control measure against them.
3. After studied unit-3, the student will be able to understand the awareness of pest in relation to public health-Houseflies diseases and their control measures,
4. After studied unit-4, To acquire the knowledge about the effective control measure against insect pest.
5. After studied unit-5, the student to acquire the knowledge Recent trends in pest control and Integrated pest management, its importance & applications.

Matching Table (Put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	yes	Yes	yes	No	No	No
3	Yes	Yes	Yes	No	No	No
4	Yes	Yes	Yes	No	No	No
5	Yes	Yes	Yes	No	No	No

UNIT – I

Introduction -Morphology of insects – Economic importance of insects- beneficial insects and harmful insects- Types of pests – types of damage caused by pests in crops – causes for insects assuming pest status – outbreak of pests.

UNIT – II

Types of insect development – ametabola and metabola (hemimetabola, holometabole) - Pests of agricultural importance, their bionomics, life cycle and control measures of paddy, ground nut, cotton, tomato, coffee & Banana.

UNIT – III

Pests of stored products and their control – Household pests – cockroach and termites – and their control – pest in relation to public health-Houseflies diseases and their control measures, Lice diseases and their control measures. Mosquitoes borne diseases and their control measures.

UNIT- IV

Pest control methods and application: cultural, mechanical, biological and chemical methods – classification of pesticides – LC 50 and LD 50 values – First Aid & precautions in handling pesticides –Plant protection appliances, duster-hand operated duster, wet duster, sprayers-hand syringe, knapsack sprayer, power-operated sprayer, miscellaneous appliances-mist bower, fog generator .

UNIT – V

Insect vectors of virus disease in crop plants. Recent trends in pest control – pheromones, attractants, repellants, antifeedants and chemosterilants, Integrated pest management, its importance & applications

Text Books

Unit-1:Temphare D.B., 1984 A. Text Book of Insects Morphology, Physiology and Endocrinology. S. Chand and Co., New Delhi.

Unit-2Nayar, K.K., Ananthakrishnan, T.N. and B.V. David 1992 General and Applied Entomology Tata McGraw, New Delhi.

Unit-3 Economic Entomology, N. T. Krishnan. Kedarnath, Ram Nath Meerut – 250 001. 110 055.

Unit-4 Vasantharaj David and T. Kumaraswami 1988. Elements of Economic Entomology Popular Book Depot, Chennai

Unit-5Nayar, K.K., Ananthakrishnan, T.N. and B.V. David 1992 General and Applied Entomology Tata McGraw, New Delhi.

Reference Items: books, Journal

1 - P.G. Fenemore, Alka Prakash 1997 Allied Entomology, Wiley Eastern Ltd., New York.

2. Wigglesworth J.B., 1994. Insect Physiology, Chapman and Hall, London Edition, W.B. Saunders Company, Philadelphia London, Toronto

E- Materials

1. <https://www.perlego.com/browse/biological-sciences/zoology>
2. <http://www.freebookcentre.net/Biology/Zoology-Books.html>
3. <https://www.pdfdrive.com/zoology-textbooks-online-e10983221.html>
4. <http://www.freebookcentre.net/biology-books-download/Textbook-of-zoology.html>
5. <https://www.e-booksdirectory.com/listing.php?category=134>
6. <https://www.ikbooks.com/subject/life-sciences/zoology/151>
7. <http://rastogipublications.com/index.php?route=product/category&path=25>
8. <https://bookwindow.in/zoology-textbooks>
9. <https://www.routledge.com/life-science/zoology>
10. <https://www.fullonstudy.com/bsc-1st-year-zoology-books>
11. <https://link.springer.com/book/10.1007/978-1-349-00198-9>
12. <https://vertebrate-zoology.arphahub.com/>
13. <https://www.quora.com/From-which-websites-can-I-download-free-e-books-in-PDF-format-botany-microbiology-zoology>
14. <https://www.mheducation.com/highered/category.12255.zoology.html>
15. <https://library.si.edu/research/vertebrate-zoology>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	s	M	M	M	S	S	M	M
CO2	S	S	s	M	S	S	M	M	S	M
CO3	M	S	M	S	S	S	M	M	M	S
CO4	M	M	s	S	S	M	s	M	S	M
CO5	S	S	M	M	s	M	S	S	M	S

PO – Programme Outcome, CO – Course outcome
S – Strong, M – Medium, L – Low (may be avoided)



திருவள்ளுவர் பல்கலைக்கழகம்
THIRUVALLUVAR UNIVERSITY
SERKKADU, VELLORE - 632 115

ANNEXURE - I

Course Structure

THIRUVALLUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: Vi Paper type: Skill Based Subject

Paper code: Name of the Paper: Medical Lab Technology Credit: 2

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

- 1) To impart awareness on clinical lab-technology
- 2) To create knowledge on self- employment opportunity

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to understand the sterilization techniques
2. After studied unit-2, the student will be able to apply and analyse the haematological parameters
3. After studied unit-3, the student will be able to diagnose different diseases.
4. After studied unit-4, the student will be able to analyse the physical examination of urine and faeces.
5. After studied unit-5, the student will be able to get a thorough knowledge about cerebro-spinal fluid.

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	Yes	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Medical Laboratory scope- general procedures- Laboratory requirements, Sterilization, Dry heat (Hot air oven),Moist heat (Autoclave, Pressure cooker),Laboratory equipments - Spectrophotometer, Incubator Refrigerator, Auto analyzer, Micro centrifuge, Automatic pipettes.

Teaching Hours: 12

Unit-2: Collection of blood samples, Packed cell volume (PVC), Erythrocyte sedimentation Rate (ESR),RBC Count, WBC Count, Reticulocyte count, Total count, Differential Count, Pulse rate, Use of blood pressure Apparatus, Electrocardiogram, Echocardiogram, Estimation of Haemoglobin, Artificial pacemaker

Teaching Hours: 12

Unit-3: Blood cross matching - Hepatitis test - Haemolytic jaundice, ELISA, Estimation of blood glucose fasting two hour post prandial - Diabetes mellitus, Estimation of blood Cholesterol, Blood Urea, Blood Uric Acid.

Teaching Hours: 12

Unit-4: Analysis of urine - Physical examination, Blood cells, Urine glucose, Urine albumin, Bile salts, Ketone bodies, Urine culture - Antibiotic susceptibility test. Pregnancy Test (Detection of HCG). Analysis of faeces - Components of faeces their characteristics, factors affecting faeces.composition. Analysis of sputum - Pathological conditions that can be detected in sputum - their causes - Detection of Group A - Streptococcus.

Teaching Hours:12

Unit-5: Cerebrospinal fluid - Formation, Composition function, Conditions altering its composition - their causes. Seminal fluid - Composition of seminal fluid, Sperm count, Abnormal sperms, Common pathological conditions detected in semen - their causes. Aminotic

fluid - Sex determination, Diagnosis of pathological conditions of developing foetus through analysis of amniotic fluid

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. Biswajit Mohanty and Sharbari Basu - Fundamentals of Practical Clinical Biochemistry, B.I. Publications PVT., LTD., 54, Janpath, New Delhi - 110001.
2. Estridge B.H. Raynold A.P and Walters N.J. Basic Medical Laboratory Techniques, 4th edition, Thomson Delmar Learning, Eastern press (Bangalore) Pvt., Ltd., Boommasandra Industrial Area, Hosur Road, Bangalore - 562158.
3. Kannai, L. Mukherjee, Medical Laboratory Technology Vol - I, Vol - II and Vol - III. Tata MC Graw Hill Publishing Company Limited, No:444/1, Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai - 600116.
4. Ramnik Sood, Medical Laboratory Technology, Methods and Interpretations. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
5. Venkadesan, O. Essential of Medical Laboratory technology, Bicobas P.G and Research Department of Zoology, Loyola College, Madras - 60003

Reference Book:

1. Mukherjee .L.K (2017), Medical Laboratory Technology, Vol.1-3, 3rd edition, Tata Mcgraw Hill
2. Sood Ramnik, (2015), Text book of Medical Laboratory Technology, 2nd edition, Jaypee Publications
3. Wintrobe's Clinical Haematology, (2014), 13th edition, Lippincott Williams & Wilkins
4. De Gruchy's Clinical Haematology in Medical Practice, (2012), Sixth edition, Wiley Publications
5. Dacie & Lewis Practical Haematology, (2011), 11th edition, Elsevier Publications
6. Contemporary Practice in Clinical Chemistry by William Clarke; American Association for Clinical Chemistry Staff.

Course Material: website links, e-Books and e-journals

1. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/med_lab_tech_students/medicallabtechnology.pdf
2. <https://nic.libguides.com/medlabtech>
3. <https://www.university.youth4work.com/study-material/mlt,medical-lab-technology-lectures>
4. <https://library.fvtc.edu/MLT/Books>
5. <https://www.slideshare.net/HusseinAltameemi2/introduction-to-medical-laboratory-technology>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
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CO1	S	S	M	M	S	S	M	S	S	S
CO2	M	S	S	M	S	S	M	M	M	S
CO3	S	M	S	S	M	S	S	S	S	S
CO4	S	M	M	S	M	S	S	M	S	M
CO5	M	S	S	M	S	M	M	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)



திருவள்ளுவர்பல்கலைக்கழகம்
THIRUVALUVAR UNIVERSITY
 SERKKADU, VELLORE - 632 115

ANNEXURE - I

Course Structure

THIRUVALUVAR UNIVERSITY, VELLORE – 632115
(Name of the Programme) – 2022-2023 onwards

Semester: VI Paper type: Skill Based Subject

Paper code: Name of the Paper: Industrial Fishery Management Credit: 2

Total Hours per Week: 3 Lecture Hours: Tutorial Hours: Practical Hours:

Course Objectives

1. .To introduce basic knowledge of industrial fishery management and export practices.
2. .To realize the need augmenting food production from aquatic resource.
3. .To give the students a holistic understanding of the subject giving substantial weight age to both the core content and techniques used in Industrial Fish and Fisheries.
4. .To acquire knowledge about various fisheries institutions of India

Course Out Comes (five outcomes for each units should be mentioned)

1. After studied unit-1, the student will be able to get the basic information about the scope of aquacultures in India.
2. After studied unit-2, the student will be able to acquire knowledge about fish farming
3. After studied unit-3, the student will be able to acquire knowledge about various culture techniques
4. After studied unit-4, the student will be able to acquire knowledge about feed formulations
5. After studied unit-5, the student will be able to acquire knowledge about disease management in fish farming

Matching Table (put Yes / No in the appropriate box)

Unit	i. Remembering	ii. Understanding	iii. Applying	iv. Analyzing	v. Evaluating	vi. Creating
1	Yes	Yes	No	No	No	No
2	Yes	Yes	Yes	No	No	Yes
3	Yes	Yes	Yes	Yes	No	Yes
4	Yes	Yes	Yes	Yes	Yes	Yes
5	Yes	Yes	Yes	Yes	Yes	Yes

Unit-1: Definition and History of Aquaculture, Scope and importance with reference to Marine, Freshwater and estuarine fishes - Status of aquaculture in India - in Tamilnadu - Hatchery technology, important hatcheries, river-rine seed collection - Different stages of seed - spawn, fry and fingerlings

Teaching Hours: 12

Unit-2: Principles of site selection in fish farm construction - Quality and productivity of water, soil character and other parameters - Nursery and rearing ponds Management

Teaching Hours: 12

Unit-3: Harvesting of fry and fingerlings - Transportation of fish seed and brood fish (Various methods of transportation) - Induced breeding techniques - Different systems of Aquaculture - Monoculture, polyculture, Cage culture - Integrated fish culture. Extensive, Semi-intensive and intensive fish culture Raceway culture, culture in re-circulatory systems Warm, water and cold water aquaculture, sewage-fed fish culture

Teaching Hours: 12

Unit-4: Feed resources - Nutritional value of feed ingredients and live feed - importance of natural food to nutrient requirement of fish - feed additives - attractants - growth stimulant and probiotics and binders - supplementary feed - feeding methods and scheduling.

Teaching Hours: 12

Unit-5: Disease management of culturable fishes - protozoan - Bacterial - crustaceans - fungal - helminths disease and their control measures - fish marketing- quality management - Role of MPEDA and IIP - fisheries institutions of India - CMFRI - CIFT - CIFE -CIFA- FSI - NIO - FFDA.

Teaching Hours: 12

Internal Assessment Methods: (refer the instructions)

Text book:

1. . V. G. Jhingran, (1991). Fish and fisheries of India. Edition-3, Hindustan Pub. Corp. (India), 727.
2. S. Ayyappan, J. K. Jena, A. Gopalakrishnan, Dr. A. K. Pandey, (2011). Handbook of Fisheries and Aquaculture, Indian Council of Agricultural Research, New Delhi, 755.
3. FAO Technical Paper No.361. Manual on production and use of live food in aquaculture.
4. Pronob Das, Sagar C. Mandal, S. K. Bhagabati, M. S. Akhtar and S. K. Singh (2012). Important Live Food Organisms And Their Role In Aquaculture, Frontiers in Aquaculture, 2012: 69-86.
5. Handbook of Aquafarming: Aquaculture Feed, MPEDA

Reference Book:

1. 1 Ganguly B.A., Sinha A.K., Adhikari S., Goswami B.C.B. (2018). Biology of Animals (Vol I & II). NCBA
2. Khanna S.S. (2014). Introduction to Fishes. Silver Line
3. Srivastava C.B.L. (2014). Fishery Science and Indian Fisheries
4. FAO. 1992. Manual of Seed Production of Carps. FAO Publ.
5. ICAR. 2006. Hand Book of Fisheries and Aquaculture. ICAR.
6. Jhingran VG & Pullin RSV. 1985. Hatchery Manual for the Common, Chinese and Indian Major Carps. ICLARM, Philippines.

Course Material: website links, e-Books and e-journals

1. <https://www.fao.org/3/y3427e/y3427e03.htm>
2. https://www.ipcc.ch/apps/nj-lite/ar5wg2/nj-lite_download2.php?id=10686
3. <https://www.britannica.com/technology/commercial-fishing>
4. <https://leap.unep.org/knowledge/glossary/fisheries-management>
5. <https://bookauthority.org/books/best-fisheries-books>

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	M	M	M	S	M	M	S
CO2	M	S	M	M	S	S	M	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	M	S	S	M	M	M	M	M
CO5	M	M	S	M	M	S	S	S	S	S

PO – Programme Outcome, CO – Course outcome

S – Strong , M – Medium, L – Low (may be avoided)

