



**SRI ADI CHUNCHANAGIRI  
WOMEN'S COLLEGE**

**(Accredited by NAAC with 'A' Grade)**

**(Run by Sri Adi Chunchanagiri Shikshana Trust @ Karnataka)  
Permanently Affiliated to Mother Teresa Women's University, Kodalkanal**

*PO, PSO & CO  
2018 onwards*



**MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL - 624 101**



**B.A ENGLISH**  
**(CHOICE BASED CREDIT SYSTEM)**

**SYLLABUS (2018-2019) Onwards**

**B.A. ENGLISH**

P. No.	Paper Code	Course Title	Hours	Credits	Continuous Internal Assessment (CIS)	End Semester Exam (ESE)	Total
<b>Semester I</b>							
1.	ULTA11	Part-I- Tamil	6	3	25	75	100
2.	ULEN11	Part-II-English English for Infotainment-I	6	3	25	75	100
3.	UENT11	Core I (Theory) Indian Writing in English	5	4	25	75	100
4.	UENT12	Core II (Theory) Modern English Grammar and Usage	5	4	25	75	100
5.	UENA11	<i>Allied Theory I</i> Social History of England	5	4	25	75	100
6.	UVAE11	Value Education	3	3	25	75	100
<b>Total</b>			<b>30</b>	<b>21</b>			<b>600</b>
<b>Semester II</b>							
7.	ULTA22	Part I-Tamil	6	3	25	75	100
8.	ULEN22	Part II-English English for Infotainment -II	6	3	25	75	100
9.	UENT21	Core III (Theory) Age of Shakespeare	6	4	25	75	100

		and Milton					
10.	UENT22	Core IV (Theory) Literary Theory	5	4	25	75	100
11.	UENA22	<i>Allied Theory</i> History of English Literature-I	5	4	25	75	100
12.	UEVS21	Environmental Studies	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>20</b>			<b>600</b>
<b>Semester III</b>							
13.	ULTA33	Part I-Tamil	6	3	25	75	100
14.	ULEN33	Part II- English English for Infotainment-III	6	3	25	75	100
15.	UENT31	Core V (Theory) Age of Dryden and Pope	5	4	25	75	100
16.	UENA33	<i>Allied II</i> History of English Literature -II	5	4	25	75	100
17.	UENE31	Elective I Subaltern Studies	4	3	25	75	100
18.	UENN31	Non Major Elective Course I General Application Skills in English	2	2	25	75	100

19.	UENS31	Skill Based Studies I Business English Communication	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>21</b>			<b>700</b>
<b>Semester IV</b>							
20.	ULTA44	Part I-Tamil	6	3	25	75	100
21.	ULEN44	Part II-English English for Infotainment -III	6	3	25	75	100
22.	UENT41	Core VI (Theory) Age of Wordsworth	4	4	25	75	100
23.	UENT42	Core VII(Theory) Age of Tennyson	4	4	25	75	100
24.	UENA44	<i>Allied Theory</i> Literary Criticism	3	4	25	75	100
25.	UENE42	Elective II Post Colonial Literature	3	3	25	75	100
26.	UENN42	Non Major Elective course II Presentation SKills	2	2	25	75	100
27.	UENS42	Skill Based Studies II Writing Skills	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>800</b>
<b>Semester V</b>							
28.	UENT51	Core VIII (Theory)	5	4	25	75	100

		Modern Age					
29.	UENT52	Core IX (Theory) American Literature	5	4	25	75	100
30.	UENT53	Core X (Theory) Shakespeare	5	4	25	75	100
31.	UENT54	Core XI (Theory) Fundamentals of Language	5	4	25	75	100
32.	UENT55	Core XII (Theory) Post Colonial Literature-II	5	4	25	75	100
33.	UENE53	Elective III Translation Theory and Practice	3	3	25	75	100
34.	UENS53	Skill Based Studies III English for Competitive Examinations	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>700</b>
<b>Semester VI</b>							
35.	UENT61	Core XIII (Theory) Introduction to Literary Theories	5	4	25	75	100
36.	UENT62	Core XIV (Theory) Comparative Literature	5	4	25	75	100
37.	UENT63	Core XV (Theory)	5	4	25	75	100

		Women's Writing					
38.	UENT64	Core XVI (Theory) English Language Teaching	5	4	25	75	100
39.	UENT65	Core XVII (Theory) Contemporary Literature	5	4	25	75	100
40.	UENE64	Elective IV Journalism and Mass Communication	3	3	25	75	100
41.	UENS64	Skill Based Studies IV The Art of Public Speaking	2	2	25	75	100
42.	USEA61	Extension Activity	-	3	25	75	100
<b>Total</b>			<b>30</b>	<b>28</b>			<b>800</b>
<b>Total credits</b>				<b>140</b>		<b>Total</b>	<b>4200</b>

## SEMESTER I

Code: ULEN11

ENGLISH FOR INFOTAINMENT – I

6 Hours/3 Credits

### Objectives:

1. To teach English with an information and entertainment.
2. To enrich the components of Grammar and Composition.
3. To expose the writings of literary men belonging to various nations.
4. To enable the students speak and write in English fluently on various topics

### UNIT I PROSE

A.P.J.Abdul Kalam	-	Early Influences
G.K.Chesterton	-	What I Found In My Pocket
Earry Collins & Dominique Lapierre	-	Second Crucifixion

### UNIT II POETRY

Allen Curnow	-	House and Land
Dennis Brutus	-	You Laughed and Laughed and Laughed
Wordsworth	-	Daffodils

### UNIT III

Parts of Speech  
Sentence Patterns, Framing Sentences, Framing Questions, Tags  
Types of Sentences

### UNIT IV

Hints Development  
Comprehension  
Describing a Place/Person

### UNIT V ONE -ACT PLAY

Bertolt Brecht	-	The Informer
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**Ref:** English For Infotainment I – Manimekala Publicatio



## SEMESTER II

CodeULEN22

ENGLISH FOR INFOTAINMENT – II

6 Hours / 3 Credits

### Objectives:

1. To teach English with an information and entertainment.
2. To enrich the components of Grammar and Composition.
3. To expose the writings of literary men belonging to various nations.
4. To enable the students speak and write in English fluently on various topics

### UNIT I PROSE

Sir Richard Livingston	-	Essentials of Education
Boman Desai	-	Between the Masque and the Temple
Walter De Lamare	-	The Four Brothers

### UNIT II POETRY

John Pepper Clark	-	Night Rain
Jean Arasanayagam	-	In the Month of July
Walt Whitman	-	O! Captain My Captain

### UNIT III

Tenses  
Agreement  
Degrees of Comparison

### UNIT IV

Re arranging the Jumbled Sentences  
Expansion of Proverbs (Write a Paragraph) – List to be attached  
Debate

### UNIT V

Biography  
Martin Luther King - R.N. Roy

**Ref:** English For Infotainment II – Manimekala Publications

## SEMESTER III

Code: ULTA33      ENGLISH FOR INFOTAINMENT – III    6 Hours / 3 Credits

### Objectives:

1. To teach English with an information and entertainment.
2. To enrich the components of Grammar and Composition.
3. To expose the writings of literary men belonging to various nations.
4. To enable the students speak and write in English fluently on various topics

### UNIT I      PROSE

- |                    |   |                             |
|--------------------|---|-----------------------------|
| A.P.J. Abdul Kalam | - | Dimensions of Creativity    |
| Leo Tolstoy        | - | Little Girls Wiser than Men |
| Guy De Maupassant  | - | At the Church Door          |

### UNIT II      POETRY

- |                 |   |                           |
|-----------------|---|---------------------------|
| Alfred Tennyson | - | King Arthur's Farewell    |
| Emily Dickenson | - | A Bird Came Down the Walk |
| Wole Soyinka    | - | To My First White Hairs   |

### UNIT – III

- Infinitive, Gerund, Participle
- Direct and Indirect Speech
- Active and Passive Voice

### UNIT – IV

- Dialogue - Writing and Speaking
- Note-Making
- General Essay (List to be attached )

### UNIT – V

- |                     |   |                  |
|---------------------|---|------------------|
| Hugh Chestermans    | - | Pie and the Tart |
| Rabindranath Tagore | - | The Post Office  |

**Ref:** English For Infotainment III – Manimekala Publications

## SEMESTER –IV

**Code: ULEN44      ENGLISH FOR INFOTAINMENT – IV      6 Hours / 3 Credits**

### **Objectives:**

- 1. To teach English with an information and entertainment.**
- 2. To enrich the components of Grammar and Composition.**
- 3. To expose the writings of literary men belonging to various nations.**
- 4. To enable the students speak and write in English fluently on various topics**

### **UNIT –I      PROSE**

- |                   |   |                           |
|-------------------|---|---------------------------|
| A.P.J.Abdul Kalam | - | My Vision for India       |
| G.W.Cox           | - | Orpheus and Euridice      |
| Jesse Owens       | - | My Greatest Olympic Prize |

### **UNIT – II**

Scene from Shakespeare's Play (The Trial Scene from the Merchant of Venice)

### **UNIT – III**

Transformation of Sentences

Spotting Errors

### **UNIT – IV**

Letter Writing – Formal, Informal and Resume

Precis Writing

Self Introduction and Introducing Others

### **UNIT – V      EXTENSIVE READING**

- |                              |   |                 |
|------------------------------|---|-----------------|
| 1. Nergis Dalal              | - | The Connoisseur |
| 2.Chitra Banerjee Divakaruni | - | The Bats        |

**Ref:** English For Infotainment IV – Manimekala Publications

## SEMESTER-I

Code:UENT11      CORE I- INDIAN WRITING IN ENGLISH      5Hours/ 4Credits

### OBJECTIVES

1. To introduce the students an Indian, writing in English.
2. To expose the Indian ethos and sensibility.
3. To enrich Indian English vocabulary usages
4. To enable the students speak and write in English fluently on various topics

### UNIT I- POETRY

Toru Dutt                      -    The Casuarina Tree

K.N.Daruwala                -    Migrations

Sarojini Naidu                -    The Snake Charmer

A.K. Ramanujan -    A River

R.Parthasarathy -    Home Coming

Tagore                        -    Gitanjali- Stanza 36

### UNIT II- PROSE

Srinivasa Sastri    -Books That Have Influenced Me

M.K. Gandhi                -The First Case (Chapter 28 My Experiments with the Truth)

### UNIT III- DRAMA

Girish Karnad-    The Dreams of Tipu Sultan ( Manimekala Publishing Housing)

### UNIT IV- FICTION

R.K. Narayan                -    Malgudi Days

### UNIT V- SHORT STORY

Bharani Battacharya - Glory of Twilight

Abburi Chaya Devi        --    The Wood Rose

### REFERENCE BOOKS:

1. Iyengar .R.Srinivasa. 1983, "Indian Writing in English". New Delhi: Sterling Publishers Private Limited,.
2. Naik, M.K, ed. 1982. "Aspects of Indian Writing in English". New Delhi: Macmillan India Limited,
3. Appasamy,S.P, Rao Govinda C.D,ed. 2003. "Representative Selections from Indian Prose". Chennai: Macmillan India Limited

## SEMESTER I

### CORE II- MODERN ENGLISH GRAMMAR AND USAGE

Code: UENT12

5Hours/ 4Credits

#### OBJECTIVES

1. To impart the students the basic structure in grammar and its usage.
2. To introduce the grammar components in English and its applications.
3. To write English Effectively.
4. To enable the students speak and write in English fluently on various topics

#### UNIT-I

Verbs and Tenses

Tag Questions

#### UNIT-II

Nouns- Adjectives- Concord-Adverbs-Degrees of Comparison

#### UNIT-III

Preposition and Articles- Phrase and Clause

#### UNIT-IV

Sentence kinds- Assertive, Interrogative, Exclamatory, Affirmative and Negative

Types- Simple, Compound, Complex

Voice, Direct and Indirect Speech and Semi negatives.

#### UNIT-V

Gerund- Infinitive- Participles- Error Analysis

#### TEXT BOOK:

- Green, David. *Contemporary English Grammar Structures and Composition*. Chennai:Macmillan India Limited,2008.

#### Books Recommended

- Quirk, Randolph and Green Baum Sidney, *University Grammar of English*, London; London Group Ltd, 1973
- Clore, R.A *University Grammar of English Work Book*, London Group Ltd, 1975
- Geist, Robert, *An introduction to Modern Grammar*.

## **SEMESTER I**

**Code:UEN11 ALLIED- SOCIAL HISTORY OF ENGLAND 5Hours/ 4Credits**

### **OBJECTIVES**

- 1. To study the History of England.**
- 2. To learn the different periods in the Social History of England.**
- 3. To expose the background study of England for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### **UNIT I**

The Renaissance – The Reformation- Colonial Expansion

### **UNIT II**

The Civil War and its Social Significance – Puritanism- Restoration England

### **UNIT III**

Age of Queen Anne- Coffee House Life in London- Agrarian and Industrial Revolution

### **UNIT IV**

Humanitarian Movement – The War of American Independence – Effects of French Revolution

### **UNIT V**

The Reform Bills- The Victorian Age – The World War and Social Security

### **Ref:**

Trevelyan – Social History of England

A.G.Xavier- Social History of England

## SEMESTER-II

Code: UENT21 CORE I- AGE OF SHAKESPEARE AND MILTON 6hrs/ 4Credits

### OBJECTIVES

1. To expose the students the age of Shakespeare and Milton
2. To study the contemporaries of the age of Shakespeare and Milton.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### UNIT-I

Spenser- Prothalamion

Milton -Paradise Lost Book IX

Shakespeare- Sonnets-18, 116, 33,

18- Shall I compare Thee to a summer's Day?

116- Let me not to the Marriage of True Minds

33 - Full Many a Glorious Morning Have I seen

### UNIT-II PROSE

Bacon Essays Of Studies

Of Marriage and single Life

Of Nature in Man

### UNIT-III DRAMA

John Webster- The Duchess of Malfi

### UNIT-IV

Christopher Marlowe- Dr. Faustus

### UNIT-V FICTION

John Bunyan- Pilgrim's Progress Part I

### Books for Reference:

- *Faber Book of Modern Verse*. 3<sup>rd</sup> Ed. Donald Hall. UK:Faber, 1965.
- *Fifteen Poets*-ed. John Brown, Oxford: Oxford University Press, 1997.

## SEMESTER II

Code:UEN22

CORE II- LITERARY FORMS

5Hrs/4 Credits

### OBJECTIVES

1. To introduce the literary genres in English literature.
2. To familiarize the literary terms and its applications.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### UNIT I

Poetry- Ballad, Epic, Ode, Sonnet, Lyric, Elegy, Idyll, Satire, Figures of Speech

### UNIT-II

Stanza Forms, Heroic Couplet, Terza Rima, Chaucerian stanza or Rhyme Royal, Ottava Rima, Spenserian Stanza

### UNIT – III

Schools and movements- Classical, Romantic Metaphysical and Pre- Raphaelites

### UNIT-IV

Comedy, Tragedy, Melodrama, Farce, One Act Play, Essay, Biography, Autobiography

### UNIT-V

Novels and Short stories

### Books for Reference:

A Background to the study of English literature – S. Prasad & R.J. Rees.



## SEMESTER II

**Code:UENA22 ALLIED – HISTORY OF ENGLISH LITERATURE – I 5Hrs/4 Credits**

### OBJECTIVES

- 1. To study the History of English Literature**
- 2. To learn the historical incidents, renowned writers and different Ages.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### UNIT I

1. The Age of Chaucer

Major Writers : Chaucer

Minor Writers : John Gower, William Langland, Thomas Wyatt, Earl of Surrey,

John Wycliff

2. Development of Drama –Mystery and Miracle Plays, University Wits

3. Age of Shakespeare

Major Writers : Shakespeare, Ben Jonson

Poet : Spenser

Prose Writers : Francis Bacon, Sir Philip Sidney, Raleigh

### UNIT II

1. Characteristics features of Puritan Age

Major Writers: Milton, Bunyan

2. The Features of Metaphysical Poets

Cavalier Poets

### UNIT III

Restoration Age – Major Events and features of Restoration Comedy

Dryden, Pope, William Congreve, William Wycherley, P.B.Sheridan, Goldsmith, Samuel

Peppys, John Evelyn, Samuel Butler

### UNIT IV

Features of Neo-classical School of Poetry, Contribution of Pope

Poets : Mathew Prior, Goldsmith, John Gay

Prose Writers: Pope, Johnson, Edmund Burke, Gibbon, Boswell

### UNIT V

#### **Periodical Essays and Satires**

Major Writers : Addison, Steele, Goldsmith, Swift

Novels : Daniel Defoe, Richardson, Henry Fielding, Smollet, Sterne

#### **Ref:**

An Outline History of English Literature – Hudson

History of English Literature – Evans

### III SEMESTER

Code: UENT31

AGE OF DRYDEN AND POPE

5Hrs/4Credits

#### OBJECTIVES

1. To introduce the Age of Dryden and Pope.
2. To study the contemporary writers.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

#### UNIT-I POETRY

John Donne	-	The Cannonization, Valediction; Forbidding Mourning
Marvel	-	To his Coy Mistress
Herbert	-	The Pulley
Dryden	-	Alexander's Feast

#### UNIT-II POETRY

Alexander Pope	-	Epistle to Dr. Arbuthnot
Oliver Goldsmith	-	The Deserted Village

#### UNIT-III PROSE

Spectator Papers	-	Sir Roger at Church
Goldsmith	-	Beau Tibbs

#### UNIT-IV DRAMA

Sheridan-	-	The Rivals
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#### UNIT-V FICTION

Daniel Defoe- Robinson Crusoe

#### BOOKS FOR REFERENCE:

- Boulton, Morjorie. *The Anatomy of Poetry*. New Delhi: Kalyani Publishers, 1979.
- Mints, William. *A Manual of English Prose Literature*. New Delhi: Atlantic Publishers and Distributors, 1995.

**III SEMESTER**  
**(ALLIED) HISTORY OF ENGLISH LITERATURE II**  
**FROM THE AGE OF TRANSITION TO PRESENT AGE**

Code: UENA33

5Hrs/4Credits

**OBJECTIVES**

1. To continue the study of History of English Literature.
2. To learn the specific trends of different writers of the Age.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

**UNIT I**

**Characteristics pre- romantic age**

**Pre cursors of Romantic Revival**

Major writers: Collins, Gray, Burns Cowper, Thompson, Blake, Goldsmith.

**UNIT II**

**Romantic Revival**

**Features of Romantic Age**

Major Poets: Wordsworth, Coleridge, Byron, Shelley, Keats

Prose Writers: Lamb, Hazlitt, De Quincey

Novelists: Walter Scott, Jane Austen, Novelists of Gothic Novel

**UNIT III**

**Victorian Compromise**

Major Poets: Tennyson, Browning, Arnold

Characteristics of Pre- Raphaelites Poets: D.G.Rossetti, Christina Rossetti, Swinburne, Morris.

Prose Writers: Ruskin, Carlyle, Arnold Newman, Macaulay

Novelists: Charles Dickens, Bronte Sisters

**UNIT IV**

**Age of Hardy**

Poets: Hardy, Rudyard Kipling, Francis Thompson

Novelists: Thackeray, George Eliot, Hardy

Dramatists: Oscar Wilde, Synge, J.M.Barrie

**UNIT V**

**Modern Age**

Poetry: Hopkins, Eliot, W. B. Yeats, W.H.Auden, Philip Larkin, Hughes

Prose: A.G. Gardiner, Robert Lynd, Chesterton

Novelists: Virginia Woolf, D.H. Lawrence, Somerset, Maugham, Graham Greene,  
H.G.Wells, Conrad, James Joyce

Drama: G.B.Shaw

Poetic Drama (Revival)

T.S.Eliot and Christopher Frye

**Books Recommended**

1. An outline of English Literature by W.H. Hudson
2. History of English Literature- Evans

### III SEMESTER

**Code: UENE31            ELECTIVE- SUBALTERN STUDIES            4Hrs/3 Credits**

#### **OBJECTIVES**

- 1. To introduce students the theme of subaltern studies**
- 2. To study the subaltern writers and their specific concepts.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

#### **UNIT I –POETRY**

- Imitiaz Dharkar    -    Purdha
- A.M. Klein            -    Indian Reservation: Chagnawaga
- Kamala Das            -    The Old Play House
- Dennis Brutus        -    You Laughed and Laughed

#### **UNITII-PROSE**

- Gayatri Spivak        -    Can The Subaltern speak?
- Maya Angelou        -    I Know Why the Caged Birds Sing

#### **UNITIII- DRAMA**

- Wole Soyinka         -    Strong Breed
- Mahesh Dattani        -    Seven Steps Around The Fire

#### **UNIT-IV FICTION**

- Bama                    -    Karukku
- Alice Walker            -    The Color Purple.

#### **UNIT -V SHORT STORIES**

- Mahasweta Devi        -    Draupadi

#### **REFERENCE BOOK:**

1. Ranajit Guha, Gayati Spival : **Selected Subaltern Studies**, September 1988, OUP US

## **SEMESTER III**

### **NON MAJOR ELECTIVE**

#### **GENERAL APPLICATION SKILLS IN ENGLISH USAGE**

**Code :UENN31**

**2Hrs/2Credits**

#### **OBJECTIVES**

- 1. To learn the general application skills in English usage.**
- 2. To familiarize the basic structures of English and develop application skills.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

#### **UNIT I**

Language for Everyday Use

Getting information from maps, graphs and tables

#### **UNIT II**

Using Dictionary – Thesaurus

#### **UNIT III**

Situational use of language – At the Bank, At the Railway Booking Counter, At the Post Office

#### **UNIT IV**

Introducing self and others

#### **UNIT V**

Note – making

The importance of Note- making

When, why and How to make notes

Diagrams and Charts in Note - Making

#### **Reference Books**

G. Radhakrishnan pillai: Emerald English grammar & usage

S.R. Inthira and V. Saraswathi: Enrich your English- Academic Skills workbook, Book: CIFL, Hyderabad

## **SEMESTER III**

**Code:UENS31      SBS – BUSINESS ENGLISH COMMUNICATION 2Hrs/2Credits**

### **OBJECTIVES**

- 1. To introduce students the Business English Communication.**
- 2. To orient the students to develop the communication skills.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### **UNIT I**

Communication: Meaning, Relevance and Practice

Information Flow: Communication and Organization Structure

Directions of Information Flow- Downward, Upward, Diagonal, Lateral , Horizontal, Multi-dimensional

### **UNIT II**

Oral and Aural Communication

Conversation, Change of date for an Appointment, Advantage and Limitations of Oral Communication

### **UNIT III**

Reading and Writing skills for Business communication

Importance of Writing skills, Sub- Skills for Reading Comprehension

Principles of Effective Writing, Choice of Form and Style

### **UNIT IV**

Process of Writing and Effective Use of Language for Clear Writing

Persuasive Business messages, Parts and Layout of Business Letter

### **UNIT V**

Business Correspondence

Internal Communication- Memos and Memo Letters

External Communication- E-Mail

### **Reference Text**

1.Francis Soundararaj- Speaking and writing for effective Business Communication Chennai; Macmillan, 2007.

## IV SEMESTER

Code: UENT41      CORE – I - AGE OF WORDSWORTH      4Hrs/4Credits

### OBJECTIVES

1. To introduce students the Age of Wordsworth.
2. To Study the contemporaries of Age of Wordsworth.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics.

### UNIT I – POETRY

Thomas Gray - Elegy written in the country church yard  
Robert Burns - My love is Red Red rose  
William Blake - The Tiger, The Lamb

### UNIT II – POETRY

Wordsworth - Ode: Intimations of Immortality, Tables Turned  
Coleridge - The Rime of Ancient Mariner  
Shelley - Ode to West Wind  
Keats - Ode to Nightingale

### UNIT III – PROSE

Wordsworth - Preface to Lyrical Ballads  
Coleridge - Biographia Literaria (XIV)  
Lamb - In Praise of Chimney Sweepers, Dream children: A Reverie

### UNIT IV - FICTION

Jane Austen - Pride and Prejudice

### UNIT V

Walter Scott - Kenilworth

### BOOKS FOR REFERENCE:

- Barber, Charles. *Poetry in English: An Introduction*. London: The Macmillan Press Ltd, 1983.
- Boulton, Morjorie. *The Anatomy of Poetry*. New Delhi: Kalyani Publishers, 1979.
- Minto, William. *A Manual of English Prose Literature*. New Delhi: Atlantic Publishers and Distributors, 1995.

## IV SEMESTER

Code:UENT42

CORE II-AGE OF TENNYSON

4Hrs/4Credits

### OBJECTIVES

1. To acquaint the student with the Age of Tennyson.
2. To Study the contemporaries of Age of Tennyson.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### UNIT I - POETRY

Tennyson - The Lotus Eaters, Ulysses  
Browning - Last Ride together  
Arnold - Dover Beach  
Rossetti - The Blessed Damozel

### UNIT II – PROSE

Arnold - Study of Poetry  
Cardinal Newman - Idea of University

### UNIT III – DRAMA

Oscar Wilde - Importance of Being Earnest

### UNIT IV – FICTION

George Eliot - Silas Mariner

### UNIT V – FICTION

Charlotte Bronte - Jane Eyre

### REFERENCE BOOK:

- Jeremy,Hawthorn(ed.) The Nineteenth- Century British Novel. London: Edward Arnold,1986.
- Lubboch, Percy. The Craft of Fiction. New Delhi B.I. Publications, 1973.
- Forster ,E.M. Aspects of the Novel.London: Edward Arnold, 1927.
- Boulton,Marjorie.The Anatomy of the Novel.London :RoulledgeAnd Kegan Paul, 1984.



## IV SEMESTER

**Code: UENA44 (ALLIED) LITERARY CRITICISM 3Hrs/4Credits**

### OBJECTIVES

- 1. To introduce the students the literary criticism and its related theories.**
- 2. To learn the concepts and criticism of critics.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### UNIT I

- 1) Definition and scope of criticism
- 2) Five approaches

### UNIT II

- 1) Plato and Aristotle
- 2) Philip Sidney

### UNIT III

- 1) Dryden
- 2) Pope
- 3) Dr. Johnson

### UNIT IV

- 1) Wordsworth
- 2) Coleridge
- 3) Arnold

### UNIT V

- 1) T.S. Eliot
- 2) I.A. Richards
- 3) F.R. Leavis

### Reference Book

1. Wilbur Scott- Five Approaches to literature
2. B. Prasad. An introduction to the literary criticism.

## IV SEMESTER

**Code: UENE42 (ELECTIVE) POST COLONIAL LITERATURE – I 3Hrs/3Credits**

### **Objectives:**

- 1. To introduce the Post Colonial Literature, Coloniser and Colonised countries.**
- 2. To study the theme adopted by the native speakers.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### **UNIT – I – POETRY**

A.D.Hope	-	Australia
Derek Walcott	-	A Far Cry from Africa
Catherine Mansfield	-	The Man with the Wooden Leg
Margaret Atwood	-	Journey to the Interior

### **UNIT – II – PROSE**

Nadine Gordimer	-	Writing and Being
Steaphen Leacock	-	The Aborgines of Canada (The Dawn of Canadian History)

### **UNIT – III – NOVELS**

Margaret Lawrence	-	The Stone Angel
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### **UNIT – IV-DRAMA**

Sharon Pollock	-	Blood Relations
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### **UNIT – V- SHORT STORY**

Dorris Lessing	-	The Story of a Non-Marrying Man
Alice Mundro	-	Silence

### **REFERENCE BOOK:**

- 1. John Mc Leod, Beginning Post Colonialism, Second Edition (MUP,2010)**
- 2. Contemporary Post Colonial Theory: A Reader Padmini Mongia, Oxford University Press, 2000**

## SEMESTER IV

Code:UENN42 NON- MAJOR ELECTIVE- PRESENTATION SKILLS 2Hrs/2Credits

### OBJECTIVE

- 1.To strengthen the speaking and writing skills.
- 2.To develop Self-confidence.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### UNIT I

#### Organizing Speech

Planning and Preparation, Developing Main Points, Supporting Ideas  
Beginning and Ending Speech

### UNIT II

#### Modes of Delivery

Reading the Manuscript  
Speaking Extemporaneously  
Impromptu  
Speaking from memory  
Speaker's Voice- Non- Verbal Communication

### UNIT III

Speech Etiquette- Avoiding Bad Habits, Developing Good Ones

### UNIT IV

#### Speech for Special Occasions

Welcome Speech, Introduction Speech- Felicitation Speech-Vote of Thanks

### UNIT V

#### Speeches that Changed the World

Sample- Speeches of Jawaharlal Nehru and Mother Teresa

### COURSE TEXT:

1. Krishna Mohan & N.P singh – Speaking English Effectively New Delhi Macmillan, 1995

### REFERENCE BOOKS:

1. Stephen E. Lucas- The Art of Public speaking Chennai: McGraw Hill.
2. Richard Denny- Speak for yourself, New Delhi: UBS, 1995

## SEMESTER IV

Code:UENS42

SBS – WRITING SKILLS 2Hrs/2Credits

### OBJECTIVE

- 1.To introduce the students the structure, mechanics, vocabulary and different modes of writing.
- 2.To master the structure of Language
3. To prepare the students for Competitive Exams.
4. To enable the students write error free English error free on various topics

#### UNIT I Sentence Structure

Kinds of Sentence structure  
Prepositional Phrase  
Verbs and Verbal Phases

#### UNIT II Signal Words

Conjunction and Preposition  
Giving Reasons: as, because of, etc.,

#### UNIT III Mechanics of Writing

Punctuation

#### UNIT IV Vocabulary

Commonly misspelt words

#### UNIT V Writing

Prewriting  
Identifying the purpose of writing  
Organizing information  
Writing the first draft  
Editing

#### REFERENCE BOOKS:

1. Warneir, John E. English Composition and Grammar (I Course) Chicago: Harcourt Brace Jovanovich Publishers, 1998.
2. Hewings, Martin. A Remedial Grammar for Advanced Students, New Delhi: CVP, 2004.

## SEMESTER V

Code: UENT51

MODERN AGE

5Hrs/4Credits

### Objectives:

- 1.To make the students to update the recent trends in Literature
2. To enrich the nuances of the Modern Age and Literature
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### UNIT – I – POETRY

Rupert Brooke	-	The Soldier
Wilfred Owen	-	Strange Meeting
W.H.Auden	-	In Memory of W.B.Yeats
W.B.Yeats	-	Easter 1916

### UNIT – II – PROSE

A.G.Gardiner	-	On Keyhole Morals
George Orwell	-	Inside the Whale
Virginia Woolf	-	Profession for Women

### UNIT – III – DRAMA

T.S. Eliot	-	Murder in the Cathedral
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### UNIT – IV – DRAMA

G.B.Shaw	-	Pygmalion
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### UNIT – V- FICTION

D.H.Lawrance	-	The Lost Girl
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### REFERENCE BOOKS:

1. Abrams M.H., et.al. The Norton Anthology of English Literature Vol II New York, WW, Norton & Co Inc., 1962

## SEMESTER V

Code: UENT52

AMERICAN LITERATURE

5Hrs/4Credits

1. To introduce students a few select writing in American Literature
2. To expose the students aware of transcendentalism and other movements
3. To prepare the students for Competitive Exams. Objectives:
4. To enable the students speak and write in English fluently on various topics

### Unit I – Prose

Emerson -- The American Scholar

Thoreau -- Civil Disobedience

### Unit II – Poetry

Walt Whitman -- Out of the Cradle Endlessly Rocking

Robert Frost -- Home Burial

Emily Dickinson -- I Felt a Funeral in My Brain

E.E.Cummings -- Cambridge Ladies

Wallace Stevens -- The Emperor of Ice Cream

### Unit III – Drama

Arthur Miller -- Death of a Salesman

### Unit IV – Fiction

Mark Twain -- The Adventures of Huckleberry Finn

### Unit V – Fiction

Earnest Hemmingway-- The Old Man and the Sea

### Reference:

Oliver, S.Egbert. An Anthology – American Literature 1890-1965. New Delhi: Eurasia Publishing House. 2011.

## SEMESTER V

Code: UENT53

SHAKESPEARE

5Hrs/4Credits

### Objectives:

1. To introduce Shakespeare to the students
2. To expose and aware of major characters of Shakespeare
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### Unit I

Shakespeare as a Dramatist

Women in Shakespeare

Fools in Shakespeare

Supernatural Elements

### Unit II

The Merchant of Venice

### Unit III

Macbeth

### Unit IV

Julius Caesar

### Unit V

Henry IV – (Part I)

### Reference:

1. Sutherland, James and Joel Hurstfield, ed. Shakespeare's World. London. Edward Arnold Publishers Ltd. 1974.
2. Rees, M.M, Shakespeare: His World and His Work – New Delhi. University Book Stall. 1980.

## SEMESTER V

**Code: UENT54    FUNDAMENTALS OF LANGUAGE    5Hrs/4Credits**

### **Objectives:**

- 1. To introduce students the Fundamentals of Language, Phonetics and aspects of developing language**
- 2. To strengthen the pronunciation skills.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### **Unit I**

What is Language? Spoken and Written Language – English for Specific Purpose.

### **Unit II**

Origin of Language – Growth of Vocabulary

The Future of the English Language

### **Unit III**

The Organs of Speech – The sounds of Language I &II

### **Unit IV**

The Syllable -Word accent & Rhythm in Connected Speech – Intonation

### **Unit V**

Phonetic Transcription

### **REFERENCE BOOKS:**

- 1. F.T Wood :**    An Outline History of English Language
- 2. Bala Subramanian :**    A text book of English Phonetics for Indian Students.



## SEMESTER V

Code : UENT55      POST COLONIAL LITERATURE – II      5Hrs/4Credits

### Objectives:

1. To introduce the Post Colonial Literature of the Colonized Countries
2. To enrich the knowledge of post colonial themes and concepts.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### UNIT – I – POETRY

Wole Soyinka	-	Telephonic Conversation
Sarojini Naidu	-	The Bird Sanctuary
Edwin Thumboo	-	Words
Kishwar Naheed	-	I am Not that Women

### UNIT – II – PROSE

Chinua Achebe	-	The Novelist as a Teacher
Negugi Wa Thango	-	Decolonizing the Mind

### UNIT – III – DRAMA

Mahesh Dattani	-	Dance Like a Man
Wole Soyinka	-	The Lion and Jewell

### UNIT – IV - FICTION

Chitra Banerjee Divakaruni	-	Sister of My Heart
Uma Parameshwaran	-	Rootless but Green are the Boulevard Trees

### UNIT – V – SHORT STORY

Bapsi Sidhwa	-	The Crow Eaters
K.A. Abbas	-	The Sparrows

**Ref:** Ed. Narasimhaiah. C.D, An Anthology of Commonwealth Poetry. Trinity Press, Chennai, 2014. Print.

## SEMESTER V

### ELECTIVE – TRANSLATION THEORY AND PRACTICE

Code:UENE53

3Hrs/3Credits

#### Objectives:

1. To study the elements of Translation, theories and practice
2. To expose translation techniques and problems.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

#### Unit I

Definitions and Theories of Translation

#### Unit II

History of Translation and Bible Translation

#### Unit III

Techniques and Problems in Translation

#### Unit IV

Translating Formal and Informal Letters

Translation Practice (Any Passage)

From English to Tamil

Tamil to English

#### Unit V

Poem

From English to Tamil

Verse from Nissim Ezekiel, Sarojini Naidu and Kamala Markandaya

Tamil to English

Verse from Bharathiyar, Bharathidhasan, Thiruvalluvar ( any popular five kurals) and familiar proverb

#### BOOKS FOR REFERENCE:

1. Basnett Susan, An Introduction to Comparative Literature. Wiley, Blackwell, 1993.
2. Newton P. Stalknecht & Horst Frenz, Comparative Literature – Method and Perspective University of Southern Illinois Press, 1961.

## **SEMESTER V**

**Code: UENE53 ENGLISH FOR COMPETITIVE EXAMINATIONS 2Hrs/2Credits**

### **Objectives:**

- 1. To enhance the students' capability to appear for various Competitive Examinations**
- 2. To enrich the English language skills to face the interviews.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### **Unit I**

Number, Subject – Verb Agreement, Articles, Common Errors, Sequence of Tenses

### **Unit II**

Idioms and Phrases, One word substitutes, Foreign Words and Phrases

### **Unit III**

Reading and Reasoning

### **Unit IV**

Paragraph Writing, Expansion of an Idea, Report Writing, Essay, Letters

### **Unit V**

Group Discussion

Interview

### **REFERENCE BOOKS:**

Saraswathi, V. Maya KM Udbhatkal. English for Competitive Examinations. Emerald Publishers.

R.P Bhatnagar – English for Competitive Examinations.

## SEMESTER VI

**Code:UENT61 INTRODUCTION TO LITERARY THEORIES 5Hrs/4Credits**

**Objective :**

- 1.To introduce the select Literary Theories.**
- 2. To strengthen the knowledge of particular theories to apply.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

### **Unit I**

Structuralism

Tzvetan Todorov - The Structural Analysis of Literature – The Tales of *Henry James*

### **Unit II**

Reader Response Theory

Wolfgang Iser - The Role of Reader in Fielding's *Joseph Andrews* and *Tom Jones*

### **Unit III**

Post Modernism

Barbara Christian - The Race for Theory

### **Unit IV**

Post – Colonial Criticism

Gayathri Chakravathy Spivak – From a Critique of Post Colonial Reason

Chapter 3 History (Can the Subaltern Speak?)

### **Unit V**

Feminist Criticism

Elaine Showalter - Towards a Feminist Poetics

### **REFERENCE BOOKS:**

**1. The Routledge Encyclopedia of Narrative Theory** by David Herman (Editor); Manfred Jahn (Editor); Marie-Laure Ryan (Editor) 2005-02-03

**2. The Johns Hopkins Guide to Literary Theory and Criticism** by Michael Groden (Editor); Martin Kreiswirth (Editor); Imre Szeman (Editor) 2004

## SEMESTER VI

Code :UENT62      COMPARATIVE LITERATURE      5Hrs/4Credits

### Objectives:

1. To introduce compare and contrast in different Literatures.
2. To expose different schools of Literature and terms.
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### Unit I

Definition and Scope – National Literature, Comparative Literature – General Literature – World Literature

### Unit II

The French and American Schools of Comparative Literature

### Unit III

Influence and Imitation – Periodization – Epoch, School, Movement

### Unit IV

Genre Studies, Thematology

### Unit V

Literature and other Discipline

Literature and other Arts

### COURSE TEXT:

1. Prof. S. Yusuf A Handbook of Comparative Literature Rev. ed., Manimekala Publishing House, 2010.

### Reference Books:

1. Theory of Literature, Wellek & Warren.
2. Basnett Susan, An Introduction to Comparative Literature. Wiley, Blackwell, 1993.
3. Newton P. Stalknecht & Horst frenz ,Comparative Literature – Method and Perspective University of Southern Illinois Press, 1961

## SEMESTER VI

Code: UENT63

WOMEN'S WRITING

5Hrs/4Credits

### Objective:

1. To introduce the works of Prominent Women Writers and their themes in various literatures.
2. To encourage creative writing
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### Unit I – Poetry

Kamala Das	-- Introduction
Mamta Kalia	-- Tribute to Papa
Toru Dutt	-- Jyogadhya Uma
Emily Dickinson	-- Because I Could not Stop For Death
Rita Dove	-- The lady Freedom Among Us
Christina Rossetti	-- UP Hill

### Unit II –Prose

Virginia Woolf	-- Professions for Women
Gayathri Chakravorty Spivak	-- Feminism & Critical Theory – Part-I
Maya Angelou	-- Graduation

### Unit III – Short Story

Anitha Desai	-- The Farewell Party
Nadine Gordiner	-- Comrades
Katherine Mansfield	-- The Stranger

### Unit IV – Fiction

Margaret Atwood	-- Surfacing
Toni Morrison	-- Sula

### Unit V –Drama

Agatha Christie	-- The Mousetrap
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### REFERENCE BOOKS:

1. Abrams, M.H.et al. The Norton Anthology of English Literature, vol. 1 . New York, Norton & Co
2. Lodge, David and Nigel Wood, Modern Criticism & Theory.2005.

## SEMESTER VI

**Code: UENT64      ENGLISH LANGUAGE TEACHING      5Hrs/4Credits**

### **Objective :**

- 1. To introduce teaching methods, approaches and techniques.**
- 2. To strengthen the knowledge of the student as a Learner/a Teacher.**
- 3. To prepare as an Efficient English Teacher.**
- 4. To enable the students speak and write in English fluently on various topics**

### **Unit I**

Issues Involved in the Teaching of English – CALL (Computer – Assisted Language Learning), CALI (Computer Assisted Language Instruction), CBLT (Content - Based Language Teaching), Methods, Approaches, Techniques, Teaching English as a Second Language.

### **Unit II**

Teaching of Listening, Speaking, Reading and Writing

### **Unit III**

Teaching of Grammar  
Teaching of Vocabulary  
Teaching of Poetry  
Teaching of Prose

### **Unit IV**

Testing – Classification  
Types of Questions

### **Unit V**

Uses of Audio – Visual Aids in the Teaching of Language (T.V., Internet)

### **REFERENCE BOOKS:**

- Hughes, Rebecca, Teaching and Researching Speak, Delhi Pearson, 2011.
- Aslam Mohammed, Teaching of English . New Delhi, Foundation Books, 2003.
- Tickoo ML, Teaching and Learning English. New Delhi, Orient Longman, 2003.
- Krishnaswamy N.and Lalitha Krishnaswamy. Methods of Teaching English. Sahibabad. Pranjali Printline, 2013.

## SEMESTER VI

Code: UENT65

CONTEMPORARY LITERATURE

5Hrs/4Credits

### Objective:

1. To make the students to understand and update the recent trends in Contemporary Literature.
2. To update the knowledge of current trends
3. To prepare the students for Competitive Exams.
4. To enable the students speak and write in English fluently on various topics

### UNIT – I –POETRY

Philip Larkin	-	Ambulance (or) Church Going
Cecil Day Lewis	-	The Poet
William Empson	-	Missing Dates
Stephen Spender	-	The Double Shame

### UNIT – II – PROSE

E.M.Forster	-	Notes on English Character Does Culture Matter
A.A.Milne	-	On Going into a House

### UNIT –III – DRAMA

Harold Pinter	-	Care Taker
Padraic Colum	-	Betrayal

### UNIT – IV – DRAMA

John Osborne	-	Look Back in Anger
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### UNIT – V- FICTION

Graham Greene	-	The Power and the Glory
A.S.Byatt	-	Possession

### REFERENCE BOOKS:

1. The Penguin Book of Contemporary Verse 1918-60



## SEMESTER VI

### ELECTIVE – JOURNALISM AND MASS COMMUNICATION

Code: UENE64

3Hrs/3Credits

#### Objective:

1. To impart the knowledge of media
2. To expose the significance of Print Media and its features.
3. To prepare the students for Competitive Exams and to become a media person.
4. To enable the students speak and write in English fluently on various topics

#### Unit I

Journalism: Its definition & Scope – What is News and News Reporting– Factors Determining News Value – Tips to Reporting

#### Unit II

Kinds of Headlines – Kinds of Leads or Intro – Types of Column – Types of Interview

#### Unit III

Film Reviews – Book Review – Editorial – Contempt of Court- Letters to the Editor – Editorial – Defamatory / Defamation

Responsibilities of an Editor and Sub -Editor – Basic Principles of Editing

#### Unit IV

Freedom of Press – Social Responsibility - Code of Ethics – Press laws

#### Unit V

Advertising - Glossary for Journalist: Banner, Beat, Box, Black and White, Blurb, Border, Copy, Correspondent, Crop, Deadline, Drop, Ears, Exclusive, Filler, Flash, Follow – up, Gallery Proof, Handout, Kill, Layout, Leg-man, Libel, Proof Reader, Retainer, Run, Running Story, Rush, Shoulder, Slug, Tail Piece, Yellow Journalism, Wire Service, Tabloid.

#### REFERENCE BOOKS:

1. Rangaswami Parthasarathy: Basic Journalism, Macmillan, Delhi, 2002.
2. Kamath.M.V. Professional Journalism, Delhi Vikas Publishing House Pvt Ltd, 1980.

## SEMESTER VI

### SKILL BASED ELECTIVE

**Code:UENS64 THE ART OF PUBLIC SPEAKING 2Hrs/2Credits**

**Objective:**

- 1.To enrich the knowledge of English Oral Communication Skill.**
- 2. To speak error free English confidently.**
- 3. To prepare the students for Competitive Exams.**
- 4. To enable the students speak and write in English fluently on various topics**

#### **Unit I**

Characteristics of Voice \_ Quality, Pitch, Volume, Body Language \_ Personal Appearance, Posture, Gestures and Eye Contact

#### **Unit II**

1. Organization of Speech - Planning and Developing
2. Beginning and Ending of Speech – Delivery

#### **Unit III**

Speeches for Special Occasions –Excerpts

- a. “Chicago” – Swami Vivekananda
- b. “ I Have a Dream” – Martin Luther King.
- c. “Blood Toil and Tears” – Churchill

#### **Unit IV**

Extemporary Speeches, Agreeing and Disagreeing.

#### **Unit V**

Drafting a Speech ( Practicals for Internal Assessment)

#### **REFERENCE BOOKS:**

1. Krishan Mohan and N.P Singh “Speaking English Effectively” 2<sup>nd</sup> Edition. Macmillan India. 2009.

அன்னை தெரசா மகளிர் பல்கலைக்கழகம்  
கொடைக்கானல்

தமிழியல் துறை  
இளங்கலைத் தமிழ் (B.A)  
விருப்பம் சார் தெரிவுமுறை (CBCS)  
பொது ஒழுங்குமுறை மற்றும் பாடத்திட்டம்



கல்விக் குழுகூட்ட நாள் 15.05.2018

2018-2019 கல்வியாண்டு முதல் நடைமுறைப்படுத்துவதற்கு  
ஒப்புதல் வேண்டி சமர்ப்பிக்கப்படுகிறது

**Mother Teresa Women's University, Kodaikanal**

**ALLOCATION OF PAPERS AND CREDITS (SEMESTER – WISE) FOR UG PROGRAMMES**  
**AS PER THE TANSCHER RULES 2018-2019 ONWARDS**

**UG- Course Structure under Choice Based Credit System (CBCS)**

P.No.	Paper Code	Course Title	Hours	Credits	Continuous Internal Assessment (CIS)	End Semester Exam (ESE)	Total
<b>Semester I</b>							
1.	ULTA11	Part I– Tamil	6	3	25	75	100
2	ULEN11	Part-II-English	6	3	25	75	100
3.	UTAT11	இக்கால இலக்கியம் (core -1	4	4	25	75	100
4.	UTAT12	நன்னூல் - எழுத்ததிகார இயல்கள் -(core – II)	4	4	25	75	100
5	UTAA11	தமிழ் இலக்கிய வரலாறு (Allied)- I	4	4	25	75	100
6	UVAE11	விழுமியக் கல்வி	3	3	25	75	100
<b>Total Credits</b>				<b>21</b>			<b>600</b>
<b>Semester II</b>							
7	ULTA22	Part – Tamil	6	3	25	75	100
8	ULEN22	Part-II-English	6	3	25	75	100
9	UTAT21	நன்னூல் சொல் அதிகார இயல்கள் (core – III)	3	3	25	75	100
10	UTAP23	கணித்தமிழ்ப் பயன்பாடு – Practical	4	4	25	75	100
11	UTAA22	இலக்கியத் திறனாய்வு – Allied	4	4	25	75	100
12	UEVS21	சுற்றுச் சூழல் கல்வி	2	2	25	75	100
<b>Total Credits</b>				<b>20</b>			<b>600</b>
<b>Semester III</b>							
13	ULTA 33	Part – Tamil	6	3	25	75	100
14	ULEN 33	Part-II-English	6	3	25	75	100
15	UTAT 31	அகப்பொருள் இலக்கணம் - நம்பியகப்பொருள் (core – IV) முழுவதும்	4	4	25	75	100
16	UTAA 33	தமிழக வரலாறும், பண்பாடும் (Allied – II)	4	4	25	75	100
17	UTAE 31	நாட்டுப்புறவியல் (Elective – I)	3	3	25	75	100
18	UTAN 31	பணிவாய்ப்புத் தமிழ் (Non major Elective Course - I)	2	2	25	75	100
19	UTAS31	மொழிபெயர்ப்பியல் (Skill Based Elective)	2	2	25	75	100
<b>Total Credits</b>				<b>21</b>			<b>700</b>
<b>Semester – IV</b>							
20	ULTA 44	Part – Tamil	6	3	25	75	100
21	ULEN44	Part-II-English	6	3	25	75	100
22	UTAT 41	புறப்பொருள் இலக்கணம் - புறப்பொருள் வெண்பா மாலை முழுவதும் - Core - V	4	4	25	75	100
23	UTAP42	படைப்பிலக்கியம் (Practical – II)	4	4	25	75	100
24	UTAA44	திராவிட மொழிகளின் ஒப்பிலக்கணம் (Allied Practical – II)	4	4	25	75	100

25	UTAE 42	இதழியல் - (Elective – II)	3	3	25	75	100
26	UTAN42	பணிவாய்ப்புத் தமிழ் (non major Elective Course – II)	2	2	25	75	100
27	UTAS42	கலைச்சொல்லாக்கமும், தொழில் நுட்பத் தமிழும் (Skill Based Studies – II)	2	2	25	75	100
		<b>Total Credits</b>		<b>25</b>			<b>800</b>
		<b>Semester V</b>					
28	UTAT51	சிற்றிலக்கியம் - core – VI (Theory)	4	4	25	75	100
29	UTAT52	பக்தி இலக்கியம் - core –VII (Theory)	4	4	25	75	100
30	UTAT53	பதினெண்கீழ்க்கணக்கு – அறஇலக்கியம்- (Core – VIII)	4	4	25	75	100
31	UTAT54	யாப்பிலக்கணம் – யாப்பருங்கலக்காரிகை முழுவதும் (core-IX-Theory)	4	4	25	75	100
32	UTAT55	காப்பிய இலக்கியம் (core-X-Theory)	4	4	25	75	100
33	UTAE53	தமிழ்மொழி வரலாறு- Elective III	3	3	25	75	100
34	UTAS53	கல்வெட்டியல் (Skill Based Studies - III)	2	2	25	75	100
		<b>Total Credits</b>		<b>25</b>			<b>700</b>
		<b>Semester VI</b>					
35	UTAT61	சங்க இலக்கியங்கள் - core – XI - Theory	4	4	25	75	100
36	UTAT62	அணியிலக்கணம் - தண்டியலங்காரம் - (சொல்லணியியல் நீங்கலாக) முழுதும் - (Theory)	4	4	25	75	100
37	UTAT63	இலக்கிய கொள்கைகள் - core – XII-Theory	4	4	25	75	100
38	UTAT64	ஓலைச் சுவடியியல் (Core – III)	4	4	25	75	100
39	UTAT65	தகவல் தொடர்பியல் - (Core- IV)	4	4	25	75	100
40	UTAE64	பெண்ணியம் - அறிமுகம் - (Elective – IV)	3	3	25	75	100
41	UTAS64	இணையத் தமிழ் இலக்கியம் (Skill Based Studies – IV)	2	2	25	75	100
42	USEA61	விரிவாக்கச் செயல்பாடுகள்	3	3	25	75	100
		<b>Total Credits</b>		<b>28</b>			<b>800</b>
		<b>Total Credits</b>		<b>140</b>		Total	<b>4200</b>

அன்னை தெரசா மகளிர் பல்கலைக்கழகம், அதன் வரம்பிற்கு உட்பட்ட கல்லூரிகளின்  
இளங்கலைத் தமிழ் இலக்கிய பாடத்திட்டம்

2018-2019 கல்வியாண்டு முதல்

இளங்கலைத் தமிழ் இலக்கியம்

முதலாம் ஆண்டு – முதல் பருவம்

UTAT11 தாள் 3 இக்கால இலக்கியம் - Core – I

அலகு – 1 1. மரபுக் கவிதை –

சி.சுப்பிரமணிய பாரதியார் - சுயசரிதை

பாரதிதாசன் - அழகின் சிரிப்பு

1.2 புதுக்கவிதை

அப்துல் ரகுமான் - ஆலாபனை

அலகு – 2 நாவல்

ராஜம் கிருஷ்ணன் - வேருக்கு நீர்

அலகு – 3 சிறுகதை - கலைச்செல்வி - இரவு ( சிறுகதைத் தொகுப்பு – 15 கதைகளும்)

அலகு – 4 நாடகம்

மு. ராமசுவாமி, செண்பகம், ராமசாமியின் சாபம் . விமோசனம் நூலில் / சாபம்,  
விமோசனம் மூன்று நாடகங்கள் மட்டும்.

அலகு – 5 உரைநடை

மகாவித்துவான் ரா. ராகவ அய்யங்கார் - நல்லிசைப் புலமை மெல்லியலாளர்கள்

பாடநூல்கள்:

பாரதியார் - பாரதியார் கவிதைகள் (முழு தொகுப்பு)

பாரதிதாசன் - பாரதிதாசன் கவிதைகள்

அப்துல் ரகுமான் - ஆலாபனை

ராஜம் கிருஷ்ணன் - வேருக்கு நீர் - [www.tamilvu.org.lib](http://www.tamilvu.org/lib).

சிறுகதை - கலைச்செல்வி - இரவு ( சிறுகதைத் தொகுப்பு – 15 கதைகளும்)

மு. ராமசுவாமி, செண்பகம், ராமசாமியின் சாபம் . விமோசனம் நூல்

ரா. ராகவ அய்யங்கார் - நல்லிசைப் புலமை மெல்லியலாளர்கள் [www. மதுரை மின் நூல்  
தொகுப்புத்திட்டம் . com.](http://www.mthuraemil.com)

UTAT12 தாள் 4 நன்னூல் எழுத்து அதிகாரம் - Core – II

அலகு – 1 எழுத்து இயல்

அலகு – 2 பத இயல்

அலகு – 3 உயிர் ஈற்றுப் புணர் இயல்

அலகு – 4 மெய் ஈற்றுப் புணர் இயல்

அலகு – 5 உருபு புணர் இயல்

நன்னூல் - காண்டிகை உரை – திருநெல்வேலி சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு.

## UTAA11 தாள் 5: தமிழ் இலக்கிய வரலாறு (Allied – I)

- அலகு – 1 இலக்கிய வரலாற்று மூலங்கள் - தமிழின் தொன்மை – தொல்காப்பியத்துக்கு முந்தைய இலக்கண இலக்கிய நூல்கள் - முச்சங்கங்களின் வரலாறு – தொல்காப்பியம் - சங்க இலக்கியச் சிறப்புகள் - எட்டுத்தொகை, பத்துப் பாட்டு
- அலகு – 2 சங்கம் மருவிய கால நூல்கள் - சங்க நூல்களிலிருந்து வேறுபடும் நிலை – அறநூல்களின் பெருக்கத்திற்கான காரணங்கள் - நீதி இலக்கியங்கள், திருக்குறளின் தனித்தன்மை - இரட்டைக் காப்பியங்கள் - தமிழ்க்காப்பியங்கள் - சமண, பவுத்தக் காப்பியங்கள் - காப்பியங்களின் தனித்தன்மை.
- அலகு – 3 பக்தி இலக்கியத்தின் தோற்றம் - பன்னிரு திருமுறைகள் - நாயன்மார்களது தமிழ்ப்பணி – சித்தர் இலக்கியம் பன்னிரு ஆழ்வார்களது தமிழ்த் தொண்டு – ஆழ்வார்களது பாசரங்களுக்குத் தோன்றிய வியாக்கியான உரைகள் - மணிப்பிரவாள நடையின் தோற்றம், வளர்ச்சி.
- அலகு – 4 தமிழில் சிற்றிலக்கியங்களின் தோற்றமும், வளர்ச்சியும் - பரணி – கலப்பகம் பிள்ளைத்தமிழ், உலா, குறவஞ்சி பள்ளு, அந்தாதி, கோவை, தூது, மடல் ஆகியவற்றின் அமைப்பும், இலக்கணமும் - கம்பராமாயணம்- வில்லிபாரதம் - அரிச்சந்திர புராணம் - நளவெண்பா – புராணங்கள் - தனிப்பாடல்கள் - நிகண்டுகள் - இடைக்கால இலக்கண நூல்கள் - இசுலாமிய கிறித்தவர்களது தமிழ்த் தொண்டு.
- அலகு – 5 இயல், இசை, நாடகத்தமிழ் வளர்ச்சி – மரபுக்கவிதை, புதுக்கவிதையின் வகைமைகள் - சிறுகதை, புதினம், நாடகம், உரைநடை ஆகியவற்றின் தோற்றம், வளர்ச்சி – நோக்கும் போக்கும் - பெண்ணிய, தலித்திய இலக்கிய வளர்ச்சி - இன்றைய நிலை.

நூல்

மு.வ. தமிழ் இலக்கிய வரலாறு, சாகித்திய அகாதெமி வெளியீடு.

தமிழண்ணல் புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு தமிழ்ப் புத்தகாலயம், சென்னை.



## UVAE11 தாள் 6: விழுமியக் கல்வி

- அலகு – 1 விழுமியம் விளக்கம் - விழுமிய வகைகள் - விழுமிய நன்னெறிகள் - தொல்காப்பியம் கூறும் வாழ்வியல் விழுமியங்கள் - சங்க இலக்கிய விழுமியங்கள் - புற நானூறு கூறும் அறஞ்சார் விழுமியங்கள்.
- அலகு – 2 திருக்குறள் கூறும் விழுமியங்கள் - தமிழ் நீதி நூல்கள் உரைக்கும் விழுமியங்கள்.
- அலகு – 3 தமிழ்க்காப்பியங்களும் விழுமியங்களும்.
- அலகு – 4 தமிழ்ச் சமய இலக்கியங்களும், விழுமியங்களும் - (சைவ – வைணவ – சமண – பௌத்த – கிறித்தவ - இசுலாமிய சமய இலக்கியங்கள் உரைக்கும் விழுமியங்கள்)
- அலகு – 5 பெண் வாழ்வியல் நன்னெறி விழுமியங்கள் - மாயூரம் வேதநாயகம் பிள்ளை – பாரதியார் - திரு.வி.க. வரை – தமிழ் இலக்கியங்களில் காலந்தோறும் உரைக்கப்பட்ட விழுமியங்களின் வரலாற்று நோக்கிலான சுருக்க வரைவு. ஆடவருக்குரிய – தமிழ் இலக்கிய விழுமிய நன்னெறிகள்.

முதலாண்டு - இரண்டாம் பருவம்

UTAT21 தாள் :9 நன்னூல் சொல் அதிகாரம் - Theory Core – III

நன்னூல் - காண்டிகை உரை – சொல் அதிகாரம் முழுவதும்.

- அலகு – 1 பெயரியல் - இன்றைய தமிழ்ப் பெயர்கள் அமைதல்
- அலகு – 2 வினையியல்
- அலகு – 3 பொது இயல்
- அலகு – 4 இடைச்சொல் இயல்
- அலகு – 5 உரிச்சொல் இயல் - உரிச்சொற்களது இன்றைய பயன் பாட்டுத் தன்மை

பாடநூல்:

நன்னூல் - காண்டிகை உரை – திருநெல்வேலி சைவசித்தாந்த நூற்பதிப்புக் கழக வெளியீடு.

## UTAP23 தாள் -11 கணித்தமிழ்ப் பயன்பாடு- Practical – I

- அலகு – 1 மின் தமிழ் இணைய தேடுபொறியைக் கண்டறிதல் -- தேடுதல் - பார்வையிடல் - தமிழில் மின் அஞ்சல் அனுப்புதல் - பெறுதல்.
- அலகு – 2 தமிழ் இணைய தளங்களைப் பார்வையிடல் - ஐந்து தமிழ் இணைய தளங்களைப் பற்றி அறிந்திருத்தல் - தமிழ்த் தரவுகளை தமிழ் இணைய தளத்திலிருந்து பதிவிறக்கம் செய்தல்.
- அலகு – 3 தமிழ் மின் நூலகங்கள் - நான்கு தமிழ் மின் நூலகங்களைப் பற்றி அறிந்திருத்தல் - கேட்கப்படும் நூலைத் தமிழ் மின் நூலகத்தில் தேடிக் கண்டறிந்து தருதல்.
- அலகு – 4 தமிழ் இதழ்களைப் பார்வையிடல் - இரண்டு இதழ்களைப் பற்றி அறிந்திருத்தல் - இதழுக்கு ஐந்து வாக்கிய அளவில் துணுக்கு / கவிதை / செய்தி / அறிவிப்பு உருவாக்கி அனுப்பக் கற்றிருத்தல்
- அலகு – 5 தமிழ் வலைப்பூக்கள் (Web blog) பற்றி அறிதல் - ஐந்து தமிழ் வலைப்பூக்கள் ஐந்தனைப் பற்றி அறிந்திருத்தல் - வலைப்பூவில் மூன்று வாக்கியங்களை உள்ளிடல்

பர்வை நூல்

முனைவர் இராதா செல்லப்பன் கண்ணியும் தமிழும், திருச்சி

## UTAA22 தாள் - 12- இலக்கியத் திறனாய்வு – Practical – Allied – I

அலகு – 1 இலக்கியம் - சொற்பொருள் விளக்கம் - இலக்கியம் பற்றி அறிஞர்கள் விளக்கம் - இலக்கியம் ஒரு கலை – நிலை பெறும் இலக்கியங்கள் - பயன்கள் - இலக்கியத் தோற்றத்துக்குரிய காரணங்கள் - இலக்கியத் திறனாய்வு – விளக்கம் - திறனாய்வாளரின் தகுதிகள் - பண்டைய உரைகாரர்கள் சிறந்த திறனாய்வாளர்கள் - திறனாய்வின் பயன் - திறனாய்வுச் சிக்கல்கள்

அலகு – 2 கவிதைத் திறனாய்வு –  
மரபுக் கவிதை  
புதுக்கவிதை  
சிறுகதைத் திறனாய்வு  
கதைக்கரு – கதைமாந்தர்கள் - மொழிநடை – உத்தி

அலகு – 3 புதினத் திறனாய்வு-  
புதினக்கரு – மொழிநடை – நிகழ்ச்சிக் கோவைகள் - உத்தி –  
சிறுகதை – புதினம் இடையிலான ஒற்றுமை வேற்றுமைகள்  
நாடகத் திறனாய்வு-

அலகு – 4 இலக்கியத் திறனாய்வு வகைகள்

அலகு – 5 இலக்கிய இயக்கங்கள்

பார்வை நூல்கள்:

1. மு. வரதராசனார் - இலக்கிய மரபு
2. மு. வரதராசனார் - இலக்கியத் திறன்
3. அ.ச. ஞானசம்பந்தனார் - இலக்கிய கலை
4. தா.ஏ.ஞானமூர்த்தி - இலக்கியத் திறனாய்வியல் - உலகத் தமிழ் ஆராய்ச்சி நிறுவன வெளியீடு
5. சு. பாலச்சந்திரன், இலக்கியத் திறனாய்வு
6. தி.சு.நடராசன், திறனாய்வுக் கலை
7. அரங்க சுப்பையா, இலக்கியத் திறனாய்வு, இசங்கள், கொள்கைகள்.

## UEVS21 தாள் - 13- சுற்றுச் சூழல் கல்வி

சுற்றுச் சூழலை நேசிக்கவும், மாசுபடுத்தாது இருக்கவும் , இயற்கை வளங்களைப் பேணிக் காக்கவும் விழிப்புணர்வைத் தோற்றுவித்தல்.

- அலகு - 1 சுற்றுச் சூழல் - விளக்க வரையறை - நில அமைப்பு - பழந்தமிழகத்தின் குறிஞ்சி, முல்லை, மருதம், நெய்தல், பாலை, திணை பகுப்பு - வளி மண்டலம் - தமிழர் வகுத்த பெரும் பொழுது, சிறு பொழுது பகுப்புகள் - உயரினங்கள் - தொல்காப்பியத்தின் அறுவகை உயிரினப்பகுப்பு - மரங்கள்- தொல்காப்பிய கருப்பொருள் பகுப்பு - தாவரங்கள் - தொல்காப்பிய மரபியல் கூறும் தாவரங்கள், விலங்குகள், பறவைகள், மலர்கள்- புறநானூற்றின் ஐம்பூதக் கட்டமைப்பு உலகு எனும் கருத்தாக்கம்.
- அலகு -2 சுற்றுச் சூழல் மாசுபாடு - நீர்மாசு, நில மாசு, காற்று மாசு - உலக வெப்பமாதல் - அமில மழை - உலக வெப்பமாதலைத் தடுக்கும் முறைகள் - ஓசோன் மண்டிலத்தைக் காத்தல்.
- அலகு - 3 மரங்களின் நன்மைகள் - வனப் பாதுகாப்புச் சட்டவிதி முறைகளைப் பின்பற்றும் நெறிகள் - காடுகள் - அழிவு தரும் கருவேலம், யுகலிட்டசு ஆகியவற்றை அகற்றல்.
- அலகு - 4 திருத்தல மரங்கள் - இயற்கை வழிபாடு - உயிரின வழிபாடு - நீர்நிலைகள் பராமரிப்பு நெறிகள் - நீர் வள ஆதாரப் பெருக்கம்.
- அலகு - 5 மின்மக் கழிவு - வேதி கழிவு - தடைசெய்யப்பட்ட பொருட்களை அகற்றுதல் - சுற்றுச் சூழலை நேசிக்கும முழுக்கங்கள் பத்தினை உருவாக்குதல்

நூல்:

சுற்றுச்சூழல் அறிவியல், கல்வித் துறை வெளியீடுகள்.

இரண்டாம் ஆண்டு மூன்றாம் பருவம்

தாள் - 16- அகப்பொருள் இலக்கணம் – நம்பியகப்பொருள் முழுவதும்

UTAT31 – (Core – IV)

அலகு - 1 சிறப்புப்பாயிரம்-

அகத்திணை இயல் - ஒன்று முதல் அறத்தொடு நிலை வரையிலான நூற்பாக்கள் ( 1 முதல் 54 வரை)

அலகு - 2 அகத்திணை .இயல் - II

கற்பு முதல் காதல் பரத்தையர் வரையிலான நூற்பாக்கள் (55 முதல் 116 வரை)

அலகு - 3 களவு இயல்

நூற்பாக்கள் 117 முதல் 170 வரை

அலகு - 4 வரைவு இயல்

(நூற்பாக்கள் 171 முதல் 199 வரை)

கற்பு இயல் நூற்பாக்கள் 200 முதல் 209 வரை)

அலகு - 5 ஒழிபு இயல்

நூற்பாக்கள் 210 முதல் 252 வரை

பாடநூல்

நம்பியகப் பொருள் - திருநெல்வேலி சைவசித்தாந்த நூற்பதிப்புக் கழக வெளியீடு

## UTAA33 தாள் 17 : தமிழக வரலாறும் பண்பாடும் (Allied – II)

- அலகு – 1 தமிழக நில இயல் கூறுகள் - வரலாற்றுச்சான்று ஆதாரங்கள் - தமிழக மக்கள் - இனம் - தாயகம் - தமிழகத் தொல் பழங்காலம் - பண்டைத் தமிழகம் - சிந்துவெளி நாகரிகத் தொடர்பு - தமிழ் மொழியின் தொன்மை - வரி வடிவங்கள் - முச்சங்கங்கள் பற்றிய வரலாற்று உண்மை - சங்ககாலத்து நாடும், மூவேந்தர்களும், குடிகளும் - தமிழகத்துக்கும், நந்த மோரியர்களுக்கும் உள்ள தொடர்பு - சங்க கால மக்கள் வாழ்க்கை அரசியல், போர்முறை, சமூகம் கல்விநிலை - கலைகள் - பொருளாதாரநிலை - சடங்குகள் - சகுனங்கள் - நம்பிக்கைகள் - திருவிழாக்கள் - வழிபாடுகள்.
- அலகு – 2 சங்கம் மருவிய காலம் - களப்பிரர் காலம் - சமண, பவுத்த சமயங்களின் வருகை - பல்லவர்கள் முற்காலப் பல்லவர்கள் - இடைக்கால பல்லவர்கள் - பிற்காலப் பல்லவர்கள் - பல்லவர்கள் - சாளுக்கியர்கள் - இராட்டிரகூடர்களுக்கு இடையான உறவு- பாண்டியர்கள், எழுச்சி - பாண்டியர் - பல்லவர் உறவு - பக்தி இலக்கிய எழுச்சி - சைவ, வைணவ பக்தி இயக்கம் - சமய நிலை - அரசியல் - சமூகப் பொருளாதார நிலை- கோயில், கட்டிடக் கலை வளர்ச்சி - மக்கள் வாழ்வியல் - கல்வி.
- அலகு – 3 சோழர் காலம் - சோழர் சாளுக்கியர்கள் உறவு நிலை - சோழர் காலம் பொற்காலம் - தென்கிழக்காசிய நாடுகளை வென்றமை - சோழர் ஆட்சி முறை - சமூகப் பண்பாட்டு நிலை - சமயம் - கலைகள் - கோயில்கள் - பாண்டியர்களது எழுச்சி - சோழ பாண்டியர் உறவு - அயல் நாட்டுப் பயணிகள் கண்ட தமிழகம் - தமிழகத்தில் முசுலீம் படையெடுப்பு - விசய நகர ஆதிக்கம் - நாயக்கர் காலம் - விசய நகர ஆட்சியின் விளைவு - தஞ்சை மராட்டியர்கள் - கர்நாடகத்தில் நவாபுகள் ஆட்சி-
- அலகு – 4 ஐரோப்பியர் வருகை - ஆற்காடு - தஞ்சை அரசர்களுடன் ஆங்கிலேயர் கொள்கை- பாளையக்காரர் எழுச்சி - வெல்லெஸ்லி பிரபுவின் கொள்கை - விடுதலைப் புரட்சி - சிப்பாய் கலகம் - கிழக்கிந்திய கம்பெனி அதிகாரம் - நீதி நிர்வாக நடைமுறை மேல்நாட்டுக் கல்வி - ஆங்கிலேயர் புகுத்திய கல்வி முறை.

அலகு - 5 விடுதலைக்கு முன் தமிழகம் - இலக்கிய வளர்ச்சி - பத்திரிக்கை வளர்ச்சி - ஐரோப்பியரது தமிழ்த் தொண்டு - சமூக நிலை- சமய நிலை - சமய, சமூகச் சீர்த்திருத்த இயக்கங்கள் - இந்திய விடுதலை இயக்கத்திற்குத் தமிழகத்தின் பங்கு - இந்திய விடுதலைக்குப் பின் தமிழகம் - மொழி வழி மாநில உருவாக்கம் - தமிழக அரசியலில் இராசாசி, காமராசர் ஈ.வே.ரா ஆகியோரது பங்கு - 1965 சமூகப் பொருளாதார மாற்றங்கள் - தமிழ் இயக்கங்கள் - சமய நிறுவனங்கள் - முன்னேற்றம் - தமிழ் இலக்கியப் போக்குகள் தமிழ் இதழ்கள், நாடகக்கலை, திரைப்படங்கள் தமிழ் ஊடகங்கள், தமிழிசை எழுச்சி .

நூல்:

கே. கே. பிள்ளை, தமிழக வரலாறும் பண்பாடும்

வே.தி. செல்லம் தமிழக வரலாறும் பண்பாடும்



தாள் 18 : UTAE31 – நாட்டுப்புறவியல் - (Elective –I)

அலகு – 1 நாட்டுப்புறவியல் விளக்கம் - பண்புகள் - நாட்டுப்புற இலக்கிய வகைகள்  
நாட்டுப்புறப் பாடல்கள்  
நாட்டுப்புறக் கதைகள்  
நாட்டுப்புறக் கதைப்பாடல்கள்  
பழமொழிகள்  
விடுகதைகள்

அலகு – 2 நாட்டுப்புறக் கைவினைப் பொருட்கள்  
நாட்டுப்புற மருத்துவம் - புழங்கு பொருட்கள்

அலகு – 3 நாட்டுப்புற இலக்கியமும், எழுத்து இலக்கியமும் - ஒற்றுமை, வேற்றுமைகள் -  
பழமொழிகள் - எழுத்திலக்கியத்தில் நாட்டுப்புற இலக்கியத்தின் செல்வாக்கு.

அலகு – 4 நாட்டுப்புறக் கலைகள்

அலகு – 5 விளையாட்டு, தொழில்கள், சடங்குகள்

பாடநூல்:

ச.சக்திவேல், நாட்டுப்புறவியல் ஆய்வு

**தாள் 19 : UTAN31 – பணிவாய்ப்புத் தமிழ் - (Non major Elective – Course - I)**

- அலகு – 1 தமிழ் மொழியின் அடிப்படை இலக்கணம் - எழுத்து – சொல், பொருள், யாப்பு, அணி இலக்கணம்.
- அலகு – 2 தமிழ்ச் சொற்கள் - பெயர், வினை, இடை, உரிச்சொல் - இயற்சொல் - திசைச்சொல் - திரிசொல் - வடசொல் - பகுபதம் - பகாபதம் - அடிச்சொல் - வேர்ச்சொல் - பகுதி – விகுதி – சந்தி – சாரியை – உருபுகள்.
- அலகு – 3 உயர்திணை – அ.றிணை – பால் - எண் - இடம் - இயைபு – தமிழ்த் தொடர் வகைகள் - எழுவாய் - பயனிலை – செயப்படுபொருள் - ஒரெழுத்து ஒரு மொழி – ஒரு பொருள் பன்மொழி.
- அலகு – 4 உலக வழக்கு – செய்யுள் வழக்கு – பேச்சு மொழி – எழுத்துமொழி – மரபுத் தொடர்கள் - வினாத் தொடர் - நேர்கூற்று – அயற்கூற்று-
- அலகு – 5 புகழ் பெற்ற இலக்கியம் சார்ந்த தரவுகள் - தொல்காப்பியம் - சங்க இலக்கியம் - அற இலக்கியம் - தமிழ்க் காப்பியம் - பக்தி இலக்கியம் - சிற்றிலக்கியம் - இக்கால இலக்கியம் - (இலக்கிய நூல் - பாடியோர் - பாடப்பட்டோர் - உள்ளடக்கம் - சிறந்த மேற்கோள் கண்டறியும் அளவிற்குச் சுருக்கமாகத் தெரிந்திருத்தல் வேண்டும்.

பார்வை நூல்:

மு. வரதராசனார், தமிழ் இலக்கிய வரலாறு

தமிழண்ணல் - புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு

சௌ. மதார் மைதீன் - பயன்முறைத்தமிழ் - 1995 – நியூ செஞ்சுரி புக் ஹபுஸ் வெளியீடு

தாள் 20 : UTAS31 – மொழி பெயர்ப்பியல் - (Skill Base Elective)

- அலகு – 1 மொழிபெயர்ப்பு - மூலமொழி - இலக்கு மொழி – மொழிபெயர்ப்பின் தேவையும், பயனும் - மொழிபெயர்ப்பாளர் தகுதிகள் - தமிழ் மொழி பெயர்ப்பின் வரலாறு.
- அலகு – 2 மொழிபெயர்ப்பு வகைகள் -  
முழுநிலை மொழிபெயர்ப்பு –  
பகுதி நிலை மொழிபெயர்ப்பு –  
சொல் நேர் மொழிபெயர்ப்பு –  
கட்டில்லா மொழிபெயர்ப்பு –  
தழுவல்
- அலகு – 3 படைப்பிலக்கிய மொழிபெயர்ப்பு –  
கவிதை, கதை, கட்டுரை  
அறிவியல் மொழிபெயர்ப்பு –  
மருத்துவ நூல்கள் மொழிபெயர்ப்பு
- அலகு – 4 மொழிபெயர்ப்பு முறைகள் - மொழிபெயர்ப்புக் கருவிகள் - மொழிபெயர்ப்புச் சிக்கல்கள்
- அலகு – 5 மொழிபெயர்ப்புப் பயிற்சி –  
உரைநடை, கதை  
ஐந்து வாக்கியங்கள் தந்து தமிழிலிருந்து ஆங்கிலத்துக்கு மொழி பெயர்க்கச் செய்தல்  
ஐந்து வாக்கியங்கள் தந்து ஆங்கிலத்திலிருந்து தமிழுக்கு மொழி பெயர்க்கச் செய்தல்

பாடநூல்கள்:

1. வளர்மதி, மொழிபெயர்ப்பியல்
2. சு. சண்முக வேலாயுதம், மொழிபெயர்ப்பியல்
3. கா. பட்டாபிராமன் - மொழிபெயர்ப்புக் கலை
4. சேதுமணி மணியன் - மொழிபெயர்ப்பியல் கோட்பாடு
5. நா. முகமது செரிப் - மொழிபெயர்ப்பு வழிகளும் வாய்ப்புகளும்

இரண்டாம் ஆண்டு – நான்காம் பருவம்

புறப்பொருள் இலக்கணம்

தாள் 22 : UTAT41 – புறப்பொருள் வெண்பாமாலை (முழுவதும்) - (Core - v)

அலகு – 1 கடவுள் வாழ்த்து – சிறப்புப் பாயிரம்

1. வெட்சிப்படலம்
2. கரந்தைப் படலம்
3. வஞ்சிப்படலம்

அலகு – 2 4. காஞ்சிப் படலம் 5. நொச்சிப்படலம் 6. உழிஞைப்படலம்

அலகு – 3 7. தும்பைப்படலம் 8. வாகைப்படலம்

அலகு – 4 9. பாடாண் படலம் 10. பொது இயல் படலம்

அலகு – 5 11. கைக்கிளைப்படலம் 12. பெருந்திணைப்படலம்

பாடநூல்:

புறப்பொருள் வெண்பாமாலை – திருநெல்வேலி சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு.

**தாள் 23 : UTAP42 – படைப்பிலக்கியம் - (Core – Practical - II)**

- அலகு – 1 மரபுக்கவிதை எழுதச் செய்தல் - ஈற்றடி தந்து எழுதச் செய்தல் ( அ)  
முதல் சொல் தந்து எழுதச் செய்தல்.
- அலகு – 2 புதுக்கவிதை – குறுங்கவிதை – துணுக்குப்பா எழுதச் செய்தல் -  
தலைப்பு தந்து எழுதச் செய்தல் - உணர்வுகள் - சூழல்கள் சொல்லப்பட்டு  
எழுதச் செய்தல்.
- அலகு – 3 தலைப்பு தந்து மூன்று பக்க அளவில் சிறுகதை எழுதச் செய்தல் -  
மையக்கரு தந்து எழுத வைத்தல்.
- அலகு – 4 தலைப்பு தந்து ஓரங்க நாடகம் எழுதச் செய்தல்
- அலகு – 5 சிறுவர் இலக்கியம் படைத்தல் -  
குழந்தை பாடும் வகையில் எளிய பாடல்கள்  
எழுதச் சொல்லல்-  
குழந்தைகளுக்கான கதைகள் எழுதுதல்  
உங்களுக்குத் தெரியுமா?  
சிறு விளக்க உரைகள் -  
துணுக்குகள் - நகைச்சுவைக் கட்டுரை எழுதுதல்.

தாள் 24 : UTAA44 – திராவிட மொழிகளின் ஒப்பிலக்கணம் - (Allied paper - II)

அலகு – 1 திராவிடம் - தொல் திராவிடம் - மூலத்திராவிடம் - இயல்புகள்

அலகு – 2 உலக மொழிக் குடும்பங்கள் - திராவிட மொழிக் குடும்பங்கள் - அவற்றின் தனித்தன்மைகள்.

அலகு – 3 மூல திராவிடம் - தென் திராவிட மொழிகள்

அலகு – 4 நடு திராவிட மொழிகள்

அலகு – 5 வட திராவிட மொழிகள்

திராவிட மொழிகளில் தமிழ் பெறுமிடம்

பாடநூல்:

கால்டுவெல்- திராவிடமொழிகளின் ஒப்பிலக்கணம் - சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு

## தாள் 25 : UTAE42 – இதழியல் - (Elective - II)

- அலகு – 1 இதழியல் - தோற்றம் - வகைகள் - வளர்ச்சி இன்றைய நிலை - இந்திய இதழ்கள் - தமிழ் இதழ்கள் - வளர்ச்சி வரலாறு – தமிழ் இதழாளர்கள் - திரு.வி.க- அறிஞர் அண்ணா – பெரியார் - சி.பா. ஆதித்தனார் -
- ஏ.என் சிவராமன் - கி.வா. ஐகந்நாதன் - கல்கி – ஏ.எஸ். அண்ணாமலை – வாசன் - தமிழ்வாணன் தமிழ் இலக்கிய இதழாளர்கள்.
- அலகு – 2 செய்தி மூலங்கள் - செய்தி சேகரித்தல் - செய்தி நிறுவனங்கள் - நிருபர்கள் - தகுதிகள் - கடமைகள்.
- அலகு – 3 செய்தி கட்டமைப்பு – தலைப்பு – முதல் பத்தி – உடல் பகுதி – தலையங்கம் - செய்தி வகைகள் - பக்க அமைப்பு
- அலகு – 4 பதிப்பாசிரியர் - ஆசிரியர் குழு - இதழ் நிர்வாகம் - விளம்பரங்கள் - விற்பனை – வாசகர் கடிதம்
- அலகு – 5 இதழியல் சட்டங்கள் - இதழியல் சுதந்திரம் - இந்திய விடுதலைக்கு இதழ்களின் பங்கு - இன்றைய தமிழ் இதழ்களின் நோக்கும் போக்கும்.

பாடநூல்:

1. மா.பா.குருசாமி - இதழியல் கலை
2. மா.சு.சம்பந்தன் - தமிழ் இதழியல் வரலாறு

தாள் 26 : UTAN42 – பணிவாய்ப்புத் தமிழ் -

(Non major Elective – Course – II)

- அலகு – 1 தமிழின் தொன்மை, சிறப்பு – திராவிட மொழிகள் தொடர்பான செய்திகள் - உலகளாவிய தமிழர்கள் - பழந்தமிழர் வணிகம் - தொல்வியல் ஆய்வுகள் - கடல் பயணங்கள்.
- அலகு – 2 பத்துப்பாட்டு, எட்டுத்தொகை நூல்கள் பற்றிய செய்திகள் - திருக்குறள் அதிகாரங்கள் - அன்பு – பண்பு-கல்வி –கேள்வி – அறிவு- அடக்கம் - ஓழுக்கம் - பொறை – நட்பு – வாய்மை- காலம் - வலி- ஒப்புரவு அறிதல் - செய்ந்நன்றி சான்றாண்மை – பெரியாரைத் துணைகோடல் - பொருள் செயல்வகை – வினைத்திட்டம் - இனியவை கூறல்.
- அலகு – 3 சிலப்பதிகாரம் , மணிமேகலை உள்ளிட்ட தமிழ்க் காப்பியச் செய்திகள் அறநூல்கள் - ஓளவை பாடல்கள் தொடர்பான செய்திகள் - தமிழ்ச் சமய முன்னோடிகள் - சைவம் - பன்னிரு திருமுறைகள் - வைணவம் - ஆழ்வார்கள் - நாலாயிரத் திவ்ய பிரபந்தம் - வைணவ ஆசாரியர்கள் - சைவ வைணவக் கோட்பாடுகள் - கம்பராமாயணம் - கோயில் கலைகள்.
- அலகு – 4 - சிற்றிலக்கியங்கள் - நாட்டுப்புறப்பாட்டு - சித்தர்கள் - தமிழ் மகளிர் - இக்கால இலக்கியம் - மரபுக் கவிதை – புதுக்கவிதை – உரைநடை, சிறுகதைகள் - புதினங்கள் - நாடகம் - நாட்குறிப்பு – கடித இலக்கியம் - இலக்கியப் படைப்பாளர்கள் குறித்த செய்திகள்.
- அலகு – 5 பொருத்துதல் - நூல் - நூலாசிரியர்  
தொடர் - இலக்கியம்  
அடைமொழி – நூல்
- இலக்கணக் குறிப்பறிதல் - வேர்ச்சொல் தந்து வினை முற்று, வினையெச்சம், வினையாலணையும் பெயர் - தொழில் பெயர் உருவாக்கம்-
- வாக்கிய வகைகள் - தன்வினை – பிறவினை, செய்வினை- செயப்பாட்டு வினை வாக்கியங்களைக் கண்டறிதல்.
- பிழை திருத்தம்
- சந்திப் பிழை – ஒருமை – பன்மை பிழை – மரபுப் பிழை, வழச் சொற்களை அகற்றுதல்.



தாள் 27 : UTAS42 – கலைச் சொல்லாக்கமும் தொழில்நுட்பத்தமிழும் -

(Skill Based Studies - II)

- அலகு – 1 கலைச் சொல் விளக்க வரையறை – மொழிபெயர்ப்பில் புதுச் சொற்களை உருவாக்கும் அவசியம் - நைடாவின் மொழிபெயர்ப்பு விதிகள்
- அலகு – 2 தமிழ்க் கலைச் சொல்லாக்க முறைகள்
- அலகு – 3 அறிவியல் கலைச் சொல்லாக்க விதிமுறைகள்  
கலைத்துறை கலைச் சொல்லாக்க விதிமுறைகள்
- அலகு – 4 ஊடகங்களும் தொழில் நுட்பத் தமிழும் - அச்ச ஊடகம் - மின் ஊடகம் - வானொலி – தொலைக்காட்சி – திரைப்படம் - தொலைவரி – தொலைநகலி – செயற்கைக் கோள் - கணினி - இணையம் - வலைதளம் - முகநூல் - மின்னஞ்சல் - கைபேசி – பிற சாதனங்கள்.
- அலகு – 5 அவரவர் பாடத் துறை சார்ந்த பத்து தொழில் நுட்பச் சொற்களுக்குத் தக்க தமிழ்க் கலைச்சொற்களை உருவாக்குதல்

பாடநூல்

முனைவர் இராதா செல்லப்பன், கலைச்சொல்லாக்கம் - திருச்சி

முன்றாம் ஆண்டு – ஐந்தாம் பருவம்

தாள் 28 : UTAT51 – சிற்றிலக்கியம் - (Core – VI (Theory))

அலகு – 1 - கலிங்கத்துப் பரணி

போர் பாடியது  
களம் பாடியது  
கூழ் அட்டது - மட்டும்

திருக்குற்றாலக் குறவஞ்சி –  
பாங்கி வசந்தவல்லியைப் பழித்துரைத்தது  
முதல் வசந்தவல்லி கூடல் இழைத்தல் வரை மட்டும்

அலகு – 2 பிள்ளைத் தமிழின் பத்துப்பருவங்களையும் விளக்கி மதுரை மீனாட்சியம்மைப் பிள்ளைத்தமிழின் ஒவ்வொரு பருவத்திலிருந்தும் முதல் பாடல் வீதம் - 10 பாடல்கள்.

2.2 கலம்பகத்தின் பதினெட்டு உறுப்புகளையும் விளக்கி நந்திக்கலம்பகத்தில் இருந்து ஒவ்வொரு உறுப்புக்குமான முதல் பாடல் வீதம் - 18 பாடல்கள் மட்டும்.

அலகு – 3 தமிழ் விடு தூது முழுதும்

அலகு – 4 சேரமான் பெருமானின் ‘ ஞானவுலா – முன்னிலை மட்டும் - பாட்டுடைத் தலைவன் ஒப்பனை செய்து படை சூழ ஊர்தியில் ஏறி, வீதிக்கு வருதல் வரை.

மறைமலையடிகளின் ‘ திருவொற்றியூர் முருகன் மும்மணிக் கோவையின் முதல் பத்து பாடல்கள் மட்டும்.

அலகு – 5 முக்கூடல் பள்ளு – நாட்டு வளம்

நகர வளம்  
பள்ளியர் ஏசல் பகுதி மட்டும்

அந்தாதி – நம்மாழ்வார் - திருவாய்மொழி – பா.2675 ‘உயர்வற என்று தொடங்கும் பாடல் முதல் கரவிசம்பு எரிவளி என்று முடியும் 2685 பாடல் வரை – 10 பாடல்கள்

நூல்கள்:

1. கழக வெளியீடு – சிற்றிலக்கியச் சொற்பொழிவுகள்
2. தா.ஈசுவர பிள்ளை – சிற்றிலக்கிய வரலாறு
3. ந.வீ. செயராமன் - சிற்றிலக்கியச் செல்வங்கள்

**தாள் 29 : UTAT52 – பக்தி இலக்கியம் - (Core – VII (Theory))**

அலகு – 1 சைவ இலக்கியம்

- 1.1 திருஞானசம்பந்தர் - தேவாரம் II – திருவான்மியூர் - 1502 -1512-  
கரையுலாம் கடலில் முதல் மாதொர் கூறுடை எனும் பாடல் வரை 10 பாடல்கள்
- 1.2 திருநாவுக்கரசர் - தேவாரம் 4 – விடம் தீர்த்த பதிகம் - 4230-4239  
-10 பாடல்கள்  
**சிவன் எனும் ஓசை அல்லது முதல் புதுவரி பொன் செய் ஓலை வரை**
- 1.3 சுந்தரர் - தேவாரம் - 7 – திருவாலங்காடு – 7754 – 7763 -10 பாடல்கள்  
**முத்தா முத்தி தரவல்ல முதல் பத்தர், சித்தர் பலர் வரை – 10 பாடல்கள்.**
- 1.4 மாணிக்கவாசகர் - திருவாசகம் - 9. ஆனந்தபரவசம் -  
**விச்சக் கேடு பொயக்காகா முதல் யானே பொய் வரை – 85-94**  
– 10 பாடல்கள்
- 1.5 காரைக்காலம்மை – திருவிரட்டை மணிமாலை – முதல் 5 பாடல்கள்
- 1.6 சேக்கிழார் - பெரியபுராணம் - 47 புகழ்ச் சோழ நாயனார் புராணம்.

அலகு – 2 வைணவம்

- 2.1 பெரியாழ்வார் - 108 -117 – 10 பாடல்கள்  
**வட்டு நடுவே வளர்க்கின்ற என்று தொடங்கும் பாடல் முதல் நன்மக்களைப் பெற்று மகிழ்வரே வரையுள்ள – 10 பாடல்கள்**
- 2.2 ஆண்டாள் - 637 – 646 - 10 பாடல்கள்  
**பட்டி மேய்ந்ததோர் காறேறு – முதல் ----- பிரியாது என்றும் இருப்பாரே வரை**
- 2.3 குலசேகரர் - 677 – 687 - 10 பாடல்கள்  
**ஊனேறு செல்வத்து முதல் பாங்காய பத்தர்களே வரை**
- 2.4 திருமழிசை ஆழ்வார் - 752 –756 - 5 பாடல்கள்  
**பூ நிலாய ஐந்துமாய முதல் ஆதி தேவன் அல்லையே வரை**
- 2.5 திருமங்கை ஆழ்வார் - 1308 – 1317 - 10 பாடல்கள்  
**கண்ணார் கடல்போல் முதல் வானவர் தாமே வரை**

அலகு – 3 கிறித்தவ இலக்கியம்  
தேம்பாவணி – முதல் காண்டம் - ஈறம்  
பொருத்துபடலம் - (454 – 526 - 72 பாடல்கள்)

அலகு – 4 இசுலாமிய இலக்கியம்  
சீறாப்புராணம் - நதி கடந்த படலம் - 1-37 பாடல்கள்

அலகு – 5 சைவ சித்தாந்தம்  
உமாபதி சிவம் - வினா வெண்பா – 13 பாடல்கள்  
நீடும் ஒளியும் நிறை இருளும் முதல்  
அருளால் உணர்வார்க்கு அகலாத எனும் 13வது பாடல் வரை.

தாள் 30 : UTAT53 – பதினெண்கீழ்க்கணக்கு - அற இலக்கியம் - (Core – VIII)

- அலகு – 1 திருக்குறள்  
இன்பத்துப்பால்  
அதிகாரம் -109 – தகை அணங்கு உறுத்தல் முதல்  
அதிகாரம் -110 – கண்விதுப்பு அழிதல் வரையிலான பத்து அதிகாரங்கள்  
மட்டும்.
- அலகு – 2 நாலடியார்  
நட்பு ஆராய்தல்  
நட்பில் பிழை பொறுத்தல்  
கூடா நட்பு - 30 பாடல்கள்
- அலகு – 3 நான்மணிக்கடிகை  
**எள்ளற்க என்றும் எளியர்** என்று தொடங்கும் முதல் பாடல் முதல்  
**கந்தில பிணிப்பர் களிற்றை** வரையுள்ள 10 பாடல்கள் (1-10)  
பழமொழி  
**அம் கண் விசும்பின் அகல் நிலா பாரிக்கும்** என்று தொடங்கும் 15 வது பாடல்  
முதல்  
**இசைவு கொடுப்பதூஉம்** என்று முடியும் 24 பாடல் வரையுள்ள – 10 பாடல்கள்  
சிறுபஞ்சமூலம்  
**பூவாது காய்க்கும் மரம் உள** எனும் 20 வது பாடல் முதல்  
**ஒருவன் அறிவானும்** எனும் 29 வது பாடல் வரை – 10 பாடல்கள்
- அலகு – 4 சிவப்பிரகாசர் - நன்னெறி – முதல் 20 பாடல்கள் மட்டும்
- அலகு – 5 அதிவீரராம பாண்டியர் - வெற்றி வேற்கை  
வ.சுப. மாணிக்கம் - தமிழ் சூடி  
சோம. இளவரசு - நீதி சூடி.

தாள் 31 : UTAT54 – யாப்பிலக்கணம் - யாப்பருங்கலக்காரிகை முழுவதும்

(Core – IX - Theory)

அலகு – 1 உறுப்பு இயல்

சிறப்புப்பாயிரம் முதல் தளை வரையிலான நூற்பாக்கள் (1 முதல் 11 வரை)

அலகு – 2 உறுப்பு இயல்

அடி முதல் தொடை விகற்பம் வரையிலான நூற்பாக்கள் (12 முதல் 20 வரை)

அலகு-3 செய்யுள் இயல்

பாக்களின் அடியும் ஓசையும் முதல் வெளிவிருத்தம், வெண்தாழிசை, வெண்துறை வரையிலான நூற்பாக்கள் (21 முதல் 27 வரை).

அலகு – 4 செய்யுள் இயல்

நால்வகை ஆசிரியப் பாக்கள் முதல் மருட்பா வரை ( 28 முதல் 35 வரை)

அலகு – 5 ஒழிபு இயல்

எழுத்துக்குப் புறனடை முதல் இந்நூல் பொருளின் தொகுப்பு வரை ( 36 முதல் 44 வரை).

நூல்:

யாப்பருங்கலக் காரிகை – திருநெல்வேலி சைவ சித்தார்த நூற்பதிப்புக் கழக வெளியீடு

தாள் 32 : UTAT55 – காப்பிய இலக்கியம்

(Core – X - Theory)

அலகு – 1 சிலப்பதிகாரம்

வஞ்சிக் காண்டம் முழுவதும்

அலகு – 2 மணிமேகலை

1. விழாவறை காதை
2. ஊரலர் உரைத்த காதை
3. மலர்வனம் புக்க காதை

அலகு – 3 சீவக சிந்தாமணி

கோவிந்தையார் இலம்பகம்

அலகு – 4 கம்பராமாயணம்

அயோத்தியா காண்டத்தில்

திருவடி சூட்டுப் படலம்

அலகு – 5 வில்லிபாரதம் - மூன்றாம் பாகம்

கிருட்டிணன் தூதுச் சருக்கம்

1 முதல் 53 பாடல்கள் வரையிலான கண்ணன் அத்தினாபுரம் வந்தடைதல்

நிகழ்வு மட்டும்.

தாள் 33 : UTAE53 – தமிழ்மொழி வரலாறு-

(Elective - III)

- அலகு – 1 தமிழ் மொழி வரலாறு அறிய உதவும் மூலங்கள்
- அலகு – 2 தொல் தமிழ் வரலாறு  
சங்கத் தமிழ் வரலாறு
- அலகு – 3 களப்பிரர் காலத்தமிழ்  
சோழர் காலத்தமிழ்  
நாயக்கர் காலத்தமிழ்
- அலகு – 4 ஆங்கிலேயர் காலத்தமிழ்  
இக்காலத் தமிழ்  
ஊடகத் தமிழ்
- அலகு – 5 தமிழ் வரி வடிவ வரலாறு  
செந்தமிழ் - கொடுந்தமிழ் வழக்கு  
உலக வழக்கு – செய்யுள் வழக்கு  
வட்டார வழக்கு – கிளை மொழிகள்  
சொற்பொருள் மாற்றம்  
கடன் வாங்கல்  
கடன் தருதல்

நூல்

தெ.பொ. மீனாட்சி சுந்தரனார் - தமிழ் மொழி வரலாறு –  
சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு



தாள் 34 : UTAS53 – கல்வெட்டியல்-

(Skill based studies - III)

- அலகு – 1 கல்வெட்டுக்கள் - நடுகல் - கல்வெட்டுக்களின் வகைகள் - நோக்கம் - தமிழ்க் கல்வெட்டுகளின் தோற்றம், வளர்ச்சி, வரலாறு
- அலகு – 2 கல்வெட்டுத் தமிழ் - பிராமிக கல்வெட்டு – குகைக் கல்வெட்டு – கல்வெட்டுகள் - செப்பேடுகள் - சாசனங்கள் - மெய்கீர்த்திகள் - பதிவு செய்யும் செய்திகள்
- அலகு – 3 பழங்காலக் கல்வெட்டுச் செய்திகள்
- அலகு – 4 சோழர் காலக் கல்வெட்டுச் செய்திகள்
- அலகு – 5 பிற்காலக் கல்வெட்டு ஆவணங்கள் - தமிழகக் கல்வெட்டியல் துறை வெளியீடுகள்

நூல்.

தமிழகக் கல்வெட்டியல் துறை ஆவண வெளியீடுகள்

மூன்றாம் ஆண்டு - ஆறாம் பருவம்

தாள் 35 : UTAT61 - சங்க இலக்கியம்

(Core - XI - Theory)

அலகு - 1 நற்றிணை - 7 பாடல்கள்

- பாடல் எண் - 121 - தேர்ப்பாகன் கூற்று - வினதையர் கொன்ற -----  
பாடல் எண் - 126 - தலைவன் கூற்று - பைங்காய் நல் இடம் ----  
பாடல் எண் - 143 - நற்றாய் கூற்று - ஐதெ கம்ம யானே----  
பாடல் எண் - 144 - தலைவி கூற்ற - பெருங்கயிறு உழுவை-----  
பாடல் எண் - 145 - தோழி கூற்று - இருங்கழி பொருத -----  
பாடல் எண் - 150 - பரத்தை கூற்று - நகை நன்கு உடையன் ---  
பாடல் எண் - 160 - பாங்கன் கூற்று - நயனும் , நண்பும், நாணும்--

1.2 குறுந்தொகை - 5 பாடல்கள் -

- ஓக்கூர் மாசாத்தியாரின் 5 பாடல்கள்  
பாடல் எண் - 126 - இளமை பாரார்  
பாடல் எண் - 139 - மனை உறை கோழி  
பாடல் எண் - 186 - ஆர்கலி ஏற்றோடு  
பாடல் எண் - 220 - பழமழைக் கவித்த  
பாடல் எண் - 275 - முல்லை ஊர்ந்த

1.3 ஐங்குறுநூறு

நெய்தல் - 19 - நெய்தல் பத்து - 10 பாடல்கள்

நெய்தல் உண்கண் முதல் தண்நறு நெய்தல் என்று முடியும் பாடல் வரை.

அலகு - 2 கலித்தொகை - 5 பாடல்கள்

முல்லைக்கலி

பாடல் - 101 முதல் 105 வரை

தளிபெறு தண்புலத்து முதல் அரைசுபடக் கடந்து வரை - 5 பாடல்கள்

அகநானூறு - 5 பாடல்

- பாடல் 25 - நெடுங்கரை கான் யாறு எனும் ஒல்லையூர் தந்த  
பூதப்பாண்டியன் பாடல்  
பாடல் 26 - கூன் முள் முள்ளி எனும் கானப்பேரெயில் தந்த உக்கிரப்  
பெருவழுதி பாடல்  
பாடல் 28 - மெய்யின் தீரா எனும் பாண்டியன் அறிவுடை நம்பி பாடல்  
பாடல் 42 - மலிபெயல் கலித்த எனும் கபிலர் பாடல்  
பாடல் 45 - வாடல் உழிஞ்சில் - எனும் வெள்ளி வீதியார் பாடல்

பரிபாடல்

- பாடல் - 9 - இருநிலம் துளங்காமை எனும் செவ்வேன்  
பாடல் - 10 - மலைவரை மரலை எனும் 'வையை' பற்றியது  
பாடல் - 15 - புலவரை அறியாப் எனும் திருமால் பற்றியது

அலகு - 3 பதிற்றுப்பத்து - 5 பாடல்கள்  
வாழியாதனைக் கபிலர் பாடிய ஏழாம்பத்து  
பலாஅம் பழுத்த எனும் முதல் பாடல் முதல்  
ஏறிபிணம் இடறிய எனும் 5 ஆம் பாடல் வரை

அலகு - 4 புறநானூறு - 5 பாடல்கள்  
பரணர் பாடல்கள்  
பாடல் எண் 4 - வாள் வலம் தர  
பாடல் எண் 63 - எனைப் பல் யாணையும்  
பாடல் எண் 141 - பாணன் சூடிய  
பாடல் எண் 142- அறுகுளத்து உகுத்தும்  
பாடல் எண் 144 - அருளாய் ஆகலோ

அலகு - 5 சிறுபாணாற்றுப்படை முழுவதும்

தாள் 36 : UTAT62 – அணியிலக்கணம்

தண்டியலங்காரம்

( சொல்லணியியல் நீங்கலாக)-(Theory)

- அலகு – 1 பொது அணி இயல்  
தற்சிறப்புப் பாயிரம் முதல் புறனடை வரையிலான 26 நூற்பாக்கள்
- அலகு – 2 பொருள் அணி இயல் - 1  
காப்பு முதல் விபாவனை அணி வரையிலான நூற்பாக்கள் (27முதல் 51 வரை)
- அலகு – 3 பொருள் அணி இயல் - II  
ஓட்டு அணி முதல் அவநுதி அணி வரையிலான நூற்பாக்கள் (52 முதல் 75 வரை)
- அலகு – 4 பொருள் அணி இயல் மற்றும் சொல் அணி இயல்  
சிலேடை அணி முதல் சித்திரகவி வரையிலான நூற்பாக்கள் (76 முதல் 98 வரை)
- அலகு – 5 சொல் அணி இயல்  
தொடர்ச்சி வழக்களின் வகை முதல் புறனடை வரையிலான நூற்பாக்கள் (99 முதல் 126 வரை)

பாடநூல்

தண்டியலங்காரம் - திருநெல்வேலி சைவசித்தாந்த நூல் பதிப்புக் கழக வெளியீடு

தாள்-37- UTAT63 -CORE-12-THEORY- இலக்கிய கொள்கைகள்

- அலகு-1 -இலக்கிய கொள்கை-விளக்கம்-வகைகள்.
- அலகு-2- தமிழிலக்கிய கொள்கைகள்-  
தொல்காப்பியரின் இலக்கிய கொள்கை-  
சங்க இலக்கிய கொள்கைகள்-  
தொல்காப்பியர் கூறும் இலக்கிய வகைமைகள்  
-நூல்-உரை-பிசி-முதுமொழி-மந்திரம்-குறிப்பு-
- அலகு-3 -தமிழ்க்காப்பியக் கொள்கைகள்-  
தமிழ் நீதி இலக்கிய கொள்கைகள்
- அலகு- 4 பக்தி இலக்கியகொள்கைகள்
- அலகு 5 புதுக்கவிதை கொள்கைகள்-  
சிறுகதை கொள்கைகள்-  
நாவல் கொள்கைகள்  
நாடகக் கொள்கைகள்-  
உரைநடை கொள்கைகள்

பாட நூல்

அரங்க சுப்பையா-இலக்கியத் திறனாய்வு-இசங்கள்-கொள்கைகள்

சென்னை-பாவை பதிப்பகம்.

தாள்-38- UTAT64 -(CORE- III ) ஓலைச் சுவடி வகைகள்

அலகு-1 தமிழில் ஓலைச் சுவடிகள்-

ஓலைச் சுவடிவகைகள்-

ஓலைச் சுவடி எழுது முறைகள்

அலகு-2 ஓலைச் சுவடி வாசிப்புப் பயிற்சி-

ஓலைச் சுவடிப்பயிற்சி

அலகு-3 ஓலைச் சுவடிகள் நூலகம்-அரசினர் கீழ்த்திசைச் சுவடிகள்-

நூலகத் தமிழ்ச் சுவடிகள் விளக்க அட்டவணைத் தொகுதிகள்-  
தமிழகச் சுவடிகள் நூலகங்கள்

அலகு-4 -தமிழ்ச் சுவடிகள் பதிப்பியல் வரலாறு

அலகு-5 பாட வேறுபாடுகள்-பாடத்தெரிவு முறைகள்-

விடுபாடு நிரப்புதல்- இடைச் செருகல்-இனம்

காணல்-திருத்தம் செய்தல்-சுவடியியல் பதிப்புத் திறன்கள்

பாடநூல்-

பூ.சுப்பிரமணியம்-சுவடிப் பதிப்புக்கலை-உலகத் தமிழாராய்ச்சி நிறுவன வெளியீடு

த.கோ.பரமசிவம்-சுவடிப் பதிப்பு நெறிமுறைகள்-தமிழ்ப் பல்கலைக்கழகம்

தாள்-39- UTAT65- (CORE- IV) —தகவல் தொடர்பியல்

அலகு-1- தகவல் தொடர்பியல்-விளக்க வரையறை- தகவல் தொடர்பியலின்

வகைகள்-வளர்ச்சி வரலாறு.

அலகு-2- வானொலித்தமிழ்

தொலைக்காட்சித்தமிழ்

தகவல் தொடர்பியலில் தமிழ்

அலகு-3 தொலைத் தகவல் தொடர்பியலும்

தமிழும்-சமூக மாற்றங்கள்

அலகு-4 மின்னணுத் தகவல் தொடர்பியலில் தமிழ்-

கருத்துப்பரவல்- விளைவுகள்

அலகு-5 தகவல் தொடர்பு ஊடகங்களில் தமிழ்ப்

பயன்பாட்டுப் பயிற்சிநெறி- கணினி-

தமிழ் இணையம்

நூல்-

1.க.அபிராமி-தகவல் தொழில் நுட்பம்-தமிழ்ப் புத்தகாலயம்

2.வெ.நல்லதம்பி-மக்கள் தகவல் தொடர்பியல்

தாள்-40- UTAE64 - (Elective – IV) —பெண்ணியம்-அறிமுகம்

- அலகு-1- பெண்ணியம்-தோற்றமும் வளர்ச்சியும்
- அலகு-2- மேலை நாட்டு, தமிழகத்துப் பெண்ணியவாதிகள்
- அலகு-3- பெண்ணிய வகைகள்- பெண்ணியத் திறனாய்வு
- அலகு-4- சங்க கால மகளிர் நிலை
- அலகு-5 இக்கால இலக்கியத்தில் மகளிர் நிலை-  
தமிழ்ப்புதுக்கவிதைகள்-புதினங்கள்-  
சிறுகதைகள்-நாடகம்-உரைநடை

நூல்கள்

1. பெண்ணியம்-இரா.பிரேமா.சென்னை.
2. பெண்ணியல்- அன்னை தெரசா மகளிர் பல்கலைக்கழக  
வெளியீட்டில் முதல் கட்டுரை மட்டும்



**தாள-41- UTAS64 - (Skill based Studies – IV) – இணையத் தமிழ் இலக்கியம்**

அலகு-1. இணையம் தேடுபொறி-தமிழ் எழுத்துரு பதிவிறக்க முறைகள்

தமிழ்வழி இணையத்துள் புகுதல்

அலகு-2. தமிழ் விக்கிபீடியா- விக்சனரி- தமிழ் உள்ளடக்கப்

பதிவிறக்கம்- பதிவேற்ற நெறிகள்-

அலகு-3 தமிழில் மின்னஞ்சல் அனுப்புதல்-பெறுதல் -இணையத் தமிழ்த் தளங்கள்

பத்தினைக் கண்டறிதல்

அலகு-4 இணைய மின் இதழ்கள் ஐந்தினைப் பார்வையிடல்-அவ்விதழ்களின்

உள்ளடக்கம் பற்றி ஐந்து பக்கங்களுக்கு எழுதிச் சமர்ப்பித்தல்

அலகு-5 இணைய மின் நூலகங்கள் ஐந்தினை அறிதல்-இணைய நூலகங்களில் ஒரு

தமிழ் நூலைத் தேடிக் கண்டறிந்து பதிவிறக்கம் செய்ய அறிந்திருத்தல்

நூல்-

டாக்டர்.இராதா செல்லப்பன்-தமிழும் கணினியும்-கவிதை அமுதம் வெளியீடு-திருச்சி.

தாள்-42- USEA61 - விரிவாக்கச் செயல்பாடுகள்

(NSS, NCC, Sports, External Activities )

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**MOTHER TERESA WOMEN'S UNIVERSITY**  
**KODAIKANAL – 624102**

**SYLLABUS (2018-2019)**  
**B.COM (Computer Applications)**  
**(CHOICE BASED CREDIT SYSTEM)**  
**(Full Time)**

**SYLLABUS, REGULATION AND SCHEME OF  
EVALUATION**

# **MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL – 624102**

## **SYLLABUS FOR B.COM (Computer Applications) (2018-2019)**

The Revised syllabus for B.Com (CA) may be recommended from the academic year 2018 – 2019 onwards. Regulations scheme of examinations and syllabus for B.Com (CA) is based on UGC/TANSICHE guidelines under Choice Base Credit System (CBCS).

### **Objectives:**

1. To inculcate the knowledge of accounting principles and practice
2. To import the Knowledge in the field of banking and insurance activities
3. To equip the students well prepared to face the competitive world.
4. To make the students well equipped for getting job opportunities.
5. To develop the computer knowledge among commerce students.

### **Eligibility:**

Candidate should have passed the higher secondary examination or CBSE or other equipment examination from any schools.

### **Duration:**

The duration of the course will be three consecutive academic years under semester system.

### **Medium of Instruction:**

English

**REGULATIONS:**

1. Maximum marks for theory is 100 each
2. The Minimum passing mark for Internal Exam 13 out of 25 marks and for External Exam 38 out of 75 marks.
3. The University examination will be conducted at the each semester for the duration of three hours per paper.
4. The break up for Internal assessment is

<b>Internal Break up</b>	<b>Marks</b>
Internal Test	15
Assignment / Technical Quiz	5
Attendance	5
<b>Total</b>	<b>25</b>

5. Quest papers in External examination carrying 75 marks will be in the format below:

Part	Type	Number questions to be answered	Marks
A	Objective Type / Multiple Choice	10 questions, 2 questions from each unit, each carrying 1 mark	10 (10*1)
B	Paragraph (about 1-1 ½ pages)	5 questions, From each Unit Either or Choice, each carrying 5 marks	20 (5*4)
C	Essay type (about 3 pages)	Any 3 out of 5 questions, Open choice, One question from each unit, each question carrying 10 marks	30 (3*10)
	Total	-----	75

**Mother Teresa Women's University, Kodaikanal**  
**Department of Commerce**

**Syllabus with Course Codes 2018 – 2019**

**B.Com. (Computer Applications)**

Paper No.	Paper Code	Course Title	Hours	Credits	Continuous Internal Assessment (CIA)	End Semester Exam (ESE)	Total
	<b>Semester I</b>						
1	ULTA11	Tamil	6	3	25	75	100
2	ULEN11	Communication Skills – I	6	3	25	75	100
3	UCOC11	Financial Accounting-I	5	4	25	75	100
4	UCOC12	Business Application of MS Office	5	4	25	75	100
5	UCOA11	Indian Economy	5	4	25	75	100
6	UVAE11	Value Education	3	3	25	75	100
		<b>Total</b>	<b>30</b>	<b>21</b>			<b>600</b>
	<b>Semester II</b>						
7	ULTA22	Tamil	6	3	25	75	100
8	ULEN22	Communication Skills – II	6	3	25	75	100
9	UCOC21	Financial accounting-II	6	4	25	75	100
10	UCOC22	Web designing using HTML	5	4	25	75	100
11	UCOA22	Business Ethics	5	4	25	75	100
12	UEVS21	Environment studies	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>20</b>			<b>600</b>
	<b>Semester III</b>						
13	ULTA33	Tamil	6	3	25	75	100
14	ULEN33	Communication Skills – III	6	3	25	75	100
15	UCOC31	Visual Basic Programming	5	4	25	75	100
16	UCOA33	Business Statistics	5	4	25	75	100
17	UCOE31	Computer Application in Business	4	3	25	75	100

18	UCON31	Fundamentals of Insurance	2	2	25	75	100
19	UCOS31	Fundamentals of Investment	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>21</b>			<b>700</b>
	<b>Semester IV</b>						
20	ULTA44	Tamil	6	3	25	75	100
21	ULEN44	Communication Skills – IV	6	3	25	75	100
22	UCOC41	Business Finance	4	4	25	75	100
23	UCOC42	Fundamentals of ‘C’ (Theory)	4	4	25	75	100
24	UCOA44	Company Secretarial Practice	3	4	25	75	100
25	UCOE42	Business Mathematics	3	3	25	75	100
26	UCON42	Accounting Fundamentals with Tally (Practical)	2	2	25	75	100
27	UCOS42	Creative Advertising (Practical)	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>800</b>
	<b>Semester V</b>						
28	UCOC51	Cost Accounting	5	4	25	75	100
29	UCOC52	Corporate Accounting	5	4	25	75	100
30	UCOC53	Tally ERP (Practical)	5	4	25	75	100
31	UCOC54	Programming in ‘C’ (Practical)	5	4	25	75	100
32	UCOC55	Income Tax	5	4	25	75	100
33	UCOE53	Business Environment	3	3	25	75	100
34	UCOS53	Commerce (Practical)	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>700</b>
	<b>Semester VI</b>						
35	UCOC61	Business Management	5	4	25	75	100
36	UCOC62	Management Accounting	5	4	25	75	100
37	UCOC63	E-Commerce	5	4	25	75	100
38	UCOC64	Business Tax	5	4	25	75	100

39	UCOC65	Programming in C ++ (Practical)	5	4	25	75	100
40	UCOE64	Business Law	3	3	25	75	100
41	UCOS64	Business Communication	2	2	25	75	100
42	USEA61	Extension Activity	-	3	25	75	100
		<b>Total</b>	<b>30</b>	<b>28</b>			<b>800</b>
<b>Total</b>			<b>180</b>	<b>140</b>			<b>4200</b>



**B.COM**  
**SEMESTER I - CORE 1**  
**UCOC11 – Financial Accounting-I**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To enable the students to acquire basic knowledge of accounting principles, concepts and conventions.
- To make the students to acquire the skill to prepare the trial balance, final accounts and
- To facilitate the students to prepare accounts from incomplete records and calculate depreciation under different methods.
- To understand the concept of Hire Purchase System and installment purchase system.

**UNIT- I**

Accounting: Introduction – Accounting concepts and conventions – Definition – Principles of Book Keeping – Journal – Ledger – Trial Balance – Rectification of Errors – Cash Book.

**UNIT- II**

Final Accounts: Trading, Profit and Loss A/c and Balance Sheet of sole trading concern – Common adjustments in the preparation of final accounts - Adjusting and Closing entries – Manufacturing account.

**UNIT- III**

Accounts from incomplete records: Features – Merits – Demerits – Calculation of profit: Statement of Affairs method – Conversion method – Calculation of missing figures.

**UNIT- IV**

Depreciation: Causes – Objectives – Factors – Methods of depreciation: Straight Line Method – Written down Value Method – Annuity Method - Sinking Fund Method.

**UNIT - V**

Hire Purchase System: Definition – Features – Terms used in Hire Purchase transactions – Accounting procedure – Calculation of interest - Default and Repossession – Instalment Purchase System: Distinction between Hire Purchase System and Instalment Purchase System.

**Text Book:**

1. Reddy, T.S. and Murthy, A., Financial Accounting, (2010), 2<sup>nd</sup> Revised Edn., Margam Publication, Chennai.

**Reference Books:**

1. Jain, S.P. and Narang, K.L., Financial Accounting, (2010), 17<sup>th</sup> Revised Edn, Kalyani Publishers, New Delhi.
2. Pillai, R.S.N. and Bhagavathi, Advanced Accountancy, (2012), 3<sup>rd</sup> Revised Edn., Konark Publishers Pvt. Ltd., New Delhi.
3. Vinayagam, N. and Charumathi, B., Advanced Accountancy, (2002), S.Chand & Co. Ltd., New Delhi.

**Note:** Question paper shall cover 25% theory and 75% problem.



**SEMESTER I - CORE 2**  
**UCOC12 – Business Application of MS-Office**

**Credit: 4**

**Hours: 5**

**UNIT – I**

Office Automation – Microsoft word – Creating a word document – Working with word document - Moving correcting and inserting text – Printing a document.

**UNIT – II**

Editing word document – Selecting Copying, Moving text-using redo and undo features – spell check-formatting text – inserting page numbers- headers and footers – using tables and graphics.

**UNIT –III**

MS Excel – Building spread sheet – selecting worksheet items – using auto fill – adding and moving information –creating and coping formulas –naming ranges –using functions – crating enhancing and printing a chart overview of power point.

**UNIT- IV**

MS-Access – Creating a new database – creating a new table- saving – creating primary key –adding fields, deleting fields- changing the views and moving fields.

**UNIT – V**

Entering and editing data – adding records – inserting and deleting records – adjusting column width and hiding columns – finding records-sorting records – querying a database-creating a new query-saving, editing and sorting the query – creating and using forms – creating a auto form – entering and editing data using a form and saving creating a new form from scratch – adding fields to form – using reports – wizards – creating and printing reports.

**Text Book:**

Fundamentals of computer-II Edition – V.Rajaraman – PHI – 1998

**Reference Books:**

1. Windows XP Professional black book, the ultimate user's Guide, Published by Dream tech new Delhi.
2. PC Software for windows made simple – R.K.Taxali, TMH -1998.
3. Computer & Information Processing – William M.Fuori and LawernceJ.Aufiero.

**I - MS WORD**

1. Type the minutes of MD meeting, Report of the Meeting, Agenda and perform the Following operations:

Bold, Underline, Font Size, style, Background color, Text color, Line spacing, Spell Check Alignment, Header & Footer, Inserting pages and page numbers, Find and Replace.

2. Prepare an invitation for the college function using Text boxes and clip parts.

3. Design a Voucher by using Drawing tool bar, Clip Art, Word Art, Symbols, Borders and Shading.

4. Prepare a Time Table for your class and perform the following operations:

Inserting the table, Data Entry, Alignment of Rows and Columns, Inserting and Deleting the Rows and Columns, Change of Table Format, changing Cell Space and Apply attractive Colors to the cell.

5. Prepare a Staff meeting letter for 10 members in different Colleges using mail merge Operation.
6. Prepare Curriculum Vitea using templates and wizards

## **II - MS EXCEL**

1. Prepare a mark list of your class (minimum of 5 subjects) and perform the following Operations:

Enter the data, Total, Average, and Result by using arithmetic and logical functions and sort the Worksheet in ascending order

2. Prepare a Payroll for a Company minimum of 10 employees
3. Insert a Chart in Worksheet to compare the yearly sales of two car companies.

## **MS POWERPOINT**

1. Design presentation slides for a car invented by you to explain to your higher authorities.

The slides must include name, brand name, special features, price, special offer etc. Add audio effects. The presentation should work in manual mode.

2. Design presentation slides for your College Result details for 5 levels of hierarchy of a using organization chart.
3. Design slides for your favorite advertisement in TV channel. The Presentation transactions are Top down, Bottom up, Zoom in and Zoom out. - The presentation should work in Custom mode.

## **MS-ACCESS**

1. Gather price, quantity and other descriptions for five products and enter in the Access table And create an invoice in form design view.
2. Create forms for the simple table ASSETS.
  - 2.1 Create report for the PRODUCT database.

## **Reference Books:**

1. Microsoft Office 2007 by Greg Perry-Pearson Education, Low Price Edition 2007
2. Working in Microsoft Office by Ron Mansfield, Tata McGraw Hill Publishing,

**Note:** 100% Practical

**SEMESTER I - ALLIED 1**  
**UCOA11 – Indian Economy**

**Credit: 4**

**Hours: 5**

**Objectives:**

At the end of the course students shall be able to understand

- The fundamental concept of Indian economy and will be able to correlate these concepts to real life situation to markets in particular and the economy in general.
- The concepts of LPG and WTO.

**UNIT - I**

Indian Economy: Features – Meaning of under development Economy – Basics Characteristics of an under development Economy. Poverty – Poverty line – Causes of poverty – measures undertaken by the government to remove poverty – Unemployment – Poverty Eradication Program.

**UNIT - II**

Agriculture: Meaning, features and problems – Causes of Low Productivity – Green Revolution – Mechanization – Merits and Demerits

**UNIT-III**

Industrial Policy: 1956 and 1991 – Micro, Small and Medium Enterprises: Definition – Industrial Sickness: Problems, measures to prevent Sickness of Small Scale Industries.

**UNIT - IV**

Unemployment: Meaning – Types of unemployment – Nature of unemployment in India – Causes of unemployment – Remedial measures for unemployment

**UNIT - V**

Liberalization – Privatization – Globalization – Evolution – Functions of W.T.O – National Income: Concepts – Methods of measuring National Income – Importance and difficulties of measuring the National Income

**Text Book:**

1. Indian Economy, S.Sankaran, (1997), Revised & Enlarged Edition, Margham Publications.

**Reference Books:**

1. Indian Economy, Rudder Dott K.P.M. Sundharam, 48<sup>th</sup> Edition, S.Chand& Co. Ltd.
2. Indian Economy, S.K. Misra&V.K.Puri, 20<sup>th</sup> Edition, Himalaya Publishing House
3. Indian Economy, Ishwar C.Dhingra, 16<sup>th</sup> Edition, Sultan Chand & Sons
4. Indian Economy, A.N. Agarwal, (2002), 20<sup>th</sup> Edition, Wishwa Prakashan Publishing, New Delhi
5. Indian Economy-Problems, Practices and development, S.Sankaran, (2002), Revised& Enlarged Edition, Margam Publication

**Note:** Question paper shall cover 100% theory

**SEMESTER II - CORE 3**  
**UCOC21 - Financial Accounting-II**

**Credit: 4**

**Hours: 6**

**Objectives:**

To enable the learners to

- Have a glimpse of Specialised Business.
- Ascertain the financial position of Specialised Business.

**UNIT –I**

Consignment – Treatment of normal loss and abnormal loss – Calculation of unsold stock – Goods sent at cost price and invoice price – Accounting for goods sent on sale or return basis.

**UNIT-II**

Joint Venture – Meaning and methods of keeping books of accounts.

**UNIT –III**

Single entry system of book keeping – Conversion of single entry to double entry system.

**UNIT-IV**

Bills of exchange – Trading and accommodation bills – Renewals – Dishonor due insolvency – Retiring of bills.

**UNIT-V**

Branch accounts (excluding foreign branches) – Dependent branches – Independent branches – Goods and cash-in-transit – Inter branch transactions. Departmental accounts – Allocation of expenses – Inter departmental branches.

**Text Book:**

1. Fundamentals of Advanced Accounting- R.S.N.Pillai and Bagavathi / S.Chand& Co., New Delhi / 3<sup>rd</sup> revised Edition, 2012

**Reference Books:**

1. Advanced Accountancy – R.L, Gupta and Radhaswamy / Sultan Chand & Sons, New Delhi./ 13<sup>th</sup> revised Edition 2007
2. Financial Accountancy – Jain & Narang / Kalyani Publishers./17<sup>th</sup> Edition, 2011.

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER II - CORE 4**  
**UCOC22 - Web designing using HTML**

**Credit: 4**

**Hours: 5**

**UNIT – I**

Introduction to HTML-The Structure of HTML Program.

**Unit II**

Popular HTML Commands: Text formatting-paragraph breaks-Line breaks-Heading styles-Drawing lines-Bold-Italics-underline-centering text-images.

**Unit III**

Types of lists-ordered list-unordered list-tables-width & border attribute-cell padding-cell spacing attribute-col span and row span attribute.

**Unit IV**

Linking Documents-links-external document reference-Internal document reference-Image as hyperlink.

**Unit V**

Frames-Forms-buttons.

**LIST OF PROGRAMS:**

1. Create a simple webpage.
2. Add images to the webpage.
3. Format the text with physical styles.
4. Create a greeting card including marquee tag.
5. Create a hyperlink using text in your webpage.
6. Create a hyperlink using image in your webpage.
7. Program to list the items in ordered lists.
8. Program to list the items in unordered lists
9. Create a glossary style listing  
eg. Dictionary listing
10. Create and format the table
11. Create frames
12. Create a webpage to communication between frames
13. Create a resume using html forms.
14. Create a authentication form
15. Create a webpage for your department.

**Reference Books:**

1. HTML Complete 2<sup>nd</sup> Edition, BPB Publications New Delhi 10001, year 2002
2. HTML for the World Wide Web by Elizabeth Castro, 5<sup>th</sup> Edition,2006

**Note:** 100% Practical

**SEMESTER II – ALLIED 2**  
**UCOA22 - Business Ethics**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

1. Know about the concepts of Business Ethics.
2. Understand the basics of Corporate Governance.

**UNIT – I**

Business Ethics – Meaning and definition – Importance – Nature and factors influencing business ethics – Scope and Objectives – Characteristics of Business ethics.

**UNIT – II**

Ethical performance – Ethics and Business – Types of Ethics – Need for Business Ethics.

**UNIT – III**

Values – Norms – Beliefs – Moral Standards – Beliefs and their role – Moral Standards Vs Standard Morality – Ethical codes.

**Unit – IV**

Corporate Governance – Meaning – Importance and Features.

**Unit – V**

Environmental Ethics – Workplace Ethics - Ethics in Marketing and Consumer protection.

**Text Book**

1. Murthy, G.S.V. 2016. Business Ethics. 1<sup>st</sup>Edn. Himalaya Publishing House, Mumbai.

**Reference Books**

1. Badi, R.V. and Badi, N.V. 2005. Business Ethics. 2<sup>nd</sup>Edn. Vrinda Publication (P) Ltd., Delhi.
2. Gene Burton. Manab Thakur. 2006. Management today – Principles and Practice. 9<sup>th</sup> Reprint. Tata Mc Graw Hill Publishing Company Ltd., Delhi
3. Jain V.K. and Omprakashbiyani. 2008. Business Ethics & Communication. 2<sup>nd</sup> Revised Edn. S.Chand& Co Ltd., New Delhi.

**Note:** Question paper shall cover 100% theory



**SEMESTER III - CORE 5**  
**UCOC31 - VISUAL BASIC PROGRAMMING**

**Credit: 4**

**Hours: 5**

**Unit I**

Introduction to Visual Basic 6.0-Advantages of VB-starting VB.

**Unit II**

Integrated Development Environment-Menu bar-Toolbar-Toolbox-Properties window-Project Explorer window-Coding Environment-Compiling the Program.

**Unit III**

Controls-textbox-label button-frames-image box-picture box-difference between option button & check box-list box-combo box-timer control. VB components-Rich Text box-Common Dialog control-calendar control-slider-progress bar-status bar.

**Unit IV**

Designing user Interfaces-Menus-Toolbars & Tab strips

**Unit V**

Connecting to Databases-DAO,RDO,ADO-generating Reports

**List of Programs**

1. Design a Form with Text Box, Labels and Command Button to display your Bio-data
2. Design a Form to display the list of products by using list box control
3. Design a form for a Food Menu that is available in hotel using option buttons (Radio/Check Box).
4. Design a form to display an advertisement for a newly imported car in your company with animation effects.
5. Design a form to display the Tally Editor using Menus and Tabs. Design the Sub menus also.
6. Design a Form to perform Working Capital Analysis by declaring Finance Function using Flex Grid control.
7. Design a Form to compare the yearly sales of two Departmental Stores using Line and Chart Controls by declaring variables.
8. Design a Form to present product details like purchases, sales, profit etc. by declaring array functions and present the details in a Rich text Box(RTB).
9. Design a form to display the stages involved in manufacturing a Product using slider control.
10. Design a Chelan of a Indian Bank to pay amount in your account.
11. Design a Form to display the highlights of the Budget using option button and Animation.
12. Design a Super market Bill to display the Sales Invoice, and create Data Base using Data control, Option Button, Check Box, Date picker etc.
13. Design the Form to create a database for 10 customers using DAO control.
14. Design a Form to display the inventory control records using data object.
15. Design an Employee Payroll using ADO control

**Text Book**

The Complete reference Visual Basic 6 by Neol Jereke, Tata MC-Hill Publications  
new Delhi,2001

**Reference Book**

Visual Basic Projects by GaGawSahoo, 1<sup>st</sup> edition-2002

**Note:** 100% Practical

**SEMESTER III - ALLIED 3**  
**UCOA33 - Business Statistics**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

1. Provide an exposure to statistical tools.
2. Enhance their statistical application skills.

**UNIT – I**

Business statistics – Meaning – Definition – Objectives – uses and Limitations – Functions – Statistics and Business – Primary and Secondary Data – Sampling and Methods of Sampling – Collection, Classification and Tabulation of data – Diagrammatic and Graphical presentation of data.

**UNIT – II**

Measures of Central Tendency – Arithmetic mean – Median – Mode – Geometric mean – Harmonic mean – Measures of Variation – Range – Quartile Deviation – Mean Deviation – Standard Deviation.

**UNIT – III**

Measures of Skewness and Kurtosis – Karl Pearson's Coefficient of Skewness – Bowley's Coefficient of Skewness – Correlation – Methods of studying Correlation – Scatter diagram method – Karl Pearson's method – Spearman's Rank Correlation method.

**UNIT – IV**

Regression – Regression Lines - Regression Equations – Time Series – Utility of Time Series Analysis – Components of Time Series – Secular Trend – Seasonal Variations – Cyclical Variations – Irregular or Erratic Variations – Measurement of Trend – Freehand or Graphic method – Method of Semi-averages – Moving averages method – Method of Least Square.

**UNIT – V**

Index Numbers – Definitions – Uses – Types of Index Numbers – Methods of constructing Index Numbers – Un-weighted Index Numbers – Weighted Index Numbers – Quantity and Volume Index Numbers – Cost of Living Index Number - Test of adequacy of Index Number Formulae – Unit Test – Time Reversal Test – Factor Reversal Test – Circular Test – Steps in constructing a Chain Index.

**Reference Books:**

1. R.S.N.Pillai&Baghavathi – Statistics Theory and Practice – S.Chand&Company Ltd – New Delhi.
2. S.P.Gupta&M.P.Gupta – Business Statistics – Sultan Chand&Sons, New Delhi.
3. S.P.Gupta – Statistical Methods – Sultan Chand&Sons, New Delhi.

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER III – ELECTIVE 1**  
**UCOE31 - Computer Applications in Business**

**Credit: 3**

**Hours: 4**

**Objectives:**

- To provide basic knowledge about the Basics of computers and windows operating system.
- After the successful completion of the course the student will come to know how to work on MS Office and application of internet in business.

**UNIT-I**

Introduction to computers: Definition, characteristics and generation of computers – element of computers – Hardware – CPU – Primary and secondary memory – Input and output devices – Features of computers – classification – parts of a computer system.

**UNIT-II**

Windows operating system – features of windows-Multimedia tools: Introduction – graphics effects & techniques – sound & music – video – multimedia author tools – Virtual reality.

**UNIT-III**

Word basics – Creating Word Documents – Business Letters – Editing – Inserting Objects – Working with tables – Mail Merger – Microsoft Excel – Introduction to Spreadsheet (MS Excel) – Electronic Spread Sheet – Structure of Spread Sheet and its application to Accounting.

**UNIT-IV**

Introduction to Internet and its basic concept – Uses of Internet – worlds wide web – Services of internet, features and benefits – browsing –locating information in web-protocols – internet address WWW – HTML – Web browsers – Searching the web.

**UNIT-V**

Application of Internet in Business – Overview of E–Commerce – Online Business Model – Mobile Commerce (M–Commerce) – Applications – Security issues – E-Banking applications in Business.

**Reference Books:**

1. Using information technology-Brief version, practical introduction to computers and communications, Stacey sawyer brain, K.Williams, Sarath K. Hutchinson, Second edition, McGraw Hill Publications.
2. A Text of information technology –R.Saravanakumar, S.Chand New Delhi-2003/3<sup>rd</sup> edition.

**Note:** Question paper shall cover 100% theory

**SEMESTER III - NON MAJOR ELECTIVE 1**  
**UCON31 - Fundamentals of Insurance**

**Credit: 2**

**Hours: 2**

**Objective:**

- To impart theoretical base on fundamental principles of insurance business

**UNIT - I**

Introduction to Insurance – Meaning, Definition of insurance – General principles of insurance –Types of insurance life, fire and marine – Difference between life and other types of insurance, Growth & Development of Indian insurance industry – Regulations of insurance business and the emerging scenario.

**UNIT-II**

Life Insurance – Introduction to life insurance: Features of life insurance – Essentials of life insurance, Different types of life policies – Annuities, Formation of life insurance contracts- Assignment and nominations – Lapses and revivals of policies. Surrender value, paid up value, Loans – Claims – Procedure for claims- Settlement of claims – Death and Maturity.

**UNIT-III**

Fire Insurance – Fire insurance contracts- Fire insurance coverage – Policies for stocks – Rate fixation in fire insurance – Settlement of claims. Marine Insurance – Functions – Marine perils – Types of marine policies – Clauses in general use – Warranties and conditions- proximate cause – subrogation and conciliation – Re-insurance – Double insurance –Types of marine losses.

**UNIT-IV**

Miscellaneous Insurance – Motor insurance – Employer's liability insurance – Personal accident and sickness insurance – Aviation insurance – Burglary insurance – Fidelity guarantee insurance – Engineering insurance – cattle insurance – Crop insurance.

**UNIT-V**

Procedure for becoming an Agent – Pre-requisite for obtaining a license – Duration of license – Cancellation of license – Termination of agency – Code of Conduct – Functions of the Agent.

**TEXT BOOKS:**

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

**Note:** Question paper shall cover 100% theory

**SEMESTER III - SBE 3**  
**UCOS31 - Fundamentals of Investment**

**Credit: 2**

**Hours: 2**

**Objective:**

To familiarize the students with

- Different investment alternatives introduce them to the framework of their analysis and valuation and highlight the role of investor protection.

**UNIT – I:**

**The Investment Environment** – The investment decision process, Types of Investments – Commodities, Real Estate and Financial Assets, the Indian securities market, the market participants and trading of securities, security market indices, sources of financial information, Concept of return and risk, Impact of Taxes and Inflation on return.

**UNIT – II:**

**Fixed Income Securities** – Bond features, types of bonds, estimating bond yields, Bond Valuation types of bond risks, default risk and credit rating.

**UNIT – III:**

**Approaches to Equity Analysis** – Introductions to Fundamental Analysis, Technical Analysis and Efficient Market Hypothesis, dividend capitalisation models, and price-earnings multiple approach to equity valuation.

**UNIT –IV:**

**Portfolio Analysis and Financial Derivatives** – Portfolio and Diversification, Portfolio Risk and Return; Mutual Funds; Introduction to Financial Derivatives; Financial Derivatives Markets in India

**UNIT – V:**

**Investor Protection** – Role of SEBI and stock exchanges in investor protection; Investor grievances and their redressal system, insider trading, investors' awareness and activism

**Reference Books:**

1. C.P. Jones, Investments Analysis and Management, Wiley, 8th Edition.
2. Prasanna Chandra, Investment Analysis and Portfolio Management, McGraw Hill Education
3. R.P. Rustogi, Fundamentals of Investment, Sultan Chand & Sons, New Delhi.
4. N.D. Vohra and B.R. Bagri, Futures and Options, McGraw Hill Education
5. Mayo, An Introduction to Investment, Cengage Learning.

**Note:** Question paper shall cover 100% theory

**SEMESTER IV - CORE 6**  
**UCOC41 - Business Finance**

**Credit: 4**

**Hours: 4**

**Objectives**

To enable the students to

1. Understand the concepts of Business finance
2. Know the short term and long term source of finance

**UNIT – I**

Introduction to Business Finance: Meaning – Significance – Factors of financial management – Objectives - Role of finance Manager – Interrelationship between investment, financing and dividend decisions.

**UNIT – II**

Long Term Sources of Finance: Financial needs – Sources of raising finance – Equity shares- Preference shares – Retained Earnings – Debentures – Long term loans from financial Institutions and Commercial banks.

**UNIT – III**

Short Term Sources of Finance: Trade credit – Advances from customers – Discounting of Bills of Exchange – Bank Overdraft – Cash credit – Letter of credit – working capital demand loan commercial paper – Advances against goods – Financing of Export trade by banks – Public Deposit

**UNIT – IV**

Working Capital Management: Meaning - Purpose – Operating cycle – Concepts – Types – Optimum Working capital – Factors determining the working capital – Estimation of working capital requirements.

**Unit – V**

Cash Management: Meaning – Objectives – Need for cash – Cash planning – Cash Budget – Utility of Cash Budget – Methods of cash forecasting – Optimum cash balance.

**Reference Books:**

1. S.N. Maheswari; Financial Management, Sultan Chand & Sons, New Delhi.
2. M. Pandey; Financial Management, Vikas Publishing House, New Delhi.
3. R.P.Rusthagi; Financial Management , Sultan Chand & Sons, New Delhi.
4. M.Y. Khan and P.K.Jain; Financial Management , Tata McGraw Hill, New Delhi.

**Note:** Question paper shall cover 40% theory and 60% problem

**SEMESTER IV - CORE 7**  
**UCOC42 - Fundamentals of 'C' (Theory)**

**Credit: 4**

**Hours: 4**

**UNIT –I**

Introduction to C Language- Importance of C – Structure of C program – C Character set - Identifiers – keywords – Data type – Constants – variables – declarations – expressions – operation – arithmetic operators. Unary operator – Relational and Logical operators – assignment operators – The conditional operators.

**UNIT – II**

Storage classes: Automatic, Register. Static and External classes, control structures decision control structure – Loop control structure – case control structure – data input; and output; get char, putchar, scant, printf, get, puts.

**UNIT –III**

Arrays: definition – One dimensional array-Two dimensional arrays – multidimensional arrays, strings and string functions, strepy, strlen, strcat, stemp.

**UNIT –IV**

Functions –User defined functions –structures and Union.

**UNIT –V**

Pointer, file management in C – Defining and opening a file – closing file – I/O operation filer – Error handling – command line argument.

**Text Book**

E.Balaguruysamy, Programming in ANSIC, Edition 2.1, Edition Tata McGraw Hill Publishing Companion 2002

**Note:** Question paper shall cover 100% theory



**SEMESTER IV – ALLIED 4**  
**UCOA44 - Company Secretarial Practice**

**Credit: 4**

**Hours: 3**

**Objectives**

To enable the students to

- Understand the proceedings of the company
- Acquire knowledge on the secretarial practices adopted by the company

**UNIT – I**

Joint Stock Company – Definition – Characteristics – Kinds of companies – Differences between a Joint Stock Company and a Partnership Firm – Promotion of a Company.

**UNIT – II**

Company Secretary – Definition – Legal position of a Company Secretary – Appointment – Role, Responsibilities and Functions of a Company Secretary.

**UNIT – III**

Incorporation of a Company – Procedure for Incorporation of a Public Limited Company and Private Limited Company – Duties of secretary in connection with Promotion and Incorporation of a company.

**UNIT – IV**

Duties, Rights and Liabilities of a Company Secretary.

**UNIT – V**

Company meetings – Objectives – Secretarial Duties relating to various meetings.

**Text Book**

1. Santhi J. 2016. Company Law and Secretarial Practice. 1<sup>st</sup>Edn. Margham publications, Chennai.

**Reference Books**

1. Premavathy, N. 2015. Company Law & Practice. 1<sup>st</sup>Edn. Sri Vishnu Publications, Chennai,
2. Ghosh, P.K. Balachandran, 2009. V. Company Law & Practice, S.Chand& Co. Ltd. New Delhi.
3. Kapoor, N.D.2005. Elements of Mercantile Law. Sultan Chand & sons, New Delhi.

**Note:** Question paper shall cover 100% theory

**SEMESTER IV – ELECTIVE 2**  
**UCOE42 - Business Mathematics**

**Credit: 3**

**Hours: 3**

**Objectives**

To enable the students to

- Get the mathematical skill for Business
- Appear confidently to the Competitive examinations.

**UNIT – I**

Common Arithmetic - Simple Interest – Compound Interest – Nominal rate, Effective rate of Interest – Depreciation – Annuity – Discount – Bankers Gain – Percentage – Stock and Shares – True Discount.

**UNIT – II**

Ratio – Definition- Inverse ratio – Compound ratio – Duplicate ratio – Triplicate ratio – Proportion – Meaning – Direct proportion – Indirect proportion – Compound proportion – Simple proportion – Continued proportion – Variation – meaning – Direct variation – Inverse variation – Joint Compound variation.

**UNIT – III**

Sets, Relations And Functions – Basic concepts – Subset – Operations on sets – Cartesian product of two sets – Relation – Properties of Relation – Functions – Functional representation – Finding function.

**UNIT – IV**

Matrices - Basic concepts – Determinants – Addition of matrices – Scalar multiplication – Multiplication of a matrix by a matrix – Inverse of a matrix.

**UNIT – V**

Differential Calculus – Standard Forms – Rules of differentiation – Application of Differential calculus in business – Simple marketing models – Equipment replacement problem.

**Text Books**

1. Manoharan, M. Elango, C. and Eswaran, K.L. 2009. Business Mathematics. 4<sup>th</sup>Edn. Palani Paramount Publications, Palani.
2. Sundaresan, V. and Jeyaseelan, S.D. Reprint 2010. An introduction to Business Mathematics. 4<sup>th</sup>Edn. S.Chand and Company Ltd., New Delhi.

**Reference Books**

1. Agarwal, R.S. 2005. Mathematics for M.B.A. 22<sup>nd</sup>Edn. S.Chand and Company Ltd., Delhi.
2. Jebaraj, P.C. 2002. Easy approach to Business Mathematics. 2<sup>nd</sup>Edn. Nirmala Publications, Tirunelveli.
3. Rajagopalan, S.P. Sattanathan, R. 2005. 2<sup>nd</sup>Edn. Business Mathematics. Vijay Nicole imprints Private Limited, Chennai.

**Note:** Question paper shall cover 40% theory and 60% problem

**SEMESTER IV – NME 2**  
**UCON42 - Accounting Fundamentals with Tally (Practical)**

**Credit: 2**

**Hours: 2**

**Objectives:**

To enable the student to understand

- The basic concept of accounting
- Applications of accounting by using accounting software
- To make the students to learn about the application of computers in accounting.

**Unit - I**

Accounting packages: Computers and financial application, Accounting software packages. Computerized Accounting – Meaning and Features – Advantages and Disadvantages – Computerized Vs Manual Accounting

**Unit – II**

Introduction of Tally: Starting Tally – Gateway to Tally and exit from Tally: Company creation in Tally, Saving the company profile - Alteration / Deletion of company, Selection of company.

**Unit - III**

Account groups and ledgers: Hierarchy of account groups and ledgers, reserved account groups, account groups balance sheet – Account groups of liabilities, account groups of assets account groups of profit & loss account – Account groups of direct income and direct expenses apart from sale and purchases, indirect income and indirect expenses account masters – Account groups creation and account ledgers creation - Feeding of opening balances, alteration / deletion of account master records - Feeding of closing stock value

**Unit - IV**

Grouping of accounts – Creation - Accounts and inventory – Entering transactions: Vouchers – Types – Numbering – Deleting and Editing vouchers – Opening and closing balances – Stock valuation

**Unit - IV**

Reports: Petty cash book – Trial balance – Profit and loss account – Balance sheet – Group wise - Accounts wise – Data range reports – Stock reports – Budget variance reports – Transactions list – Accounts list.

**Text & Reference Books (Latest revised edition):**

1. Computer Application in business - S.V.Srinivasa Vallabhan, Sultan Chand and sons.
2. Computer Application in Accounting software – P.Kasivairavan, Friends publication.
3. Computer Applications in Business – Mohankumar K & Rajkumar S, Vijay Nicole Imprints (P) Ltd
4. Implementing Tally – A.K. Nadhani, BPB Publications.
5. Computer Application in Business – R. Paramasivam, S.Chand & Co, New Delhi.
6. Computer Application in Business - Joseph Anbarasu, Learntech Press

**Note:** 100% Practical

**SEMESTER IV - SBE 2**  
**UCOS42 - Creative Advertising (Practical)**

**Credit: 2**

**Hours: 2**

**Objectives:**

- To highlight the importance of advertising as a business strategy.
- To explain how creativity can be incorporated in an advertisement.
- To understand the communication process that takes place while advertising and to analyse it from the view point of a customer.

**UNIT – I**

Creative Advertising Meaning – definition of marketing and advertising – functions of advertising – communication and persuasion process – human communication process – advertising exposure model – applying communication process to advertising.

**UNIT – II**

Consumer Behaviour Consumer Behaviour – consumer decision making process – consumer perception process

**UNIT – III**

Creative Advertising Creativity in advertising, creative thinking – Creative process – Appeals – Copy Writer – Copy Writing – Print Copy elements, Headlines – body Copy – Slogan elements of design and principles of design.

**UNIT – IV**

Designing Designing Print Ad – choosing format – designing page – choosing type faces – working with visuals – lay-out ready for print. Course

**UNIT – V**

**Advertising** and Media strategy – Role of Media; types of media, their advantages; and disadvantages; media planning, selection & scheduling strategies

**Text Book:**

1. Chunawalla&K.C.Sethia, Foundation of Advertising Theory & Practice, Himalaya Publishing House, New Delhi, 2000 Course

**Reference Books**

1. William H. Bolew, Advertising,
2. John Wiley & Sons, New York, 1995
3. Courtland Bovee John Thill& George Dovel, Advertising Excellence,
4. Tata Mc Graw Hill Publications, New Delhi, 1995.

**Note:** 100% practical

**SEMESTER V - CORE 8**  
**UCOC51 - Cost Accounting**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

- Learn the mechanics of cost records and management of cost.
- Understand the various costing methods and their suitability.

**UNIT – I**

Definition of costing – importance – uses – objects – advantages – difference – between cost and financial accounting – installation of costing system – analysis and classification of cost – Preparation of cost sheet.

**UNIT – II**

Materials – Purchase procedure – requisition of material control – recording and controlling of material department – maintenance stores – minimum level – economic order quantity – Perpetual inventory – control over wastage and scrap and s spoilage.

**UNIT – III**

Methods of remunerating labour-incentive schemes-idle time –control over idle time  
Labour turnover-measurement.

**UNIT – IV**

Accounting overhead-fixed and variable overheads of changing overheads-allocation and apportionment-absorption-Distinction Between works overheads, administrative, overhead, selling and distribution of service overheads.

**UNIT – V**

Process costing – normal loss – abnormal loss – abnormal gain – equivalent production  
(Excluding by – products and joint products)

**Text Book:**

1. Cost Accounts – S.P.Jain&K.L.Narang/ Kalyani Publishers / 7<sup>th</sup> Edition

**Reference Books:**

2. Cost Accounts-P.P.DasGupta/ Sultan chand& Sons, New Delhi/ 7<sup>th</sup> Edition
3. Business Organisation& Management – V.K. Bhushan/ S.Chand/ Reprint 2003

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER V - CORE 9**  
**UCOC52 - Corporate Accounting**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the Students to

- Understand the concept of companies from formation to liquidation.
- Develop the skills in preparing accounts of Joint Stock Companies.

**UNIT – I**

Accounting Procedure for issues of shares at par, at discount and at premium call in advance – calls in arrear for feature of shares – Re-issue of shares at discount and premium – underwriting of shares, redemption of preference-underwriting of shares, redemption of preference shares.

**UNIT – II**

Valuation of shares and goodwill in joint stock companies

**UNIT – III**

Meaning and definition of company-Kinds of joint stock companies-Formation of a company – commencement of business- Prospectors – issue of share capital-kinds of shares.

**UNIT – IV**

Acquisition of business- Profit prior to incorporation – preparation of financial accounts-requirements as per schedule IV part I and II.

**UNIT – V**

Amalgamation – Absorption – Internal and external reconstruction of joint stock companies.

**Text Book:**

1. Advanced accountancy by R.L.Gupta&Radhaswamy, Sultan Chand &sons, Delhi. 13<sup>th</sup> Edition 2007
2. Corporate Accounting by T.S.Reddy&A.Murthy / Margham Publication, Chennai / 6<sup>th</sup> revised edition 2007, reprint 2010

**Reference Book:**

1. Corporate accountancy by R.L.Gupta&Radhaswamy.Sultan Chand &sons , Delhi. 13<sup>th</sup> Edition 2007
2. Advanced accounting by S.P.Jain&Narang ,Kalyani Publishers 17<sup>th</sup> Edition 2011./reprint 2005.
3. Corporate Accounting by S.N.Maheswari&S.K.Maheswari / Sultan Publisher/4<sup>th</sup> edition

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER V - CORE 10**  
**UCOC53 - Tally ERP (Practical)**

**Credit: 4**

**Hours: 5**

**Objective**

To enable the student to understand

- The basic concept of accounting
- Applications of accounting by using accounting software

**UNIT –I**

**Accounting Masters in Tally, ERP 9**

Accounting configuration & features – group creation – multiple group creation – ledger creation – multiple ledger creation – new voucher creation- advance ledger creation.

**UNIT – II**

**Inventory in Tally, ERP**

Inventory configuration features – inventory info. Menu – stock groups – stock categories – stock items – unit of measurement – bills of materials – locations / godowns.

**UNIT – III**

**Voucher Entry in Tally, ERP 9**

Accounting vouchers – inventory vouchers – invoicing – optional & non-accounting voucher – order processing – advanced voucher entry.

**UNIT – IV**

**Advanced Accounting in Tally, ERP 9**

Bill-wise details – cost centers and cost – categories – bank reconciliation – interest calculations – cheque printing credit limits – budgets & controls.

**UNIT –V**

**Introduction to GST**

GST Registration – supply of goods and services – place of supply – time of supply – value of supply – invoicing – input credit mechanism – e-way bills – returns – payment of Tax.

**PROGRAMMES FOR TALLY GST**

**PRACTICALS**

1. Creating A Company Using Tally.ERP 9 For GST Compliance.
2. Updating Stock Items and Stock Groups For GST Compliance
3. Updating Party GST In
4. Creating GST Ledgers
5. Creating Income and Expense Ledgers
6. Recording GST Sales Invoice
7. Recording GST Purchase Invoice
8. Stock Transfer Journal
9. Stock Summary
10. Trial Balance
11. Balance Sheet
12. GSTR - 1
13. GSTR 2
14. GSTR 3 B
15. E-Way Bill

**Note:** 100% Practical

**SEMESTER V - CORE 11**  
**UCOC54 - Programming in 'C' (Practical)**

**Credit: 4**

**Hours: 5**

**LIST OF PROGRAMS**

1. Create a program to find the sum and average of two numbers.
2. To check whether the given numbers are prime (or) not.
3. Armstrong Checking.
4. Perfect number checking
5. Matrix multiplication
6. Matrix addition
7. Armstrong number checking
8. Program to check the biggest of three numbers.
9. Program to convert numbers into words.
10. Program to count the number of odd, even, positive and negative numbers.
11. Program to arrange the items in alphabetical order.
12. Program using string functions.
13. Factorial of a number using recursive function.
14. Program using structures and unions.
15. Write a program to create a file with following field.
  - ❖ Name
  - ❖ Register Number
  - ❖ Marks (5 Subjects)
  - ❖ Total
  - ❖ Average
  - ❖ Result

**Reference Books**

1. E. Balagurusamy, programming in ANSIC, Edition 2.1, Edition, Tata MC Hill Publishing Companion, 2002.
2. Let us C – Yashavanth kanetkar, Edition 3 BPB Publications 1999.
3. M.G. Venkateshmoorthy, Programming Techniques through c A Beginners companion person Education, New Delhi 2002.
4. S.S. Khandare programming in C & C++ Chanda & Company & Ltd, New Delhi. 2002.

**Note:** 100% Practical



**SEMESTER V - CORE 12**  
**UCOC55 - Income Tax**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

- Know the basic concepts of Income-tax.
- Acquire knowledge on various heads of incomes.

**UNIT – I**

Income tax Act-meaning of income – important definitions under the Income tax Act – Scope of the total Income – Residential status – Income exempt from tax-capital, revenue – Agricultural Income

**UNIT – II**

Income from salaries-scope of salary income – taxable perquisites of perquisites – deduction from salary income. Income from the house property – definition of annual value – deduction from annual value.

**UNIT – III**

Income from business and profession-basic principles of arriving at business Income – Losses incidental to trade – specific deductions in computing income from business – general deductions – instances of general deductions under section 37 (1) – specific disallowances under the act.

**UNIT – IV**

Income under capital gains, short term and long term capital gains – transfer of capital assets – Certain transactions not included as transfer – computation of capital gains – cost of acquisition – Cost of improvement of cost – capital gains under different circumstances – Exempted capital gains.

**UNIT – V**

Income from other sources-deductions in computing income under this head.

**Text Book:**

1. Income tax theory, law & Practice – T.S.Reddy&Y.HariPrasad Reddy /new edition 2013-2014/Margam Publications.

**Reference Books:**

1. Income tax law and practice –Bhagawati Prasad/wishwaprakashan publishers/28<sup>th</sup> edition.
2. Income tax law and practice-Gaur and Narang/Kalyanipublishers(2004)/32 revised edition.
3. Income tax and Law and practice-Mehrotra/SathyaBhawanPublications(2009-10)/30<sup>th</sup> edition.

**Note:** Question paper shall cover 40% theory and 60% problem

**SEMESTER V – ELECTIVE 3**  
**UCOE53 - Business Environment**

**Credit: 3**

**Hours: 3**

**Objectives**

To enable the students to

- Familiarize with the changing business environment
- Have a clear insight into the global business environment and its impact.

**UNIT – I**

Business environment – Meaning – Internal environment and external environment – Need for environmental awareness – Benefits and limitations of environmental analysis – Social responsibilities of business.

**UNIT – II**

Economic Environment of business – Nature of Economic Environment – Privatisation – Disinvestment – GNP – Per capita Income.

**UNIT – III**

Political Environment of Business – Critical elements of political environment – Government and business.

**UNIT – IV**

Legal Environment – Changing dimensions of legal environment in India – Competition Act 2002 – FEMA and licensing policy – Consumer Protection Act.

**UNIT – V**

Ecological Environment - Ecology and Business – Pollution Agents – Ways of preventing industrial pollution – Environment Protection Act, 1986 – Incentives for pollution control measures – Sustainable Development – Impact of Ecological Environment on Industries

**Text Book**

1. Francis Cherunilam. 2006. Business Environment. 14<sup>th</sup> Revised Edn. Himalaya Publishing House, Mumbai.

**Reference Books**

1. Agarwal, V.K., and Rohatgi, K.B. 2005. Consumer Protection in India. Deep and Deep Publications, New Delhi.
2. Aswathappa, K. 2016. Essentials of Business Environment. 12<sup>th</sup> Revised Edn. Himalaya Publishing House, Mumbai.
3. Chowdhry, N.K., and Agarwal, G.J.C. 2005. Dunkel Proposals (Vol. I Vol.II), Vikas Marg, New Delhi.

**Note:** Question paper shall cover 100% theory

**SEMESTER V - SBE 3**  
**UCOS53 - Commerce (Practical)**

**Credit: 2**

**Hours: 2**

**Objectives:**

- To provide practical knowledge to fill forms like insurance, bank, loan application, membership form, income tax return forms etc.

**LIST OF EXERCISES FOR COMMERCE PRACTICAL**

**UNIT – I**

1. Preparation of invoice, receipts, vouchers, delivery challan, entry pass, gate pass-debit and credit notes.
2. Preparation of Application for shares and allotment - letter of shares Allotment - transfer forms.

**UNIT – II**

1. Drawing, endorsing and crossing of cheques- filling up of pay in slips demand draft application and preparation of demand drafts
2. Making entries in the passbook and filling up of account opening forms for SB account, current account and FDR's.
3. Drawing and endorsing of bills of exchange and promissory notes.

**UNIT – III**

1. Filling up of application forms for admission in cooperative societies.
2. Filling up of loan application forms and deposit challan.
3. Filling up of Jewel loan application form, Procedure for releasing of jewellery in jewel loans and repayment.

**UNIT – IV**

1. Preparation of agenda and minutes of meetings-both general body and board of directors.(students are asked to write agenda and minutes of their own and should not use printed format)
2. Using Bin card and inventories.
3. Using Cost Sheets.

**UNIT – V**

1. Filling up of an application form for LIC policy, filling up of the premium form-filling up the challan for remittance of premium.
2. Preparation of an advertisement copy, collection of advertisement in dailies and journals, critically evaluating the advertisement copy.
3. Filling up income -tax returns and application for permanent account number.

**Note:**

Students may be asked to collect original or Xerox copies of the documents and affix them on the record note book after having filled up. Drawing of the documents should not be insisted.

**Note:** 100% Practical

**SEMESTER VI - CORE 13**  
**UCOC61 - Business Management**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To make the students to get acquainted with the basic Principles of Management.
- On successful completion of this course, the students will get an opportunity to examine and apply appropriate theories / concepts about managing the business effectively.

**UNIT – I**

Introduction to Management: Definition & Meaning of management – Functions of Management – Managerial skills – levels of management – roles of manager, Management as a Science or Art – Approaches to Management – Contribution to management by F.W. Taylor, Henry Fayol, Elton Mayo and Peter F. Drucker.

**UNIT – II**

Planning: Planning – Importance – Process of planning – Types of planning methods (Objectives- Policies – Procedures – Strategies & Programmes) – Obstacles to effective planning - Decision making – Steps – Types – Decision tree.

**UNIT – III**

Organization – Importance – Principles of Organizing – Delegation & Decentralization – Departmentation – Span of Management. Organizational structure – line & functional – organizational charts and manual – making organizing effective – staffing – recruitment – selection – Training, promotion and appraisal.

**UNIT – IV**

Directing: Function of directing – Motivation – Theories of motivation – Maslow, Herzberg Theories. Communication – Process – Barriers to effective communication. Leadership – Definition – Theories and approach to leadership – styles of leadership – Types.

**UNIT – V**

Co-ordination and Control: Nature – Problems of effective co-ordination. Control – Nature – Basic control process – control techniques (traditional and non-traditional) – Use of computers in managing information.

**Reference Books:**

1. Gupta .B. Business Management, Sultan Chand & Son, New Delhi, 2011.
2. Koontz, O'Donnell, Weirich, Essentials of Management, Tata McGraw Hill Publishing Comp Ltd., New Delhi, Edition, 1998.
3. PagareDinkar, Principles of Management, Sultan Chand & Sons, New Delhi, 2003,

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - CORE 14**  
**UCOC62 - Management Accounting**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To develop an understanding of the conceptual frame work of management accounting.
- To acquaint the students, the Management Accounting Techniques that facilitates managerial decision making.

**UNIT – I**

Management accounting-meaning objectives-relationship between cost, financial and management accounting – financial statements analysis and interpretation – ratios – their significance-uses – their significance-limitations analysis for liquidity, profitability and solvency only excluding Projection through ratios.

**UNIT – II**

Fund flow and cash flow analysis-forecasting of funds requirements

**UNIT – III**

Standard costing and variance analysis (simple problem only)

**UNIT – IV**

Marginal costing-Objects –advantages – limitations – Breakeven point (simple problem only)

**UNIT – V**

Decision involving alternate choice-concepts of decision making – concepts of relevant and differential cost – steps in decision making – sales mix – exploring new markets – discounting products line – make or buy decisions – equipment replacement – shutdown or continue

**Text Book:**

1. Management Accounting - Ramachandram&Srinivasan / Sriram Publication, Tiruchy / 11<sup>th</sup> edition 1997
2. Management Accounting – R.S.N.Pillai& V/Bagavathi / S.Chand& company LTD / 1<sup>st</sup> edition revised 1999.

**Reference Book:**

1. Principles of Management Accounting-S.N.Maheswari/ sultan, Chand & sons,/ 13 revised edition 2001.

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER VI - CORE 15**  
**UCOC63 - E-Commerce**

**Credit: 4**

**Hours: 5**

**UNIT – I**

E-Commerce, meaning-Definition reasons for the growth of E-commerce – importance of E-commerce – objectives of E-commerce infrastructure – anatomy of E-commerce application

**UNIT – II**

E-Business – Potential benefits of E-Commerce – Impact of E-Commerce on Business models – E-Commerce applications – Consumer to Business (C2B) – Business to Consumer (B2C) – Consumer to Consumer (C2C) – Internal business process (intra organizational E-commerce), their features and applications.

**UNIT – III**

Advertising and marketing: information based marketing Advertising on the internet on line advertising – types – charting the on line marketing process market research – search and resource Discovery

**UNIT – IV**

Electronic Data Interchange (EDI) meaning Definition importance of EDI – EDI and Email – EDI and E-commerce EDI application in business implementation of EDI – legal, security and privacy issues. Firewall – meaning types – firewall and Electronic data securities.

**UNIT – V**

Electronic payment system – Types of payment systems in E-commerce E-cash e-checks-Smart Cards – Credit cards (plain credit card, encrypted credit card and third party verification) Encryption and credit card – On-line Third party processors (OTTP) – Risks in electronic payments designing electronic payments system.

**Books Reference:**

1. Frontiers of Electronic commerce, Kalakota&Whinston, Person Education, Delhi, 6<sup>th</sup> impression,2008.

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - CORE 16**  
**UCOC64 - Business Tax**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To provide an in depth knowledge of the provisions of Income Tax Act.
- To enable the students to access the financial status of the organization and individual and filing of returns.

**UNIT – I**

Total income – deduction in the computation of total income – setoff And carry forward losses.

**UNIT – II**

Assessment of individuals – Hindu Undivided Family – Joint stock companies – Partnership firms.

**UNIT – III**

Income Tax administration – machinery for taxation – central board of Taxed – directorate of inspection – commissioner of income tax – appellate Tribunal

**UNIT – IV**

Procedure for assessment self assessment – Provisional assessment – reassessment – best judgment assessment – expert assessment – rectification of mistakes.

**UNIT-V**

Collection & recovery – refund of tax deduction of tax at source advance payment of tax – tax credit certificate.

**Text Book:**

1. Income tax theory, law & Practice – T.S.Reddy&Y.HariPrasad Reddy / Margham Publications / 11<sup>th</sup> Edition 2012.

**Reference Books:**

1. Income Tax Law & Practice-Bagavathi Prasad, WishwaPrakashan Publication.
2. Income Tax Law & Practice-VinodK.Singhania/Taxmann Publication Pvt Ltd
3. Income Tax Law & Practice-H.C.MehorthaSahityaBhawan Publications

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - CORE 17**  
**UCOC65 - Programming in C ++ (Practical)**

**Credit: 4**

**Hours: 5**

**Unit I**

C++ Statements – Structure of C++ Program.

**Unit II**

Operators in C++-Control Structures-Functions in C++.

**Unit III**

Arrays-Constructors-Destructors

**Unit IV**

Operator Overloading.

**Unit V**

Inheritance.

**LIST OF PROGRAMS**

1. Write a program to find the sum and average of 3 numbers.
2. Find GCD of the given two positive integers.
3. Find LCM of the given two positive integers.
4. To find the square and cube of the number using inline function.
5. Create a class to find the area and perimeter of the rectangle.
6. Create a class to implement the stack.
7. Create a class to implement the queue.
8. Write a program to find, the maximum using overloading function.
9. Write a program to overload unary minus operation.
10. Write a program to overload binary operation.
11. Write a program to illustrate the constructor.
12. Write a program to show static data member function.
13. Write a simple program to illustrate single inheritance.
14. Write a program to illustrate multilevel inheritance.
15. Write a program to illustrate multiple inheritances.

**Reference Book**

**E.Balagurusamy**, “Object Oriented Programming with C++”, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2003.

**Note:** 100% Practical



**SEMESTER VI - ELECTIVE 4**  
**UCOE64 - Business Law**

**Credit: 3**

**Hours: 3**

**Objectives:**

- To cultivate understanding of the various Trade Laws of Land - with an expert knowledge of Indian Contract Act, Sale of Goods Act.
- To provide comprehensive understanding of rights, duties and responsibilities of the parties entering into business dealings

**UNIT – I**

Law of contracts – Introduction – Definition – Essentials – Offer – Acceptance – Consideration – Capacity of parties – Free Consent – Coercion – Undue influence – Fraud and Misrepresentation.

**UNIT – II**

Legality of object and consideration – Agreements opposed to public policy – Wagering agreement – Wagering agreement Vs. Contract of Insurance – Contingent Contract – Performance of contracts – Breach of contracts – Remedies for breach of contract.

**UNIT – III**

Contract of agency – Creation of agency - Kinds of agents – Rights and duties of agent and principal – Liability of principal and agent towards third parties - Termination of agency.

**UNIT – IV**

Sale of Goods Act – Formation of contract – Distinction between Sale and Hire Purchase – Classification of goods – Conditions and Warranties – Rights of unpaid sellers.

**UNIT – V**

Intellectual Property Rights –Definition – Need – Role of WIPO – Types of Intellectual property – Patent, Copyrights and Trademarks – Meaning – Steps involved in Registration of Patent, Copy Right and Trade Mark.

**Text Book**

1. Kapoor, N.D. 2015. Elements of Mercantile Law. 34<sup>th</sup> Revised Edn. Sultan Chand and Sons, New Delhi.

**Reference Books**

1. Gogna, P.P.S. 2007. A Text Book of Business and Industrial Laws. 2<sup>nd</sup> Revised Edn. S. Chand and Co. (P) Ltd., New Delhi.
2. Moshal, B.S. 2010. Mercantile Law. Revised Edn. Anne Book (P) Ltd., New Delhi.
3. A manual on Intellectual Property Rights. November 2007. Brilla Institute of Technology and Science, Pilani.

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - SBE 4**  
**UCOS64 - Business Communication**

**Credit: 2**

**Hours: 2**

**Objectives:**

- To develop better written and oral business communication skills among the students and enable them to know the effective media of communication.
- To enhance their writing skills in various forms of business letters and reports.

**UNIT – I**

Organization of a modern office – Meaning of Office, Functions and importance of an office. Office manuals – Types, Preparation of office manuals. Office forms – Form designing and control.

**UNIT – II**

Mail and Correspondence – Handling inward and outward mail. Internal and External communication. Layout of business letters – Kinds of business letters, Characteristics of a good letter.

**UNIT – III**

Trade letters – Enquiries – Quotations – Acceptance and order confirmation – Execution – Refusal or cancellation of orders, complaints and adjustments – Acknowledgements – Collection letters – Follow up letters – Status enquiry

**UNIT – IV**

Circular letters – Banking correspondence – Agency correspondence- Correspondence with government

**UNIT – V**

Modern communication methods – Electronic mail (E-Mail), Voice mail, Cellular phones, Fax (Facsimile), Video conferencing, Multimedia, Telephone answering machine, Whatsapp.

**Text Books**

1. Chopra, R.K. 2015. Office Management. 17<sup>th</sup>Edn. Himalaya Publishing House, Mumbai. (Units I &II)
2. Pillai, R.S.N and Bhagavathi,V. 2014. Business Correspondence and Office Methods. 11<sup>th</sup>Edn. S.Chand& Co (P)Ltd, New Delhi. (III, IV &V)

**Reference Books**

1. Devanarayanan, T.S and Ragunathan, N.S. 2015. Office Management. 1<sup>st</sup>Edn. Margham Publications, Chennai.
2. Gupta, C.B. 2014. Office Organisation and Management. 2<sup>nd</sup>Edn. Sultan Chand & Sons, New Delhi.
3. Sundar, K. and Kumara Raj, A. 2015. Business Communication. 1<sup>st</sup>Edn. Vijay Nicole Imprints Private Limited, Chennai.

**Note:** Question paper shall cover 100% theory



**MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL - 624 101**



**SYLLABUS (2018-2019)**

**B.COM (CHOICE BASED CREDIT SYSTEM)**

(Full Time)

**SYLLABUS, REGULATION AND SCHEME OF  
EVALUATION**

# **MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL – 624102**

## **SYLLABUS FOR B.COM (2018-2019)**

The Revised syllabus for B.Com may be recommended from the academic year 2018 – 2019 onwards. Regulations scheme of examinations and syllabus for B.Com is based on UGC/TANSICHE guidelines under Choice Base Credit System (CBCS).

### **Objectives:**

1. To inculcate the knowledge of accounting principles and practice
2. To impart the Knowledge in the field of banking and insurance activities
3. To equip the students well prepared to face the competitive world.
4. To make the students well equipped for getting job opportunities.
5. To develop the computer knowledge among commerce students.

### **Eligibility:**

Candidate should have passed the higher secondary examination or CBSE or other equipment examination from any schools.

### **Duration:**

The duration of the course will be three consecutive academic years under semester system.

### **Medium of Instruction:**

English

**REGULATIONS:**

1. Maximum marks for theory is 100 each
2. The Minimum passing mark for Internal Exam 13 out of 25 marks and for External Exam 38 out of 75 marks.
3. The University examination will be conducted at the each semester for the duration of three hours per paper.
4. The break up for Internal assessment is

<b>Internal Break up</b>	<b>Marks</b>
Internal Test	15
Assignment / Technical Quiz	5
Attendance	5
<b>Total</b>	<b>25</b>

5. Quest papers in External examination carrying 75 marks will be in the format below:

Part	Type	Number questions to be answered	Marks
A	Objective Type / Multiple Choice	10 questions, 2 questions from each unit, each carrying 1 mark	10 (10*1)
B	Paragraph (about 1-1 ½ pages)	5 questions, From each Unit Either or Choice, each carrying 5 marks	20 (5*4)
C	Essay type (about 3 pages)	Any 3 out of 5 questions, Open choice, One question from each unit, each question carrying 10 marks	30 (3*10)
	Total	-----	75

**Mother Teresa Women's University, Kodaikanal**  
**Department of Commerce**

**Syllabus with Course Codes 2018 – 2019**

**B.Com.**

<b>Paper No.</b>	<b>Paper Code</b>	<b>Course Title</b>	<b>Hours</b>	<b>Credits</b>	<b>Continuous Internal Assessment (CIA)</b>	<b>End Semester Exam (ESE)</b>	<b>Total</b>
	<b>Semester I</b>						
1	ULTA11	Tamil	6	3	25	75	100
2	ULEN11	Communication Skills – I	6	3	25	75	100
3	UCOC11	Financial Accounting-I	5	4	25	75	100
4	UCOC12	Business Organization	5	4	25	75	100
5	UCOA11	Indian Economy	5	4	25	75	100
6	UVAE11	Value Education	3	3	25	75	100
		<b>Total</b>	<b>30</b>	<b>21</b>			<b>600</b>
	<b>Semester II</b>						
7	ULTA22	Tamil	6	3	25	75	100
8	ULEN22	Communication Skills – II	6	3	25	75	100
9	UCOC21	Financial accounting-II	6	4	25	75	100
10	UCOC22	Business Economics	5	4	25	75	100
11	UCOA22	Business Ethics	5	4	25	75	100
12	UEVS21	Environment studies	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>20</b>			<b>600</b>
	<b>Semester III</b>						
13	ULTA33	Tamil	6	3	25	75	100
14	ULEN33	Communication Skills – III	6	3	25	75	100
15	UCOC31	Marketing	5	4	25	75	100
16	UCOA33	Business Statistics	5	4	25	75	100
17	UCOE31	Computer Application in Business	4	3	25	75	100
18	UCON31	Fundamentals of Insurance	2	2	25	75	100

19	UCOS31	Fundamentals of Investment	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>21</b>			<b>700</b>
	<b>Semester IV</b>						
20	ULTA44	Tamil	6	3	25	75	100
21	ULEN44	Communication Skills – IV	6	3	25	75	100
22	UCOC41	Business Finance	4	4	25	75	100
23	UCOC42	Auditing	4	4	25	75	100
24	UCOA44	Company Secretarial Practice	3	4	25	75	100
25	UCOE42	Business Mathematics	3	3	25	75	100
26	UCON42	Accounting Fundamentals with Tally(Practical)	2	2	25	75	100
27	UCOS42	Creative Advertising (Practical)	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>800</b>
	<b>Semester V</b>						
28	UCOC51	Cost Accounting	5	4	25	75	100
29	UCOC52	Corporate Accounting	5	4	25	75	100
30	UCOC53	Tally ERP (Practical)	5	4	25	75	100
31	UCOC54	Banking Theory Law and Practice	5	4	25	75	100
32	UCOC55	Income Tax	5	4	25	75	100
33	UCOE53	Business Environment	3	3	25	75	100
34	UCOS53	Commerce (Practical)	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>700</b>
	<b>Semester VI</b>						
35	UCOC61	Business Management	5	4	25	75	100
36	UCOC62	Management Accounting	5	4	25	75	100
37	UCOC63	E-Commerce	5	4	25	75	100
38	UCOC64	Business Tax	5	4	25	75	100
39	UCOC65	EDP	5	4	25	75	100
40	UCOE64	Business Law	3	3	25	75	100
41	UCOS64	Business	2	2	25	75	100

		Communication					
42	USEA61	Extension Activity	-	3	25	75	100
		<b>Total</b>	<b>30</b>	<b>28</b>			<b>800</b>
<b>Total</b>			<b>180</b>	<b>140</b>			<b>4200</b>



**B.COM**  
**SEMESTER I - CORE 1**  
**UCOC11 – Financial Accounting-I**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To enable the students to acquire basic knowledge of accounting principles, concepts and conventions.
- To make the students to acquire the skill to prepare the trial balance, final accounts and
- To facilitate the students to prepare accounts from incomplete records and calculate depreciation under different methods.
- To understand the concept of Hire Purchase System and installment purchase system.

**UNIT- I**

Accounting: Introduction – Accounting concepts and conventions – Definition – Principles of Book Keeping – Journal – Ledger – Trial Balance – Rectification of Errors – Cash Book.

**UNIT- II**

Final Accounts: Trading, Profit and Loss A/c and Balance Sheet of sole trading concern – Common adjustments in the preparation of final accounts - Adjusting and Closing entries – Manufacturing account.

**UNIT- III**

Accounts from incomplete records: Features – Merits – Demerits – Calculation of profit: Statement of Affairs method – Conversion method – Calculation of missing figures.

**UNIT- IV**

Depreciation: Causes – Objectives – Factors – Methods of depreciation: Straight Line Method – Written down Value Method – Annuity Method - Sinking Fund Method.

**UNIT - V**

Hire Purchase System: Definition – Features – Terms used in Hire Purchase transactions – Accounting procedure – Calculation of interest - Default and Repossession – Instalment Purchase System: Distinction between Hire Purchase System and Instalment Purchase System.

**Text Book:**

1. Reddy, T.S. and Murthy, A., Financial Accounting, (2010), 2<sup>nd</sup> Revised Edn., Margam Publication, Chennai.

**Reference Books:**

1. Jain, S.P. and Narang, K.L., Financial Accounting, (2010), 17<sup>th</sup> Revised Edn, Kalyani Publishers, New Delhi.
2. Pillai, R.S.N. and Bhagavathi, Advanced Accountancy, (2012), 3<sup>rd</sup> Revised Edn., Konark Publishers Pvt. Ltd., New Delhi.
3. Vinayagam, N. and Charumathi, B., Advanced Accountancy, (2002), S.Chand & Co. Ltd., New Delhi.

**Note:** Question paper shall cover 25% theory and 75% problem.

**SEMESTER I - CORE 2**  
**UCOC12 - Business Organization**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To make the students to get acquainted with the types of Business Organizations.
- On successful completion of this course, the students will get an opportunity to know about the basic legal requisites in forming the various types of business organizations effectively.

**UNIT – I**

Types of business organizations: Sole Proprietorship, Partnership, Private and Public limited company, Co-operatives, Not-for-Profit business organizations under the Societies Act, and Trusts – Public sector business units (PSU) – Public Utilities – Unique features of each one and their merits, suitability and limits.

**UNIT – II**

Basic legal requisites in forming a partnership – comparison with sole proprietorship – sharing of finance, managerial activities and risks – Partnership Deed and its contents, Rights and Duties of partners –Winding up.

**UNIT – III**

Basic legal requirements in forming a Company, – Incorporation, Legal entity concept – Private and public limited – Management, General Meetings and Filing of Important Returns – Liquidation

**UNIT – IV**

Basic legal requirements in forming an Association under the Societies Registration Act, and under TN Co-op. Societies Act; Meetings, Filing of Reports, Winding up.

**UNIT – V**

Legal requisites in terms of registration under the TN General Sales Tax Act/Goods and Services Tax , Value Added Tax (VAT) and using TIN – License to establish and operate a Factory by Municipalities, Corporations and the Govt. – Applicability of Employees Provident Fund Act and procedure under the Act-simple computations – Benefits to employees and responsibilities of the Employer.

**Reference Books:**

1. Y.K. Bhushan, Business Organisation and Management, (2012), Sultan Chand & Sons.
2. C.B. Gupta, Business Organisation and Management, (2011), Mayur Paperbacks.
3. S.A. Sherlekar, Modern Business Organisation and Management- A System Approach, (2010), Himalaya Publications.

**Note:** Question paper shall cover 100% theory

**SEMESTER I - ALLIED 1**  
**UCOA11 – Indian Economy**

**Credit: 4**

**Hours: 5**

**Objectives:**

At the end of the course students shall be able to understand

- The fundamental concept of Indian economy and will be able to correlate these concepts to real life situation to markets in particular and the economy in general.
- The concepts of LPG and WTO.

**UNIT - I**

Indian Economy: Features – Meaning of under development Economy – Basics Characteristics of an under development Economy. Poverty – Poverty line – Causes of poverty – measures undertaken by the government to remove poverty – Unemployment – Poverty Eradication Program.

**UNIT - II**

Agriculture: Meaning, features and problems – Causes of Low Productivity – Green Revolution – Mechanization – Merits and Demerits

**UNIT-III**

Industrial Policy: 1956 and 1991 – Micro, Small and Medium Enterprises: Definition – Industrial Sickness: Problems, measures to prevent Sickness of Small Scale Industries.

**UNIT - IV**

Unemployment: Meaning – Types of unemployment – Nature of unemployment in India – Causes of unemployment – Remedial measures for unemployment

**UNIT - V**

Liberalization – Privatization – Globalization – Evolution – Functions of W.T.O – National Income: Concepts – Methods of measuring National Income – Importance and difficulties of measuring the National Income

**Text Book:**

1. Indian Economy, S.Sankaran, (1997), Revised & Enlarged Edition, Margham Publications.

**Reference Books:**

1. Indian Economy, Ruddar Dott K.P.M. Sundharam, 48<sup>th</sup> Edition, S.Chand& Co. Ltd.
2. Indian Economy, S.K. Misra&V.K.Puri, 20<sup>th</sup> Edition, Himalaya Publishing House
3. Indian Economy, Ishwar C.Dhingra, 16<sup>th</sup> Edition, Sultan Chand & Sons
4. Indian Economy, A.N. Agarwal, (2002), 20<sup>th</sup> Edition, Wishwa Prakashan Publishing, New Delhi
5. Indian Economy-Problems, Practices and development, S.Sankaran, (2002), Revised& Enlarged Edition, Margam Publication

**Note:** Question paper shall cover 100% theory

**SEMESTER II - CORE 3**  
**UCOC21 - Financial Accounting-II**

**Credit: 4**

**Hours: 6**

**Objectives:**

To enable the learners to

- Have a glimpse of Specialised Business.
- Ascertain the financial position of Specialised Business.

**UNIT –I**

Consignment – Treatment of normal loss and abnormal loss – Calculation of unsold stock – Goods sent at cost price and invoice price – Accounting for goods sent on sale or return basis.

**UNIT-II**

Joint Venture – Meaning and methods of keeping books of accounts.

**UNIT –III**

Single entry system of book keeping – Conversion of single entry to double entry system.

**UNIT-IV**

Bills of exchange – Trading and accommodation bills – Renewals – Dishonor due insolvency – Retiring of bills.

**UNIT-V**

Branch accounts (excluding foreign branches) – Dependent branches – Independent branches – Goods and cash-in-transit – Inter branch transactions. Departmental accounts – Allocation of expenses – Inter departmental branches.

**Text Book:**

1. Fundamentals of Advanced Accounting- R.S.N.Pillai and Bagavathi / S.Chand& Co., New Delhi / 3<sup>rd</sup> revised Edition, 2012

**Reference Books:**

1. Advanced Accountancy – R.L, Gupta and Radhaswamy / Sultan Chand & Sons, New Delhi./ 13<sup>th</sup> revised Edition 2007
2. Financial Accountancy – Jain &Narang / Kalyani Publishers./17<sup>th</sup> Edition, 2011.

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER II - CORE 4**  
**UCOC22 - Business Economics**

**Credit: 4**

**Hours: 5**

**Objectives:**

- At the end of the course students shall be able to understand the fundamental concept of economics and
- will be able to correlate these concepts to real life situation to markets in particular and the economy in general

**UNIT – I**

Introduction of Economics and Business Economics: Meaning, Nature and Significance of Economics – subject matter of Economics – Meaning, Nature and Significance of business Economics – Role of business economics in decision making – Role and responsibilities of a business economist.

**UNIT – II**

Consumption and Demand analysis: Business significance of Consumption and Demand – Demand determinants – Law of demand and demand curves – Types of demand – Concept of elasticity – Methods of measuring price elasticity of demand – Relationship between price elasticity and sales revenue.

**UNIT – III**

Production Analysis: Factors of production and their characteristics – Production possibility curves – Concepts of total product, Average product and Marginal product – Fixed and variable factors – Classical and Modern approaches to the law of variable proportions – Law of returns to scale and Economies and diseconomies of scale.

**UNIT – IV**

Supply and Cost analysis: Supply – Factors affecting supply – Law of supply – Elasticity of supply and types of elasticity of supply – Cost of production – Concepts of Cost – Sunk cost and future cost, direct cost and indirect cost – Cost curves – Total, Average, Marginal cost curves – Relationship of MC to AC – Fixed and variable cost curves.

**UNIT – V**

Price and output decisions in various market forms: Role of Time in determining the value of products – Equilibrium conditions of a firm and Industry under various market forms – Price and output determination in a Perfect Market – Price and output determination in an Imperfect Market with specific reference to Monopoly, Monopolistic competition and Oligopoly.

**Reference Books:**

1. Chaturvedi, D.D., Gupta S.L. and Sumitra A.L. (2001), Business Economics – Text and cases, Galgotia publishing company, New Delhi.
2. ManabAdhkary., (2002), Business Economics (2<sup>nd</sup> Edition), Excel Books, New Delhi.
3. Samuelson, B.A., Economics (1976), Tale McGraw – Hill, New Delhi.

**Note:** Question paper shall cover 100% theory

**SEMESTER II – ALLIED 2**  
**UCOA22 - Business Ethics**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

1. Know about the concepts of Business Ethics.
2. Understand the basics of Corporate Governance.

**UNIT – I**

Business Ethics – Meaning and definition – Importance – Nature and factors influencing business ethics – Scope and Objectives – Characteristics of Business ethics.

**UNIT – II**

Ethical performance – Ethics and Business – Types of Ethics – Need for Business Ethics.

**UNIT – III**

Values – Norms – Beliefs – Moral Standards – Beliefs and their role – Moral Standards Vs Standard Morality – Ethical codes.

**Unit – IV**

Corporate Governance – Meaning – Importance and Features.

**Unit – V**

Environmental Ethics – Workplace Ethics - Ethics in Marketing and Consumer protection.

**Text Book**

1. Murthy, G.S.V. 2016. Business Ethics. 1<sup>st</sup>Edn. Himalaya Publishing House, Mumbai.

**Reference Books**

1. Badi, R.V. and Badi, N.V. 2005. Business Ethics. 2<sup>nd</sup>Edn. Vrinda Publication (P) Ltd., Delhi.
2. Gene Burton. Manab Thakur. 2006. Management today – Principles and Practice. 9<sup>th</sup> Reprint. Tata Mc Graw Hill Publishing Company Ltd., Delhi
3. Jain V.K. and Omprakashbiyani. 2008. Business Ethics & Communication. 2<sup>nd</sup> Revised Edn. S.Chand& Co Ltd., New Delhi.

**Note:** Question paper shall cover 100% theory

**SEMESTER III - CORE 5**  
**UCOC31 - Marketing**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

1. Understand the concept of Marketing and International Marketing
2. Obtain knowledge on the elements of Marketing Mix.

**UNIT – I**

Marketing – Definition – Objectives – Micro and Macro marketing – Modern marketing concept – Marketing in economics development.

**UNIT – II**

Functions of marketing – Marketing mix – Market segmentation – Market targeting and positioning.

**UNIT – III**

Product Planning – Development – Product line – Product Mix strategies – Product life cycle – Diversification – Elimination - Pricing Strategies.

**UNIT – IV**

Marketing of consumer goods – Channels of distribution – Types of channels – Recent trends in marketing – Online marketing – Tele – Marketing – Relationship marketing.

**UNIT – V**

International marketing – Importance – Objectives – Policies – Import and Export marketing – Prohibited imports and exports – Coping with global competition – Export – Import scene in India.

**Text Book**

1. Pillai, R.S.N. and Baghavathi. 2012. Modern Marketing, Revised 4<sup>th</sup>Edn. S.Chand and Co. New Delhi.

**Reference books**

1. Kapoor, D.C. 2004. Marketing and Sales Management. 1<sup>st</sup>Edn. S.Chand and Co (P) Ltd., New Delhi.
2. Sherlekar, S.A. 2010. Marketing Management. Revised 14<sup>th</sup>Edn. Himalaya Publishing House, New Delhi.
3. Rajan Nair, N. and Varma, M.M. 2006. Marketing Management. 2<sup>nd</sup>Edn. S.Chand and Co.Ltd., Chennai.

**Note:** Question paper shall cover 100% theory

**SEMESTER III - ALLIED 3**  
**UCOA33 - Business Statistics**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

1. Provide an exposure to statistical tools.
2. Enhance their statistical application skills.

**UNIT – I**

Business statistics – Meaning – Definition – Objectives – uses and Limitations – Functions – Statistics and Business – Primary and Secondary Data – Sampling and Methods of Sampling – Collection, Classification and Tabulation of data – Diagrammatic and Graphical presentation of data.

**UNIT – II**

Measures of Central Tendency – Arithmetic mean – Median – Mode – Geometric mean – Harmonic mean – Measures of Variation – Range – Quartile Deviation – Mean Deviation – Standard Deviation.

**UNIT – III**

Measures of Skewness and Kurtosis – Karl Pearson's Coefficient of Skewness – Bowley's Coefficient of Skewness – Correlation – Methods of studying Correlation – Scatter diagram method – Karl Pearson's method – Spearman's Rank Correlation method.

**UNIT – IV**

Regression – Regression Lines - Regression Equations – Time Series – Utility of Time Series Analysis – Components of Time Series – Secular Trend – Seasonal Variations – Cyclical Variations – Irregular or Erratic Variations – Measurement of Trend – Freehand or Graphic method – Method of Semi-averages – Moving averages method – Method of Least Square.

**UNIT – V**

Index Numbers – Definitions – Uses – Types of Index Numbers – Methods of constructing Index Numbers – Un-weighted Index Numbers – Weighted Index Numbers – Quantity and Volume Index Numbers – Cost of Living Index Number - Test of adequacy of Index Number Formulae – Unit Test – Time Reversal Test – Factor Reversal Test – Circular Test – Steps in constructing a Chain Index.

**Reference Books:**

1. R.S.N.Pillai&Baghavathi – Statistics Theory and Practice – S.Chand&Company Ltd – New Delhi.
2. S.P.Gupta&M.P.Gupta – Business Statistics – Sultan Chand&Sons, New Delhi.
3. S.P.Gupta – Statistical Methods – Sultan Chand&Sons, New Delhi.

**Note:** Question paper shall cover 25% theory and 75% problem



**SEMESTER III – ELECTIVE 1**  
**UCOE31 - Computer Applications in Business**

**Credit: 3**

**Hours: 4**

**Objectives:**

- To provide basic knowledge about the Basics of computers and windows operating system.
- After the successful completion of the course the student will come to know how to work on MS Office and application of internet in business.

**UNIT-I**

Introduction to computers: Definition, characteristics and generation of computers – element of computers – Hardware – CPU – Primary and secondary memory – Input and output devices – Features of computers – classification – parts of a computer system.

**UNIT-II**

Windows operating system – features of windows-Multimedia tools: Introduction – graphics effects & techniques – sound & music – video – multimedia author tools – Virtual reality.

**UNIT-III**

Word basics – Creating Word Documents – Business Letters – Editing – Inserting Objects – Working with tables – Mail Merger – Microsoft Excel – Introduction to Spreadsheet (MS Excel) – Electronic Spread Sheet – Structure of Spread Sheet and its application to Accounting.

**UNIT-IV**

Introduction to Internet and its basic concept – Uses of Internet – worlds wide web – Services of internet, features and benefits – browsing –locating information in web-protocols – internet address WWW – HTML – Web browsers – Searching the web.

**UNIT-V**

Application of Internet in Business – Overview of E–Commerce – Online Business Model – Mobile Commerce (M–Commerce) – Applications – Security issues – E-Banking applications in Business.

**Reference Books:**

1. Using information technology-Brief version, practical introduction to computers and communications, Stacey sawyer brain, K.Williams, Sarath K. Hutchinson, Second edition, McGraw Hill Publications.
2. A Text of information technology –R.Saravanakumar, S.Chand New Delhi-2003/3<sup>rd</sup> edition.

**Note:** Question paper shall cover 100% theory

**SEMESTER III - NON MAJOR ELECTIVE 1**  
**UCON31 - Fundamentals of Insurance**

**Credit: 2**

**Hours: 2**

**Objective:**

- To impart theoretical base on fundamental principles of insurance business

**UNIT - I**

Introduction to Insurance – Meaning, Definition of insurance – General principles of insurance –Types of insurance life, fire and marine – Difference between life and other types of insurance, Growth & Development of Indian insurance industry – Regulations of insurance business and the emerging scenario.

**UNIT-II**

Life Insurance – Introduction to life insurance: Features of life insurance – Essentials of life insurance, Different types of life policies – Annuities, Formation of life insurance contracts- Assignment and nominations – Lapses and revivals of policies. Surrender value, paid up value, Loans – Claims – Procedure for claims- Settlement of claims – Death and Maturity.

**UNIT-III**

Fire Insurance – Fire insurance contracts- Fire insurance coverage – Policies for stocks – Rate fixation in fire insurance – Settlement of claims. Marine Insurance – Functions – Marine perils – Types of marine policies – Clauses in general use – Warranties and conditions- proximate cause – subrogation and conciliation – Re-insurance – Double insurance –Types of marine losses.

**UNIT-IV**

Miscellaneous Insurance – Motor insurance – Employer's liability insurance – Personal accident and sickness insurance – Aviation insurance – Burglary insurance – Fidelity guarantee insurance – Engineering insurance – cattle insurance – Crop insurance.

**UNIT-V**

Procedure for becoming an Agent – Pre-requisite for obtaining a license – Duration of license – Cancellation of license – Termination of agency – Code of Conduct – Functions of the Agent.

**TEXT BOOKS:**

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

**Note:** Question paper shall cover 100% theory

**SEMESTER III - SBE 3**  
**UCOS31 - Fundamentals of Investment**

**Credit: 2**

**Hours: 2**

**Objective:**

To familiarize the students with

- Different investment alternatives introduce them to the framework of their analysis and valuation and highlight the role of investor protection.

**UNIT – I:**

**The Investment Environment** – The investment decision process, Types of Investments – Commodities, Real Estate and Financial Assets, the Indian securities market, the market participants and trading of securities, security market indices, sources of financial information, Concept of return and risk, Impact of Taxes and Inflation on return.

**UNIT – II:**

**Fixed Income Securities** – Bond features, types of bonds, estimating bond yields, Bond Valuation types of bond risks, default risk and credit rating.

**UNIT – III:**

**Approaches to Equity Analysis** – Introductions to Fundamental Analysis, Technical Analysis and Efficient Market Hypothesis, dividend capitalisation models, and price-earnings multiple approach to equity valuation.

**UNIT –IV:**

**Portfolio Analysis and Financial Derivatives** – Portfolio and Diversification, Portfolio Risk and Return; Mutual Funds; Introduction to Financial Derivatives; Financial Derivatives Markets in India

**UNIT – V:**

**Investor Protection** – Role of SEBI and stock exchanges in investor protection; Investor grievances and their redressal system, insider trading, investors' awareness and activism

**Reference Books:**

1. C.P. Jones, Investments Analysis and Management, Wiley, 8th Edition.
2. Prasanna Chandra, Investment Analysis and Portfolio Management, McGraw Hill Education
3. R.P. Rustogi, Fundamentals of Investment, Sultan Chand & Sons, New Delhi.
4. N.D. Vohra and B.R. Bagri, Futures and Options, McGraw Hill Education
5. Mayo, An Introduction to Investment, Cengage Learning.

**Note:** Question paper shall cover 100% theory

**SEMESTER IV - CORE 6**  
**UCOC41 - Business Finance**

**Credit: 4**

**Hours: 4**

**Objectives**

To enable the students to

1. Understand the concepts of Business finance
2. Know the short term and long term source of finance

**UNIT – I**

Introduction to Business Finance: Meaning – Significance – Factors of financial management – Objectives - Role of finance Manager – Interrelationship between investment, financing and dividend decisions.

**UNIT – II**

Long Term Sources of Finance: Financial needs – Sources of raising finance – Equity shares- Preference shares – Retained Earnings – Debentures – Long term loans from financial Institutions and Commercial banks.

**UNIT – III**

Short Term Sources of Finance: Trade credit – Advances from customers – Discounting of Bills of Exchange – Bank Overdraft – Cash credit – Letter of credit – working capital demand loan commercial paper – Advances against goods – Financing of Export trade by banks – Public Deposit

**UNIT – IV**

Working Capital Management: Meaning - Purpose – Operating cycle – Concepts – Types – Optimum Working capital – Factors determining the working capital – Estimation of working capital requirements.

**Unit – V**

Cash Management: Meaning – Objectives – Need for cash – Cash planning – Cash Budget – Utility of Cash Budget – Methods of cash forecasting – Optimum cash balance.

**Reference Books:**

1. S.N. Maheswari; Financial Management, Sultan Chand & Sons, New Delhi.
2. M. Pandey; Financial Management, Vikas Publishing House, New Delhi.
3. R.P.Rusthagi; Financial Management , Sultan Chand & Sons, New Delhi.
4. M.Y. Khan and P.K.Jain; Financial Management , Tata McGraw Hill, New Delhi.

**Note:** Question paper shall cover 40% theory and 60% problem

**SEMESTER IV - CORE 7**  
**UCOC42 - Auditing**

**Credit: 4**

**Hours: 4**

**Objectives**

To enable the students to

- Familiarize with the principles of auditing.
- Get knowledge about the audit procedure.

**UNIT-I**

Auditing its origin – Definition – Objectives – Deduction of errors – Deduction or Frauds – Advantages – Distinction between auditing and accountancy – Qualification and quality of and auditor

**UNIT-II**

Various kinds of audit – Private audit it statutory audit – Periodic audit – Continuous audit. Balance sheet audit – cost audit – management audit.

**UNIT-III**

Vouchers meaning – Definitions – objectives –Vouching of receipts and payments.

**UNIT-IV**

Appointment of Auditors – Rights and powers of Auditors – Duties – Liabilities of the company Auditor.

**UNIT-V**

Investigation – Various classes of investigation – Different between audit And investigation.

**Text Book:**

1. Auditing-D.P.Jain/ konark publishers pvt ltd/2<sup>nd</sup> revised edition (2008)

**Reference Books:**

2. Practical Auditing / B.N.Tandon/S.Chand& Company ltd/13<sup>th</sup> Revised Edition 2001.

**Note:** Question paper shall cover 100% theory

**SEMESTER IV – ALLIED 4**  
**UCOA44 - Company Secretarial Practice**

**Credit: 4**

**Hours: 3**

**Objectives**

To enable the students to

- Understand the proceedings of the company
- Acquire knowledge on the secretarial practices adopted by the company

**UNIT – I**

Joint Stock Company – Definition – Characteristics – Kinds of companies – Differences between a Joint Stock Company and a Partnership Firm – Promotion of a Company.

**UNIT – II**

Company Secretary – Definition – Legal position of a Company Secretary – Appointment – Role, Responsibilities and Functions of a Company Secretary.

**UNIT – III**

Incorporation of a Company – Procedure for Incorporation of a Public Limited Company and Private Limited Company – Duties of secretary in connection with Promotion and Incorporation of a company.

**UNIT – IV**

Duties, Rights and Liabilities of a Company Secretary.

**UNIT – V**

Company meetings – Objectives – Secretarial Duties relating to various meetings.

**Text Book**

1. Santhi J. 2016. Company Law and Secretarial Practice. 1<sup>st</sup>Edn. Margham publications, Chennai.

**Reference Books**

1. Premavathy, N. 2015. Company Law & Practice. 1<sup>st</sup>Edn. Sri Vishnu Publications, Chennai,
2. Ghosh, P.K. Balachandran, 2009. V. Company Law & Practice, S.Chand& Co. Ltd. New Delhi.
3. Kapoor, N.D.2005. Elements of Mercantile Law. Sultan Chand & sons, New Delhi.

**Note:** Question paper shall cover 100% theory

**SEMESTER IV – ELECTIVE 2**  
**UCOE42 - Business Mathematics**

**Credit: 3**

**Hours: 3**

**Objectives**

To enable the students to

- Get the mathematical skill for Business
- Appear confidently to the Competitive examinations.

**UNIT – I**

Common Arithmetic - Simple Interest – Compound Interest – Nominal rate, Effective rate of Interest – Depreciation – Annuity – Discount – Bankers Gain – Percentage – Stock and Shares – True Discount.

**UNIT – II**

Ratio – Definition- Inverse ratio – Compound ratio – Duplicate ratio – Triplicate ratio – Proportion – Meaning – Direct proportion – Indirect proportion – Compound proportion – Simple proportion – Continued proportion – Variation – meaning – Direct variation – Inverse variation – Joint Compound variation.

**UNIT – III**

Sets, Relations And Functions – Basic concepts – Subset – Operations on sets – Cartesian product of two sets – Relation – Properties of Relation – Functions – Functional representation – Finding function.

**UNIT – IV**

Matrices - Basic concepts – Determinants – Addition of matrices – Scalar multiplication – Multiplication of a matrix by a matrix – Inverse of a matrix.

**UNIT – V**

Differential Calculus – Standard Forms – Rules of differentiation – Application of Differential calculus in business – Simple marketing models – Equipment replacement problem.

**Text Books**

1. Manoharan, M. Elango, C. and Eswaran, K.L. 2009. Business Mathematics. 4<sup>th</sup>Edn. Palani Paramount Publications, Palani.
2. Sundaresan, V. and Jeyaseelan, S.D. Reprint 2010. An introduction to Business Mathematics. 4<sup>th</sup>Edn. S.Chand and Company Ltd., New Delhi.

**Reference Books**

1. Agarwal, R.S. 2005. Mathematics for M.B.A. 22<sup>nd</sup>Edn. S.Chand and Company Ltd., Delhi.
2. Jebaraj, P.C. 2002. Easy approach to Business Mathematics. 2<sup>nd</sup>Edn. Nirmala Publications, Tirunelveli.
3. Rajagopalan, S.P. Sattanathan, R. 2005. 2<sup>nd</sup>Edn. Business Mathematics. Vijay Nicole imprints Private Limited, Chennai.

**Note:** Question paper shall cover 40% theory and 60% problem

**SEMESTER IV – NME 2**  
**UCON42 - Accounting Fundamentals with Tally (Practical)**

**Credit: 2**

**Hours: 2**

**Objectives:**

To enable the student to understand

- The basic concept of accounting
- Applications of accounting by using accounting software
- To make the students to learn about the application of computers in accounting.

**Unit - I**

Accounting packages: Computers and financial application, Accounting software packages. Computerized Accounting – Meaning and Features – Advantages and Disadvantages – Computerized Vs Manual Accounting

**Unit – II**

Introduction of Tally: Starting Tally – Gateway to Tally and exit from Tally: Company creation in Tally, Saving the company profile - Alteration / Deletion of company, Selection of company.

**Unit - III**

Account groups and ledgers: Hierarchy of account groups and ledgers, reserved account groups, account groups balance sheet – Account groups of liabilities, account groups of assets account groups of profit & loss account – Account groups of direct income and direct expenses apart from sale and purchases, indirect income and indirect expenses account masters – Account groups creation and account ledgers creation - Feeding of opening balances, alteration / deletion of account master records - Feeding of closing stock value

**Unit - IV**

Grouping of accounts – Creation - Accounts and inventory – Entering transactions: Vouchers – Types – Numbering – Deleting and Editing vouchers – Opening and closing balances – Stock valuation

**Unit - IV**

Reports: Petty cash book – Trial balance – Profit and loss account – Balance sheet – Group wise - Accounts wise – Data range reports – Stock reports – Budget variance reports – Transactions list – Accounts list.

**Text & Reference Books (Latest revised edition):**

1. Computer Application in business - S.V.Srinivasa Vallabhan, Sultan Chand and sons.
2. Computer Application in Accounting software – P.Kasivairavan, Friends publication.
3. Computer Applications in Business – Mohankumar K & Rajkumar S, Vijay Nicole Imprints (P) Ltd
4. Implementing Tally – A.K. Nadhani, BPB Publications.
5. Computer Application in Business – R. Paramasivam, S.Chand & Co, New Delhi.
6. Computer Application in Business - Joseph Anbarasu, Learntech Press

**Note:** 100% Practical



**SEMESTER IV - SBE 2**  
**UCOS42 - Creative Advertising (Practical)**

**Credit: 2**

**Hours: 2**

**Objectives:**

- To highlight the importance of advertising as a business strategy.
- To explain how creativity can be incorporated in an advertisement.
- To understand the communication process that takes place while advertising and to analyse it from the view point of a customer.

**UNIT – I**

Creative Advertising Meaning – definition of marketing and advertising – functions of advertising – communication and persuasion process – human communication process – advertising exposure model – applying communication process to advertising.

**UNIT – II**

Consumer Behaviour Consumer Behaviour – consumer decision making process – consumer perception process

**UNIT – III**

Creative Advertising Creativity in advertising, creative thinking – Creative process – Appeals – Copy Writer – Copy Writing – Print Copy elements, Headlines – body Copy – Slogan elements of design and principles of design.

**UNIT – IV**

Designing Designing Print Ad – choosing format – designing page – choosing type faces – working with visuals – lay-out ready for print. Course

**UNIT – V**

**Advertising** and Media strategy – Role of Media; types of media, their advantages; and disadvantages; media planning, selection & scheduling strategies

**Text Book:**

1. Chunawalla&K.C.Sethia, Foundation of Advertising Theory & Practice, Himalaya Publishing House, New Delhi, 2000 Course

**Reference Books**

1. William H. Bolew, Advertising,
2. John Wiley & Sons, New York, 1995
3. Courtland Bovee John Thill& George Dovel, Advertising Excellence,
4. Tata Mc Graw Hill Publications, New Delhi, 1995.

**Note:** 100% practical

**SEMESTER V - CORE 8**  
**UCOC51 - Cost Accounting**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

- Learn the mechanics of cost records and management of cost.
- Understand the various costing methods and their suitability.

**UNIT – I**

Definition of costing – importance – uses – objects – advantages – difference – between cost and financial accounting – installation of costing system – analysis and classification of cost – Preparation of cost sheet.

**UNIT – II**

Materials – Purchase procedure – requisition of material control – recording and controlling of material department – maintenance stores – minimum level – economic order quantity – Perpetual inventory – control over wastage and scrap and s spoilage.

**UNIT – III**

Methods of remunerating labour-incentive schemes-idle time –control over idle time  
Labour turnover-measurement.

**UNIT – IV**

Accounting overhead-fixed and variable overheads of changing overheads-allocation and apportionment-absorption-Distinction Between works overheads, administrative, overhead, selling and distribution of service overheads.

**UNIT – V**

Process costing – normal loss – abnormal loss – abnormal gain – equivalent production  
(Excluding by – products and joint products)

**Text Book:**

1. Cost Accounts – S.P.Jain&K.L.Narang/ Kalyani Publishers / 7<sup>th</sup> Edition

**Reference Books:**

2. Cost Accounts-P.P.DasGupta/ Sultan chand& Sons, New Delhi/ 7<sup>th</sup> Edition
3. Business Organisation& Management – V.K. Bhushan/ S.Chand/ Reprint 2003

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER V - CORE 9**  
**UCOC52 - Corporate Accounting**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the Students to

- Understand the concept of companies from formation to liquidation.
- Develop the skills in preparing accounts of Joint Stock Companies.

**UNIT – I**

Accounting Procedure for issues of shares at par, at discount and at premium call in advance – calls in arrear for feature of shares – Re-issue of shares at discount and premium – underwriting of shares, redemption of preference-underwriting of shares, redemption of preference shares.

**UNIT – II**

Valuation of shares and goodwill in joint stock companies

**UNIT – III**

Meaning and definition of company-Kinds of joint stock companies-Formation of a company – commencement of business- Prospectors – issue of share capital-kinds of shares.

**UNIT – IV**

Acquisition of business- Profit prior to incorporation – preparation of financial accounts-requirements as per schedule IV part I and II.

**UNIT – V**

Amalgamation – Absorption – Internal and external reconstruction of joint stock companies.

**Text Book:**

1. Advanced accountancy by R.L.Gupta&Radhaswamy, Sultan Chand &sons, Delhi. 13<sup>th</sup> Edition 2007
2. Corporate Accounting by T.S.Reddy&A.Murthy / Margham Publication, Chennai / 6<sup>th</sup> revised edition 2007, reprint 2010

**Reference Book:**

1. Corporate accountancy by R.L.Gupta&Radhaswamy.Sultan Chand &sons , Delhi. 13<sup>th</sup> Edition 2007
2. Advanced accounting by S.P.Jain&Narang ,Kalyani Publishers 17<sup>th</sup> Edition 2011./reprint 2005.
3. Corporate Accounting by S.N.Maheswari&S.K.Maheswari / Sultan Publisher/4<sup>th</sup> edition

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER V - CORE 10**  
**UCOC53 - Tally ERP (Practical)**

**Credit: 4**

**Hours: 5**

**Objective**

To enable the student to understand

- The basic concept of accounting
- Applications of accounting by using accounting software

**UNIT –I**

**Accounting Masters in Tally, ERP 9**

Accounting configuration & features – group creation – multiple group creation – ledger creation – multiple ledger creation – new voucher creation- advance ledger creation.

**UNIT – II**

**Inventory in Tally, ERP**

Inventory configuration features – inventory info. Menu – stock groups – stock categories – stock items – unit of measurement – bills of materials – locations / godowns.

**UNIT – III**

**Voucher Entry in Tally, ERP 9**

Accounting vouchers – inventory vouchers – invoicing – optional & non-accounting voucher – order processing – advanced voucher entry.

**UNIT – IV**

**Advanced Accounting in Tally, ERP 9**

Bill-wise details – cost centers and cost – categories – bank reconciliation – interest calculations – cheque printing credit limits – budgets & controls.

**UNIT –V**

**Introduction to GST**

GST Registration – supply of goods and services – place of supply – time of supply – value of supply – invoicing – input credit mechanism – e-way bills – returns – payment of Tax.

**PROGRAMMES FOR TALLY GST**

**PRACTICALS**

1. Creating A Company Using Tally.ERP 9 For GST Compliance.
2. Updating Stock Items and Stock Groups For GST Compliance
3. Updating Party GST In
4. Creating GST Ledgers
5. Creating Income and Expense Ledgers
6. Recording GST Sales Invoice
7. Recording GST Purchase Invoice
8. Stock Transfer Journal
9. Stock Summary
10. Trial Balance
11. Balance Sheet
12. GSTR - 1
13. GSTR 2
14. GSTR 3 B
15. E-Way Bill

**Note:** 100% Practical

**SEMESTER V - CORE 11**  
**UCOC54 - Banking Theory Law and Practice**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

- Be aware of the law and practice governing the day-to-day operations of commercial banks.
- Become familiar with the various forms used in day-to-day banking.

**UNIT – I**

Origin of banking – definition – classification of banks based on operations and size or area of operations. Commercial banks – functions – modern trend in deposit mobilization and lending – innovative lending schemes – merchant banking – credit cards & debit cards – ATM etc.

**UNIT – II**

Banking structure in India – RBI and its functions – Indigenous banker – Commercial Banks – Scheduled Banks – Co-operative Banks – Regional Rural Banks – Industrial Development Banks – NABARD – EXIM Bank – Housing Banks.

**UNIT – III**

Banker and Customer – meaning – definition – relationship – general and special relationship – obligation to honour Cheque – lien – obligation to maintain secrecy of customer's accounts.

**UNIT – IV**

Types of deposits – savings deposit – current deposit – fixed deposit – fixed deposit receipt and its legal implications – passbook – meaning and maintenance – effect of entries favorable to bankers – special type of customers – general procedure for opening account – minors, limited companies, non-trading concerns – joint account. Types of advances – loan – cash credit – over draft – secured advances – modes of creating charges – lien – pledge – mortgage – hypothecation.

**UNIT – V**

Cheque – meaning – definition – essentials – crossing – types of crossing – types of endorsement – making – significance – material alternation & immaterial alternation. Paying banker – duties – circumstances for dishonor of cheques – collecting banker – duties.

**Text Book:**

1. Banking Theory, Law and Practice-E.Gordon and K.Natarajan / Himalaya Publication/22<sup>nd</sup> revised Edition, 2010

**Books Recommended:**

1. Banking Theory, Law and Practice-K.P.M.Sundaram&P.N.Varshney / Sultan Chand & sons, 1999.
2. Banking Theory, Law and Practice-Sundaram&Tanna / Indian Law house/ 2004
3. Principles of Bank Management - Vasant Desai / Himalaya Publication / 1<sup>st</sup> Edition 1993

**Note:** Question paper shall cover 100% theory

**SEMESTER V - CORE 12**  
**UCOC55 - Income Tax**

**Credit: 4**

**Hours: 5**

**Objectives**

To enable the students to

- Know the basic concepts of Income-tax.
- Acquire knowledge on various heads of incomes.

**UNIT – I**

Income tax Act-meaning of income – important definitions under the Income tax Act – Scope of the total Income – Residential status – Income exempt from tax-capital, revenue – Agricultural Income

**UNIT – II**

Income from salaries-scope of salary income – taxable perquisites of perquisites – deduction from salary income. Income from the house property – definition of annual value – deduction from annual value.

**UNIT – III**

Income from business and profession-basic principles of arriving at business Income – Losses incidental to trade – specific deductions in computing income from business – general deductions – instances of general deductions under section 37 (1) – specific disallowances under the act.

**UNIT – IV**

Income under capital gains, short term and long term capital gains – transfer of capital assets – Certain transactions not included as transfer – computation of capital gains – cost of acquisition – Cost of improvement of cost – capital gains under different circumstances – Exempted capital gains.

**UNIT – V**

Income from other sources-deductions in computing income under this head.

**Text Book:**

1. Income tax theory, law & Practice – T.S.Reddy&Y.HariPrasad Reddy /new edition 2013-2014/Margam Publications.

**Reference Books:**

1. Income tax law and practice –Bhagawati Prasad/wishwaprakashan publishers/28<sup>th</sup> edition.
2. Income tax law and practice-Gaur and Narang/Kalyanipublishers(2004)/32 revised edition.
3. Income tax and Law and practice-Mehrotra/SathyaBhawanPublications(2009-10)/30<sup>th</sup> edition.

**Note:** Question paper shall cover 40% theory and 60% problem

**SEMESTER V – ELECTIVE 3**  
**UCOE53 - Business Environment**

**Credit: 3**

**Hours: 3**

**Objectives**

To enable the students to

- Familiarize with the changing business environment
- Have a clear insight into the global business environment and its impact.

**UNIT – I**

Business environment – Meaning – Internal environment and external environment – Need for environmental awareness – Benefits and limitations of environmental analysis – Social responsibilities of business.

**UNIT – II**

Economic Environment of business – Nature of Economic Environment – Privatisation – Disinvestment – GNP – Per capita Income.

**UNIT – III**

Political Environment of Business – Critical elements of political environment – Government and business.

**UNIT – IV**

Legal Environment – Changing dimensions of legal environment in India – Competition Act 2002 – FEMA and licensing policy – Consumer Protection Act.

**UNIT – V**

Ecological Environment - Ecology and Business – Pollution Agents – Ways of preventing industrial pollution – Environment Protection Act, 1986 – Incentives for pollution control measures – Sustainable Development – Impact of Ecological Environment on Industries

**Text Book**

1. Francis Cherunilam. 2006. Business Environment. 14<sup>th</sup> Revised Edn. Himalaya Publishing House, Mumbai.

**Reference Books**

1. Agarwal, V.K., and Rohatgi, K.B. 2005. Consumer Protection in India. Deep and Deep Publications, New Delhi.
2. Aswathappa, K. 2016. Essentials of Business Environment. 12<sup>th</sup> Revised Edn. Himalaya Publishing House, Mumbai.
3. Chowdhry, N.K., and Agarwal, G.J.C. 2005. Dunkel Proposals (Vol. I Vol.II), Vikas Marg, New Delhi.

**Note:** Question paper shall cover 100% theory

**SEMESTER V - SBE 3**  
**UCOS53 - Commerce (Practical)**

**Credit: 2**

**Hours: 2**

**Objectives:**

- To provide practical knowledge to fill forms like insurance, bank, loan application, membership form, income tax return forms etc.

**LIST OF EXERCISES FOR COMMERCE PRACTICAL**

**UNIT – I**

1. Preparation of invoice, receipts, vouchers, delivery challan, entry pass, gate pass-debit and credit notes.
2. Preparation of Application for shares and allotment - letter of shares Allotment - transfer forms.

**UNIT – II**

1. Drawing, endorsing and crossing of cheques- filling up of pay in slips demand draft application and preparation of demand drafts
2. Making entries in the passbook and filling up of account opening forms for SB account, current account and FDR's.
3. Drawing and endorsing of bills of exchange and promissory notes.

**UNIT – III**

1. Filling up of application forms for admission in cooperative societies.
2. Filling up of loan application forms and deposit challan.
3. Filling up of Jewel loan application form, Procedure for releasing of jewellery in jewel loans and repayment.

**UNIT – IV**

1. Preparation of agenda and minutes of meetings-both general body and board of directors.(students are asked to write agenda and minutes of their own and should not use printed format)
2. Using Bin card and inventories.
3. Using Cost Sheets.

**UNIT – V**

1. Filling up of an application form for LIC policy, filling up of the premium form-filling up the challan for remittance of premium.
2. Preparation of an advertisement copy, collection of advertisement in dailies and journals, critically evaluating the advertisement copy.
3. Filling up income -tax returns and application for permanent account number.

**Note:**

Students may be asked to collect original or Xerox copies of the documents and affix then on the record note book after having filled up. Drawing of the documents should not be insisted.

**Note:** 100% Practical



**SEMESTER VI - CORE 13**  
**UCOC61 - Business Management**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To make the students to get acquainted with the basic Principles of Management.
- On successful completion of this course, the students will get an opportunity to examine and apply appropriate theories / concepts about managing the business effectively.

**UNIT – I**

Introduction to Management: Definition & Meaning of management – Functions of Management – Managerial skills – levels of management – roles of manager, Management as a Science or Art – Approaches to Management – Contribution to management by F.W. Taylor, Henry Fayol, Elton Mayo and Peter F. Drucker.

**UNIT – II**

Planning: Planning – Importance – Process of planning – Types of planning methods (Objectives- Policies – Procedures – Strategies & Programmes) – Obstacles to effective planning - Decision making – Steps – Types – Decision tree.

**UNIT – III**

Organization – Importance – Principles of Organizing – Delegation & Decentralization – Departmentation – Span of Management. Organizational structure – line & functional – organizational charts and manual – making organizing effective – staffing – recruitment – selection – Training, promotion and appraisal.

**UNIT – IV**

Directing: Function of directing – Motivation – Theories of motivation – Maslow, Herzberg Theories. Communication – Process – Barriers to effective communication. Leadership – Definition – Theories and approach to leadership – styles of leadership – Types.

**UNIT – V**

Co-ordination and Control: Nature – Problems of effective co-ordination. Control – Nature – Basic control process – control techniques (traditional and non-traditional) – Use of computers in managing information.

**Reference Books:**

1. Gupta .B. Business Management, Sultan Chand & Son, New Delhi, 2011.
2. Koontz, O'Donnell, Weirich, Essentials of Management, Tata McGraw Hill Publishing Comp Ltd., New Delhi, Edition, 1998.
3. PagareDinkar, Principles of Management, Sultan Chand & Sons, New Delhi, 2003,

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - CORE 14**  
**UCOC62 - Management Accounting**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To develop an understanding of the conceptual frame work of management accounting.
- To acquaint the students, the Management Accounting Techniques that facilitates managerial decision making.

**UNIT – I**

Management accounting-meaning objectives-relationship between cost, financial and management accounting – financial statements analysis and interpretation – ratios – their significance-uses – their significance-limitations analysis for liquidity, profitability and solvency only excluding Projection through ratios.

**UNIT – II**

Fund flow and cash flow analysis-forecasting of funds requirements

**UNIT – III**

Standard costing and variance analysis (simple problem only)

**UNIT – IV**

Marginal costing-Objects –advantages – limitations – Breakeven point (simple problem only)

**UNIT – V**

Decision involving alternate choice-concepts of decision making – concepts of relevant and differential cost – steps in decision making – sales mix – exploring new markets – discounting products line – make or buy decisions – equipment replacement – shutdown or continue

**Text Book:**

1. Management Accounting - Ramachandram&Srinivasan / Sriram Publication, Tiruchy / 11<sup>th</sup> edition 1997
2. Management Accounting – R.S.N.Pillai& V/Bagavathi / S.Chand& company LTD / 1<sup>st</sup> edition revised 1999.

**Reference Book:**

1. Principles of Management Accounting-S.N.Maheswari/ sultan, Chand & sons,/ 13 revised edition 2001.

**Note:** Question paper shall cover 25% theory and 75% problem

**SEMESTER VI - CORE 15**  
**UCOC63 - E-Commerce**

**Credit: 4**

**Hours: 5**

**UNIT – I**

E-Commerce, meaning-Definition reasons for the growth of E-commerce – importance of E-commerce – objectives of E-commerce infrastructure – anatomy of E-commerce application

**UNIT – II**

E-Business – Potential benefits of E-Commerce – Impact of E-Commerce on Business models – E-Commerce applications – Consumer to Business (C2B) – Business to Consumer (B2C) – Consumer to Consumer (C2C) – Internal business process (intra organizational E-commerce), their features and applications.

**UNIT – III**

Advertising and marketing: information based marketing Advertising on the internet on line advertising – types – charting the on line marketing process market research – search and resource Discovery

**UNIT – IV**

Electronic Data Interchange (EDI) meaning Definition importance of EDI – EDI and Email – EDI and E-commerce EDI application in business implementation of EDI – legal, security and privacy issues. Firewall – meaning types – firewall and Electronic data securities.

**UNIT – V**

Electronic payment system – Types of payment systems in E-commerce E-cash e-checks-Smart Cards – Credit cards (plain credit card, encrypted credit card and third party verification) Encryption and credit card – On-line Third party processors (OTTP) – Risks in electronic payments designing electronic payments system.

**Books Reference:**

1. Frontiers of Electronic commerce, Kalakota&Whinston, Person Education, Delhi, 6<sup>th</sup> impression,2008.

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - CORE 16**  
**UCOC64 - Business Tax**

**Credit: 4**

**Hours: 5**

**Objectives:**

- To provide an in depth knowledge of the provisions of Income Tax Act.
- To enable the students to access the financial status of the organization and individual and filing of returns.

**UNIT – I**

Total income – deduction in the computation of total income – setoff And carry forward losses.

**UNIT – II**

Assessment of individuals – Hindu Undivided Family – Joint stock companies – Partnership firms.

**UNIT – III**

Income Tax administration – machinery for taxation – central board of Taxed – directorate of inspection – commissioner of income tax – appellate Tribunal

**UNIT – IV**

Procedure for assessment self assessment – Provisional assessment – reassessment – best judgment assessment – expert assessment – rectification of mistakes.

**UNIT-V**

Collection & recovery – refund of tax deduction of tax at source advance payment of tax – tax credit certificate.

**Text Book:**

1. Income tax theory, law & Practice – T.S.Reddy&Y.HariPrasad Reddy / Margham Publications / 11<sup>th</sup> Edition 2012.

**Reference Books:**

1. Income Tax Law & Practice-Bagavathi Prasad, WishwaPrakashan Publication.
2. Income Tax Law & Practice-VinodK.Singhania/Taxmann Publication Pvt Ltd
3. Income Tax Law & Practice-H.C.MehorthaSahityaBhawan Publications

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - CORE 17**  
**UCOC65 - EDP**

**Credit: 4**

**Hours: 5**

**Objective:**

- To enable the students to learn the concept of Entrepreneurship.
- To instill ideas on identification, selection and preparation of projects and to have awareness on the institutions promoting entrepreneurship.

**UNIT – I**

Entrepreneurship - Meaning – Importance and types – Marketing Vs Manufacturing entrepreneurship – Innovation as the essence of entrepreneurship – Sources of innovation – Entrepreneurial environment – Entrepreneurial skill – Entrepreneurial motivation – Achievement motivation.

**UNIT – II**

Identification of Potential entrepreneurs – Project Identification – Meaning – Classification of Project – Sources of project ideas, project formulation – Report preparation – Project finance and project appraisal.

**UNIT – III**

Institutional set up – DIC, SIDO, NSIC, SISI, SIDCO of Tamil Nadu, SIPCOT, KVIC, TCO's, ITCOT.

**UNIT – IV**

Need for EDP – Objectives, Course contents and curriculum for EDP, Phases of EDP, Evaluation of EDP.

**UNIT – V**

Entrepreneurship in specific areas – Scope – Entrepreneurship in MSME – Significance and problems – Women Entrepreneurship Development in rural areas – Importance, prospects and difficulties – Entrepreneurship development through Industrial Estates.

**Text Book**

1. Khanka, S.S. 2012. Entrepreneurial Development. Revised Edn. Sultan Chand and Sons Ltd., New Delhi.

**Reference Books**

1. Gorden.E., and Natarajan.K, 2009. Entrepreneurial Development. 6<sup>th</sup> Revised Edn. Himalaya Publishing House, New Delhi.
2. Gupta.C.B and Dr.Khanka.S.S. 2010. Entrepreneurship and Small Business Management. 4<sup>th</sup> Edn. Sultan Chand & Sons, New Delhi.
3. Renu Arora and Sood, S.K. 2007. Entrepreneurial Development. Kalyani Publishers, Chennai,

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - ELECTIVE 4**  
**UCOE64 - Business Law**

**Credit: 3**

**Hours: 3**

**Objectives:**

- To cultivate understanding of the various Trade Laws of Land - with an expert knowledge of Indian Contract Act, Sale of Goods Act.
- To provide comprehensive understanding of rights, duties and responsibilities of the parties entering into business dealings

**UNIT – I**

Law of contracts – Introduction – Definition – Essentials – Offer – Acceptance – Consideration – Capacity of parties – Free Consent – Coercion – Undue influence – Fraud and Misrepresentation.

**UNIT – II**

Legality of object and consideration – Agreements opposed to public policy – Wagering agreement – Wagering agreement Vs. Contract of Insurance – Contingent Contract – Performance of contracts – Breach of contracts – Remedies for breach of contract.

**UNIT – III**

Contract of agency – Creation of agency - Kinds of agents – Rights and duties of agent and principal – Liability of principal and agent towards third parties - Termination of agency.

**UNIT – IV**

Sale of Goods Act – Formation of contract – Distinction between Sale and Hire Purchase – Classification of goods – Conditions and Warranties – Rights of unpaid sellers.

**UNIT – V**

Intellectual Property Rights –Definition – Need – Role of WIPO – Types of Intellectual property – Patent, Copyrights and Trademarks – Meaning – Steps involved in Registration of Patent, Copy Right and Trade Mark.

**Text Book**

1. Kapoor, N.D. 2015. Elements of Mercantile Law. 34<sup>th</sup> Revised Edn. Sultan Chand and Sons, New Delhi.

**Reference Books**

1. Gogna, P.P.S. 2007. A Text Book of Business and Industrial Laws. 2<sup>nd</sup> Revised Edn. S. Chand and Co. (P) Ltd., New Delhi.
2. Moshal, B.S. 2010. Mercantile Law. Revised Edn. Anne Book (P) Ltd., New Delhi.
3. A manual on Intellectual Property Rights. November 2007. Brilla Institute of Technology and Science, Pilani.

**Note:** Question paper shall cover 100% theory

**SEMESTER VI - SBE 4**  
**UCOS64 - Business Communication**

**Credit: 2**

**Hours: 2**

**Objectives:**

- To develop better written and oral business communication skills among the students and enable them to know the effective media of communication.
- To enhance their writing skills in various forms of business letters and reports.

**UNIT – I**

Organization of a modern office – Meaning of Office, Functions and importance of an office. Office manuals – Types, Preparation of office manuals. Office forms – Form designing and control.

**UNIT – II**

Mail and Correspondence – Handling inward and outward mail. Internal and External communication. Layout of business letters – Kinds of business letters, Characteristics of a good letter.

**UNIT – III**

Trade letters – Enquiries – Quotations – Acceptance and order confirmation – Execution – Refusal or cancellation of orders, complaints and adjustments – Acknowledgements – Collection letters – Follow up letters – Status enquiry

**UNIT – IV**

Circular letters – Banking correspondence – Agency correspondence- Correspondence with government

**UNIT – V**

Modern communication methods – Electronic mail (E-Mail), Voice mail, Cellular phones, Fax (Facsimile), Video conferencing, Multimedia, Telephone answering machine, Whatsapp.

**Text Books**

1. Chopra, R.K. 2015. Office Management. 17<sup>th</sup>Edn. Himalaya Publishing House, Mumbai. (Units I &II)
2. Pillai, R.S.N and Bhagavathi,V. 2014. Business Correspondence and Office Methods. 11<sup>th</sup>Edn. S.Chand& Co (P)Ltd, New Delhi. (III, IV &V)

**Reference Books**

1. Devanarayanan, T.S and Ragunathan, N.S. 2015. Office Management. 1<sup>st</sup>Edn. Margham Publications, Chennai.
2. Gupta, C.B. 2014. Office Organisation and Management. 2<sup>nd</sup>Edn. Sultan Chand & Sons, New Delhi.
3. Sundar, K. and Kumara Raj, A. 2015. Business Communication. 1<sup>st</sup>Edn. Vijay Nicole Imprints Private Limited, Chennai.

**Note:** Question paper shall cover 100% theory

**Mother Teresa Women's University, Kodaikanal**  
**ALLOCATION OF PAPERS AND CREDITS (SEMESTER-WISE) FOR B.Sc.,**  
**BIOCHEMISTRY PROGRAMMES AS PER THE TANSCHER RULES 2018-19**  
**ONWARDS**

**B.Sc. Biochemistry Course Structure under Choice Based Credit System (CBCS)**

P. No.	Paper Code	Course Title	Hours	Credits	Continuous Internal Assessment (CIS)	End Semester Exam (ESE)	Total
<b>Semester I</b>							
1.	ULTA11	Part-I- Tamil	5	3	25	75	100
2.	ULEN11	Part-II-English	5	3	25	75	100
3.	UBCT11	Core I (Theory)-Biomolecules	6	4	25	75	100
4.	UBCT12	Core II (Theory)- Nutritional Biochemistry	6	4	25	75	100
5.	UBCA11	Allied Theory I – Chemistry I	5	4	25	75	100
6.	UVAE11	Value Education	3	3	25	75	100
<b>Total</b>			<b>30</b>	<b>21</b>			<b>600</b>
<b>Semester II</b>							
7.	ULTA22	Part I-Tamil	5	3	25	75	100
8.	ULEN22	Part II-English	5	3	25	75	100
9.	UBCT21	Core III (Theory)- Enzyme & Enzyme Technology	6	4	25	75	100
10.	UBCP21	Core Practical I- Lab in Biomolecules	6	4	25	75	100
11.	UBCA21	<i>Allied Practical I - Chemistry Practical</i>	5	4	25	75	100
12.	UEVS21	Environmental Studies	3	2	25	75	100
<b>Total</b>			<b>30</b>	<b>20</b>			<b>600</b>
<b>Semester III</b>							
13.	ULTA33	Part I-Tamil	5	3	25	75	100
14.	ULEN33	Part II- English	5	3	25	75	100
15.	UBCT31	Core IV (Theory)-Intermediary Metabolism	6	4	25	75	100
16.	UBCA32	Allied II - Statistics for Biology	5	4	25	75	100
17.	UBCE31	Elective I –	5	3	25	75	100



		Bioinstrumentation/Human physiology					
18.	UBCN31	Non Major Elective Course I- Biofertiliser	2	2	25	75	10
19.	UBCS31	SBE- Tools & Techniques in Biochemistry (Lab)	2	2	25	75	100
<b>Total</b>				<b>21</b>			<b>700</b>
<b>Semester IV</b>							
20.	ULTA44	Part I-Tamil	4	3	25	75	100
21.	ULEN44	Part II-English	4	3	25	75	100
22.	UBCT41	Core V (Theory)- Immunology	5	4	25	75	100
23.	UBCP42	Core Practical II- Lab in Immunology & Microbiology	5	4	25	75	100
24.	UBCA42	Allied Theory- Physics for Biology	4	4	25	75	100
25.	UBCE42	Elective II - General Microbiology/Bioprocess technology	4	3	25	75	100
26.	UBCN42	Non Major Elective course II- Mush room cultivation	2	2	25	75	100
27.	UBCS42	Skill Based Studies II – Protein purification Techniques (Lab)	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>800</b>
<b>Semester V</b>							
28.	UBCT51	Core VI(Theory) - Clinical Biochemistry	5	4	25	75	100
29.	UBCT52	Core VII (Theory) - Molecular Biology	5	4	25	75	100
30.	UBCT54	Core VIII (Theory) - Plant Biochemistry	5	4	25	75	100
31.	UBCT55	Core IX (Theory) – Pharmacology	5	4	25	75	100
32.	UBCT55	Core X (Theory) - Genetics	5	4	25	75	100
33.	UBCE56	Elective III – General Biology/Developmental Biology	3	3	25	75	100
34.	UBCE53	Skill Based Studies III – Clinical Biochemistry (Lab)	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>700</b>

		Semester VI					
35.	UBCT61	Core XI (Theory) - Hormones & Neurochemistry	4	4	25	75	100
36.	UBCT62	Core XII (Theory) - r DNA technology	4	4	25	75	100
37.	UBCT63	Core XIII (Theory) - Genetics & Genetic Engineering	5	4	25	75	100
38.	UBCP63	Core Practical III – Lab in Genetics & Molecular Biology	5	4	25	75	100
39.	UBCP64	Core Practical IV - Lab in Biochemical Techniques	5	4	25	75	100
40.	UBCE64	Elective IV – Bioinformatics/ Biosafety & IPR	4	3	25	75	100
41.	UBCS64	Skill Based Studies IV – Bioinformatics(Lab)	2	2	25	75	100
42.	UEAS61	Extension Activity	1	3	25	75	100
<b>Total</b>			<b>30</b>	<b>28</b>			<b>800</b>
<b>Grand Total</b>				<b>140</b>			<b>4200</b>

**SEMESTER - I**  
**CORE I (THEORY) - BIOMOLECULES**

**UBCT11**

**6 hrs/4credits**

**Objectives:**

- To understand the basic fundamentals of biochemistry.
- To learn about the general properties of carbohydrates, proteins and lipids its role in the living beings.
- To understand the major role of nucleic acids in life processes.
- Student can understand the chemistry of biomolecules and its significance

**UNIT I**

Cellular and chemical foundations of life, Historical background of the origin and development of Biochemistry. Carbohydrates - basic structure of monosaccharides, its isomers, epimers and enantiomers – Structure & biological importance of disaccharides, Trisaccharides. Polysaccharides – structural & storage polysaccharides, homo & hetero polysaccharides with examples - other polysaccharides.

**UNIT II**

Amino acids and Proteins - classification amino acids, physical properties of amino acids - Solubility, electrochemical properties, fundamental role of proteins in life - Composition of proteins - General properties of proteins - Rudimentary treatment of structure, classification of the proteins on the basis of their Biological functions- Criteria for the purity of Proteins.

**UNIT III**

Lipids – Fatty acids - Classification, Hydroxy and keto derivatives and cyclic fatty acids - physical properties of fatty Acids - solubility, boiling point, absorption, spectro chemical properties of fatty acids - Salts, detergents and wetting agents, esters - reactions of unsaturated fatty acids - hydrogenation, halogenations and oxidation.

Fats - Fatty acids esters of glycerol - Chemical structures. Physical and chemical properties of fats – Waxes, phospholipids, non-phosphorylated lipids and steroids.

**UNIT IV**

Nucleic Acids- fundamental role of nucleic acids in life processes- DNA & its types, RNA – types, functions. Structure of bases, nucleosides and nucleotides - bond linking the various bases.

**UNIT V**

Vitamins – Discovery and physico- chemical properties of vitamins, fat-soluble vitamins, vitamin A, D, E and K - Water soluble vitamins, vitamin B complex, vitamin C – Brief mention of source and physiological role.

**REFERENCE**

1. E.S.West Todd, W.R Mason H.S.Van Bruggan J.J. 1967, Textbook of Biochemistry: Fourth edition, The Macmillian Company, New York.

2. Lehninger, A.L .Biochemistry. 2012, Sixth edition, Kalyani publishers. India.
3. Lubert Stryer 2012, Biochemistry, Seventh edition, W.H. Freeman and Company, New York.
4. E.E.Conn and Stumpf, 1987. Outlines of Biochemistry, Fifth edition, WILEY EASTERN LIMITED.

## **CORE II (THEORY) - NUTRITIONAL BIOCHEMISTRY**

**UBCT12**

**6hrs/4 credits**

### **Objectives:**

- To know the value and nutritional components of food.
- To understand the sources of nutrients such as carbohydrates, proteins, fibres and fats for good health.
- To get aware about the disorders caused due to deficiency of protein, vitamin deficiency and minerals
- Enlighten the student about the healthy food- balanced diet, food production and food storage applications and can able to identify the food adulterations.

### **UNIT I**

Introduction of nutrition - Function of foods and its relation to nutritional and clinical health, essential nutrients, analysis of food composition, food groups, ICMR five-food group, food pyramids.

### **UNIT II**

Carbohydrates: types, functions, food sources. Fibre. Fat - types, functions, food sources, essential fatty acids, and cholesterol. Proteins - types, Function, food source, complete and incomplete protein. Nitrogen balance, quality of food proteins and requirements, protein deficiency disorders.

### **UNIT III**

Vitamins: Definition, Classification, Sources, distribution, function, abnormalities, minimum requirements and optimum allowances.

Mineral Nutrition: Essential-micro and macro mineral nutrients, distribution, sources, function and abnormalities.

### **UNIT IV**

Energy: Basal metabolism, measurement of BMR,RDA,BMI, factors affecting BMR, regulation of body temperature, energy needs, and total energy requirement estimation of energy requirements and energy value of foods, obesity.

Balanced diet formulation- Assessment of nutritional status. Nutrition at various stages of growth and development, diets of infants, children, adolescents, pregnant women, lactating mothers and old age.

## UNIT V

Nutritional Challenges of the future: Food production and food storages, future foods, new protein foods, new fat foods and changing food habits Food adulterations.

## REFERENCE

1. Dr.M.Swaminathan 2005 Principles of Nutrition Determination dietetics-, Anmol publication
2. Corine Robinson, 1967.Normal and Therapeutic Nutrition, seventh edition
3. B.Srilakshmi 2003, Food science, Third edition, New age international.
4. Bernard L. Oser Hawk's.1965. Physiological chemistry. 14th Ed. McGraw-Hill Book Co.

## ALLIED THEORY I- CHEMISTRY-I ORGANIC, INORGANIC & PHYSICAL CHEMISTRY

UBCA11

5hrs/4credits

### Objectives:

- To study the chemical kinetics, enzyme kinetics and the rate of reactions.
- To understand the principles and application of electrochemistry and analytical chemistry.
- To know the principles and methods of corrosion, electroplating process and the properties of carbohydrates
- The students can learn the kinetics, bonding theory, atomic orbital and MO theory.

## UNIT I

Bonding:

- 1) VB theory – Postulates of VB theory – Applications to the formation of simple molecules like  $H_2$  and  $O_2$ . Overlap of atomic orbitals S-S, S-P and P-P overlap –principles of hybridization.
- 2) MO theory – Formation of MO's – bonding and antibonding and non bonding MO's – MO diagram for hydrogen, helium,  $F_2$ .

## UNIT II

Chemical kinetics: Rate of reaction – rate law and rate constant – order and molecularity of reactions – derivation of first order rate constant – half-life period –examples of second order and third order reaction – enzyme kinetics.

## UNIT III

Electrochemistry:

A. Arrhenius theory of electrolytes – weak electrolytes – Oswald's dilution of law and its application – ionic product of water and its applications – solubility product and its determination. pH – definition –simple calculation of pH from molarity of acids and bases –

common ion effect and its application in analytical chemistry – buffer solution – definition – theory of buffer action – application.

B. Acid – base indicators – working range of indicators – choice of indicators – commercial cells – primary and secondary cells – Weston – cadmium cell lead storage cell.

#### **UNIT IV**

Corrosion Principle and methods – corrosion and passivity rusting of iron preventive methods from rusting – Electroplating

#### **UNIT V**

Carbohydrates – definition and classification:

a) Monosaccharide – preparation properties and uses of glucose and fructose. Configuration of glucose and fructose. Haworth's structure.

b) Disaccharides: Sucrose – manufacture, properties and uses of sucrose – structure. Only (No elucidation) Distinction between glucose fructose and sucrose.

c) Polysaccharides: Starch and cellulose (A general study)

### **VALUE EDUCATION**

#### **UVAE11**

**3hrs/3 credits**

#### **UNIT I**

Values – definition – value crisis – need for practicing positive values for good life – values erosion – its impact on individual, societal – cultural level – way out.

#### **UNIT II**

Family, material, human values – good health – individual and intellectual freedom – human progress – production and distribution – prosperity and peace – Aesthetic values – sense of beauty – moral ethical value – conscience – integrity – fairness.

#### **UNIT III**

Societal values – cooperative living – healthy behaviors – justice – social responsibility – free from bribery and corruption – good citizen – good society – pursuit of excellence – Psychological values - self-esteem and acceptance – emotional intelligence – spiritual values – devotion and self-fulfillment

#### **UNIT IV**

Bioethics – definition – goals and objectives – love of life – animal use and ethics – medical ethics – negligence and wrong judgments – issues genomes on organ transplantation – donors – drugs – mortality – social ethics – child labour and bonded labor

#### **UNIT V**

Women – and development – sex versus gender – women's rights – factors affecting development – violence against women – right to privacy – abortion and reproductive rights – social stigma – women empowerment – social, economic and political – government program and policies.

**SEMESTER - II**  
**CORE III (Theory) - ENZYME AND ENZYME TECHNOLOGY**

**UBCT21**

**6hrs/4credits**

**Objectives:**

- To study the enzyme reaction and enzyme kinetics through Michaelis-Menten equation and LB plot.
- To learn the methods of enzyme assay and the regulation mechanism of enzyme activity.
- To understand and know the mode of enzyme action and the industrial applications of enzymes.
- The students can gain the knowledge about the significance and industrial application of enzymes.

**UNIT I**

Introduction, Function, nomenclature, classification, isolation, purification and characterization of enzymes. Enzyme specificity and its reactions.

**UNIT II**

Enzyme substrate complexes – Michaelis – Menten kinetics: Determination of  $K_m$  and  $V_{max}$  – Line Weaver Burk plot – Factors influencing enzyme reaction and enzyme inhibition – competitive inhibition, non - competitive inhibition, un competitive inhibition, Inhibitors and its types.

**UNIT III**

Enzyme assay – methods and applications, regulation of enzyme activity- allosteric regulation, covalent modification, zymogens and feedback regulation.

**UNIT IV**

Mechanism of enzyme action: acid base catalysis – Ribonuclease, covalent catalysis - chymotrypsin, metal ion catalysis – carboxy peptidase A, activation energy, role of coenzymes in enzyme reaction. eg: NADH,FADH and CoASH.

**UNIT V**

A brief account of enzyme applications – Immobilized enzymes and diagnostic enzymes (Liver enzymes (SGOT,SGPT),LDH,CK, Phosphatase) – enzymes as drugs in digestive disorders, applications of enzymes in Industries.

**REFERENCE**

1. Nicholas Price, 1982. Fundamentals of Enzymology 3<sup>rd</sup> edition.
2. Malcolm Dixon and Edwin C. Web, 1964. Enzymes - Academic press.
3. Allan Fersht, 1977.Enzyme Structure and Mechanism.
4. Trevor Palmer, 4<sup>th</sup> edition, 1995. Understanding enzymes. Ellis-Horwood Limited.
5. Dixon and Webb, 1964. Enzymes Edwin Clifford *Webb*. Edition, 2. Publisher, Academic Press.

6. Chapline & Bucke. 1990. Enzyme Technology Christopher *Bucke* (Cambridge University Press)
7. Alan Welshman, 1933. Hand book of enzyme biotechnology, 2<sup>nd</sup> edition,

### **CORE PRACTICAL I - LAB IN BIOMOLECULES**

**UBCP21**

**6hrs/4credits**

#### **Obectives:**

- To learn the preparation mode of biological chemicals from bio-based materials.
  - To acquire the knowledge about to operate pH meter and preparation of buffer.
  - To understand the instrumentation of colorimeter and verification through Beer Lamberts law.
  - Student can acquire the skills for the qualitative and quantitative analysis of bio-organic compounds
1. Qualitative analysis of Bio-organic Compounds
    - i. Carbohydrates
    - ii. Amino acids
    - iii. Proteins
    - iv. Lipids and cholesterol
    - v. Nucleic acids
  2. Biochemical Preparation
    - i. Starch (potato)
    - ii. Lactose (milk)
    - iii. Casein (milk)
    - iv. Caffeine (coffee seeds)
  3. pH meter- preparation of Buffer.
  4. Verification of Beer Lamberts law using colorimeter.
    - i. Determination of the extinction co-efficient of given colored compound.
    - ii. Determination of the concentration of given colored compound using a standard graph.

#### **REFERENCE**

1. S.Sadasivam and A.Manickam, 2007. Biochemical methods -
2. Dr. Plummer, 2010. Biochemical methods.
3. David T. Plummer, 1988 an introduction to practical bio-chemistry.
4. Pattabiraman, 1994. Laboratory manual in bio-chemistry.
5. J.Jayaraman, 1966. Practical bio-chemistry.



## ALLIED PRACTICAL I - ORGANIC & VOLUMETRIC ANALYSIS

UBCA21

5 hrs/4credits

### Objectives:

- To enlighten the volumetric analytical methods.
- The students can learn organic analytical methods practically and to improve the laboratory skills.

### UNIT I

Organic analysis:

Analysis of the following function group – Acids, phenols, aldehydes, ketones, esters, amines, amides, anilides, glucose and fructose. No preparation of solid derivatives.

### UNIT II

Volumetric Analysis

#### I. Acidimetry and alkalimetry

- a) Titration between a strong acid against NaOH
- b) Titration between a strong acid against  $\text{Na}_2\text{CO}_3$ .
- c) Titration between sodium hydroxide against oxalic acid.

#### II. Permanganometry

- a) Titration between  $\text{KMnO}_4$  against oxalic acid.
- b) Titration between  $\text{KMnO}_4$  against ferrous sulfate
- c) Titration between  $\text{KMnO}_4$  against Mohr's salt (ferrous ammonium sulfate)

#### III Iodometry

- a) Titration between sodium thiosulfate and potassium dichromate
- b) Titration between sodium thiosulfate and copper sulfate

Estimation: Only one question has to be set either from Unit I or Unit II (Random choice)

## ENVIRONMENTAL STUDIES

UEVS21

3 hrs/2 credits

### UNIT – I

The multidisciplinary nature of environmental studies  
Definition, Scope and importance.  
Need for public awareness

### UNIT – II

Natural resources:

Renewable and non – renewable resources

Natural resources and associated problems

- a) Forest resources: Use and over – exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.

b) Water resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer – pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non – renewable energy sources, use of alternate energy sources, case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable of resources for sustainable lifestyles.

### **UNIT – III**

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystem:
  - Forest ecosystem
  - Grassland ecosystem
  - Desert ecosystem
  - Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

### **UNIT – IV**

#### **Biodiversity and its conservation**

- Introduction – definition: generic, species and ecosystem diversity.
- Biogeographical classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega – diversity nation.
- Hot – spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wild life, man – wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of biodiversity: In – situ and Ex-situ conservation of biodiversity.

### **UNIT – V**

#### **Environmental Pollution**

- Causes, effects and control measures of:
  - Air pollution
  - Water pollution
  - Soil pollution

- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards
- Solid waste Management: causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: floods, earthquakes, cyclone and landslides.

## **UNIT – VI**

### Social issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation. Rainwater harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation.
- Public awareness.

## **UNIT - VII**

### Human population and the Environment

- Population growth, variation among nations.
- Population explosion – family Welfare Programme.
- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS.
- Women and child welfare
- Role of Information Technology in Environment and human health.
- Case studies.

## **UNIT - VIII**

### Field work

- Visit to a local area to document environment assets – river / forest/ grassland/ hill/ mountain.

- Visit to a local polluted site – Urban/ Rural/ Industrial/ Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems – pond, river, hill slopes, etc.

## REFERENCE

1. Agarwal, K.C 2001 Environmental Biology, Nidi Publ Ltd, Bikaner
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt Ltd. (R)
3. Brunner R.C 1989, Hazardous Waste Incineration, McGraw Hill Inc 480p
4. Clark R.S Marine Pollution, Claderson Press, Oxford (TB)
5. Cunningham, W.P Cooper, T.H Gorhani, E & Hepworth, M.T 2001, Environmental Encyclopedia, Jaico Publ House, Mumbai 1196p.
6. De A.K Environmental Chemistry, Wiley Eastern Ltd.,
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P 1993 Water in crisis, Pacific Institute for Studies in Dev., Environmental & Security. Stockholm Env. Institute. Oxford Univ Press 473p.
9. Hawkins R.E Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).
10. Heywood, VH & Watson R.T 1995 Global Biodiversity Assessment. Cambridge Univ Press 1140p.
11. Jadhav, H 7 Bhosale, V.M 1995 Environmental Protection and Laws. Himalaya Pub House, Delhi 248p.
12. McKinney M.L & Schoch R.M 1996 Environmental Science systems & Solutions, Web enhanced edition 639p.
13. Mhaskar A.K Matter Hazardous, Techno Science publications (TB)
14. Miller T.G Jr Environmental Science, Wadsworth Publishing Co (TB).
15. Odum, E.P 1971 Fundamentals of Ecology, W.B Saunders Co USA, 574p.
16. Rao MN & Datta A.K 1987. Waste Water treatment. Oxford & IBH Publ Co Pvt Ltd. 345p.
17. Sharma B.K 2001 Environmental Chemistry Goel Publ House, Meerut.
18. Survey of the Environment, The Hindu (M)
19. Townseed C. Harper J and Michael Begon, Essentials of Ecology, Blackwell Science (TB).
20. Trivedi R.K Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol I and II, Enciro Media (R).
21. Trivedi R.K and P.K Goel, introduction to air pollution, Techno Science Publications (TB).
22. Wagner K.D 1998 Environmental Management W.B Saunders Co Philadelphia, USA 499p.(M) Magazine, (TB) Textbook, (R) Reference.

## SEMESTER - III

### CORE IV (THEORY) - INTERMEDIARY METABOLISM

UBCT31

6 hrs/4 credits

#### Objectives:

- To learn the metabolic pathways involved in the physiological processes
- To understand the concept of bioenergetics, carbohydrate and amino acid metabolism
- To study the lipid and nucleotide metabolism
- Student acquire the knowledge about the bioenergetics and intermediate metabolism of biomolecules

#### UNIT I

Metabolism – definition, importance in physiological processes, Division of metabolism. Bioenergetics: high energy and low energy phosphates, Oxidative phosphorylation.

#### UNIT II

Carbohydrate metabolism: glycolysis, TCA cycle, ETC, HMP Shunt, glycogenolysis, glycogenesis, gluconeogenesis.

#### UNIT III

Amino acid metabolism: A brief account of amino acid metabolism of glycine, cysteine, proline, homoserine, phenylalanine, (other amino acids excluded), urea cycle, a brief account on protein biosynthesis.

#### UNIT IV

Lipid metabolism: Oxidation of fatty acids, energetics of oxidation, ketone body metabolism, glycerol metabolism. Biosynthesis of fatty acids, biosynthesis of triglycerides, phospholipids, cholesterol metabolism.

#### UNIT V

Nucleotide metabolism: Purine and pyrimidine bases, De novo synthesis and Salvage pathway, catabolism of nucleic acids.

#### REFERENCE

1. Robert K, Murray, Harper's Biochemistry, 2001 25th Edition, Peter A, Meyes Victor W. Rodwell.
2. Albert L. Lehinger, 2015 Principles of Biochemistry.
3. Bender, David, (1985). Amino Acid Metabolism. A. Willey
4. Devlin, 2010 Biochemistry.
5. Voet and Voet, 2011. Biochemistry.
6. Murray, K. Robert, *et al.*, - Harper's Biochemistry. 25th edition.
7. Voet and Voet - Biochemistry. 4th edition. 2011. John Wiley and Sons.
8. Mathews, Freeland and Miesfeld 1972. - Biochemistry – a short course. Wiley & sons, 4<sup>th</sup> edition
9. Garrett and Grisham – 2006. Biochemistry. 4<sup>th</sup> edition, Saunders College Publishers

## **. ALLIED - II (THEORY) - STATISTICS FOR BIOLOGY**

**UBCA32**

**5 hrs/4 credits**

### **Objectives:**

- To understand the basics and purpose of statistics in organization and representation of collected data.
- To learn the measure of central tendency and probability calculations.
- The students can able to understand the correlation, regression and test of statistical significance to confirm the significance level
- After this course student can able to use appropriate statistical tool for the validation, interpretation of biological data and present clearly

### **UNIT I**

Statistics: Definition, collection and organization of data, representation of data, sampling and sampling design, tabulation, diagrammatic and graphical representation.

### **UNIT II**

Measures of central tendency: Mean, median, mode, measures of dispersion: range, mean deviation, standard deviation, and variance (problems and explanation).

### **UNIT III**

Probability, Binomial, Poisson and normal distribution.

Measures of symmetry: Skewness, kurtosis and moments - a brief explanation (Problems not necessary).

### **UNIT IV**

Correlation and regression: Explanation, types of correlation - positive and negative correlation, methods of studying correlation, Karl Pearson's co-efficient of correlation (simple problems related to correlation and regression).

### **UNIT V**

Tests of statistical significance: F test, t test, Chi square test, Analysis Of Variance.

### **REFERENCE**

1. Gupta SP. 1997. Statistical Methods.
2. Bhaskar Rai T. 2001. Methods of Biostatistics.
3. Bliss C.I.K. 1967. Statistics in Biology. Vol I. McGraw Hill, New York.
4. Campbell R.C. 1974. Statistics for Biologists, Cambridge University Press.

## MAJOR ELECTIVES - ELECTIVE I (THEORY)-

UBCE31

5hrs/3credits

### Option-1: BIOINSTRUMENTATION

#### Objectives:

- To gain the knowledge about the components, types and application of microscopes, centrifugation techniques and electrophoresis
- To understand about the principles and function of spectrometry in biological field.
- To learn the chromatographic techniques and its types for the separation of biological compounds.
- Student can understand the basic principle and application of all bioinstrumentation for the biological samples analysis.

#### UNIT I

Microscopy – parts and their function, resolving power, aperture – simple, compound, light and dark field, electron and phase contrast ,SEM,TEM microscopes – their applications.

#### UNIT II

Colorimeter: parts and their functions - Beer Lambert's Law. Spectroscopy – pH meter.

#### UNIT III

Chromatography techniques – Principles and types – paper, TLC, Column, HPLC and GC.

#### UNIT IV

Centrifugation techniques – principle, centrifuges and their uses, separation and analytical methods. Ultracentrifugation - applications

#### UNIT V

Electrophoretic techniques – principle, electrophoresis of proteins and nucleic acids. Capillary electrophoresis.

#### REFERENCE

1. Practical Biochemistry – Fifth edition Keith Wilson and John Wilson.
2. Analytical Biochemistry & Separation Techniques – Palanivelu.P
3. Fundamental Laboratory & Approach for Biochemistry & Biotechnology – Alexander.J Ninfa

## **ELECTIVE I (THEORY)**

**UBCE31**

**5 hrs/3 credits**

### **Option-2: HUMAN PHYSIOLOGY**

#### **Objectives:**

- To understand the composition and function of blood, ABO blood grouping and the students also can learn to about the properties of cardiac muscles, cardiac problems and how to measure the blood pressure.
- To study the anatomy of human body and the function of organs in the growth and development of human.
- To learn about the structure and function of respiratory system and endocrine system of human body.
- Student can learn all body organ structure and its function.

#### **UNIT I**

Composition and Functions of blood; White Blood Cells – Types and function; Red Blood Cells – Structure and functions; Haemoglobin –Structure and functions, Blood coagulation, Blood group – ABO, Rh. Structure of heart and blood vessels; Properties of cardiac muscle; cardiac cycle; origin and conduction of heart beat; measurement of arterial blood pressure. cardiac arrest.

#### **UNIT II**

General Anatomy; Digestion in the mouth, stomach and intestines. Movements of the intestine; Role of Liver and Pancreas – Structure and Functions.

#### **UNIT III**

Structure of Respiratory organs; Sub – divisions of lung air; Chemistry of Respiration. Physiology of the Urinary System- Structure of kidney and nephron; Formation of urine, Skin – Structure and functions, Regulations of body temperature

#### **UNIT IV**

Endocrine System – Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of langerhans of pancreas b) Reproductive System – anatomy of the male and female reproductive organs; menstrual cycle; mammary glands; Fertilization; Development of Embryo; Pregnancy and parturition

#### **UNIT V**

General classification of nervous system ; Structure of nerve cell and Spinal cord; Basic Knowledge of different parts of the brain – anatomy and functions of cerebrum, cerebellum and medulla oblongata. Structure and function of eye and ear; taste, smell and cutaneous sensations.

#### **REFERENCES**

1. Chatterjee C.C (2004), Human Physiology, Volume I, Medical Allied Agency, Kolkata
2. Chatterjee C.C (2004), Human Physiology, Volume II, Medical Allied Agency, Kolkata



3. Sembulingam, K. (2000) Essentials of Medical Physiology, Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
4. Best and Taylor, (1992) The Physiological Basis for Medical Practice, Saunders Company.
5. Chaudhri, K. (1993) Concise Medical Physiology, New Central Book Agency (Parental) Ltd., Calcutta.

### **NON MAJOR ELECTIVES –I (THEORY) – BIOFERTILIZER**

**UBCN31**

**2hrs/2credits**

**Objectives:**

- To know the production of biofertilizer using algal and fungal strains which are alternative for the chemical fertilizer.
- To learn the preparation methods of manures and biopesticides using plant based sources and green manuring to increase the soil fertility.
- To learn the application and production of organic compost and vermicompost through eco-friendly route.
- The students can get aware about the importance and need of eco-friendly biofertilizer for improving crop yield also can become entrepreneur.

**UNIT I**

Introduction: History, importance and present status of different types of fertilizers and their application to crop plants. Need of ecofriendly fertilizers. Effect of chemical fertilizers on environment. Energy consuming pattern for chemical fertilizers.

**UNIT II**

Algal and fungal (mycorrhizae) biofertilizers Bacterial biofertilizers Rhizobial, free living N<sub>2</sub> fixers and phosphate solublizing bacteria, their significance and practice. Nitrogen fixing mechanisms.

**UNIT III**

Manures: A general account of manures such as leaf moulds, composts form Yard Manure and a study of the following oilseed cakes: castor and neem as Biopesticide. Green Manuring Role of serbania serban for improving soil fertility.

**UNIT IV**

Application of biofertilizers and manures: A combination of biofertilizer and manure application.organic farming-compost and vermi compost.

**UNIT - V**

Mass production of Cyanobacterial Biofertilizers -- Nostoc, Anabaena Azolla. Blue green algae. Bacterial Biofertilizers -Azotobacter, Azospirillum ,Rhizobium ,Pseudomonas

## REFERENCE

- 1.N.S. Subbao Rao-soil microorganisms and plant growth.
- 2.N.S. Subbao Rao-Biofertilizer
- 3.Ronald M. Atlas& Richard bartha, Microbial Ecology,Fundamentals & application
4. Alexander1977.Introduction to soil microorganism and plant growth.

## SKILL BASED STUDIES I- TOOLS & TECHNIQUES IN BIOCHEMISTRY

UBCS31

2hrs/2 credits

### Objectives:

- To know the laboratory safety practices such as do's and don'ts inside the lab, handling of glass wares and toxic chemicals.
  - To know the preparation and storage methods of chemical solutions.
  - To learn the working methods of pH meter, centrifuge and spectrophotometer.
  - Students can obtain the basic instrument handling skills and various solution preparation for biomolecules analysis
1. Safety practices in the laboratory.
  2. Preparation and storage of solutions. Separation of blood sample
  3. Working of a pH meter, centrifuges
  4. Preparation of buffer
  5. Spectroscopy- UV-visible and fluorescence spectroscopy.
    - a. Determination of concentration of a protein
    - b. Principle and instrumentation of Calorimeter
  6. Introduction and importance of virtual labs in biochemistry

## REFERENCE

1. Physical Biochemistry: Principles and Applications (2010) 2<sup>nd</sup> ed., Sheehan, D., Wiley Blackwell (West Sussex), ISBN:978-0-470-85602-4 / ISBN:978-0-470-85603-1.
2. Physical Biochemistry: Applications to Biochemistry and Molecular Biology (1982) 2<sup>nd</sup> ed., Freifelder, D., W.H. Freeman and Company (New York), ISBN:0-7167-1315-2 /ISBN:0-71671444-2.
3. An Introduction to Practical Biochemistry (1998) 3<sup>rd</sup> ed., Plummer D. T., Tata McGraw Hill Education Pvt. Ltd. (New Delhi), ISBN:13: 978-0-07-099487-4 / ISBN:10: 0-07-099487-0.

**SEMESTER - IV**  
**CORE V (THEORY) - IMMUNOLOGY**

**UBCT41**

**5hrs/4 credits**

**Objectives:**

- To study the basics of immunology and function of immune system against infections.
- To learn the properties and functions of antigens and antibody types.
- To acquire knowledge about hypersensitivity caused by immunological action and autoimmune disorders.
- Students can understand the immunodeficiency disorders, vaccine production and the fundamentals of oncology.

**UNIT I**

Development of immunology – Immunity – types –Organs of immune system – Hematopoiesis – Cells of immune system – blood grouping ABO and Rh systems – Blood transfusion.

**UNIT II**

Antigens – properties – types – Haptens and adjuvants – antibodies – structure – classes and biological functions.

**UNIT III**

Antigen antibody reaction – Host response – humoral and cell mediated immunity – complement - pathways of complement activation, MHC.

**UNIT IV**

Hypersensitivity – immune tolerance – transplantation immunity – auto immune diseases.

**UNIT V**

Immunodeficiency – Immunology of infectious diseases –microbial infection bacterial, protozoan, viral infection – toxoid. Vaccines – type – vaccine development – Oncology.

**REFERENCE**

1. I.M. Roitt, 1988. Essential immunology; Blackwell Scientific Publications, Oxford.
2. R.M Coleman. 1992. Fundamentals of Immunology. W.C Brown Publ.
3. Janis Kuby. 1992. Immunology. W.H Freeman and Coy, N.Y.
4. Illustrated dictionary of Immunology, Cruse.
5. Cellular and Molecular Immunology, Abbas.

## **CORE PRACTICAL II - LAB IN IMMUNOLOGY AND MICROBIOLOGY**

**UBCP42**

**5hrs/4 credits**

### **Objectives:**

- To learn the blood grouping and method to estimate haemoglobin level in blood.
- To train the students to know the diagnostic methods in laboratory level.
- To know the isolation and identification of microbes from various samples.
- Students can equip the skills of immunotechniques and microbial techniques

- 1) Blood grouping
- 2) Estimation of Hemoglobin
- 3) Precipitation method
  - i. Immunodiffusion
  - ii. Immunoelectrophoresis(OD)
- 4) WIDAL test
- 5) ELISA
- 6) VDRL test
- 7) CRP test
- 8) RA test
- 9) ASO test
- 10) Aseptic Techniques – Sterilization
- 11) Serial Dilution, Pour Plate and Spread Plate & streak plate method
- 12) Staining – Simple and Gram's Staining
- 13) Antibiotic sensitivity test (Disc diffusion method)

### **REFERENCE**

1. Hudson and Hay Practical Immunology.
2. Cappuccino, G. James and Natalie Sherman, 1999. Gram stain, Microbiology A Lab. Manual.
3. Atlas, M. Ronald, 1995, Alfred E. Brown and Lawrence C. Parks, Gram stain, Experimental Microbiology.
4. Handbook of Microbiological Media – Hi Media

## **ALLIED – III (THEORY) - PHYSICS FOR BIOLOGY**

**UBCA42**

**5hrs/4 credits**

### **Objectives:**

- To obtain knowledge about the principles and types of spectroscopy and its application in the analysis of biological macromolecules.
- To study the types of radioisotopes, techniques used for the measurement of radioactivity and its used in biological studies.
- To learn the role of isotopes in biological field, autoradiography techniques.

- The students can acquire skills on spectroscopy and can get awareness about hazardous effect of radioactive substances and to know how to handle the radioisotopes.

### **UNIT I**

Spectroscopy - Absorption spectroscopy – principle, instrumentation and applications of atomic absorption, UV visible spectroscopy, Infrared spectroscopy, Nuclear Magnetic Resonance Spectroscopy, NOSY, COSY and ROSY techniques. Electron Spin resonance.

### **UNIT II**

Emission spectroscopy – introduction, principle, method and application of Flame photometry. Fluorimetry – principle, instrumentation and application. Mass spectroscopy – principle, instrumentation and application. Light scattering Raman Spectroscopy; principles, method, application with reference to biological macromolecules such as proteins and nucleic acids.

### **UNIT III**

Principles of thermodynamics and their applications. Introduction, thermodynamics system, thermodynamic state functions, first and second laws of thermodynamics, concept of free energy, standard free energy, determination of  $\Delta G$  for a reaction, relation between equilibrium constant and standard free energy change, biological standard state and standard free energy change in coupled reactions.

### **UNIT IV**

Types of radioisotopes used in biology, units of radioactivity measurements, techniques used to measure radioactivity (gas ionization and liquid scintillation counting), nuclear emulsions used in biological studies (pre-mounted liquid and stripping).

### **UNIT V**

Isotopes commonly used in biochemical studies –  $^{32}\text{P}$ ,  $^{35}\text{S}$ ,  $^{14}\text{C}$  and  $^3\text{H}$ . Autoradiography, Biological hazards of radiation and safety measures in handling radioisotopes – Biological applications.

### **REFERENCE**

1. Physical Biochemistry – VanHolde K.E., Prentice Hall Inc.
2. Biophysical Chemistry – Upathayah
3. Practical Biochemistry – Principles and Techniques – Keith Wilson & John Walker.
4. Practical Biochemistry – D. Friefelder, WH Freeman & Co USA.

## **ELECTIVE II (THEORY)**

**UBCE42**

**4 hrs/3 credits**

### **Option-1 GENERAL MICROBIOLOGY**

#### **Objectives:**

- To understand the basics of microbiology, classification and general characteristics of microbes.
- To study the structural organization and morphological features of microorganisms.
- To know the growth, reproduction and metabolism of bacteria.
- After this course student can get thorough knowledge of microbial classification, metabolism, microbial production of medicine, fuel, food products and diseases caused by microbes.

#### **UNIT I**

History of microbiology, Microscope (light & electron), natural distribution of microorganism, general classification of microorganisms (bacteria, yeast) and their characteristics.

#### **UNIT II**

Organization and structure of Microorganisms: Prokaryotic organization, cytoplasm membranes and their function, mesosomes, cell wall – gram positive and gram negative reactions, capsule and slime layers, flagella and cilia, bacterial chromosome, plasmids, ribosomes, reserved food and endospore.

#### **UNIT III**

Bacterial nutrition: Growth and reproduction, autotrophic and heterotrophic nutrition, bacterial photosynthesis, chemolithotrophy, bacterial metabolism, fermentation, homo fermentative and hetero conjugation, transformation, transduction, speculation, kinetics of bacterial growth, normal growth curve.

#### **UNIT IV**

Food Microbiology: Food spoilage, food poisoning, food borne infections and disease causing microorganisms.

#### **UNIT V**

Industrial Microbiology: Use of microbes in industries, ethanol production, organic acid (penicillin and streptomycin) production. Microorganisms and milk: Sources of microorganisms, fermentation of milk and characteristic, Transmission of disease through milk, determining the wholesomeness of mild, frozen dairy products.

#### **REFERENCE**

1. Y.Stainer L. Wheelis, 2005.General Microbiology.
2. David genenwood, 2012. Medical Microbiology.
3. Gerand J.Tortora, 2015. Microbiology An introduction.
4. Cordic Nims, Hazel M.Dockrell, Medical Microbiology.

## **ELECTIVE II (THEORY)**

**UBCE42**

**4 hrs/3 credits**

### **Option-2: BIOPROCESS TECHNOLOGY**

#### **Objectives:**

- To acquire the knowledge about bioreactors design, used for fermentation process and the recovery of end products.
- To know the production of valuable chemicals such as alcohol, antibiotics and protein from microbial fermentation.
- To study the food preservation methods and application of enzymes in biosensor and application of commercial product production using enzymes.
- The students can obtain knowledge regarding the bioreactors, microbial production and recovery of useful products.

#### **UNIT –I**

Introduction to industrial microorganisms: Isolation, Preservation and Maintenance of Industrial Microorganisms. Kinetics of microbial growth and death. Media for industrial fermentation. Air and Media Sterilization.

#### **UNIT- II**

Types of fermentation processes: Analysis of batch, Fed-batch and continuous bioreactors; components of bioreactor- Measurement and control of bioprocess parameters.

#### **UNIT –III**

Downstream Processing: Introduction, Removal of microbial cells and solid matter, foam removal, precipitation, filtration, centrifugation, cell disruption, liquid-liquid extraction chromatography, Membrane process, Drying and Crystallization. Effluent treatment: BOD and C.O.D. Treatment and disposal of effluents.

#### **UNIT- IV**

Industrial Production of Chemicals: Alcohol (Ethanol), Acids (Citric), Antibiotics (Penicillin), Amino acids (lysine), Single Cell Protein (algae/fungi).

#### **UNIT- V**

Introduction to Food Technology: Food Preservation – methods. Enzyme technology-biosensor, immobilization of enzymes. Commercial production of enzymes-techniques and applications.

#### **REFERENCES**

1. Stanbury, P.F. and Whitaker, A.,(Eds). 1984. Principles of Fermentation Technology. Pergamon Press, Oxford.
2. Arnold L Demain and Julian E.Davies. 1999. Manual of Industrial Microbiology and Biotechnology, III edition .ASM press, Washington DC.

3. Frazier, W.C. and Dennis, C. Westhoff. 1995. Food Microbiology, Tata McGraw Hill Publishing Company, New Delhi.
4. Casida, L.E. 2003. Industrial Microbiology. New Age International (P) Ltd., New Delhi.
5. Michael Shuler and Fikret Kargi. 2002. Bioprocess Engineering: Basic Concepts, 2<sup>nd</sup> Edition, Prentice Hall, Englewood Cliffs, NJ.
6. Pauline M. Doran. 1995. Bioprocess engineering principles, 1 Edition, Academic Press
7. Bailey, J.E. and D.F Ollis. 1986. Biochemical Engineering Fundamentals, 2nd ed. McGraw-Hill Chemical Engineering Series, Berkshire, U.K.
8. Aiba. S., Humphrey, A.E. and Millis N.F. 1973. Biochemical Engineering. University of Tokyo Press, Tokyo
9. Aktinson B. 1974. Biochemical Reactors. Pion Ltd., London
10. Jackson, A.T . 1991. Process Engineering in Biotechnology. Prentice Hall, Englewood Cliffs, NJ, USA. 26.
11. Enfors, S. O and Haggstrom, L.H. 1998. Bioprocess Technology – Fundamentals and Application.

### **NON MAJOR ELECTIVE – II - MUSHROOM CULTIVATION**

**UBCN42**

**2 hrs/2 credits**

**Objectives:**

- To gain the knowledge about mushroom types and its nutritional properties.
- The students can obtain knowledge about morphological, life cycle of mushroom and methods for cultivation of mushroom.

Student can become mushroom entrepreneur

1. Mushroom and its nutritional value
2. Morphology of mushroom
3. Life cycle of mushroom
4. Spawn preparation
5. Cultivation of mushroom
6. Mushroom diseases and control measures.

**REFERENCE**

1. T.N. Kaul. Introduction to Mushroom Science (Systematics), Oxford and IBM Publishing Co. Ltd.
2. Nita Bahl. Handbook on Mushroom Science (Third edition).
3. K.R Aneja. Experiment in Microbiology, Plant Pathology Tissue Culture and Mushroom Cultivation, New Age International Ltd.
4. Experiment in Microbiology, Plant Pathology and Biotechnology, New Age International (P) Ltd.



## **SKILL BASED STUDIES – II - PROTEIN PURIFICATION TECHNIQUES**

**UBCS42**

**2 hrs/ 2 credits**

### **Objectives:**

- To know the techniques for the purification of proteins.
  - To learn the chromatography techniques and protein characterization methods.
1. Purification and characterization of a protein from a complex mixture
    - Preparation of the sample.
    - Ion-exchange chromatography.
    - Gel filtration chromatography.
    - Affinity chromatography.
    - Electrophoresis.
  2. Principle of High Performance Liquid Chromatography (HPLC)

### **REFERENCE**

1. Physical Biochemistry: Principles and Applications (2010) 2<sup>nd</sup> ed., Sheehan, D., Wiley Blackwell (West Sussex)
2. Physical Biochemistry: Applications to Biochemistry and Molecular Biology (1982) 2<sup>nd</sup> ed., Freifelder, D., W.H. Freeman and Company (New York).
3. An Introduction to Practical Biochemistry (1998) 3<sup>rd</sup> ed., Plummer D. T., Tata McGraw Hill Education Pvt. Ltd. (New Delhi).

## **SEMESTER - V**

### **CORE VI (THEORY) - CLINICAL BIOCHEMISTRY**

**UBCT 51**

**5 hrs/4 credits**

### **Objectives:**

- The students can understand about scope of clinical biochemistry to detect disorders.
- To study the disorders caused due to the error in carbohydrate, lipid, protein metabolism and regulation of blood glucose level.
- To learn the tissue function tests, biochemical tests and renal disorders.
- Student can get the theoretical knowledge of clinical test.

### **UNIT I**

Introduction, scope and development of clinical biochemistry. Disorders of carbohydrate metabolism: Regulation of blood glucose, digestion and absorption, normal blood glucose level, hypo and hyper glycemia, diabetes GTT, glucosuria GTT, and galactosemia, GTT. Inborn errors of carbohydrate metabolism.

### **UNIT II**

Disorders of lipid metabolism: Digestion and absorption of lipid, hypo and hyper lipoproteinemias, disorders of triglycerides, phospholipids and cholesterol metabolism, inborn errors of lipid metabolism.

### **UNIT III**

Disorders of amino acid and protein metabolism: Digestion and absorption, urea cycle, disorders of urea, uric acid, creatinine and ammonia. Hypo urecemia, hyper urecemia and porphyria, inborn errors of amino acid metabolism.

### **UNIT IV**

Disorders of nucleic acid metabolism: Purine and pyrimidine metabolism. Gout, orotic aciduria and xanthinuria.

### **UNIT V**

Tissue function tests: Biochemical tests of liver, kidney and pancreas, significance of tissue function tests. Renal and liver transport: Renal Glycosuria, cystenuria, Fanconi syndrome, Crigglar- Najjar disease, Gilbert's disease, Dubin – Johnson disease.

### **REFERENCE**

1. Hawk's, 1965. Physiological Chemistry.
2. Harold Varley, 1960. Practical Clinical Biochemistry –Fourth edition.
3. Tietz, Edward R. Ashwood, David E. Bruns, 2012. Clinical Biochemistry.
4. Burtis A. Carl and Edward R. Ashwood, Tietz 1994, text book of clinical chemistry W.B. Saunders company, 2<sup>nd</sup> edition.
5. Philip D. Mayne, 1994. Clinical Chemistry in diagnosis and treatment. ELBS Publication, 6<sup>th</sup> edition.
6. Montgomery, Conway, Spector, Biochemistry 1990– A case oriented approach. The C.V. Mosby Company, 5<sup>th</sup> edition.

## **CORE VII (THEORY) - MOLECULAR BIOLOGY**

**UBCT 52**

**5 hrs/4 credits**

### **Objectives:**

- To study about the genetic material, mutation, and DNA repair mechanism.
- To understand the mechanism and types of DNA replication in prokaryote and eukaryote.
- To obtain the knowledge of bacterial genetic exchange, genetic maps and linkage.
- The students can understand the genetic material, regulation of gene expression

### **UNIT I**

Nucleic acid as genetic material, Experimental evidence, mutation – types, introns, exons, probes, complementation of gene function. Genetic code: codon, Wobble hypothesis.

### **UNIT II**

Replication: types and mechanism of replication, difference between prokaryotic and eukaryotic replication, DNA polymerases. Transcription: mechanism, RNA polymerase. Translation

### **UNIT III**

Genetic exchange in bacteria: transformation, transduction, and conjugation. genetic maps, linkages, HFr strain.

#### **UNIT IV**

Regulation of Gene expression: Organization of operon, positive and negative operon, lac and ara operon. Chemical mutagen: NTG, HNO<sub>2</sub>, physical mutagen: UV and biological mutagen.

#### **UNIT V**

Extra chromosomal inheritance: Plasmids, types; Transposons: structure and functions; DNA damage and repair mechanism.

#### **REFERENCE**

1. Lewin, Gene VIII 2004. Oxford University Press.
2. Arthur Kornberg, 1992. DNA replication.
3. Lodish, Berk, Zippursky, 2012. Molecular Cell Biology (W.H Freeman).
4. Freifelder, Molecular Biology 1982. Narosa Publishing Co.,
5. Weaver, F., Robert, Hedrick, W. Philip, Genetics, 1997, W.C. Brown Publishers 4th ed.
6. David Freifelder, 2002, Jones and Bartlett publishers, Molecular Biology, Reprint, , Narosa Publishing House.
7. Gardner, Simmons, 1994, 8<sup>th</sup> edition, Principles of Genetics

### **CORE VIII (THEORY) - PLANT BIOCHEMISTRY**

**UBCT54**

**5 hrs/4 credits**

#### **Objectives:**

- To understand the photosynthesis process occurs in plants.
- To enlighten the students about plant nutrition, nitrogen fixation, the function of mineral, sulphur and nitrate metabolism in the plants.
- To understand the plant physiology
- The deep knowledge can use for the production of new crop variety and transgenic plants

#### **UNIT I**

Photosynthesis: Photosynthesis apparatus and photosynthesis pigments, light and dark reactions of photosynthesis, C<sub>3</sub> C<sub>4</sub> and CAM plants, factors affecting photosynthesis, photorespiration.

#### **UNIT II**

Plant growth regulators: Normal growth hormones, Auxins, GA, Cytokinins, Ethylene and ABA, synthetic growth hormones.

#### **UNIT III**

Plant nutrition: Essential mineral nutrients, absorption, translocation and function, effects to toxicity and deficiency, N<sub>2</sub>, cycle N<sub>2</sub> fixation, symbiotic and asymbiotic N<sub>2</sub> fixation: nitrogenase, nitrate assimilation, sulphur metabolism, sulphur as a mineral nutrient, sulphate assimilation.

#### **UNIT IV**

Physiology and reproduction: Brief account on physiology of germination, dormancy, photoperiodism, vernalization.

#### **UNIT V**

Plant tissue culture (an elementary treatment), Disease resistance in plants, plant chemicals and their significance, storage carbohydrates, proteins and fats, secondary metabolites, their physiological, biochemical and pharmacological properties. Terpenes, terpenoids and alkaloids (structural elucidation not necessary).

#### **REFERENCE**

1. Bonner and Varner, 1972. Plants Biochemistry, Third edition, Academic press.
2. Hopkins, 2008. Plant physiology.
3. John. W. Anderson and John Brardall, Molecular activities of plant cell – An Introduction to Plant Biochemistry. Black well Scientific Publications, 1994.
4. Lea and Lea wood, Plant Biochemistry and Molecular Biology, John Wiley and sons, 1997.
5. Devlin N. Robert and Francis H. 1971. Witham Plant Physiology –, CBS Publications.
6. Hans Walter Heldt, 1997, Plant Biochemistry and Molecular Biology –.Oxford University Press, New York,
7. William G. Hopkins, John Wiley and sons, 2004. Introduction to Plant Physiology.
8. C.K. John 1997, Rajani, S. Nadyanda AF. Mascarenhas, Niscom, Tissue culture of economic plants, New Delhi.

#### **CORE IX (THEORY) - PHARMACOLOGY**

**UBCT55**

**5 hrs/4 credits**

#### **Objectives:**

- To understand the drug receptors, principles and phases of drug metabolism and pharmacological activity.
- To study the principles and methods of chemotherapy for cancer and mode of anticancer drugs.
- To get knowledge about the adverse effect of drugs and metabolism of Xenobiotics.
- The students can acquire profound knowledge regarding the drug metabolism

#### **UNIT I**

Definition, classification of drugs, routes of drug administration, absorption of drugs, factors influencing absorption of drugs. Drug distribution: role of kidney in drug interaction with biomolecules, binding of drugs to plasma proteins.

#### **UNIT II**

Drug receptors: drug receptor interaction, involvement of binding forces in drug receptor interaction, drug action not mediated by receptors.

### **UNIT III**

Drug metabolism: effects of drug metabolism, principles of phase I & II reactions, microsomal metabolism of drugs, role of cytochrome p450, enzyme induction and pharmacological activity.

### **UNIT IV**

Chemotherapy: Principles of cancer chemotherapy, target sites for cancer chemotherapeutic agents. Mode of action of anticancer drugs: antibiotics, antimetabolites, alkylating agents, hormones and other agents. Mode of action of sulphonamides, antiviral substances, antimalarials and cancer chemotherapy.

### **UNIT V**

Unusual, adverse response to drugs, drug tolerance and intolerance, drug induced diseases, commonly abused drugs and their biological effects.

Metabolism of xenobiotics and their biomedical importance.

### **REFERENCE**

1. The pharmacology, 1991. Volumes I and II – Goodman, Gilman
2. Rang, Dale, 2012. Basic and clinical pharmacology 7th edition – Katzung, Printice Hall,
3. Satoskar *et al.*, 2012. Pharmacology and pharmacotherapeutics, Popular Prakashar, Mumbai
4. Foye, Waverks, 2012. Principles of medicinal chemistry, Pvt. Ltd. New Delhi
5. Burger's medicinal chemistry and drug discovery. 2012. Principles and practice – Wolf, John Wiley
6. Davies, 1988. Molecular basis of inherited diseases, Read, IRL Press.
7. Glick, Pasternak, 2002. Molecular biotechnology 2nd edition, Panima Publishers,

## **CORE X (THEORY) - GENETICS**

**UBCT 55**

**5 hrs/4 credits**

### **Objectives:**

- To get deep knowledge about the concepts of genetics, principles and mechanism of Mendelian inheritance, genes, chromosome and Mendel's law.
- To study the gene interaction, structure of chromosome, chromosomal abberation gene organization.
- To study about the chromatin, metabolic pathways, mRNA molecules and nuclear transcription.
- Student can able to get the thorough knowledge in genetics which can be used for advanced research

### **UNIT I**

Introduction to genetics, Mendelian analysis of inheritance, genes, chromosomes, alleles, homozygous, heterozygous and mechanism of Mendelian inheritance, Mendel's laws. Linkage:

definition, simple measurement and salient features. Salient features of autosomal dominant, recessive, extra nuclear inheritance.

## **UNIT II**

Gene and gene interaction, Sex determination and sex linkage in diploids, linkage and crossing over, gene mapping. Chromosomal theory of inheritance, maternal inheritance.

## **UNIT III**

Chromosomal variation in number, changes in chromosomal structure, chromosomal aberrations, transposable elements in prokaryotes and eukaryotes.

## **UNIT IV**

Structure of chromosome, organization of gene, cistron, recon, structure of eukaryotic gene, experimental evidence for DNA as the genetic material, cytoplasm genetic system: mitochondria and chloroplast DNA.

## **UNIT V**

Heterochromatin, euchromatin, chromatin remodeling, regulation of galactose metabolism in yeast, regulation by phosphorylation of nuclear transcription factors, regulatory RNAs, riboswitches, RNA interference, synthesis and function of mRNA molecules, phosphorylation of nuclear transcription factors.

## **REFERENCE**

1. Genetics Daniel L. Hartl, Maryellen Ruvolo , 2011. Analysis of gene and genomes, sixth edition
2. Benjamin H. Pierce, 2012.Genetics – Fourth Edition.
3. Primrose *et al.*, 1960. Principles of gene manipulation, 6<sup>th</sup> Edition.
4. Brown, John wisely. 1999, Genomes.
5. Lodish *et al.*, 2012. Molecular Biology.

## **ELECTIVE III (THEORY)**

**UBCE56**

**3 hrs/3 credits**

### **Option-1: GENERAL BIOLOGY**

#### **Objectives:**

- The students learn about the classification of plants and general characteristics of plants, fungi and algae.
- To acquire more knowledge about the general characters of bryophytes, gymnosperms and angiosperms with examples.
- To understand the organ structure and function.
- Student can get basic knowledge about plant and animal biology

## **UNIT I**

Basis of Classification – Bentham and Artificial, Natural Classification of plants, Morphology, Structure and reproduction in plants, Algae- General characters – Sargassum as an example – Economic importance of Seaweeds. Fungi – General characters – Yeasts as an example.

## **UNIT II**

Bryophytes – General characters – Funaria as an example- alternation of generation. Pteridophytes – General characters – Selaginella. Gymnosperm – General characters – Pinus – Economic uses of gymnosperms. Angiosperms – Monocot flower – Allium cepa. Dicot flower – Tribulus terrestris.

## **UNIT III**

Organization, movement and secretions of gastrointestinal tract, Respiration – respiratory organs in mammals – morphology –respiratory pigments. Blood and circulation – composition of blood – General organization of circulatory systems.

## **UNIT IV**

Excretion – excretory organs – general organization in man – muscular system – ultra structure of voluntary muscle.

## **UNIT V**

Nervous system – CNS – Autonomic nervous system – Endocrine glands in man

## **REFERENCE**

1. A.C.Dutta, Botany for degree students
2. G.M.Smith, Cryptogamic Botany, Volume I & II
3. W.T.Taylor and R.J.Wehe – General Biology
4. Narayanaswamy – Outlines of Botany
5. General Biology – Cambridge Press

## **ELECTIVE III (THEORY)**

**UBCE56**

**3 hrs/3 credits**

### **Option-2: DEVELOPMENTAL BIOLOGY**

#### **Objectives:**

- To study about gametogenesis, origin of sperm and egg, cleavages.
- To learn about gastrulation, metabolism and molecular changes and gene activities during gastrulation.
- To study about the organogenesis and regeneration.
- Student can get deep knowledge in embryo formation and development.

## **UNIT – I**

Gametogenesis: Definition-primordial germ cells-origin-spermatogenesis-physiological ripening of sperm-oogenesis-previtellogenesis-vitellogenesis.

## **UNIT – II**

The egg: Size-shape-egg membranes, tertiary membranes, organization of the egg yolk, pigments, egg cortex, polarity, origin of polarity, types of eggs. Cleavage-Definition, morula, blastula, types of blastula, molecular changes, planes of cleavages, types of cleavage, factors affecting cleavage, cleavage laws, adhesion of blastomeres during cleavage, nuclei of cleaving cells, cytoplasm of cleaving cells.

## **UNIT – III**

Gastrulation: Definition, exogastrulation, metabolism and molecular changes during gastrulation, gene activities during gastrulation. Morphogenic movements- Definition, types epiboly, emboly mechanism of morphogenic movements.

## **UNIT – IV**

Organogenesis: Definition, tabulation, neurogenesis, spermatogenesis, growth and differentiation derivatives of ectoderm and mesoderm.

## **UNIT – V**

Regeneration: Definition – Types, Human Reproduction puberty, Menstrual cycle. Menopause, Pregnancy and related problems parturition and lactation.

## **REFERENCE**

1. Verma.S and Agarwal V.K. 2000. Chordate Embryology S.Chand & Co. New Delhi.
2. Berrill.N.J., 1986 Developmental Biology Mc.Graw Hill, New Delhi.
3. Patten, B.M., (1958) Foundations of Embryology Mc.Graw Hill, New Delhi.
4. Saunders.J.W (1982) Developmental Biology – Pattern and Principles, Macmillan New York.
5. Principles of Embryology – Waddington.
6. Embryology by Brath.

## **SKILL BASED STUDIES III - CLINICAL BIOCHEMISTRY (LAB)**

**UBCE53**

**2 hrs/2 credits**

### **Objectives:**

- The students can acquire the clinical laboratory skills
- To know the techniques to estimate glucose, triglycerides and bilirubin in blood and urine.

The students can get practice basic clinical test

1. Organization of clinical laboratory
2. Collection of blood and storage.
3. Separation and storage of serum
4. Total Blood Cell Count (RBC, WBC)
5. Estimation of glucose blood / urine.
6. Estimation of triglycerides in blood / urine



7. Estimation of bilirubin (direct and indirect).
8. Quantitative determination of serum creatinine and urea/ urine
9. Qualitative experiments of urine

## **REFERENCE**

1. Practical Manual of Biochemistry – S.P.Singh
2. Biochemical Analysis – Dr.Palanivelu
3. Medical Laboratory Technology, Vol II Kanai, L.Mukherje

## **SEMESTER VI CORE XI (THEORY) - HORMONES AND NEUROCHEMISTRY**

**UBCT 61**

**4 hrs/4 credits**

### **Objectives:**

- To get the deep knowledge about the classification, biosynthesis and degradation mechanism of hormones.
- To learn about the biosynthesis and mode of action of thyroid hormone, pancreatic and adrenal hormones.
- To gain the profound knowledge about the structure and function of brain, neurotransmitters with examples.
- Student can get thorough knowledge in hormone chemistry and neurochemistry

### **UNIT I**

Hormones: Definition, classification, biosynthesis and degradation. Mechanism of hormone action, class I and II hormone receptors, steroids. Feedback regulation of hormones.

### **UNIT II**

Hypothalamus and pituitary hormones: Hypothalamic releasing factors vasopressin, oxytocin. Biosynthesis, secretion, transport, regulation and biological effects of growth hormones, FSH, LH, TSH, ACTH and prolactin.

### **UNIT III**

Thyroid hormones: biosynthesis, secretion, transport, regulation and biological actions. Hypo and hyperthyroidism, antithyroid agent's role of parathyroid hormones, calcitriol, calcium and phosphorous homeostasis. Hypo and hyperparathyroidism.

### **UNIT IV**

Pancreatic hormones: Islets of Langerhans, cell types. Insulin and glucagon: biosynthesis, mechanism of action and biological effects. Hormonal action of somatostatin and pancreatic polypeptide.

Adrenal hormones: biosynthesis, secretion, transport, mechanism of action and excretion of glucocorticoids, mineralocorticoids, adrenal medullary hormones - epinephrine and nor epinephrine, steroid hormones - androgens and estrogens.

### **UNIT V**

Structure and function of the brain, central nervous system, peripheral and autonomic nervous system. Cells of nervous system: Neurons, Glial cells, Oligodendrocytes and Schwann cells. Neurotransmitters - Synthesis, storage, release, uptake, degradation and action of neurotransmitters. Acetyl choline, GABA, serotonin, dopamine, glutamate, aspartate, nitrous oxide. Mechanism of action of anesthetics, analgesics, hallucinogens, depressants, stimulants and toxins on the nervous system. Addiction and drug abuse.

## **CORE XII (THEORY) – rDNA TECHNOLOGY**

**UBCT62**

**4 hrs/4 credits**

### **Objectives:**

- To study the construction of prokaryotic and eukaryotic cloning vectors.
- To know the techniques for the production of rDNA, mode of recombination and synthetic primer synthesis and gene transfer methods.
- To develop the knowledge regarding the genomic library, PCR and the applications of genetic engineering in biotechnology.
- The students can acquire knowledge about recombinant DNA technology and the manipulating methods which can be used for transgenic plant production.

### **UNIT I**

Introduction to recombinant DNA technology:

Overview of recombinant DNA technology. Restriction and modification systems, restriction, endonucleases and other enzymes used in manipulating DNA molecules, separation of DNA by gel electrophoresis. Extraction and purification of plasmid and bacteriophage DNA.

### **UNIT II**

Cloning vectors for prokaryotes and eukaryotes:

Plasmids and bacteriophages as vectors for gene cloning. Cloning vectors based on *E. coli* plasmids, pBR322, pUC8, pGEM3Z. Cloning vectors based on M13 and  $\lambda$  bacteriophage. Vectors for yeast, higher plants and animals.

### **UNIT III**

Production of r DNA:

Ligation of DNA molecules. DNA ligase, sticky ends, blunt ends, linkers and adapters. Synthetic oligonucleotides, synthesis and use. Uptake of DNA by cells, preparation of competent cells. Selection for transformed cells.

### **UNIT IV**

Selection of recombinants:

Identification for recombinants - insertional inactivation, blue-white selection. Introduction of phage DNA into bacterial cells. Identification of recombinant phages. Introduction of DNA into animal cells, electroporation.

### **UNIT V**

Methods for clone identification:

The problem of selection, direct selection, marker rescue. Gene libraries, identification of a clone from gene library, colony and plaque hybridization probing, methods based on detection of the translation product of the cloned gene. PCR, DNA sequencing. Applications of genetic engineering in Biotechnology

### **CORE XIII (THEORY)- GENETICS & GENETIC ENGINEERING**

**UBCT63**

**5 hrs/4 credits**

#### **Objectives:**

- To study the basic concept of genetic engineering, different types of vectors ,expression of transfer gene
- To understand about cloning vectors and the construction of genomic library and cDNA libraries.
- To learn the key concepts of PCR and sequencing methods.
- Student can learn the application of rDNA technology in agriculture field or high yield and to produce therapeutic agents and can know the effect of biohazards, biosafety levels and handling and disposal of hazardous materials.

#### **UNIT I**

Outline process of genetic engineering and recombinant DNA technology, Isolation of genes, exonuclease & endonuclease, Concept of restriction and modification – Restriction endonucleases, DNA modifying enzymes, Ligases.

#### **UNIT II**

Different Kinds of Vectors - Plasmids, Phage vectors, Cosmids, Phagemids, Virus vectors, Shuttle vectors and expression vectors- YAC, BAC- *S. cerevisiae* system as a model.

#### **UNIT III**

Host-vector system - Cloning vectors for *E. coli.*, Cloning vectors for Eukaryotes- Cloning strategies, construction of genomic libraries and cDNA Libraries.

#### **UNIT IV**

DNA amplification using polymerase chain reaction (PCR): key concepts, Analysis of amplified products. Sequencing (chemical degradation; chain termination and automated sequence.

#### **UNIT V**

Applications of recombinant DNA technology in agriculture – Ti plasmids and their uses in pharmaceuticals, Insulin, Aminoacids, protein engineering and drug design – transgenic plants, animals and microbes – biohazards and biosafety.

#### **REFERENCES**

1. Cell and molecular biology, 3rd edition, Philip Sheeler, Donal E Bianchi, John Wiley
2. Molecular biology of cell, Alberts et al
3. Molecular cell biology, Lodish, Baltimore, Scientific American books, 1994

4. Molecular and cell biology, Stephen L Wolfe, Wordsworth Publishing company 1993
5. Cell biology. Sadava

### **CORE III (PRACTICAL) - LAB IN GENETICS & MOLECULAR BIOLOGY**

**UBCP63**

**5 hrs/4 credits**

#### **Objectives:**

- To develop the laboratory skills and to learn the techniques to isolate plasmid DNA and amplification of DNA by PCR.
  - To learn the transformation techniques.
  - To learn the handling and knowledge to perform blotting, electrophoresis and ELISA methods.
  - Student can learn all genetic and molecular techniques for biological research
1. Isolation of plasmid DNA from *E. coli* cells.
  2. Amplification of a DNA fragment by PCR.
  3. Transformation of *E. coli* cells with plasmid DNA.
  4. Blotting Techniques – Western, Southern
  5. Agarose gel electrophoresis
  6. SDS – PAGE
  7. ELISA

### **CORE IV (PRACTICAL) - LAB IN BIOCHEMICAL TECHNIQUES**

**UBCP64**

**5 hrs/4 credits**

#### **Objectives:**

- To know the methodology to quantify carbohydrate, sugar, protein and amino acid in the biological samples.
  - To learn the techniques for the estimation of DNA and RNA isolated from biological sample.
  - To know the mode to determine the acid number, iodine number and saponification number.
  - Student can able to do the qualitative and quantitative analysis of biomolecules.
1. Estimation of carbohydrate by Anthrone method
  2. Estimation of reducing sugar by DNSA Method.
  3. Estimation of total protein concentration by
    - a. Biuret method b) Lowry's method.
  4. Determination of total amino acid by Ninhydrin method
  5. Estimation of DNA by diphenyl amine methods.
  6. Estimation of RNA by orcinol method.
  7. Estimation of Iodine Number
  8. Determination of Acid Number

9. Determination of Saponification Number

**REFERENCE**

1. Dr. Plummer, 2010. Biochemical methods.
2. David T. Plummer, 1988 an introduction to practical bio-chemistry.
3. Pattabiraman, 1994. Laboratory manual in bio-chemistry.
4. J.Jayaraman, 1966. Practical bio-chemistry

**ELECTIVE IV (THEORY)**

**UBCE64**

**4 hrs/3 credits**

**Option 1: BIOINFORMATICS**

**Objectives:**

- To gain the knowledge about the history and development of different types of computers.
- To learn the basic concepts of bioinformatics and its application in various field.
- To understand the sequencing methods, database searching tools and Phylogenetic construction tools.
- To obtain knowledge to take and submission process of protein and nucleotide sequence form the databases.
- Student can learn the bioinformatics tool for the application of biological research .

**UNIT I**

History, development and types of computers, general awareness of computer systems, hardware and software (CPU and other peripheral devices, computer arithmetic, computer logic, programming languages – machine language, assembly language, higher level languages), Email, World Wide Web and Surfing.

**UNIT II**

Introduction to bioinformatics, classification of biological databases, biological data formats, application of bioinformatics in various fields. Introduction to single letter code of amino acids, symbols used in nucleotides, data retrieval – Entrez and SRS..

**UNIT III**

Sequence analysis: need and importance, pairwise alignment, dynamic programming, Global (Needleman – Wunsch) and Local (Smith Waterman) Alignment concepts, Database searching tools – Entrez, BLAST, FASTA, multiple alignment– Clustal, construction of phylogenetic trees.

**UNIT IV**

Use of nucleic acid and protein data banks – NCBI, EMBL, DDBJ, SWISSPORT. 3D structural analysis of biomolecules, molecular visualization tools – RasMol.

**UNIT V**

Evolutionary analysis; Distance, Clustering methods – Rooted and Unrooted tree representation, Bootstrapping strategies, Neural Networks.

## REFERENCE

1. Bioinformatics – Principles and potential of a new multidisciplinary tool, TIBITE, 1996.
2. A. Fielding. 1985, computing for biologists. Benjamin/Cuming Publ.Co.
3. G.Von Heine, Sequence Analysis in molecular Biology
4. Devereux and Gtribskov, Sequence analysis – A pioneer.
5. Attwood T and Parry, D. 2002, Introduction of Bioinformatics –Pearson Education Asia.

## ELECTIVE IV (THEORY)

UBCE64

4 hrs/3 credits

### Option 2: BIOSAFETY AND IPR

#### Objectives:

- To understand the key concept and historical background of biosafety and to know the importance of biosafety levels, biosafety guidelines and regulations and the function of institutional biosafety committee.
- To study the application of GMOs in various field and methods to release GMO's in the environment.
- To acquire the knowledge about IPR, patenting, trademark, copyrights and geographical indications.
- Student can acquire the knowledge regarding biosafety rules and patenting protocols

#### UNIT - I

Biosafety: Introduction; biosafety issues in biotechnology-historical background; Introduction to Biological Safety Cabinets; Biosafety Levels.

#### UNIT - II

Biosafety Guidelines: Biosafety guidelines and regulations (National and International) – operation of biosafety. Guidelines and regulations of Government of India; Roles of Institutional Biosafety Committee.

#### UNIT - III

Definition of GMOs & LMOs; RCGM, GEAC etc. GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication.

#### UNIT - IV

Types of Intellectual Property: Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications. Importance of IPR – patentable and non patentables – patenting life – legal protection of biotechnological inventions – world intellectual property rights organization (WIPO).

#### UNIT -V

Patent Filing Procedures: National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Precautions while patenting – disclosure/nondisclosure; Financial assistance for patenting.

## **REFERENCES**

1. Martin. M.W. and Schinzinger R. 2003. Ethics in engineering, III Edition, Tata McGraw- Hill, New Delhi.
2. BAREACT, Indian Patent Act 1970 Acts & Rules, Universal Law Publishing Co. Pvt. Ltd., 2007
3. Kankanala, K . C. 2007. Genetic Patent Law & Strategy, 1st Edition. Manupatra Information Solution Pvt. Ltd.,Noida, India.
4. Jose B. Cibelli, Robert P. Lanza, Keith H. S. Campbell, Michael D.West. 2002. Principles of Cloning, Academic Press, SanDiego, Gurdon.

## **SKILL BASED STUDIES IV- BIOINFORMATICS (LAB)**

**UBCS64**

**2 hrs/2 credits**

### **Objectives:**

- To gain the practical knowledge to retrieve protein and gene sequences from databases.
- To know the methods to predict the structure of a compound through molecular visualization software.
- To know the methods to sequence similarity searching tools such as FASTA and BLAST.
- The students can learn the phylogentic tree construction for finding the relationship between the species.

1. Sequence retrieval of Protein from NCBI
2. Sequence retrieval of gene from NCBI
3. Structure download of protein from PDB
4. Structure download of gene from PDB
5. Molecular viewer by visualization software
6. Database searching by – Fasta
7. Database searching by – BLAST
8. Phylogenetic tree construction
9. Multiple sequence alignment using ClustalW

## **REFERENCE**

1. Bioinformatics: Sequence and Genome Analysis (2001), 1<sup>st</sup> ed., Mount, D.W. Cold Spring Harbor Laborator Press (New York), ISBN: 0-87969-608-7.
2. Bioinformatics and Functional Genomics (2003), 1<sup>st</sup> ed., Pevsner, J., John Wiley & Sons, Inc. (New Jersey), ISBN: 0-47121004-8.

MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL - 624 102  
Tamil Nadu.

**SYLLABUS FOR  
B.SC BIOTECHNOLOGY**



**From 2018 – 2019 Onwards**



**MOTHER TERESA WOMEN'S  
UNIVERSITY  
KODAIKANAL**



**Common Course structure for  
UG Programmes under CBCS  
B.Sc Biotechnology  
From 2018 – 2019 Onwards**

**MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL**

**ALLOCATION OF PAPERS AND CREDITS (SEMESTER-WISE) FOR B.Sc.**  
**BIOTECHNOLOGY PROGRAMMES AS PER THE TANSICHE RULES 2018-2019**

**ONWARDS**

**B.Sc. Biotechnology Course Structure under Choice Based Credit System (CBCS)**

<b>P. No.</b>	<b>Paper Code</b>	<b>Course Title</b>	<b>Hours</b>	<b>Credits</b>	<b>Continuous Internal Assessment (CIA)</b>	<b>End Semester Exam (ESE)</b>	<b>Total</b>
<b>Semester - I</b>							
<b>1.</b>	ULTA 11	Part –I - Tamil	6	3	25	75	<b>100</b>
<b>2.</b>	ULEN 11	Part – II - English	6	3	25	75	<b>100</b>
<b>3.</b>	UBTT1 1	Core I (Theory) Microbiology	5	4	25	75	<b>100</b>
<b>4.</b>	UBTT1 2	Core II (Theory) Genetics	5	4	25	75	<b>100</b>
<b>5.</b>	UBTA 11	Allied Theory I Ancillary Chemistry	5	4	25	75	<b>100</b>
<b>6.</b>	UVAE 11	Value Education	3	3	25	75	<b>100</b>
<b>Total Credits</b>			<b>30</b>	<b>21</b>			<b>600</b>
<b>Semester - II</b>							
<b>7.</b>	ULTA 22	Part –I - Tamil	6	3	25	75	<b>100</b>
<b>8.</b>	ULEN 22	Part – II - English	6	3	25	75	<b>100</b>
<b>9.</b>	UBTT2 1	Core III (Theory) - Cell & Molecular Biology	6	4	25	75	<b>100</b>

<b>10.</b>	UBTP2 1	Practical I - Lab in Microbiology	5	4	40	60	<b>100</b>
<b>11.</b>	UBTA 21	Allied Practical I - Lab in Chemistry	5	4	40	60	<b>100</b>
<b>12.</b>	UEVS2 1	Environmental Studies	2	2	25	75	<b>100</b>
<b>Total Credits</b>			<b>30</b>	<b>20</b>			<b>600</b>
<b>Semester - III</b>							
<b>13</b>	ULTA 33	Part –I - Tamil	6	3	25	75	<b>100</b>
<b>14.</b>	ULEN 33	Part – II - English	6	3	25	75	<b>100</b>
<b>15.</b>	UBTT3 1	Core IV(Theory) - Immunology & Immunotechnology	5	4	25	75	<b>100</b>
<b>16.</b>	UBTA 32	Allied Theory II Biomolecules	5	4	25	75	<b>100</b>
<b>17.</b>	UBTE3 1	Elective I – Choice 1 Taxonomy & Plant physiology Choice2:Seed Technology	4	3	25	75	<b>100</b>
<b>18.</b>	UBTN 31	Non Major Elective course I - Computer Applications	2	2	25	75	<b>100</b>
<b>19.</b>	UBTS3 1	Skill based Studies I - Vermi and Mushroom Technology	2	2	25	75	<b>100</b>
<b>Total Credits</b>			<b>30</b>	<b>21</b>			<b>700</b>
<b>Semester - IV</b>							
<b>20.</b>	ULTA44	Part I Tamil	6	3	25	75	<b>100</b>
<b>21.</b>	ULEN44	Part II English	6	3	25	75	<b>100</b>
<b>22.</b>	UBTT41	Core V (Theory) Principles of Genetic Engineering	4	4	25	75	<b>100</b>
<b>23.</b>	UBTP42	Practical II - Lab in	4	4	40	60	<b>100</b>

		Genetic Engineering & Immunotechnology					
<b>24.</b>	UBTA42	Allied practical II Lab in Biochemistry	3	4	40	60	<b>100</b>
<b>25.</b>	UBTE42	Elective II – Option 1- Biophysics Option 2- Biodiversity conservation	3	3	25	75	<b>100</b>
<b>26.</b>	UBTN42	Non Major Elective II - Medical lab technology	2	2	25	75	<b>100</b>
<b>27.</b>	UBTS42	Skill based Elective - II Food processing technology	2	2	25	75	<b>100</b>
<b>Total Credits</b>			<b>30</b>	<b>Total Credits</b>			<b>800</b>
<b>Semester - V</b>							
<b>28.</b>	UBTT5 1	Core VI (Theory) - Developmental Biology	5	4	25	75	<b>100</b>
<b>29.</b>	UBTT5 2	Core VII (Theory) - Animal Biotechnology	5	4	25	75	<b>100</b>
<b>30.</b>	UBTT5 3	Core VIII (Theory) - Bio process technology	5	4	25	75	<b>100</b>
<b>31.</b>	UBTT5 4	Core IX (Theory) Biostatistics	5	4	25	75	<b>100</b>
<b>32.</b>	UBTT5 5	Core X (Theory) Environmental Biotechnology	5	4	25	75	<b>100</b>
<b>33.</b>	UBTE5 3	Elective III – Option 1 Biotechnology and health Choice2: Bioremediation	3	3	25	75	<b>100</b>
<b>34.</b>	UBTS5 3	Skill based studies III Introduction to medicinal & aromatic plants	2	2	25	75	<b>100</b>
<b>Total Credits</b>			<b>30</b>	<b>Semester – VI</b>			<b>700</b>

Semester – VI							
35.	UBTT6 1	Core XI (Theory) – Plant Biotechnology	5	4	25	75	100
36.	UBTT6 2	Core XII (Theory) Bioinformatics	5	4	25	75	100
37.	UBTT6 3	Core XIII (Theory) Bioinstrumentation	5	4	25	75	100
38.	UBTP6 3	Core Practical III Lab in Microbial Technology	5	4	40	60	100
39.	UBTP6 4	Core Practical IV Lab in Plant tissue culture	5	4	40	60	100
40.	UBTE6 4	Elective IV Option 1 Biosafety & IPR Option 2 General Biology	3	3	25	75	100
41.	UBTS6 4	Skill based Studies Biofertilizer	2	2	25	75	100
42.	UEAS6 1	Extension Activities	-	3		100	100
<b>Total Credits</b>			<b>30</b>	<b>28</b>			<b>800</b>
<b>Total Credits</b>				<b>140</b>			<b>4200</b>

### **Regulations:**

#### **1. Qualification for Admission:**

- i. Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Examination, Govt. of Tamilnadu or any other Examination accepted by the syndicate as equivalent there to with atleast one of the following subject.
- ii. Biology/Botany/Zoology
- iii. Candidate should have secured atleast 55% in the above subject and above in the aggregate.
- iv. A relaxation of 10% in the total percentage will be given to SC, ST candidates.
- v. Candidates sponsored by industries/hospitals/Clinical laboratories may be considered for admission.

#### **2. Duration of the course:**

The students will undergo the prescribed course of study for a period of not less than three academic years (Six semesters).

#### **3. Medium of Instruction:** English

#### **4. Subject of Study:** As given in Appendix A

**5. Scheme of Examination:** As given in Course Structure

**6. Eligibility of the degree:**

(i) Candidates will be eligible if they complete the course with the required credits and pass in the prescribed examinations.

(ii) The candidate requires 75% of attendance to attend the semester exam.

(iii) The passing minimum is 40 percent (both in internal and external separately) in each paper.

(iv) The internal marks will be divided as 5 for assignment, 5 for attendance and 15 for written tests. One or two assignments can be given and a consolidate can be taken for the evaluation.

(v) To complete the course the students should gain the prescribed credits i.e. 140 credits.

**SEMESTER I**  
**CORE I – THEORY –MICROBIOLOGY – UBTT11**

**Objectives**

**Hours : 5      Credit : 4**

- The objectives of this course are to introduce the students to the field of microbiology with special emphasis on microbial diversity, morphology, physiology and nutrition; methods for control of microbes and host-microbe interactions.
- Students should be able to Identify the major categories of microorganisms and analyze their classification, diversity, and ubiquity.
- Students should gain knowledge about to Identify and demonstrate the structural, physiological, and genetic similarities and differences of the major categories of microorganisms.
- Students should know about to demonstrate and evaluate the interactions between microbes, hosts and environment.

**UNIT 1:**

History of Microbiology, Basic Principles in microscopy, Types of Microscopes – Light, Compound, Phase contrast and Electron microscope (TEM and SEM). Prokaryotic and Eukaryotic microorganisms. Classification of microorganisms.

**UNIT II:**

General structure, growth and reproduction of Bacteria, Fungi, Algae, Virus and Protozoa. Structure and organization of bacterial cell wall: Gram positive and Gram negative cell wall.

**UNIT III:**

Nutritional requirements of Microorganisms – Autotrophs, Heterotrophs, Photoautotrophs, Chemotrophs. Culture media – Solid and Liquid – Types of media – Semi-synthetic, synthetic, Enriched, Enrichment, Selective and Differential media. Macro nutrients, growth factors

**UNIT IV:**

Factors influencing and affecting microbial growth, Growth and death kinetics, Sterilization and Disinfection – Methods of sterilization- Physical methods- Dry heat – Moist heat, Radiation – Chemical sterilization – antimicrobial chemo therapy.

**UNIT V:**

Gene transfer in microbes, conjugation, Transformation, Transduction, Transfection sexfactor.

**REFERENCES:**

1. Microbiology- M.J. Pelczar, Jr., E.C.S. Chang and N.R. Krieg, McGraw Hill

Company, Newyork (1986).

2. Microbiology-concepts and applications, M.J. Pelczar, Jr., E.C.S. Chang and N.R. Krieg, McGraw Hill Company (1993).

3. Microbiology – L.M. Prescott, J.P. Hareley D.A. Klein – Wm.c. Brown publishers. Dutique, Jawa, Melbourne. 1993.

4. Modern Microbiology – wayne w. Umbreit – W.H, Freeman and company, son fransislcod London (1962).

5. Basic and Practical Microbiology – Ronald M. Atlas, Mac.Milleen Company, Newyork (1986).



## **CORE II- THEORY –GENETICS – UBTT12**

### **Objectives**

**Hours : 5      Credit : 4**

- To know about the basics of genetics and classical genetics encompassing prokaryotic/phage genetics to yeast and higher eukaryotic domains.
- To acquire knowledge about the classical concepts of Mendelian genetics across these life-forms.
- The students will be exposed to the concepts of population genetics, quantitative genetics encompassing complex traits, clinical genetics and genetics of evolution.
- Student will be able to know the fundamental molecular principles of genetics and to understand the relationship between phenotype and genotype in human genetic traits.

### **UNIT – I**

Classical genetics – Mendelian laws – monohybrid, dihybrid inheritance – pedigree analysis – complete, incomplete and codominance – lethal factor – allelic and non allelic gene interaction – complementary and supplementary genes – epistasis – pleiotrophism.

### **UNIT - II**

Multiple alleles and blood groups antigens. Quantitative inheritance Sex chromosomes and sex linked inherited disorders – X – linked, Y – linked inheritance.

### **UNIT - III**

Chromosome organization – linkage and crossing over-theories and types.,maternal inheritance.

### **UNIT - IV**

Mutation – gene mutation – molecular basis of mutation – chromosomal abnormalities – deletion, duplication, translocation, inversion – number: autosomal-down's syndrome, Edward's syndrome-sex chromosomal-turner's syndrome, klenefelters syndrome.

### **UNIT - V**

Genetic recombination bacteria: conjugation, transduction, transformation – population genetics.

### **REFERENCES:**

1. Lewis, R.2001. Human genetics – concepts and application. 4<sup>th</sup> edition.
2. Griffiths, Miller, J. H. Suzuki. D. T. Lewentin – introduction to genetics analysis.
3. Gardner E. J. – principles of genetics.
4. Microbial genetics – David Friefelder.
5. 1. Maloy, S.R., J.Egronan and D.Friefelder.1994. Microbial Genetics. . Jones and
6. Bartlett Publishers, Sudbury, MA, USA.

7. 2. Dale, J.W. 1994. Molecular Genetics of Bacteria. John Wiley and Sons, Hoboken,NJ, USA.
8. USA.
9. 3. Klug, W.S. and M.R. Cummings. 1997. Concepts of Genetics. Prentice Hall, NJ, USA.

### **ALLIED – I- THEORY- ANCILLARY CHEMISTRY – UBTA11**

#### **Objectives**

**Hours : 5      Credit : 4**

- The course aims at elucidating principles of applied chemistry in industrial systems, water treatment, engineering materials and analytical techniques.
- The Students will be able to analyse trends in periodic table with electronic and atomic structure.
- The Students will be able to interpret phase diagrams of pure and binary substances and demonstrate the working of electrodes and their applications.
- The Students will be able to calculate various parameters defining water and fuel quality and also to carry out basic experimental procedure and to emphasize need for safety and safety procedure in laboratory

#### **UNIT – I**

##### **Bonding**

V.B Theory – postulates of V.B Theory – application to the formation of simple molecules like H<sub>2</sub> and O<sub>2</sub> – overlap of atomic orbitals – s-s , s-p and p-p overlap – principle of hybridization – sp,sp<sup>2</sup> and sp<sup>3</sup> hybridization.

M.O Theory: Formation of M.O's – bonding, anti-bonding and non-bonding M.O's – M.O diagram for H<sub>2</sub>, He and F<sub>2</sub>.

#### **UNIT – II**

##### **Chemical kinetics**

Reaction rate – order and molecularity of a reaction – zero order and first order. First order rate equation and half life period – derivation. Examples of first order reactions and second order reactions. Enzyme catalysis – Michaelis and menton mechanism – Significance of K<sub>m</sub>.

#### **UNIT – III**

##### **Electro chemistry**

pH – Definition-simple calculation of pH . Molarity,Normality, PPM. pH of acid and bases-common ion effect-and its application in analytical chemistry-buffer solution-definition-theory of buffer action-application.

Acid- base indicators-working range – commercial cells and batteries – primary and secondary cells.Weston – cadmium cell,lead storage cell, electroplating – principle and methods.

#### **UNIT – IV**

Stereo isomerism: Chiral centre – optical activity of compounds containing one or two chiral centers – R-S notation – diastereoisomers – racemisation - resolution.

Geometrical isomerism of maleic and fumaric acids – E-Z notation of geometrical isomers.

#### **UNIT –V**

Adsorption: Definition , difference between adsorption and absorption – adsorbate, adsorbent – physical adsorption and chemical adsorption – differences between these two types – factor influencing adsorption – adsorption isotherm – Langmuir isotherm (no derivation statement) – adsorption of gases on solid surface.

#### **Reference:**

- 1.Modern inorganic chemistry – R.D. Madhan
- 2.Advanced organic chemistry – Bahl & Arun Bahl
- 3.Physical chemistry – Y.R. Puri & Sharma

### **SEMESTER II**

#### **CORE III –THEORY- CELL AND MOLECULAR BIOLOGY – UBTT21**

#### **Objectives**

**Hours : 6      Credit : 4**

- To the understand the various biological processes and molecular structure and functions of cells and molecules such as DNA, RNA and proteins.
- To understand storage of genetic information and its translation at molecular level in prokaryotic and eukaryotic systems.
- Student should be equipped to understand the fundamental aspects in biological phenomenon.
- Students will be able to know the properties of genetic materials and storage and processing of genetic information.

#### **UNIT – I**

The plant cell: Structure and function of cell wall, membrane, chloroplast, mitochondria, ribosomes, peroxisomes, golgi apparatus, nucleus, nucleolar organizer and ER.

#### **UNIT – II**

Cell cycle – mitosis and meiosis, pairing, crossing over and cytokinesis. Transposons and Plasmids.

#### **UNIT – III**

Chromosomes: Morphology and chemistry ,Chromatin organization – C- value paradox. DNA replication and enzymes involved, DNA damage and repair,

#### **UNIT – IV**

Transcription, RNA splicing – post transcriptional modification. Enzymes involved in transcription. Translation, post translational modifications – targeting of proteins to different cellular components

#### **UNIT – V**

Mitochondrial genome and Chloroplast genome – import of protein into Mitochondria and chloroplast. RNA editing. Plastome – structure and function.

#### **REFERENCES:**

1. Pawar. Cell Biology, Himalaya Publishing House, Mumbai.
2. De Robertis E.D. and De Robertis E.M.F. 2002. Cell and Molecular Biology. 8<sup>th</sup> Edition. Lee and Fab International edition, Philadelphia.
3. Cooper G. 1996. The cell – A molecular approach. ASM Press, Washington
4. Buchanan B.B. Gruissem W., Jones R.L. 2008. Biochemistry and Molecular Biology. American Society of Plant Physiologist, Maryland, USA.
5. Sheeler P and Binachi D. 2004. Cell and Moecular Biology, Third edition, Wiley New York, USA.
6. Lewin, B. 2000. Gene VII. Oxford University Press, New York, USA.

## **CORE PRACTICAL I –LAB IN MICROBIOLOGY – UBTP21**

### **Objectives**

**Hours : 5      Credit : 4**

- Students should know about the safe practices in a microbiology laboratory.
  - Students should be able to correctly demonstrate use of the scientific method
  - Demonstrate proper usage, identify the parts/functions of the following microscopes: bright field and stereoscopic.
  - To demonstrate proficiency and use of the following in the laboratory: streak plate isolation technique; bacterial staining techniques; wet mounts; and proper culture handling.
- 
1. Maintenance of hygienic conditions in the laboratory-rules and regulations.
  2. Microscope and its functions,
  3. Preparation of culture media and sterilization methods.
  4. Staining techniques, simple, gram, spore and capsular.
  5. Enumeration of microorganisms – Spread and Pour plate method.
  6. Pure Culture Technique – Streaking techniques.
  7. Motility of bacteria, Growth studies.
  8. IMVIC test.
  9. Characterization of biofertilizer microbes.

### **REFERENCE:**

2. Cappuccino, G. James. And Natalie Sherman, Gram stain, Microbiology A Lab. Manual, 1999.
2. Atlas, M. Ronald, Alfred E. Brown. And Lawrence C. Parks, Gram stain, Experimental Microbiology, 1995.
3. Handbook of Microbiological Media – HiMedia.
4. Biochemical Methods – Wilson & Walker.

## ALLIED PRACTICAL – I –LAB IN CHEMISTRY – UBTA21

Objectives

Hours : 5      Credit : 4

- To familiarize the solubility nature of organic substances of different functional group and know about the volumetric analysis different chemical compounds.
- To familiarize the systematic producers organic substances analysis.
- To familiarize the test involving identification of special elements.
- To learn the conformatory test for various functional groups and knows the proper procedures and regulations for safe handling and use of chemicals and can follow the proper procedures and regulations for safe handling when using chemicals.

### 1. Organic analysis

Analysis of the following function group – Acids, phenols, aldehydes, ketones, esters, amines, amides, anilides, glucose and fructose. No preparation of solid derivatives.

### 2. Volumetric Analysis

#### Acidimetry and alkalimetry

- a) Titration between a strong acid against NaOH
- b) Titration between a strong acid against  $\text{Na}_2\text{CO}_3$ .
- c) Titration between sodium hydroxide against oxalic acid.

#### Permanganometry

- a) Titration between  $\text{KmnO}_4$  against oxalic acid.
- b) Titration between  $\text{KmnO}_4$  against ferrous sulfate
- c) Titration between  $\text{KmnO}_4$  against Mohr's salt (ferrous ammonium sulfate)

#### Iodometry

- a) Titration between sodium thiosulfate and potassium dichromate
- b) Titration between sodium thiosulfate and copper sulfate

**Estimation: Only one question has to be set either from Unit I or Unit II (Random choice)**



## SEMESTER-III

### CORE IV- THEORY – IMMUNOLOGY & IMMUNOTECHNOLOGY- UBTT31

**Objectives**

**Hours : 5      Credit : 4**

- To get knowledge on the basic principles and definitions of immunology, its modern achievements and practical ways of implementation
- Students will acquire skills and competence in specialized immunological techniques in the diagnosis and management of health related disorders.
- Acquire knowledge and understanding of research methods employing immunological techniques for application in biomedical and clinical research.
- Students should know the skills to analytically, critically and systemically analyze and evaluate information related to immunotechnologies.

#### **UNIT I:**

Introduction, History and Scope of immunology. Types of immunity, Antigen-Antibody- immunoglobulin's – Structure, types, distribution and functions.

#### **UNIT II:**

Lymphoid tissues – Primary and secondary lymphoid organs – thymus, bone marrow, spleen, mucosal associated lymphoid organs. Ontogeny and physiology and immune system. T & B Cells – receptors – activation and function.

#### **UNIT-III**

Hypersensitivity reactions, HLA Tissue typing & MHC transplantation immunity.

#### **UNIT IV**

Autoimmunity, Tumour immunology and Immunodeficiency disorders.

#### **UNIT-V**

Antigen-antibody interactions: precipitation – diffusion –radial and ouse diffusion – agglutination – Haemoagglutination, Passive agglutination. Immuno diagnostics – precipitation, agglutination, ELISA and FISH. General introduction to monoclonal antibodies and vaccines

#### **REFERENCE:**

3. Immunology by I.M. Roitt, J. Brostoff and D.K. Male (1993) Gower medical publishing, London.
2. Immunology by J.Jube (1991) freeman and company.
3. Immunology – A short course by E. Benzamini, G. Sunshine and Leskpwitz, Willy – Liss 1996.



4. Introduction to medical Immunology by Gabriel Virellce, Marcel Dekkar 1993.
5. Donald M.Weir, John Stewart, 1993.Immunology VII edition. ELBS, London.
6. Richard M.Hyde. 1995. Immunology III edition. National Medical series, Williams and Wilkins. Harward publishing company.

### **ALLIED-THEORY – II – BIOMOLECULES – UBTA32**

**Objectives**

**Hours : 5**

**Credit : 4**

- Students should learn the elements present in biomolecules and the different monomers and polymers.
- Students will be able to identify their chemical elements and the difference between simple sugars and complex carbohydrates.
- To acquire knowledge to identify the chemical elements and functional groups and to recognize the structure of an amino acid..
- Students should be able to identify the chemical elements and components of a nucleotide and also be able to describe the function of DNA.

#### **UNIT – I**

**Carbohydrates:** Classification of Carbohydrates .structural elucidation of glucose and fructose. Properties, structure and biological functions of mono, di, oligo and polysaccharides. Homoglycans and Heteroglycans.

#### **UNIT – II**

**Amino acids:** Structure, classification, physical and chemical properties. Peptides, peptide bond, biologically important peptides.

**Proteins:** classification and Biological importance. Primary structure, Secondary, tertiary and quaternary structure.

#### **UNIT – III**

**Nucleic acids:** Components of mono nucleotides, pyrimidines and purines. Polynucleotide's: DNA and RNA. Composition and structure- their biological importance

#### **UNIT – IV**

**Lipids:** nomenclature, classification and Biological significance. Simple lipids: types of fatty acids, triglycerides, waxes, steroids, prostaglandins and their properties. Compound lipids: Phospholipids, sphingolipids and glycolipids.Lipoproteins.

#### **UNIT – V**

**Vitamins.** Source, structure, biological role, daily requirement and deficiency manifestation of the fat soluble vitamins A,D,E & K. Water soluble vitamins-Ascorbic acid, thiamine, riboflavin, pyridoxine, niacin, pantothenic acid, lipoicacid, biotin, folic acid and vitamin B12.

## REFERENCES

1. Principles of Biochemistry – Lehninger
2. Textbook of Biochemistry-West & Todd.
3. Harper's Biochemistry 25<sup>th</sup> edn, Mc Graw Hill.
4. Fundamentals of Biochemistry – O.P. Agarwal.
5. Essentials of Biochemistry – M.C. Pant.
6. Essentials of Biochemistry – A.I. Jain.

### Option 1

#### ELECTIVE – THEORY –I – TAXONOMY & PLANT PHYSIOLOGY – UBTE31

##### Objectives

Hours : 4      Credit : 3

- To acquire the basic knowledge needed for proper understanding of plant functioning. .
- Students should gain the knowledge of Plant Kingdom and understanding of the taxonomic hierarchy.
- Students should identify and describe the different types of plant cells and tissues, their structure and function.
- Students should be able to determine the role and function of specific vegetative parts of the plant and the role and function of the reproductive parts of the plant.

#### UNIT I

Terminology of flower and floral parts- Morphology – Inflorescence – types- racemose, cymose, mixed and special types. Descriptive Fruit-classification. Details of simple, fleshy, dry dehiscent and dry indehiscent, aggregate and multiple fruits.

#### UNIT II

Taxonomy:- Binomial nomenclature. Systems of classification-Bentham & Hooker.. A detailed study of the following families and their Economic Importance- Annonaceae, Leguminosae, Asclepiadaceae, Caesalpinoideae (Caesalpiaceae) & Mimosoideae (Mimosaceae), Cucurbitaceae, Apiaceae, Gramineae (Poaceae).

#### UNIT III

Water relation: significance, - osmotic and non-osmotic uptake of water. Ascent of sap-cohesion theory: root pressure, transpiration, physiology of stomatal Action, Translocation of solutes and assimilates. Mineral uptake: Passive and active. Role of major and Minor elements, mineral deficiency symptoms.

#### UNIT IV

Photosynthesis: role of pigments enhancement effect, photosystems I & II  
Photosynthetic electron transport, Photophosphorylation, Carbon Assimilation: Calvin cycle  
Hatch & Salck pathway, CAM pathway.

#### **UNIT V**

Plant Growth: regulatory substances; auxins, kinins, gibberellins, abscissic acid and their function. Photoperiodism, phytochrome-vernalization.

#### **REFERENCES**

Porter, C.L. ( ) : Taxonomy of flowering Plants

Eurasia Publishing House, New Delhi.

Lawrence, G.H.M. (1953) : Taxonomy of Vascular Plants

Oxford & IBH Publishers, New Delhi, Calcutta-823pp.,23

Mitra, J.N. (1964) : An Introduction to Systematic botany & Ecology

The World Press (P) Ltd., Calcutta –694pp.,

Jefferey, C. (1968) : An Introduction to Plant Taxonomy

J.A. Churchill, London-142pp.,

### **Option 2-SEED TECHNOLOGY**

#### **Objectives**

**Hours : 4      Credit : 3**

- Students should know the basic knowledge of seed development and structures and apprise students with its relevance to production of quality seed.
- Students should know about the basic principles of quality seed production and physiological processes governing seed quality and its survival.
- Students should gain knowledge in principles and practices of seed health testing and management of seed borne diseases.
- To impart knowledge on the principles and techniques of seed processing for quality upgradation and of storage for maintenance of seed quality.

#### **UNIT I**

Seed processing – Importance of seed processing in the pathway of seed improvement, physical characteristics used to separate seeds. Preparing seeds for processing. Licensing of machines.

#### **UNIT II**

Seed drying : Importance and advantages of seed drying ,moisture content and methods of seed moisture measurements, Theory of seed drying (wet dry seeds),advantages of mechanical drying equipments dehumidification and drying of heat sensitive seeds , relative humidity and equilibrium, moisture content of seeds.

### **UNIT III**

Seed processing machines : Principle, construction, working, adjustments, cleaning and uses of seed processing machines viz. i) Air screen cleaner cum grader ii) Specific gravity separator, aspirators, pneumatic aspirators, stoner iii)Roll mill iv) Magnetic separators v) Spiral separators, dropper best separator, electrostatic separators

### **UNIT IV**

Seed Treatment: Principle, construction, working, adjustments and uses of slurry seed treater mist –o- matic seed treated, storage and labeling of treated seeds, seed users safety.

Seed conveyors and elevators

### **UNIT V**

Seed storage – structures and their management: Packing and marketing of seeds, bagger weigher, bag closing ,portable and conveyor type of bag closer, labeling and maintaining lot identify, lot numbers, seed pellets, handling and stacking, maintenance of seed processing record.

### **REFERENCES**

1. K.A. Jeffs, (1986), Seed treatment, CIPAC Publishers,
2. D.S. Bindra- Plant Protection and equipments.
3. Billy R. Gregg, Alvin G.Law,S.S. Virde,J.S. Balis-Seed Processing. Published by National Seeds Corporation, New Delhi, and Mississippi State University and USAID.
4. S.M. Henderson & R. Perry, (1976), Agricultural process Engineering, Avi Publishing Co Inc.; 3<sup>rd</sup> Revised edition
5. Carl W. Hall, (1967), Drying Farm crops, Agricultural Consulting Associates; 6<sup>th</sup> printing edition
6. A Chakravarty, (1989), Post Harvest Technology & cereals , oil seeds. Pulses & Oxford & IBH Publishing Co Pvt.Ltd
7. Waren L.Melabe,Julien C. Smith & Peter Harviot , (2004), Unit operation in chemical engineering. McGraw-Hill Education; 7 edition

8. ICAR, (1961), Handbook of Agriculture, Directorate of Information and Publication of Agriculture (DIPA),
9. Hunt D, (1977), Farm power & machinery management, Iowa State University Press.
10. Prem Singh and Arya – Vegetable breeding and seed production; Kalyani Publ.Ludhiana.

**NON MAJOR ELECTIVE COURSE I – THEORY – COMPUTER APPLICATION –  
UBTN31**

**Objectives**

**Hours : 2      Credit : 2**

- Students should gain knowledge in fundamentals of Microsoft Office, Microsoft Windows XP, and browsing and searching the World Wide Web.
- Students should acquire knowledge with the proper procedures to create documents, worksheets, databases, and presentations suitable for coursework, professional purposes, and personal use.
- To improve reading, literacy, and numeracy, developing strategies and ideas to address literacy and numeracy issues improving the reading level of students.
- Students will also perform activities using intergrated software programs.

**UNIT I**

History of computers, Types of Computers, Basic computer concepts

**UNIT-II**

Parts of a computer-input (key board, Mouse) and Output devices (Monitors, Printers), computer memory (RAM,ROM), Storage Devices (Floppy disk, Compact disk, Hard disk), Central Processing Unit, Software, Hardware, Computer peripherals – Mouse, Modem.

**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

**UNIT IV**

Word Processing software MS-Office.

DESKTOP PRINTING (DTP)- Application software like- ADOBE Pagemaker, Corel Ventura and Microsoft Publisher and their uses.

**UNIT-V**

A Basic knowledge of Networking-Internet-email facilities, terminology connected with them and their uses in Biotechnology

**SKILL BASED STUDIES I –THEORY- VERMI & MUSHROOM TECHNOLOGY –  
UBTS31**

**Objectives**

**Hours : 2      Credit : 2**

- To providing basic knowledge about vermi and mushroom Technology .
- Students will able to gain the knowledge of Mushroom cultivation, composting and cultivation of different types of edible Mushroom .
- Students should know the methods of harvesting of Mushroom and the methods of grading, packing and storing and value added products out of Mushroom.
- Students will be able to compost in a limited space and describe the decomposing process and they will also turn towards organic farming and get the knowledge of biodiversity of local earthworms.

**UNIT-I**

History and scope of vermi composting - Role of Earthworm in fertilizer preparation. Types of Earthworm – Epigeics, Anecic and Endogeics – vermicast, coccons. Requirement for ounseling ting, vermitech – Economic importance of vermicompost.

**UNIT-II**

Bins-small scale-Large scale- Starting off-Bedding. Feeding –Harvesting. Vermicomposting properties- problems. Commercially available ounseling ting systems-vermicomposting for small farms-vermicompost & Plants.

**UNIT-III**

History of mushroom cultivation-Food value of mushroom-morphology of mushroom-Life cycle in brief.

**UNIT-IV**

Fungal nutritional habitat-spawn preparation, casting and casting methods, cropping and harvesting.

**UNIT-V**

Cultivation of mushroom-mushroom disease and control measures.

**REFERENCE:**

1. Invertebrate zoology- Dr. Veer bala rastogi- Kedernath Ramnash publications
2. Biology of invertebrates- Jan A. Penchenik-Tata McGraw Hill Edition.
3. Biofertilizers and organic farming – S.V. Vyas ,Sameer vyas,





## SEMESTER – IV

### CORE V – THEORY – PRINCIPLES OF GENETIC ENGINEERING – UBTT41

#### Objectives

Hours : 4      Credit : 4

- To understand the basic theoretical concepts and techniques of genetic engineering.
- Students should know about the different types of vectors of genetic engineering.
- Students will gain knowledge about the applications of recombinant DNA technology
- Student will acquire knowledge about the DNA sequencing and amplification and its importance in the Genetic engineering.

#### UNIT- I

Outline process of genetic engineering and recombinant DNA technology, Isolation of genes, exonuclease & endonuclease, Concept of restriction and modification – Restriction endonucleases, DNA modifying enzymes, Ligases.

#### UNIT- II

Different Kinds of Vectors – Plasmids, Phage vectors, Cosmids, Phagemids, Virus vectors, Shuttle vectors and expression vectors- YAC, BAC- *S. cerevisiae* system as a model.

#### UNIT –III

Host-vector system – Cloning vectors for *E. coli.*, Cloning vectors for Eukaryotes- Cloning strategies, construction of genomic libraries and cDNA Libraries.

#### UNIT –IV

DNA amplification using polymerase chain reaction (PCR): key concepts, Analysis of amplified products. Sequencing (chemical degradation; chain termination and automated sequence.

#### UNIT – V

Applications of recombinant DNA technology in agriculture – Ti plasmids and their uses in pharmaceuticals, Insulin, Aminoacids, protein engineering and drug design – transgenic plants, animals and microbes – biohazards and biosafety.

#### REFERENCES

1. Cell and molecular biology, 3<sup>rd</sup> edition, Philip Sheeler, Donal E Bianchi, John Wiley
2. Molecular biology of cell, Alberts et al
3. Molecular cell biology, Lodish, Baltimore, Scientific American books, 1994
4. Molecular and cell biology, Stephen L Wolfe, Wordsworth Publishing company 1993
5. Cell biology. Sadava

**CORE PRACTICAL II- LAB IN GENETIC ENGINEERING AND  
IMMUNOTECHNOLOGY – UBTP42**

**Objectives**

**Hours : 4      Credit : 4**

- Students should understand the basic techniques of genetic engineering and immunology.
  - Students will acquire knowledge about to isolation of DNA from bacteria, plant and animals different electrophoresis techniques and it applications.
  - To learn the antigen-antibody reaction and blood grouping techniques and its application in immunotechnology.
  - To understand the working principles and applications of PCR and ELISA.
1. Isolation of genomic DNA – bacteria
  2. Isolation of genomic DNA – Plant
  3. Isolation of genomic DNA – Animal
  4. Agarose Gel Electrophoresis
  5. Isolation of Plasmid DNA
  6. Restriction digestion
  7. SDS-PAGE
  8. Western blotting – Demo
  9. Southern blotting – Demo
  10. PCR – Demo

**IMMUNOLOGY**

1. Antigen-anti body reactions
2. Immuno diffusion (Single radial, double and rocket)
3. Blood grouping
4. Preparation of serum from blood
5. ELISA- Demonstration

**REFERENCES:**

1. Sambrooke E.F.Fritsch. 1989. Molecular cloning lab manual. Volume I, II, III.
2. Asubel F.M., Brent R., Kinstein RE, Moore DD, Seidmen JG. 2000. Current Protocols in molecular biology. Volume XVII

3. Harwood A. J. 1994. Protocols for gene analysis
4. Weir. 1988, Hand book of experimental Immunology. Vol I & II. Blackwell scientific publishing.
5. Hudson L & Hay H.C. 1980, Techniques in clinical immunology –Blackwell scientific publishing.
6. Thompson R.A. 1997, Techniques in clinical immunology –Blackwell scientific publications.

### **ALLIED PRACTICAL II- LAB IN BIOCHEMISTRY – UBTA42**

#### **Objectives**

**Hours : 3      Credit : 4**

- Students should gain knowledge about fundamental approaches for investigating biochemical estimations.
- Students should learn about the chromatography techniques and its applications.
- Students acquire knowledge about the principles and application of colorimetric techniques.
- To learn about the basic procedure for preparation of solutes.

1. Estimation of Protein – Lowry’s method.
2. Estimation of DNA by DPA Method
3. Estimation of RNA by Orcinol method
4. Estimation of Sugars by Benedict method
5. Estimation of total free amino acids – Sulfovanicillin method.
6. Estimation of Lipids
7. Analysis of Oils- Iodine Number- Saponification Value –Acid Number.
8. Estimation of Vitamin C.
9. Paper Chromatography.
10. Preparation of Buffer- Phosphate, Acetate, Tris.
11. Principles of Colorimeter, Spectrophotometer and pH.
12. Determination of Normality, Molarity, Molality, Percent Solution

#### **REFERENCES**

1. David T. Plummer, An introduction to practical bio-chemistry.
2. Pattabiraman, Laboratory manual in bio-chemistry.

3. J.Jayaraman, Practical bio-chemistry.

## Option 1

### ELECTIVE II- THEORY – BIOPHYSICS – UBTE42

**Objectives**

**Hours : 3      Credit : 3**

- Students should know about the physical laws (laws of Physics) are valid in biological systems.
- Students should be able to explore the biophysics of signaling and movement at the cellular level.
- To learn the relationship between structure and function at the molecular level.
- To prepare students for higher courses in environmental and medical biophysics, genomics and proteomics

#### **UNIT-I**

Scope and methods of biophysics-level of molecular organization-  
Detailed structure of protein molecule at – primary, secondary, tertiary, and quaternary structural levels.

#### **UNIT-II**

Protein – protein interaction and protein –nucleic acid interaction-structure and chemical nature of polysaccharide.

#### **UNIT-III**

Radiation Biophysics

Introduction-nucleus and its radiation-half lives-rate of decay- units of measurement- interaction of radiation with matter-measurement of radio activity-GM counter, scintillation counter-uses of radioactivity.

#### **UNIT-IV**

Methods of cell study:

Introduction-cell culture-fixation-dehydration-embedding-sectioning-staining-mounting-measurement of cell.

#### **UNIT-V**

Structure of nerve cell-action potential of the nerve-impulse transmission-EEG-structure of muscle- muscle contraction-energetics of muscle contraction-ECG-Structure of ear-mechanism of hearing.

**REFERENCE:**

4. Basic Biophysics for Biologists – Daniel. H
5. Principles of Biophysics – Palanichamy. S
6. Laboratory manual in Biochemistry – J. Jayaraman.

## Option 2

### Option 2 – BIODIVERSITY AND CONSERVATION

**Objectives**

**Hours : 3      Credit : 3**

- To provide students with basic knowledge of biodiversity conservation as bases for sound ecotourism and wildlife resource management.
- To provide students with opportunities for goal oriented research in biodiversity conservation and management for ecotourism and wildlife development.
- Students should be able to identify the variety of our enormous biological resources in relation to their various ecological settings.
- Students should be able to understand the functioning of the ecological systems and their driving force.

#### **Unit 1**

Biodiversity and Conservation: Categories of biodiversity – species concepts: keystone, flagship, dominant and co-dominant species – Biogeography: Major terrestrial biomes – theory of island biogeography – Biogeographical zones of India – Principles and approaches of conservation – In-situ conservation: National parks, Wildlife Sanctuaries, Biosphere reserves – Ex-situ conservation: Botanical and herbal gardens, zoological parks, seed orchards and gene banks.

#### **Unit II**

Values of biodiversity-ecosystem services- screening plants for medicines- New agricultural and industrial products from the tropics- identifying and protecting the origin of food crops. Speciation- species area relationship: productivity- diversity relationship – Biodiversity hot spot.

#### **Unit III**

The effect of global climatic change on natural communities- IUCN categories of extinction-red data book – causes for species extinction – impact of exotic species on native species – GMOs and biosafety – Intellectual property rights- GATT,WTO, farmers and breeders rights- Biodiversity act -2002.

#### **Unit IV**

Remote sensing : Introduction-Analysis techniques-Digital image processing Role of remote sensing in biodiversity management-GIS and biodiversity, landscape elements Oceans colour and fishery, water security. Environment assessment and monitoring.

#### **Unit V**

Conservation: In situ and Ex situ conservation methods- conservation of biological diversity in Botanical gardens- Information management for the conservation of biodiversity. Cryobiology-Agro ecology and in situ conservation of native crop diversity- International development and the protection of biodiversity

**References:**

7. Stiling, P. 2002. Ecology – Theory and applications. Prentice-Hall of India Pvt. Ltd., New Delhi.
8. Gurevitch, J., Scheiner S.M and Fox G.A. 2002. The Ecology of Plants. Sinauer Associates Inc Publishers, Massachusetts.
9. Cunningham, W.P. and Cunningham, M.A. 2002. Principles of environmental science. Tata McGraw-Hill Publishing Company Ltd., New Delhi.
4. Agarwal, K.C. 2000 Biodiversity. Agrobios (India). Jodhpur.
5. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Company, London.
6. Colvinox, P. 1986. Ecology John Wiley and sons, Singapore.
7. Krishnamoorthy, K.V. 2004 An advanced Text Book of Biodiversity. Oxford & IBH Publishing Co, Pvt. Ltd., New Delhi.
10. Meffe, G.K. and Carroll, R.C. 1994. Principles of Conservation of Biology, Sinauer Associates, Inc., Publishers, Sunderland
11. Jeffries, M.J. and M.J. Jeffries. 2005. Biodiversity and Conservation, Routledge Taylor & Francis Group, UK.



**NON MAJOR ELECTIVE COURSE II THEORY- FOOD PROCESSING  
TECHNOLOGY – UBTS42**

**Objectives**

**Hours : 2      Credit : 2**

- To gain knowledge and understanding about food systems in the production, processing and consumption of food and an appreciation of their impact on society.
- To have a knowledge and understanding about the nature of food and human nutrition and an appreciation of the importance of food to health.
- Students should understand the sources and processing techniques of meat, dairy products, edible fats and Oils
- Students should be able to know about principles of food preservation, packaging and its ethics.

**UNIT – I**

Carbohydrate, fat and protein rich foods, vitamins, minerals and fiber. Milk and milk Products – Fluid milk & some of its derivatives, Ice cream & related products, cheese, Yoghurt milk powder, paneer, Indian dairy products – kheer, khoa / mawa, khurchan, Rabri, kulfi / Dahi, Ghee, Lassi, Makkhan.

**UNIT – II**

Food preservation: Food Irradiation, microwave heating & cosmic heating preparation of cakes-methods. Assessment of Quality Factors in foods: - Appearance factors, Textural factors, flavor factors, quality standards.

**UNIT – III**

Food deterioration and its control: Shelf life & dating of foods, principles of food preservation, control of microorganisms. Beverages: Carbonated non alcoholic beverages, beer, wine, coffee, tea. Causes of spoiling and their control methods.

**UNIT – IV**

Confectionaries: Confectionary SS chocolate products: Sugar based Chocolates, Ingredients, confectionery manufacturing practices.

**UNIT – V**

Food Safety, Risks Hazards: Food processing & the environment, principles of food packaging. Governmental regulation of food & nutrition labeling for jam, jelly, squash, pickle. General characteristic of milk, milk products.

## REFERENCES

1. Food science – Fifth Edition – Norman N.Potter, Joseph H. Hotchkiss.
2. Outlines of Dairy technology – Sukumar De.
3. Modern technology of milk processin & Dairy products – NIIR Board of dairy technology
4. Nutrition & Dietetics – Shubhangini A.Joshi.

## SKILL BASED STUDIES II-THEORY MEDICAL LAB TECHNOLOGY – UBTN42

Objectives

Hours : 2      Credit : 2

- Students should know about the storage and handling of chemicals and waste management the clinical laboratory.
- Students should able to know about basic knowledge of cells, tissues, blood, physiological functions of the body.
- To acquire knowledge about basic study and understanding of the various disorders as well as their laboratory investigations.
- To learn about the basic molecular diagnostics equipments and it applications in the disease diagnosis.

### UNIT – I

Clinical Laboratory records. Common Lab accidents and ways for its prevention, First aid in the clinical laboratory. Storage and handling of dangerous chemicals. Waste disposal in the labs.

### UNIT – II

Blood Analysis – anticoagulant, hemoglobin, RBC, Packed cell volume, ESR, WBC total, differential normal and abnormal hametopathy – anemia, bone marrow smear, leukemia and myelodysplastic syndromes, diagnostic significance of PB smear, hemorrhagic disorder, L.E. cell phenomenon

### UNIT – III

Urine analysis – collection – physical, chemical and microscopic examination of urine.

### UNIT – IV

Faeces: Collection and preservation, examination of motion for color, mucus, consistency, ova, ameba, cysts, parasites, puscells, RBC and crystals.

## **UNIT – V**

Molecular Diagnostics – Blood banking, Transplantation, ELISA, RIA, FACS, PCR.  
Computers in lab.

### **REFERENCES:**

1. Handbook of medical lab technology – Ed; V.H.Talib, CBS publication
2. Clinical Chemistry by William J.Marshall (Fifth edition, Mosby Publications).
3. An Illustrated color text of Clinical Biochemistry by Allen Gaw, Robert A.Cowan, illustrated by Robert Britton (1999, second edition, Churchill Living stone press).
4. Marks' Basic Medical Biochemistry: A Clinical Approach (2<sup>nd</sup> Edition), by Colleen M. Smith, Allan D. Marks and Michael A. Lieberman.
5. Medical Microbiology by Jawetz.

## **SEMESTER – V**

### **CORE VI – THEORY – DEVELOPMENTAL BIOLOGY – UBTT51**

#### **Objectives**

**Hours : 5      Credit : 4**

- Students should be able to understand the different phases of the embryo development and associated medical implications.
- Students will acquire knowledge to analyze and interpret the principles of early and late embryonic development .
- To compare and comprehend the development of model organisms like C. elegans, amphibians, Aves .
- To demonstrate the medical implications of developmental biology.

#### **UNIT – I**

Gametogenesis: Definition-primordial germ cells-origin-spermatogenesis-physiological ripening of sperm-oogenesis-previtellogenesis-vitellogenesis.

#### **UNIT – II**

The egg: Size-shape-egg membranes,tertiary membranes,organization of the egg yolk, pigments, egg cortex, polarity, origin of polarity, types of eggs. Cleavage-Definition, morula, blastula, types of blastula, molecular changes, planes of cleavages, types of cleavage, factors affecting cleavage, cleavage laws, adhesion of blastomeres during cleavage, nuclei of cleaving cells, cytoplasm of cleaving cells.

#### **UNIT – III**

Gastrulation: Definition, exogastrulation, metabolism and molecular changes during gastrulation, gene activities during gastrulation. Morphogenic movements- Definition, types epiboly, emboly mechanism of morphogenic movements.

#### **UNIT – IV**

Organogenesis: Definition, tabulation, neurogenesis, spermatogenesis, growth and differentiation derivatives of ectoderm and mesoderm.

#### **UNIT – V**

Regeneration: Definition – Types, Human Reproduction puberty, Menstrual cycle. Menopause, Pregnancy and related problems parturition and lactation.

#### **REFERENCE:**

1. Verma.S and Agarwal V.K. 2000. Chordate Embryology S.Chand & Co. New Delhi.
2. Berrill.N.J., 1986 Developmental Biology Mc.Graw Hill, New Delhi.
3. Patten, B.M., (1958) Foundations of Embryology Mc.Graw Hill, New Delhi.
4. Saunders.J.W (1982) Developmental Biology – Pattern and Principles, Macmillan New York.
5. Principles of Embryology – Waddington.
6. Embryology by Brath.

## **CORE VII – THEORY – ANIMAL BIOTECHNOLOGY – UBTT52**

### **Objectives**

**Hours : 5      Credit : 4**

- The objectives of this course is to introduce students to the principles, practices and application of animal biotechnology
- Students to develop basic skills for vertebrate cell culture, maintenance of cell lines and in vitro application of cell and molecular techniques.
- Students should understand the principles of animal cloning and its applications.
- Students will be able to acquire knowledge in animal cloning and its applications

### **UNIT –I**

Animal cell culture: Fundamentals. Facilities and Applications. Media for Animal cells. Types of cell culture: Primary cell culture, secondary culture, cell transformation, cell lines, Insect cell lines, stem cell cultures, cell viability and cytotoxicity.

### **UNIT –II**

Biology of cultured cells, measurement of growth, cell synchronization, senescence and apoptosis Organ culture. Cryopreservation.

### **UNIT –III**

Genetic engineering in animals: methods of DNA transfer into animal cells- calcium phosphate co precipitation, micro-injection, electroporation, Liposome encapsulation, Biological vectors. Hybridoma technology, Vaccine production.

### **UNIT –IV**

Gene therapy, mapping of human genome. RFLP and applications. DNA finger printing and Forensic Science. Molecular diagnosis of Genetic disorders.

### **UNIT –V**

Transgenics: Transgenic animals. Production and recovery of products from animal tissue cultures: cytokines, Plasminogen activators, Blood clotting factors, Growth hormones.- Transgenic animals – Merits and demerits –Ethical issues in animal biotechnology.

### **REFERENCES:**

1. Freshney, E. D. 2000. Animal Cell Culture: A practical approach. John Wiley Pub., New York.
2. Mather, J.P. and Barnes, D. (Eds.). 1998. Animal Cell Culture Methods (Methods in Cell Biology. VOL. 57). Academic Press, London.

3. Butler, M. (Ed.). 1990. Mammalian Cell Biotechnology- A Practical Approach. Oxford Univ. Press, Oxford.
5. E.J. Murray (Ed) .1991. Gene Transfer and Expression Protocols – Methods in Molecular Biology Vol.7. Humana Press,Totowa, NJ.
7. Watson, J.D., M. Gilman, J. Witkouski and M.Zoller.1992. Recombinant DNA. Scientific American Books, New York
8. Puller, A. (Ed) .1993. Genetic Engineering of Animals. VCH Publishers, New York.

### **CORE VIII – THEORY – BIOPROCESS TECHNOLOGY – UBTT53**

#### **Objectives**

**Hours : 5      Credit : 4**

- This course will provide a comprehensive understanding of media formulations, microbial growth kinetics, bioreactor selection, upstream & fermentation processes, and its role in manufacturing bio-products..
- To learn about how microorganisms and biochemical processes can be applied in engineered systems..
- Students should gain knowledge about microbial growth & cultivation, various bioreactor components, and types of bioreactor used in biotechnology industries.
- To learn important microbial/enzymatic industrial processes in food and fuel industry.

#### **UNIT –I**

Introduction to industrial microorganisms: Isolation, Preservation and Maintenance of Industrial Microorganisms .Kinetics of microbial growth and death. Media for industrial fermentation. Air and Media Sterilization.

#### **UNIT- II**

Types of fermentation processes: Analysis of batch, Fed-batch and continuous bioreactors; components of bioreactor- Measurement and control of bioprocess parameters.

#### **UNIT –III**

Downstream Processing: Introduction, Removal of microbial cells and solid matter, foam removal, precipitation, filtration, centrifugation, cell disruption, liquid-liquid extraction chromatography, Membrane process, Drying and Crystallization. Effluent treatment:BOD and C.O.D. treatment and disposal of effluents.

#### **UNIT- IV**

Industrial Production of Chemicals: Alcohol (Ethanol), Acids (Citric), Antibiotics (Penicillin), Amino acids (lysine), Single Cell Protein (algae/fungi).

#### **UNIT- V**

Introduction to Food Technology: Food Preservation – methods. Enzyme technology-biosensor, immobilization of enzymes. Commercial production of enzymes-techniques and applications.

**REFERENCES:**

1. Stanbury, P.F. and Whitaker, A.,(Eds). 1984. Principles of Fermentation Technology. Pergamon Press, Oxford.
2. Arnold L Demain and Julian E.Davies. 1999. Manual of Industrial Microbiology and Biotechnology, III edition .ASM press, Washington DC.
3. Frazier, W.C. and Dennis, C. Westhoff. 1995. Food Microbiology, Tata McGraw Hill Publishing Company, New Delhi.
12. Casida, L.E. 2003. Industrial Microbiology. New Age International (P) Ltd., New Delhi.
5. Michael Shuler and Fikret Kargi. 2002. Bioprocess Engineering: Basic Concepts, 2<sup>nd</sup> Edition, Prentice Hall, Englewood Cliffs, NJ.
6. Pauline M. Doran. 1995. Bioprocess engineering principles, 1 Edition, Academic Press
7. Bailey, J.E. and D.F Ollis. 1986. Biochemical Engineering Fundamentals, 2<sup>nd</sup> ed. McGraw-Hill Chemical Engineering Series, Berkshire, U.K.
8. Aiba. S., Humphrey, A.E.and Millis N.F. 1973. Biochemical Engineering. University of Tokyo Press, Tokyo
9. Aktinson B. 1974. Biochemical Reactors. Pion Ltd., London
10. Jackson, A.T . 1991. Process Engineering in Biotechnology. Prentice Hall, Engelwood Cliffs, NJ, USA. 26
11. Enfors, S. O. and Haggstrom, L.H. 1998. Bioprocess Technology – Fundamentals and Application. KTH, Stockholm.

## CORE IX –THEORY – BIOSTATISTICS – UBTT54

**Objectives**

**Hours : 5      Credit : 4**

- The course will provide the fundamentals of statistics, methodology.
- Students will be able to know the theory of statistics and their application for solving the problems in the field of life sciences.
- Students should classify the various types of data and apply basic statistical concepts
- Students should learn the use of concepts of probability, probability laws, probability distributions and apply them in solving biological problems and statistical analysis.

### **UNIT – I**

Introduction to Basis of statistics – Definition – Statistical methods – kinds of Biological Data. Classification of Data, Meaning and definition, objectives of Classification of Data.

### **UNIT – II**

Collection, Organization and Representation of Data.

Collection of Data, Types of Data- Primary Data and Secondary Data, methods of collecting Data. Sampling and sampling Designs – Meaning and Definition – Random and Non – Random sampling. Tabulation and representation of data – diagrammatic and graphical.

### **UNIT – III**

Measures of central Tendency. Definition, Types of averages- Arithmetic mean, Median, Mode, Problems related to ungrouped data, simple grouped data – Continuous and discrete series.

### **UNIT – IV**

Measures of Dispersion, Definition, Types of dispersion – Range, Mean deviation, Standard deviation and variance, problems related to measures of dispersion.

### **UNIT – V**

Correlation analysis (Karl Pearson's and Spearman's Rank), Regression analysis – simple, linear. Tests of significance – 't'-test, Chi-square and goodness of fit, 'F' test, Analysis of variance (ANOVA): One-way & Two-way.

### **REFERENCES:**

1. Sokal, R.R. and F.J. Rohlf. 1981. Biometry. W.K. Freeman. San Francisco.
2. Zar, J.H. 2003. Biostatistical Analysis. Pearson Education (Singapore) Pvt. Ltd., Indian Branch, New Delhi.



## **CORE X – THEORY – ENVIRONMENTAL BIOTECHNOLOGY – UBTT55**

### **Objectives**

**Hours : 5      Credit : 4**

- Students should understand how biotechnology can help in monitoring or removing the pollutants and developing an understanding of new trends such as biofuels, renewable energy sources, or microbial technologies which can minimize the harmful impact of pollutants in the environment.
- To learn comprehend fundamentals of biodegradation, biotransformation and bioremediation of organic contaminants and toxic metals.
- To acquire knowledge and apply biotechnological processes in waste water and solid waste management.
- Students will be able to demonstrate innovative biotechnological interventions to combat environmental challenges

### **UNIT – I**

Classification of natural resources-renewable and non-renewable, conservation of natural resources-water and soil resources. Environmental impact- production of biofuel and biogas.

### **UNIT – II**

Bioremediation and Bio-leaching: Environmental impact of pollution and measurement methods – Composting of organic wastes, microbial bioremediation of oil spills; Waste water treatment – sewage treatment and common industrial effluent treatment ; Concepts of bioremediation (in-situ and ex-situ), Bioremediation of toxic metal ions – biosorption and bioaccumulation principles. Concepts of phytoremediation; Microbial biotransformation of pesticides and xenobiotics; Microbial leaching of ores – direct and indirect mechanisms.

### **UNIT – III**

Biofertilizers: Biofertilizers and their importance in crop productivity; Algal and fungal (mycorrhizae) biofertilizers Bacterial biofertilizers (rhizobial, free living Nitrogen fixers and phosphate solubilizing bacteria), their significance and practice.

### **UNIT –IV**

Biopesticides : Bacterial (Bt pesticides), fungal (Trichoderma); Viral biopesticides – Baculovirus, NPV insecticides; Production of biofertilizers and biopesticides for large scale application.

### **UNIT –V**

Genetic Engineering in Environmental Biotechnology: Genetically engineered microorganisms in environmental health-Genetically engineered plants and microorganisms in agriculture and productivity-Genetically engineered bacteria in bioremediation of organic pesticides, insecticides oil spills-Hazards of genetically engineered microorganisms, plants and animals-Policies of genetic engineering research.

## **REFERENCES**

13. Alan Scragg. 1999. Environmental Biotechnology. Pearson Education Limited, England.
- 2 Jogdand, S.N. 1995. Environmental Biotechnology. Himalaya Publishing House, Bombay.
3. Technoglous, G., Burton, F.L. and Stensel, H.D. 2004. Wastewater Engineering – Treatment, Disposal and Reuse. Metcalf and Eddy, Inc., Tata Mc Graw Hill, New Delhi.
4. De, A.K. 2004. Environmental Chemistry. Wiley Eastern Ltd. New Delhi.
5. Allsopp, D. and K.J. Seal. 1986. Introduction to Biodeterioration. ELBS/Edward Arnold, London.
6. Athie, D. and C.C. Cerri. 1990. The Use of Macrophytes in Water Pollution Control, Pergamon Press, Oxford.
7. Chin, K.K. and K. Kumarasivam. 1986. Industrial Water Technology Treatment, Resuse and Recycling . Pergamon Press, Oxford.
8. Jenkins, D. and B.H. Olson(Eds). 1989. Water and Wastewater Microbiology. Pergamon Press, Oxford.
9. Fry, F.C., Gadd, G.M. Herbert, R.A. , Jones, C.W., and Watson-Craik, J.A.(Eds.) 1982. Microbial Control of Pollution . Cambridge University Press, New York.
10. Dart, R.K. and R.J. Stretton, 1994. Microbiological Aspects Pollution Control. Elsevier Pub.Co., Amsterdam: New York.

## **ELECTIVE III – THEORY: BIOTECHNOLOGY AND HEALTH – UBTE53**

### **Objectives**

**Hours : 3      Credit : 3**

- To learn about the classical genetics and transmission of characters from one generation to the next which will make foundation for the advanced genetics.
- To learn about the advanced genetic technology and therapy related to the human diseases.
- Students should be able to develop innovative research ideas for curing genetic disorders in humans
- Students should know about the Social, Ethical and Legal Issues in Medical Biotechnology.

### **UNIT- I**

Human Genetics and Human Genome: History and development of human genetics; organization of the human genome. – chromosome and gene organization –Inherited human diseases-single gene diseases,complex traits.

### **UNIT- II**

Gene Therapy: Identification and isolation of disease genes –Cancer genetics – Genetic counseling. Gene therapy. Infectious Diseases: Classification: fungal, protozoal, helminthic, bacterial and viral;Vaccines – types. Hospital-acquired infections (nosocomial), water-borne diseases.

### **Unit –III**

Transplantation Technology: Introduction- types, transplantation immunology. Preventing methods, Immunosuppressive drugs.

### **Unit –IV**

Embryonic Stem cells: Culture & Therapy. Artificial Blood. Aminocentosis. Biochemical and Molecular Diagnostics.

### **UNIT- V**

Social, Ethical and Legal Issues in Medical Biotechnology: IPR: patents and copyrights. Human cloning. Pre-natal sex determination and foeticide.Genetically Modified Organisms.

### **REFERENCES:**

1. Schacter, Bernice (Ed.). 2006. Biotechnology and Your Health: Pharmaceutical Applications. Chelsea House Publications, New York.
2. Dinesh, K.P. and Chetan, D.M. 2007. Health and Pharmaceuticals Biotechnology. Laxmi Publications (P) Ltd., India.

3. Crommalin, D.J.A., R.D. Sindeler and B.Meibohm (Eds). 2007. Pharmaceuticals Biotechnology: Fundamentals and Applications. Informa Health Care, London.

## Option 2

### Option 2- BIOREMEDIATION - UBTE53

#### Objectives

Hours : 3      Credit : 3

- Students should demonstrate an understanding of the nature and importance of bioremediation.
- Students should know about the influence of site characteristics: hydraulic conductivity, soil type, microbial presence, and groundwater properties.
- Students should understand the influence of contaminant characteristics to bioremediation (e.g. chemical structure, toxicity, and solubility).
- Students will be able to use of course concepts to solve problems in real world applications.

#### UNIT I

Bioremediation- Introduction, constraints and priorities, Biostimulation of Naturally occurring microbial activities, Bioaugmentation, in situ, ex situ, intrinsic & engineered bioremediation.

#### UNIT II

Solid phase bioremediation - land farming, prepared beds, soil piles, Composting, Bioventing & Biosparging; Liquid phase bioremediation- suspended bioreactors, fixed biofilm reactors.

#### UNIT III

Hazardous Waste Management biotechnology application to hazardous waste management - examples- cyanide detoxification - detoxification of oxalate, urea etc. - toxic organics - phenols.

#### UNIT IV

Concept of bioremediation (in-situ & ex-situ), Bioremediation of toxic metal ions biosorption and bioaccumulation principles. Concepts of phytoremediation. Biosensors and Bioindicators.

#### UNIT V

Microbial leaching of ore-direct and indirect mechanisms. Mining and metal. Use of microorganisms in augmentation of petroleum recovery. Biotechnology-with special reference to Copper and Iron.

## REFERENCES

1. Environmental Biotechnology by S. K. Agarwal
2. Biodegradation & Bioremediation (1999), Martin Alexander, Academic press.
3. Foster C.F., John Ware D.A., Environmental Biotechnology, Ellis Horwood Ltd.,  
a. 1987.
4. Environmental Biotechnology by A.K. Chatterjee
5. Environmental Biotechnology by S.N.Jogdand Himalaya Publishing

## SKILL BASED STUDIES III-THEORY- INTRODUCTION TO MEDICINAL AND AROMATIC PLANTS – UBTS53

### Objectives

Hours : 2      Credit : 2

- Students learn as they can on medicinal and aromatic plants in their local habitats and abroad, and gain useful knowledge on their cultivation and commercial production.
- Students should also know on medicinal and aromatic plants, their parts and products used in folk medicine and on groceries of these in local markets.
- Students able to obtain the active constituents of medicinal and aromatic plants and know their chemistry and values.
- Students know on methods of medicinal and aromatic plants preparations, formulations for marketing and healing properties.

### 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.

### UNIT - II

Classification of drugs (elementary). Chemistry of Drugs (Basics). Morphological and Histological studies - Chemical constituents.

### UNIT - III

Therapeutic and other Pharmaceutical uses of Bark - Cinchona, Leaves - Adathoda and Eucalyptus, Flower - Clove. Root-vetivera zizonoids

### UNIT - IV

Fruits and seed - Wood apple, Goosberry and Poppy seed, Underground stem - Ginger, Unorganized drugs. Gum - Acacia, Resin - Turpentine, Fixed oil - Castor oil.

#### **UNIT - V**

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).

### **SEMESTER - VI**

#### **CORE XI – THEORY - PLANT BIOTECHNOLOGY – UBTT61**

##### **Objectives**

**Hours : 5      Credit : 4**

- The Students will learn the fundamentals of culturing plant cells and tissues, culture environment, cell proliferation, differentiation, and media formulation.
- The Students will acquire knowledge on various recombinant DNA techniques to produce genetically modified organisms with novel traits.
- To acquire the knowledge about the techniques of Plant Tissue Culture, Lab. organization & measures adopted for aseptic manipulation and nutritional requirements of cultured tissues.
- To learn the techniques of culturing tissues, single cells, protoplasts & anther culture, germplasm conservation and cryobiology.

#### **UNIT – I**

Plant genome organization – structure of representative plant genes and gene families in plant – organization of chloroplast genome – organization of mitochondrial genome .

#### **UNIT – II**

Molecular biology and gene rearrangement – Agrobacterium and crown gall tumors – mechanism of T-DNA transfer to plant – Ti plasmid vectors and its utility – plant viral vectors – symbiotic nitrogen fixation in Rhizobia.

### **UNIT – III**

Genetic engineering of plants – construction of genome libraries and cDNA libraries  
Molecular breeding – probe construction – recombinant DNA – Transgenic plant and applications – Edible vaccine.-vaccine from plant.

### **UNIT – IV**

Plant hormones - Auxin , IAA. GA, Cytokinins and Abscisic acid (ABA) - molecular basis of action – phytochrome – role in photo – morphogenesis – regulation of gene expression - stress induced promoter switches in the control of gene expression – ethylene and fruit ripening.

### **UNIT V**

Plant tissue culture – cells suspension cultures– haploid plants – cloning of hosts – micro propagation – somatic embryogenesis – protoplast isolation and applications.

### **REFERENCES:**

1. Kojima, Lee, H. and Kun, Y. 2001 Photosynthetic microorganisms in Environmental Biotechnology. Springer – Verlag.
2. Trivedi, P.C.2000 Applied Biotechnology and plant genetics, Dominant publishers and distribution.
3. Ignacimuthu, 1996. Applied Plant Biotechnology. Tata McGraw – Hill.
4. Grierson and Convey, S.N. 1988. Plant molecular Biology. Backie.
5. Narayanaswamy. S. 1994. Plant cell and tissue culture. Tata McGraw Hill publishing company limited, New Delhi.



## **CORE XII - THEORY – BIOINFORMATICS – UBTT62**

### **Objectives**

**Hours : 5      Credit : 4**

- The objectives of this course are to provide students with the theory and practical experience of the use of common computational tools and databases which facilitate investigation of molecular biology and evolution-related concepts.
- Develop an understanding of the basic theory of these computational tools.
- Students should gain working knowledge of these computational tools and methods.
- Students gain knowledge to relevance for investigating specific contemporary biological questions and critically analyse and interpret the results of their study.

### **UNIT – I**

History, development and types of computers. General awareness of computer systems – hardware and software (CPU and other peripheral devices, computer arithmetic, computer logic,

### **UNIT – II**

Programming languages – machine language, assembly language, higher level languages). Introduction – Email – World Wide Web – surfing.

### **UNIT – III**

Sequence analysis – need and importance – pair wise alignment – dynamic programming – Global ( Needle man – Wunsch) and local (Smith Waterman ) Alignment Concepts – Database searching tools – Entrez, BLAST, FASTA – Multiple alignment – clustal – construction of phylogentic trees.

### **UNIT – IV**

Use of nucleic acid and protein data banks – NCBI, EMBI, DDBJ, SWISSPORT. 3D structural analysis of biomolecules – molecular visualization tools Rasmol, chemsketch and SPDBV – Protein Docking.

### **UNIT – V**

Evolutionary analysis: Distance – clustering methods – Rooted and unrooted tree representation – Bootstrapping Strategies. Neutral Networks.

### **REFERENCE:**

1. Bioinformatics – Principles and potential of a new multidisciplinary tool, TIBITE, 1996.
2. Computer for biologists. – A. Fielding i985. Benjamin / cuming publ.co
3. Sequence Analysis in Molecular Biology – G. Von Heijine.
4. Sequence Analysis – A Pioneer - Devereux and Gtribskov.

5. Introduction of Bioinformatics – Attwood Tand Parry, D. 2002. Pearson Education Asia.

### **CORE XIII - THEORY – BIOINSTRUMENTATION – UBTT63**

#### **Objectives**

**Hours : 5      Credit : 4**

- Students should know the basics and advanced principles, concepts, and operations of medical devices.
- Students should learn brief study of different medical instruments and their use in physiological measurements
- This course is to familiarize the students with the analysis and design of different instruments like HPLC and GC.

#### **UNIT - I**

Acid & Bases: Acid-Base theories, Mole concept, Molarity, Molality & Normality, pH, Buffers, Oxidation –Reduction, Types of electrodes.

#### **UNIT - II**

Microscopy – parts and their function, resolving power, aperture – simple, compound, light and dark field, electron and phase contrast microscopes – their applications.

#### **UNIT - III**

Colorimetry – parts and their functions – Beer Lambert's Law – Spectroscopy – pHmetry.

#### **UNIT - IV**

Chromatography techniques – Principles and types – paper, TLC, Column, HPLC and GC. Centrifugation techniques – principle, centrifuges and their uses, separation methods. Ultracentrifugation – applications.

#### **UNIT - V**

Electrophoretic techniques – principle, electrophoresis of proteins and nucleic acids. Capillary electrophoresis.

#### **REFERENCES**

1. Keith Wilson and John Wilson. 2004. Practical Biochemistry. Fifth edition
2. Palanivelu P. 2001 Analytical Biochemistry & Separation Techniques. 2nd edition.
3. Alexander. J Ninfa, Fundamental Laboratory & Approach for Biochemistry & Biotechnology –2nd edition.

## **CORE PRACTICAL III – LAB IN MICROBIAL TECHNOLOGY – UBTP63**

### **Objectives**

**Hours : 5**

**Credit : 4**

- To acquire basic techniques in microbiology and microbial physiology.
- Students should understand the different types of media used in microbial isolation and also understand the methods used for characterization of microorganisms
- To learn and understand the basic techniques of microbial isolation.
- Students should know about the production methods for industrially important products of microbial origin such as antibiotics, vaccines, proteins, primary and secondary metabolites, as well as food and dairy products.

- 1) Bioprocess – Fermentor
- 2) Part and design, types of fermentors / bioreactors
- 3) Isolation and characterization of Microorganisms involved in Biodegradation (Cellulolytic)
- 4) Determination of cellulolytic activity
- 5) Isolation and characterization of microorganisms involved in biodegradation (amylolytic)
- 6) Determination of amylolytic activity by DNS method
- 7) Compost making
- 8) Production of wine from grapes using bakers yeast
- 9) Production of alcohol by *S.Cerevisiae*
- 10) Isolation of Rhizobial colonies involved in biofertilization
- 11) Isolation of lactic acid bacteria.
- 12) Milk quality testing

## CORE PRACTICAL IV – LAB IN PLANT TISSUE CULTURE – UBTP64

### Objectives

Hours : 5      Credit : 4

- The students will be able to establish and maintain aseptic techniques in controlled conditions for plant tissue culture.
- Students should be able to explain the various components of plant tissue culture media, e.g. minerals, growth factors, hormones, and what governs the choice of components.
- Students will be able to perform some of the more advanced techniques, e.g. embryo rescue, and protoplasting.
- To acquire knowledge in maintaining plants in tissue culture and micropropagation, including morphogenesis.

1. Sterilization procedures, media preparation, different media combination.
2. In vitro germination of seeds
3. Callus induction and differentiation
4. Embryo Culture
5. Somatic embryogenesis.
6. Isolation and fusion of protoplast
7. Artificial seed production
8. Meristem culture
9. Micropropagation

### Reference Books

1. Hulse P.I. and Patterson., M.K. Tissue culture, methods and applications,
2. Marchan, D.J. 1964. Handbook of Cell and Organ Culture (2nd ed). Burgess Pub. Co., Minneapolis, USA.
3. Animal cell culture course manual – cold spring warbor laboratory, Newyork.
4. Shanmugam, Laboratory Manual of Cell Biology, Macmillan, India.
5. Dixon, L.A. and R.A. Gonzales. Plant cell culture – A Practical Approach. Revan Press, New York.
6. Quak, F. 1981. Plant Tissue Culture: Methods and Applications in Agriculture. Academic Press, New York.

## Option 1

### **ELECTIVE IV THEORY – BIOSAFETY AND IPR – UBTE64**

#### **Objectives**

**Hours : 3**

**Credit : 3**

- Students will gain awareness about Intellectual Property Rights (IPRs) to take measure for the protecting their ideas.
- They will able to devise business strategies by taking account of IPRs.
- Students will acquire adequate knowledge in the use of genetically modified organisms and its effect on human health.
- Students will gain more insights into the regulatory affairs

#### **UNIT - I**

Biosafety: Introduction; biosafety issues in biotechnology-historical background; Introduction to Biological Safety Cabinets; Biosafety Levels.

#### **UNIT - II**

Biosafety Guidelines: Biosafety guidelines and regulations (National and International) – operation of biosafety. Guidelines and regulations of Government of India; Roles of Institutional Biosafety Committee.

#### **UNIT - III**

Definition of GMOs & LMOs; RCGM, GEAC etc. GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication.

#### **UNIT - IV**

Types of Intellectual Property: Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications. Importance of IPR – patentable and non patentables – patenting life – legal protection of biotechnological inventions – world intellectual property rights organization (WIPO).

#### **UNIT -V**

Patent Filing Procedures: National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Precautions while patenting – disclosure/nondisclosure; Financial assistance for patenting.

#### **REFERENCES:**

1. Martin. M.W. and Schinzinger R. 2003. Ethics in engineering, III Edition, Tata McGraw-Hill, New Delhi.
2. BAREACT, Indian Patent Act 1970 Acts & Rules, Universal Law Publishing Co. Pvt. Ltd., 2007

3. Kankanala, K . C. 2007. Genetic Patent Law & Strategy, 1st Edition. Manupatra Information Solution Pvt. Ltd.,Noida, India.
4. Jose B. Cibelli, Robert P. Lanza, Keith H. S. Campbell, Michael D. West. 2002. Principles of Cloning, Academic Press, SanDiego, Gurdon.

## Option 2

### Electives I -Choice 1 General Biology – UBTE64

#### Objectives

Hours : 3

Credit : 3

- To provide a foundation in basic biological principles.
- Student should develop an understanding of the scientific method and its implications.
- To develop an understanding of some natural laws and their applications to life.
- To develop the ideas of the uniqueness and diversity of life.
- To develop an understanding of the interrelationships among living organisms.

#### Unit I

Basis of Classification – Bentham and Artificial, Natural Classification of plants. Morphology, Structure and reproduction in plants. Algae: General characters – *Sargassum* as an example – Economic importance of Sea weeds. Fungi: General characters – *Yeast* as an example.

#### Unit II

Bryophytes: General characters – *Funaria* as an example - alternation of generation. Pteridophytes: General characters – *Selaginella* as an example. Gymnosperm: General characters – *Pinus* – Economic uses of gymnosperms. Angiosperms – Monocot flower – *Allium cepa*; Dicot flower – *Tribulus terrestris*.

#### Unit III

Digestion: Organization, movement and secretions of gastrointestinal tract. Respiration: respiratory organs– morphology and respiratory pigments. Circulation: Blood – composition of blood - General organization of circulatory systems.

#### Unit IV

Excretion system – excretory organs – general organization in man – muscular system – ultra structure of voluntary muscle.

#### Unit V

Nervous system – CNS – Autonomic nervous system – Endocrine system in man.

#### Reference

1. A.C.Dutta, Botany for degree students

2. G.M.Smith, Cryptogamic Botany Volume I & II
3. W.T.Taylor and R.J.Wehe – General Biology
4. Narayanaswamy – Outlines of Botany
5. General Biology – Cambridge Press

### **SKILL BASED STUDIES IV-THEORY BIOFERTILIZER – UBTS64**

#### **Objectives**

**Hours : 2      Credit : 2**

- To know about the rural based economically viable & self income generation, Entrepreneurship & Skill Development Programme (ESDP) on Biofertilizers.
- To demonstrate the effectiveness of biofertilizer cultural practices in the farmers fields for enhanced crop productivity through bioreclamation of waste/ marginal land.
- To demonstrate the know-how technology pertinent to microbiological and physico-chemical analyses of soil samples and their assessment.

#### **UNIT - I**

Introduction: History, importance and present status of different types of fertilizers and their application to crop plants. Need of ecofriendly fertilizers. Effect of chemical fertilizers on environment. Energy consuming pattern for chemical fertilizers.

#### **UNIT – II**

Algal and fungal (mycorrhizae) biofertilizers Bacterial biofertilizers Rhizobial, free living N<sub>2</sub> fixers and phosphate solubilizing bacteria, their significance and practice. Nitrogen fixing mechanisms.

#### **UNIT- III**

Manures: A general account of manures such as leaf moulds, composts form Yard Manure and a study of the following oilseed cakes: castor and neem as Biopesticide. Green Manuring Role of *Sesbania sesban* for improving soil fertility.

#### **UNIT- IV**

Application of biofertilizers and manures: A combination of biofertilizer and manure application. organic farming-compost and vermi compost.

#### **UNIT - V**

Mass production of Cyanobacterial Biofertilizers -- *Nostoc*, *Anabaena* *Azolla*. Blue green algae. Bacterial Biofertilizers -*Azotobacter*, *Azospirillum*, *Rhizobium*, *Pseudomonas*

#### **Reference:**

- 1.N.S. Subbao Rao-soil microorganisms and plant growth.
- 2.N.S. Subbao Rao-Biofertilizer
- 3.Ronald M. Atlas& Richard bartha, Microbial Ecology,Fundamentals & application
4. Alexander1977.Introduction to soil microorganism and plant growth.





**MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL - 624 101**



**BACHELOR OF SCIENCE  
B.Sc. COMPUTER SCIENCE  
UNDER CBCS**

Syllabus with effect from 2018-2019

**BACHELOR OF SCIENCE**  
**B.Sc. COMPUTER SCIENCE**  
**UNDER CBCS (with effect from 2018-2019)**

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**OBJECTIVES**

1. To produce employable Computer Professionals who have sound knowledge Computer Science subjects that can be applied to develop and customize solutions for Small and Medium Enterprises (SME).
2. To develop academically competent and professionally motivated personnel, equipped with objective, critical thinking, right moral and ethical values that compassionately foster the scientific temper with a sense of social responsibility.
3. To develop skilled manpower in the various areas of Computer Science :  
Software Development, Computer-Languages, Software engineering, Data base management, Web based applications etc.

**PROGRAMME SPECIFIC OUTCOMES FOR B.Sc. COMPUTER SCIENCE**

- PSO1: Understanding of the basics of computer science.
- PSO2: Apply fundamental principles and methods of Computer Science to a wide range of applications and mathematical and scientific reasoning to a variety of computational problems.
- PSO3: Students have the opportunity to develop foundational skills to install and maintain computer networks, troubleshoot hardware and software problems.
- PSO4: Design and implement software systems that meet specified design and performance requirements
- PSO5: Apply advanced algorithmic and mathematical concepts to the design and analysis of software.
- PSO6: Adhere to do higher studies or progress as an entrepreneur.
- PSO7: Students gets the confidence to survive and get succeed in IT industry.
- PSO8: Gets proficiency in the practice of computing, and to prepare them for continued professional development.
- PSO9: Apply sound principles to the synthesis and analysis of computer systems
- PSO10: Understands manage databases and develop web pages.

**MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL**

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**B.SC COMPUTER SCIENCE**

**ALLOCATION OF PAPERS AND CREDITS FOR UG PROGRAMME**

**EFFECT FROM - 2018-2019 ACADEMIC YEAR ONWARDS**

**I SEMESTER**

S.NO	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA11	Tamil	6	3	25	75	100
02.	ULEN11	English	6	3	25	75	100
03.	UCST11	Programming in C	5	4	25	75	100
04.	UCST12	Digital Principles & Computer Organization	5	4	25	75	100
05.	UCSA11	Discrete Mathematics	5	4	25	75	100
07.	UVAE11	Value Education	3	3	25	75	100
		<b>Total</b>	<b>30</b>	<b>21</b>			<b>600</b>

**II SEMESTER**

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA22	Tamil	6	3	25	75	100
02.	ULEN22	English	6	3	25	75	100
03.	UCST21	Programming in C++	6	4	25	75	100
04.	UCSP21	Programming in C and C++Lab	5	4	25	75	100
05.	UCSA21	Web Designing Lab	5	4	25	75	100
06.	UEVS21	Environmental Studies	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>20</b>			<b>600</b>

### III SEMESTER

S.NO	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA33	Tamil	6	3	25	75	100
02.	ULEN33	English	6	3	25	75	100
03.	UCST31	Fundamentals of Data Structures	5	4	25	75	100
04.	UCSA32	Operation Research	5	4	25	75	100
05.	UCSE31	Fundamentals of Computer Algorithms	4	3	25	75	100
06.	UCSN31	NME 1	2	2	25	75	100
07.	UCSS31	Office Automation Lab	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>21</b>			<b>700</b>

### IV SEMESTER

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA44	Tamil	6	3	25	75	100
02.	ULEN44	English	6	3	25	75	100
03.	UCST41	Relational Database Management Systems	4	4	25	75	100
04.	UCSP42	Relational Database Management Systems Lab	4	4	25	75	100
05.	UCSA42	DTP Lab	3	4	25	75	100
06.	UCSE42	Numerical Methods	3	3	25	75	100
07.	UCSN42	NME 2	2	2	25	75	100
08.	UCSS42	Linux\Unix Lab	2	2	25	75	100

		<b>Total</b>	<b>30</b>	<b>25</b>			<b>800</b>
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### V SEMESTER

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	UCST51	System Software	5	4	25	75	100
02.	UCST52	Data Mining	5	4	25	75	100
03.	UCST53	Software Engineering	5	4	25	75	100
04.	UCST54	Computer Networks	5	4	25	75	100
05.	UCST55	Multimedia & its Application	5	4	25	75	100
06.	UCSE53	Visual Basic Lab	3	3	25	75	100
07.	UCSS53	Python Lab	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>700</b>

### VI SEMESTER

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	UCST61	Java and Internet Programming	5	4	25	75	100
02.	UCST62	Web Technology	5	4	25	75	100
03.	UCST63	Computer Graphics	5	4	25	75	100
04.	UCSP63	Java And Internet Programming Lab	5	4	25	75	100
05.	UCSP64	Web Technology Lab	5	4	25	75	100

06.	UCSE64	Mini Project	3	3	25	75	100
07.	UCSS64	Computer Graphics Lab	2	2	25	75	100
08.	UEAS61	Extension Activities	-	3	25	75	100
		<b>Total</b>	<b>30</b>	<b>28</b>			<b>800</b>

	<b>I</b>	<b>II</b>	<b>III</b>	<b>IV</b>	<b>V</b>	<b>VI</b>	<b>TOTAL</b>
<b>Total Credits</b>	<b>21</b>	<b>20</b>	<b>21</b>	<b>25</b>	<b>25</b>	<b>28</b>	<b>140</b>
<b>Total Marks</b>	<b>600</b>	<b>600</b>	<b>700</b>	<b>800</b>	<b>700</b>	<b>800</b>	<b>4200</b>

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### SCHEME OF EXAMINATION

<b>Internal (Theory)</b>	- 25
<b>Test</b>	- 15
<b>Attendance</b>	- 5
<b>Assignment / Technical Quiz</b>	- 5
<b>Total</b>	- 25
<b>External (Theory)</b>	- 75

### QUESTION PATTERN

<b>1.</b>	<b>PART A</b>	<b>10*1 Marks=10</b> (Objective Type/Multiple Choice) 2 Question from each Unit	<b>10</b>
<b>2.</b>	<b>PART B</b>	<b>5*4 Marks =20</b> (From each Unit Either or Choice)	<b>20</b>

<b>3.</b>	<b>PART C</b>	<b>3*15 Marks =45</b> (Open Choice) (Any three Question out of 5,onequestion from each unit)	<b>45</b>
		<b>Total</b>	<b>75</b>

The Internal assessment for Practical : 25

The External assessment for Practical : 75

## SEMESTER I PROGRAMMING IN C

**SUBJECT CODE: UCST11**

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### **Objectives:**

**OBJ 1:** To understand and develop well-structured programs using C language.

**OBJ 2:** To learn the basic data structures through implementing in C language.

### **Course Outcomes:**

CO1: Describes the complete overview of C Structure

CO2: Describe about Data types, functions and control statements.

CO3: Handling 'Decision making, branching and looping statements'

CO4: Understanding the concept of array and its types.

CO5: Able to allocate the Memory for structure & union.

### **UNIT I**

History of C, Importance of C, Structure of C program, Programming style, Executing a C Program, keywords, identifiers, constants, variables, data types, type conversion, Types of operators and expressions, Managing Input and output operations in C.

## **UNIT II**

Decision making and Branching: Decision Statement –IF-ELSE statement, and nested IF statement break, continue, goto, switch() case. Loop Control Statements –For loop, While loop, Do-while loop and nested loops.

Arrays –Definition, Initialization, characteristics, One, Two, Three and Multidimensional Arrays, Working with Strings & Standard Functions.

## **UNIT III**

Functions –Declaration, Prototype, Types of functions, call by value and reference, Function with operators, function with decision statements, function with Loop statements, Function with Arrays, Types of Storage Classes.

## **UNIT IV**

Structure and Union –Declaration, Initialization, structure within structure, Array of Structure, Enumerated data types, Union of structure, Files – Streams and file types, file operations, File I/O, Read, Write and Other file function

## **UNIT V**

Pointers –Introduction, features, Declaration, Arithmetic operations, pointers and Arrays, Array of pointers, pointers to pointers, pointers and strings, Pointers to structures.

### **Text Books**

1. Programming in ANSI C by E. Balaguruswamy, Tata McGraw Hill Publishing Company, 2002.

### **Reference Books**

1. Programming Techniques through C – A beginners Companion by M.G. Vankatesh Murthy, Pearson education, New Delhi, 2002.
2. Programming in C and C++ by S. Chand & Company Ltd., New Delhi, 2002.

## **DIGITAL PRINCIPLES & COMPUTER ORGANIZATION**

**SUBJECT CODE: UCST12**

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### **Objectives:**

**OBJ 1:** To understand digital circuits and its functions.

**OBJ 2:** Students will learn the concept of flip flops and number system

**Course Outcomes: DIGITAL PRINCIPLES & COMPUTER ORGANIZATION**

CO1: Impart the knowledge in the field of digital electronics



CO2: Design and realize the functionality of the computer hardware with basic gates.

CO3: Design digital circuits by simplifying the Boolean functions

CO4: Acquire knowledge about multiprocessor organization and parallel processing

CO5: To know about Half Adder and Full Adder.

CO6: Able to trace the execution sequence of an instruction through the process

### **UNIT I**

Number Representation: Number system – Binary – Hexa Decimal – Octal codes – BCD – Excess 3 – Gray codes – ASCII – EBCDIC – Boolean algebra: Boolean laws – Logic gates – K. Map: sum of products – Product of sum method.

### **UNIT II**

Encoder – Decoder – Multiplexer – Negative Number: 1's & 2's Complement – Half & Full adder.

### **UNIT III**

Flip – Flop: RS, D, JK - Triggering – Registers: Four shift registers - Counters.

### **UNIT IV**

Data & Instructer format fixed print & floating point – Number representation – representation of singed numbers – Alpha numeric representation – Arthimetic and logical Units -, +, \*, / with singed number – Floating point arithmetic operation logical operation.

### **UNIT V**

Central Processor unit: Processor bus organization – Instruction format – Addressing modes – data transfer & Manipulation – Memory and I/O units – Main Memory – RAM and ROM address space – Associative – Virtual cache Memory – I/O bus verses memory bus.

### **Text books**

1. Digital Principles and Design By Malvino Leach, Fourth Edition TMH Publications.
2. Digital Principles By Thomas C. Bartee, TMH Publications.
3. Computer systems Architecture by Moris Mano, M. PILL Publications.

## **DISCRETE MATHEMATICS**

**SUBJECT CODE: UCSA11**

## **Objective:**

**OBJ 1:** To understand problem solving method.

**OBJ 2:** To have a broad background in Mathematics

## **Course Outcomes:**

CO1: Describes Relations

CO2: Learning Object Implications.

CO3: Demonstrate the use Normal Subgroups.

CO4: Managing Console I/O Operations.

CO5: Understanding Eigen Values.

CO6: Understanding about Boolean Algebra.

## **UNIT I**

Review of theory of sets – Relations – Equivalence Relations – partial Order – Function – Binary Operations.

## **UNIT II**

Logic – Introduction – connectives – Truth Table – Tautology – Implications – Equivalences.

## **UNIT III**

Groups – Definitions & Examples – Elementary – Properties – Sub Groups – Cycle groups – Cosets and Lagrange's Theorem – Normal Subgroups.

## **UNIT IV**

Matrices – Special type of Matrices – operations – Inverse of a Matrices – Elementary Transformation – Rank of Matrix – Simultaneous Linear Equation – Eigen values and Eigen vectors – Cayley Hamilton theorem.

## **UNIT V**

Partial Ordering – Posets – Hasse Diagram - Lattices – Properties – Sub Lattices – Special lattices – Boolean Algebra.

## **Text Books**

1. Modern algebra & S. Arumugam & Thangapandi Issac, New Gamma Publishing House, Palamkottai.
2. Discrete mathematics by M.K. Venkataramanan and N. Chandrasekaran, nation publishing CO., Chennai.

## **SEMESTER-II**

# PROGRAMMING IN C++

**SUBJECT CODE: UCST21**

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## **Objective:**

**OBJ 1:** To develop students' knowledge and understanding of the fundamental principles of data structures.

**OBJ 2:** To build up students' capacity to evaluate different algorithmic techniques and to write programs for developing simple applications using C++.

## **Course Outcomes:**

CO1: Describes complete overview of Data types, functions, control statements, pointers.

CO2: Learning Object Oriented Programming Concepts.

CO3: Demonstrate the use of virtual functions to implement polymorphism.

CO4: Managing Console I/O Operations.

CO5: Understanding Function Overloading & Operator Overloading

CO6: Understanding about Templates, Files and Exception Handling.

## **UNIT I**

Principles of object Oriented Programming : Software Evolution – Basic concepts of object Oriented Programming – Benefits of OOPS – Object Oriented Language – Application of OOPS – Beginning with C++

## **UNIT II**

Token, Expressions and Control Structure Functions : Token – Keyword – Identifier and constant – Basic Data Types – User defined data type- Derived data type – Operators in C++ - Scope Resolution Operator – Member dereferencing Operator – Manipulators – Type cast Operators –Expression and their types – Implicit conversion – Control structures.

## **UNIT III**

Classes and Objects – Constructor and Destructors – Operator overloading and Type conversions.

## **UNIT IV**

Inheritance: Extending Classes – Pointers, Virtual Function and Polymorphism – Managing consoles I/O operations.

## **UNIT V**

Working with Files – Templates – Exception Handling.

## **Text Book**

1. Object oriented Programming with C++ by E. Balagurusamy Tatta McGraw Hill Publishing Company Limited 1998 Chapter: 1 to 11.
2. C++, the Complete Reference Herbert Schlitz, 1997.

## PROGRAMMING IN C and C++ LAB

**SUBJECT CODE: UCSP21**

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### **Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

### **Using C**

CO1. Programs using I/O Statements.

CO 2. Programs using Control Structure.

CO 3. Programs using Arrays and Strings.

CO 4. Program using Functions:

- a) Call by value b) Call by Reference c) User Defined d) Built-in

CO 5. Pointers

- a) Operators & Expressions b) Pointers and Arrays c) Pointers & Strings d) Pointers & Structures e) Pointers & Functions.

CO 6. Structure & Unions

CO 7. File Handling.

### **Exercise:**

1. Simple Programs
2. Arrays
3. Strings
4. Functions
5. Recursion
6. Structures
7. Pointers
8. Arrays with Structures
9. Arrays with Pointers
10. Files

### **Using C++**

CO 1. Inline Functions , Function with default arguments

CO 2. Function Overloading ,Constructor, Friend Function

CO 3. Operator Overloading , Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hierarchical Inheritance

**Exercise:**

1. Simple Programs
2. Arrays
3. Strings
4. Functions
5. Recursion
6. Structures
7. Pointers
8. Arrays with Structures
9. Arrays with Pointers
10. Files
11. Call by value & call by reference method
12. Inline function in C++
13. Function overloading
14. Default Arguments
15. Operator overloading
16. Program using Inheritance
17. Program using polymorphism and virtual functions
18. File concepts

## WEB DESIGN LAB

**SUBJECT CODE: UCSA21**

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### **Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

### **Using Web Design Lab**

CO 1. Ordered list

CO 2. Marquee creation

### **Exercise:**

#### **HTML**

1. Web page creation using head, title, body, h1 – h6.
2. Web page creation using formatting tags (bold, italic, underline etc)
3. Ordered list
4. Unordered list
5. Definition list
6. Marquee creation
7. Web page with images
8. Web page creation with various font styles and body colors.
9. Hyper link
10. Tables
11. Frames
12. Forms

#### **XML**

13. Simple XML Programs
14. XML and CSS
15. XML and XSLT
16. Parsing XML and the XML DOM
17. XML Output from a Server

**SEMESTER – III**  
**FUNDAMENTALS OF DATA STRUCTURES**

**SUBJECT CODE: UCST31**

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**Objective:**

**OBJ 1:** To understand computer knowledge of data structures.

**OBJ 2:** Students will learn the concept arrays and Linked List.

**Course Outcomes:**

CO1: Describes overview of array and its representations.

CO2: Understanding about Stack & Queue.

CO3: Understanding about Linked List and storage management.

CO4: Understanding about tree & its traversal techniques.

CO5: Understanding about Graphs and its components.

**UNIT I**

ARRAY: Axiomatization – Ordered Lists – Sparse Matrices – Representation of Arrays.

**UNIT II**

STACKS AND QUEUES: Fundamentals – Amazing Problem – Evaluation of expressions – Multiple Stack and Queues.

**UNIT III**

LINKED LIST: Singly Linked List, Linked Stacks and Queues – The Storage Pool - Polynomial Addition – Doubly Linked list and Dynamic Storage Management – Garbage Collection and Compaction.

**UNIT IV**

TREES: Basic Terminology – Binary Trees – Binary Tree Representations – Binary Trees Traversal – More on Binary Trees – Threaded Binary trees – Binary Trees Representation of Trees

**UNIT V**

GRAPHS: Terminology and Representations: Introduction – Definitions and Terminology – Graph representations – Traversal, Connected components and Spanning Trees.

**Text Book**

1. Fundamentals of Data Structure by Ellis Horowitz Sartaj Sahnial Galgotia Publications, 1998.
2. Reference: Sam Series (Dynamic Storage Management)

**Reference Book**

3. Data Structure, Algorithms and Applications in C++ Sartaj Sahni McGraw Hill 1998.
4. Data Structure, Algorithms and Applications in C++, Sartaj Sahni, TMH 1988.

**OPERATION RESEARCH****SUBJECT CODE: UCSA32**

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**Objective:****OBJ 1:** To understand problem solving methods.**OBJ 2:** Students will learn the concept operation research.**Course Outcomes:**

CO1: Describes AND Development of OR.

CO2: Handling Mathematical Formation of L.P.P.

CO3: Understanding Simplex Method &amp; Artificial Variables.

CO4: Understanding transportation Problem and Assignment Problem.

**UNIT I**

Development of OR – Definition OR – General methods for solving OR models – main characteristics and Phases of OR study – tools, techniques and methods – scientific methods in OR – Scope of OR.

**UNIT II**

Linear Programming Problem – Mathematical formation of L.P.P. – Slack and surplus variables – graphical solution of L.P.P.

**UNIT III**

Simplex method – computational procedure – Artificial Variables technique - two phase method – Duality in linear programming.

**UNIT IV**

Mathematical formulation of transportation problem – optimal solution of T.P. – Methods for obtaining an initial feasible solution – Optimal solution – Degeneracy in T. Unbalance T.P.

**UNIT V**



Mathematical Formulation of Assignment Problem- Assignment Algorithm – Optimal Solution of Assignment Problem- -Unbalance Assignment Solution – Balanced Assignment Solution.

**Text Books:**

1. Operations Research – S.D. Sharma (Kedarnath Ramanath & COBOL) chapter 1 to 6 (all section).

**Reference Books:**

2. Operations Research- KantiSwarup, P.K Gupta &Manmohan, Sultan Chand &Sons publications, Sixteenth Revised Edition 2009.
3. Resource Management Techniques – Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, AR Publications Revised Edition 2010.

## FUNDAMENTALS OF COMPUTER ALGORITHMS

**SUBJECT CODE: UCSE31**

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**Objective:**

- OBJ 1:** To understand computer knowledge of algorithms.
- OBJ 2:** Students will learn the various programming techniques.

**Course Outcomes:**

- CO1: Describes overview of computer algorithms to solve problems
- CO2: Handling Dynamic programming
- CO3: Understanding search& traversal techniques.
- CO4: Understanding back tracking System.
- CO5: Design & providing solution for Knapsack problem
- CO6: Understanding the AND/OR Graphs
- CO7: Understand and work with the Travelling Sales Man Problem

## **UNIT I**

Introduction: Divide and conquer: General Method-binary search-finding the maximum and minimum – Merge sort – Quick sort – Selection sort.

## **UNIT II**

The greedy method: General method -Optimal storage on tapes - Knapsack problem – Job sequencing with deadlines – Minimum spanning trees, Single Source Shortest path.

## **UNIT III**

Dynamic Programming: General method – Multistage graphs – All pairs shortest paths – Optimum Binary search Trees –0/1 Knapsack – the travelling salesman problem – Flow shop scheduling.

## **UNIT IV**

Basic search and Traversal Techniques: The techniques – Code optimization – AND/OR graphs – Biconnected components and Depth – First search – Breadth first search.

## **UNIT V**

Backtracking: General Method- 8 Queens Problem – Hamiltonian cycles – Knapsack problem – Euler circuit.

Branch and bound: Travelling Salesman – Efficiency consideration.

### **Text Books:**

Fundamentals of Computer Algorithms by Ellis Horowitz and Sartaj Sahni, Galgotia publications, New Delhi.

## **OFFICE AUTOMATION**

### **SUBJECT CODE: UCSS31**

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#### **Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

#### **Using Office Automation**

CO 1. Mail Merge

CO 2. Power Point

#### **Exercise:**

#### **MS-WORD**

1. Preparing Documents Using Formatting options.
2. Table preparation
3. Find and Replace
4. Mail merge
5. Header and Footer
6. Drop cap

#### **MS-EXCEL**

1. Payroll calculation
2. Mark sheet preparation using mathematic function
3. Chart preparation

#### **MS –ACCESS**

1. Table creation
2. Query processing
3. Form
4. Report generation

#### **MS-POWER POINT**

1. Slide show animation

### **SEMESTER – IV**

### **RELATIONAL DATA BASE MANAGEMENT SYSTEMS**

**SUBJECT CODE: UCST41**

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#### **Objective:**

**OBJ1:** Learn and practice data modeling using the entity-relationship and developing database

Designs.

**OBJ2:** Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access.

#### **Course Outcomes:**

CO1: Describes overview of Data Base systems & Data Models.

CO2: Handling Relationship Model.

CO3: Understanding Algebra Operation.

CO4: Understanding back tracking System.

CO5: Design Relational Languages & Integrity Constraints

CO6: Understanding PLSQL / SQL.

### **UNIT I**

Introduction: Purpose of data base systems – View of data – Data models – Database languages – Transaction management – Storage management – Database Administrator – Database users – Overall system structure.

### **UNIT II**

Entity – Relationship Model-Basic concepts – Design issues – Mapping cardinalities – Keys – E-R Diagrams – Weak entity sets – Extended E-R features – Design of an E-R Database scheme – Reduction of an E-R scheme to table.

### **UNIT III**

Relational Model: Structure of relational databases – Relational algebra – The tuple relational calculus – The domain relational calculus – Extended relational – Algebra operations – Modification of the database – Views.

### **UNIT IV**

Other Relational Languages & Integrity Constraints:

Query by Example – Quel – Datalog – Domain constraints – Referential Integrity – Assertions – Triggers – Functional dependencies.

### **UNIT V**

PL/SQL – Relationships between SQL & PL/SQL –Advantages of PL/SQL – arithmetic & expressions in PL/SQL – Loops and conditional statements in PL/SQL – Exceptions Handling – Cursor management – Triggers – Functions & Procedures.

### **Text Book**

Data base system concepts(third edition)- abraham silberschtz, henry f.korth l.sudershan, mcg hill international editions, 1997.

### **Reference books**

1. S.AT'RE-DS Techniques for Design, Performance& Management-John Wiley&sons.
2. James W Martin n-principles of database management-prentice hall,1979.
3. C.I.DATE an Introduction to DBS-addition Wesley,1981.

## RELATIONAL DATA BASE MANAGEMENT SYSTEMS LAB

SUBJECT CODE: UCSP42

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### Course Outcome :

- CO1. PL/SQL tables & records & database triggers
- CO2. excepting handling & explicit cursors & implicit cursors
- CO3. ADO, DAO & RDO connectivity
- CO4. Design procedures using In, Out, Parameter
- CO5. Packages & Functions.

### Exercise:

#### PL/SQL

1. Program using conditional control, interactive controls & sequential controls.
2. Program using excepting handling
3. Programs using explicit cursors & implicit cursors
4. Program using PL/SQL tables & records
5. Programs using database triggers
6. Program to design procedures using In, Out, Parameter
7. Program to design procedures using functions
8. Program to design procedures using packages
9. Program using ADO, DAO & RDO connectivity.

## DESK TOP PUBLISHING LAB (DTP)

SUBJECT CODE: UCSA42

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### Course Outcomes:

Students are able to understand and develop own source code for the following concepts.

### Page Maker

CO1: Visiting Card in English , Advertisement

CO2: Certificate

### Coral Draw

CO3: India Map , Cartoon

CO4: Rangoli , Logos in Tamil

### PhotoShop

CO5:Album

### Exercise:

### Page Maker

1. Visiting Card in English
2. Advertisement
3. Certificate
4. Wedding Invitation card in English
5. Greeting Card
6. Prospectus
7. Flow Chart
8. Calendar

### Corel Draw

1. India Map
2. Cartoon
3. Rangoli
4. Logos in Tamil
5. Fashion Designing
6. Jewel Designing
7. Greeting card

### PhotoShop

1. Flex Designing
2. Photo Editing

## NUMERICAL METHODS

SUBJECT CODE: UCSE42

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### **Objective:**

**OBJ1:** To have the versatility to work effectively in a broad range of numerical computations.

**OBJ2:** To have a broad background in Mathematics

### **Course Outcomes:**

CO1: Describes about Numerical Computations.

CO2: Describes comparison of direct and iterative method

CO3: Understanding about Newton's Formulae.

CO4: Understanding Gaussian Quadrature.

CO5: Understanding Euler's method.

### **UNIT I**

Algebraic and transcendental equations : Errors in numerical computations – iteration methods – bisection methods – regular false methods – Newton Rap son method.

### **UNIT II**

Simultaneous equations – back substitutions – gauss elimination method – gauss serial iteration method – comparison of direct and iterative method.

### **UNIT III**

Interpolation – Newton's Formulae – gauss interpolation formulae Language's Interpolation formula – inverse interpolation.

### **UNIT IV**

Numerical Differentiation: Newton's formulae – Numerical integration – Simpson's Rule – Gaussian Quadrature.

### **UNIT V**

Numerical solution of differential equations: Euler's method - Taylor series method – Range Kati methods – Predictor Corrector methods.

### **Text books:**

1. Numerical methods by S.Arumugam and S.Thangapandi Issac, A.Somasundaram, Scitech publications, Chennai -2002

**Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

**USING Linux / UNIX**

CO1. IPC using pipes, Message Queues.

CO 2. Demonstration of process synchronization using signal,semaphores

CO 3. Deadlock

CO4. Creation of a child, orphan and Zombie process.

**Exercise:**

1. Creation of a child, orphan and Zombie process.
2. IPC using pipes.
3. IPC using message queues.
4. Simulation of FCFS process scheduling.
5. Simulation of ROUND ROBIN process scheduling.
6. Simulation of SJF process scheduling.
7. Demonstration of process synchronization using signals.
8. Demonstration of process synchronization using semaphores.
9. Deadlock avoidance using banker's algorithm.



## SEMESTER – V

### SYSTEM SOFTWARE

**SUBJECT CODE: UCST51**

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#### **Objective:**

**OBJ1:**Review historical development of system software

**OBJ2:**Identify design levels for microcomputer structure

#### **Course Outcomes:**

CO1: Describes about Microcomputer Structure.

CO2: Learning Object 8086 Instruction.

CO3: Managing about Loader.

CO4: Demonstrate about objectives & functions.

CO5: Describe about Memory management requirements.

#### **Unit – I**

Overview of Microcomputer Structure and Operation-Execution of a Three-Instruction and Operation-Microprocessor Evolution and types-The 8086 Microprocessor Family-Overview-8086 Internal Architecture.

#### **Unit- II**

Family Assembly Language Programming:-Program Development Steps-Costructing the Machine Codes for 8086 Instructions-Writing Programs for Use with an Assembler-Assembly Language Program Development Tools.

#### **Unit-III**

System Software: Evolution Components of Programming System-Evolution of Operating System-Operating System User View Pont: Functions, Facilities, Macro Instructions & Features of Macro Facility.

Loader : Loader Schemes-Design of Absolute Loader, Direct Linking Loader-Recognizing Basic Elements-Recognizing Syntactic units and Interpreting Meaning-Intermediate Form-Storage Allocation-Code Generation.

#### **Unit- IV**

Operating system Introduction : Definition operating system objectives and functions – operating system as resource manager, operating system as a user/computer interface – Evolution of operating system – Serial processing, batch processing, Multiprogramming, time sharing system.

Semaphore- dead lock – Principles – Prevention – Avoidance – Detection.

#### **Unit-V**

Memory Management : Memory management requirements – Relocation, protection, sharing, Logical organization, Physical organization – Virtual memory – Locating and virtual memory, paging, segmentation, combined paging and segmentation – protection and sharing – operating system software – fetch policy , placement & replacement policy.

**Text books**

1. “MicroProcessor and Interfacing”-Douglas.Hall Second Edition.
2. “System Programming by John J.Donovan-McGram Hill Publication.
3. Operating system by William Stallings.

**DATA MINING**

**SUBJECT CODE: UCST52**

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**Objective:**

**OBJ1:** Understand the basic knowledge of all the functionalities and classification.

**OBJ2:** Understand the basic functions of the mining.

**Course Outcomes:**

CO1: Aware of the Functionalities, patterns, of operating system

CO2: Design and deploy appropriate classification techniques

CO3: Use association rule mining for handling large data set.

CO4: Understand the concept of classification for the retrieval purposes

CO5: Understands OLAP , various kinds of association rule.

CO6: Able to know the applications of data mining

**UNIT-I**

Introduction - What is Data mining, Data mining – On kind of data - Data mining Functionalities –Classification of Data mining Systems - Data mining Task Primitives - Integration of Data Mining System - Major issues in Data Mining?

**UNIT-II**

Data Preprocessing : Why Preprocess the Data - Descriptive Data Summarization – Data Cleaning - Data Integration and Transformation - Data Reduction-Data Discretization and Concept Hierarchy Generation

**UNIT- III**

Data Warehouse and OLAP Technology An overview : Data Warehouse –A Multidimensional Data Model - Data Warehouse Architecture - Data Warehouse Implementation – From Data warehousing to Data Mining.

**UNIT-IV**

Mining – Frequent Patterns ,Associations Correlations : Basic Concepts - Efficient Scalable - Frequent Item set Mining methods - Mining Various Kinds of Association rules.

**UNIT-V**

Applications and Trends in Data mining : Data mining Applications –Data Mining System Products and Research Prototypes - Additional Themes on Data Mining - Social impact of Data mining - Trends in Data mining .

**Text Book :**

1. Data Mining (Concepts and Techniques) Second Ed

Author : Jiawei Han and Michelin Kamber Publishers : Morgan Kaufmann Publishers ( An imprint of Elsevier )

**Reference Books :**

1 Data Mining (Next Generation Challenges and Future Directions)

Author : Karguta, Joshi, Sivakumar & Yesha Publishers : Printice Hall of India ( 2007 )

2. Data Mining (Practical Machine Learning Tools and Techniques (II Edition)

Author : Ian H. Witten & Eibe Frank Publishers : Morgan Kaufmann Publishers (An imprint of Elsevier]

3. Data Warehousing, Data mining & OLAP (Edition 2004)

Author: Alex Benson, Stephen V. Smith Publishers: Tata McGraw – Hill

## **SOFTWARE ENGINEERING**

**SUBJECT CODE: UCST53**

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**Objective:**

**OBJ1:** It seeks to complement this with a detailed knowledge of techniques for the analysis and design of complex software intensive systems.

**OBJ2:** Be successful professional in the field with solid fundamental knowledge of Software Engineering.

**Course Outcomes:**

CO1: Describe the processes of software development

CO2: Develop software design and modules for real time system

CO3: Analyze verification & validation techniques

CO4: Enhancing the software maintenance from the plan to implementation

CO5: Describe configuration management & source code

**UNIT I**

Introduction to Software engineering some definitions – some size factors – quality to productivity factors – managerial Issue.

Planning a software project: defining the problems developing a solution strategy – planning on organization structure – other planning activities.

**UNIT II**

Software cost estimation: Software cost factors – Software cost estimation techniques – staffing – level estimation – estimative software maintenance costs.

**UNIT III**

Software requirements, definition: the software requirements specifications – formal specification techniques – language and processors for requirements specification.

#### **UNIT IV**

Software Design: fundamentals Descartes concepts – Modules and Modularizing criteria -Design techniques – detailed design considerations – real time and distributed system design – test plan – mile – stones walk through and inspection – design guide line.

#### **UNIT V**

Verification and validation techniques: Quality Assurance – static analysis – symbolic execution – unit testing and debugging system - testing formal verification.

Software maintenance: enhancing maintainability during developments managerial aspects of software maintenance – configuration management – sources code metrics – other maintenance tools and techniques.

#### **Text book:**

Software Engineering Concepts, 1985 Mc Graw Hill Book company by Richard E.Fairy, chapters 1-5, 8,9

#### **References books:**

1. Software Engineering: A practical Approach by Foger S.Pressman Mc Graw Hill International Books Company 1987 Edition.
2. Software Engineering-Mathur
3. Software Engineering-James

## **COMPUTER NETWORKS**

**SUBJECT CODE: UCST54**

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#### **Objective:**

**OBJ1:** Build an understanding of the fundamental concepts of computer networking.

**OBJ2:** Familiarize the student with the basic taxonomy and terminology of the computer networking area.

#### **Course Outcomes:**

CO1: Understand networking concepts and basic communication model.

CO2: Understand network architectures and components required for data communication

CO3: Identify the components required to build different types of networks

CO4: Understand the working principles of various application protocols

CO5: Working with routing algorithms.

CO6: Describe about TCP/UDP/SNMP.

CO7: Understanding Domain Name System.

## **UNIT I**

Introduction: User - Hardware – Software – Reference Models – Example Network – Example Data Communication service – Network Standardization.

## **UNIT II**

Physical Layer: Transmission Media – Wireless Transmission – The Telephone system – Cellular radio – Communication satellites.\

## **UNIT III**

Data Link Layer & Medium Access Layer – D.L.L.Design Issues – Elementary Data link protocols – Multiple Access Protocols – Ethernet, Token bus, Token ring standards.

## **UNIT IV**

Networks Layer & Transport Layer: N.W.L. Design Issues – Routing - Algorithms – T.P.L. Design Issues – Elements of T.P.L.Protocol.

## **UNIT V**

Application Layer: Network Security: Cryptography – Digital Signature - E-Mail Security – Web Security – Social Issues.

## **Text Book**

1. Computer Networks by Andrew S.Tenenbaum, PHI, Third edition, 1996.

## **Reference Book**

2. Computer Networks - Fourouzan

## **MULTIMEDIA AND ITS APPLICATIONS**

### **SUBJECT CODE: UCST55**

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#### **Objectives:**

**OBJ1:** Know and be able to discuss multimedia components.

**OBJ2:** Know and be able to use a current multimedia applications .

#### **Course Outcomes:**

CO1: Understand Multimedia Architecture.

CO2: Understanding Audio System.

CO3: Design Authoring Tools.

CO4: Working with Multimedia.

CO5: Understanding with Internet.

**Unit I**

Introduction- Brief history of Multimedia – Resources for multimedia developers –  
Types of products – Multimedia Computer Architecture

**Unit II**

Digital Audio – Characteristics of sound and Digital Audio – Digital Audio Systems –  
MIDI – Audio File Formats - Using Audio in Multimedia Applications – Digital Video –  
Background on Video – Characteristics of Digital Video – Digital Video Data Sizing – Video  
Capture and Playback Systems – Computer Animation – Using Digital Video in Multimedia  
Applications.

**Unit – III**

Product Design – Building Blocks – Classes of products – Content Organizational  
Strategies – Story Boarding – Authoring Tool – Categories of Authoring Tools – Selecting  
the right Authoring paradigm

**UNIT IV**

Multimedia and the Internet – The Internet – HTML and Web Authoring –  
Multimedia Considerations for the Internet – Design Considerations For Web Pages –  
Multimedia Development Team – Team Approach – Assembling a Multimedia Production  
Team.

**UNIT V**

Text – Elements of Text – Text Data Files – Using Text in Multimedia Applications –  
Hypertext – Graphics – Element of Graphics – Images and Color – Graphics file and  
Application Formats – Obtaining Images for Multimedia Use – Using Graphics in  
Multimedia Applications.

**Text books:**

1. Multimedia Technology and Applications – David Hillman – 1998/Galgotia  
Publications Pvt. Ltd.,

**Reference books:**

1. Multimedia making it work – Tay Vaughan TMH 1996.

**VISUAL BASIC LAB****SUBJECT CODE: UCSE53**

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**Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are

CO1:Simple Arithmetic Operators(+,-,\*,/) Using text command boxes.

CO2:Manipulation of string and data functions.

CO3:Designing Using file.

CO4: RDO, ODBC.

CO5: Game.

**Exercise:**

1. Simple Arithmetic Operators(+,-,\*,/) Using text command boxes.
2. Manipulation of string and data functions.
3. Designing in calculator.
4. Magic square.
5. Number Puzzle, Picture Puzzle.
6. Using file, directory and drive list boxes o load a text file into a rich text box.
7. Function of Command Dialog Box( open, save color font, printer, help options)
8. Design a text editor using Rich Text Box.
9. Design a Screen Saver.
10. Animation of Picture.
11. Use list box, combo box to change the font, font size of the given text.
12. Display a popup menu in the form when you click the right mouse button.
13. Use graphical function to draw a picture and save it.
14. Data base Access using DAO, RDO, ODBC.
15. Compare the Scores of two cricket teams, by the use of graphics.
16. Design a Game(like solitaire).

**PYTHON LAB**

**SUBJECT CODE: UCSS53**

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**Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.

CO1. Print the text & Add to Numbers.

CO2. SQUARE Root & Calculate Triangle

CO3. Multiplication Table, Fibonacci Series.

**Exercise:**

1. Python Program to Print the Text.
2. Python Program to Add Two Numbers.
3. Python Program to find the square root.
4. Python Program to calculate the area of the triangle.
5. Python Program to convert Celsius to Fahrenheit.
6. Python Program to check prime number.
7. Python Program to check leap year
8. Python Program to display multiplication table.
9. Python Program to display Fibonacci series
10. Python Program to display factorial.

**SEMESTER VI****JAVA AND INTERNET PROGRAMMING****SUBJECT CODE: UCST61**

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**Objective:****OBJ1:** knowledge of object-oriented paradigm in the Java programming language.**OBJ2:** the use of Java in a variety of technologies and on different platforms.**Course Outcomes:**

CO1: Describes Object Oriented fundamentals

CO2: Describe about Package and Interfaces.

CO3: Handling 'Exception handling'

CO4: Handling of looping statements.

CO5: Understanding Applets.

CO6: Understanding the controlling windows..

**UNIT I**

Fundamentals of Object Oriented Programming - Java Evolution – overview of Java Language - Constants, Variables and Data types.

**UNIT II**

Operators and Expressions – Decision Making and Looping - Classes , Objects and Methods – Arrays, Strings and Vectors.



### **UNIT III**

Interfaces : Multiple Inheritance – Packages :Putting classes together – Multithreaded Programming – Managing errors and Exception.

### **UNIT IV**

Applet Programming – Graphics Programming – Introduction to AWT packages – Introduction to Swings - Managing Input Output in Files in Java.

### **UNIT V**

Introduction to Java script – Data types – Variables – Operators, expressions – statements – functions, date month & type related objects, controlling windows.

### **Text Books**

1. Introduction to Java Programming by E. Balagurusamy – Fifth Edition – McGrawHill Education Private Limited.
2. Java Complete Reference.
3. Krishnamoorthy & Prabu, New Age Intl Publications

## **WEB TECHNOLOGY**

**SUBJECT CODE: UCST62**

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### **Objective:**

**OBJ1:** Able to know Internet Basics and HTML.

**OBJ2:** Choose best technologies for solving web client/server problems.

**OBJ3:** Use JavaScript for dynamic effects.

### **Course Outcomes:**

CO1: Describes the complete overview of HTML.

CO2: Describe about Java Script.

CO3: Understanding the concept of Event Handling.

CO4: Understanding the concept of , Tables, Forms, Files. Basic Web server Controls.

CO5: Understanding the concept of OLEDB connection class & Cookies

### **UNIT-I**

Internet Basic - Introduction to HTML - List - Creating Table - Linking document Frames - Graphics to HTML Doc - Style sheet - Style sheet basic - Add style to document - Creating Style sheet rules - Style sheet properties - Font - Text - List - Color and background color - Box - Display properties.

## **UNIT-II**

ASP. NET Language Structure - Page Structure - Page event, Properties & Compiler Directives. HTML server controls - Anchor, Tables, Forms, Files. Basic Web server Controls- Label, Textbox, Button, Image, Links, Check & Radio button, Hyperlink.

## **UNIT-III**

Data List Web Server Controls - Check box list, Radio button list, Drop down list, List box, Data grid, Repeater.

## **UNIT-IV**

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.

## **UNIT-V**

Error handling. Security - Authentication, IP Address, Secure by SSL and Client Certificates

### **Reference Books**

1. Deitel & Deitel, internet & World Wide Web How to program, Pearson Education
2. I. Bayross, Web Enabled Commercial Application Development Using HTML, DHTML, Javascript, Pen CGI, BPB Publications, 2000
3. J. Jaworski, Mastering Javascript, BPB Publications, 1999
4. T. A. Powell, Complete Reference HTML (Third Edition), TMH, 2002
5. G. Buczek, ASP.NET Developers Guide, TMH, 2002

## **COMPUTER GRAPHICS**

### **SUBJECT CODE: UCST63**

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#### **Objectives:**

**OBJ1:** Know and be able to discuss hardware system architecture for computer graphics. This includes, but is not limited to: graphics pipeline, frame buffers, and graphic accelerators/co-processors.

**OBJ2:** Know and be able to use a current 3D graphics API .

#### **Course Outcomes:**

CO1: Understand computational development of graphics

CO3: Analyze the Line attribute & curve attribute

CO4: Design animation with rotation, translation and scaling

CO5: Working with Interface.

CO6: Understanding Three Dimensional.

### **Unit I**

Application of Computer graphs – Video display devices – Raster scan systems – Random scan system – Graphics monitor – Input devices – Hard copy devices.

Points & Lines – DDA & Bresenham's line drawing, algorithms – Circle generating algorithms – Ellipse – generating algorithms – Other curves – Character generator.

### **Unit II**

Translation – Rotation – Scaling – Matrix representatives & homogeneous coordinates – Composite – Transformation – Reflection & Shear.

### **Unit – III**

The Viewing Pipeline-Viewing Coordinate reference frame-Window to View Port Coordinate transformation-Viewing functions-Clipping functions-Point clipping-Line clipping-Polygon clipping curve clipping-Text Clipping-Exterior clipping.

### **UNIT IV**

Graphical User Interfaces and Interactive Input Methods - Input of Graphical Data - Input Functions - Interactive Picture-Construction Techniques - Virtual-Reality Environments

### **UNIT V**

Three-Dimensional Concepts - Three-Dimensional Display Methods Parallel Projection - Three-Dimensional Graphics Packages - Color Models and Color Applications

#### **Text books:**

1. Computer Graphics By Donald Hearn and M.Pauline Basker PHI, Second edition, 1994.

#### **Reference books:**

1. Color Models and Color Summary Applications

## **JAVA AND INTERNET PROGRAMMING LAB**

**SUBJECT CODE: UCSP63**

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### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

CO1: Multi- Threading.

CO2:Manipulation of Event Handling.

CO3:Designing Java Streams.

CO4: Arithmetic Operation Using Java Script

CO5: Animation and Images

**Exercise:**

1. Arrays and flow control statements.
2. Run time exception And I/O exception.
3. Multi- Threading.
4. Layout Management.
5. GUI Components (Labels, Check box, Menus, Text, etc.)
6. Event Handling (Focus Events, Key Events, Paint Events, Text Events, Mouse Events, Window Events, Etc.)
7. Animation and Images.
8. Java Applet.
9. Java files management methods.
10. Java Streams.
11. JDBC (Java Database Connectivity).
12. Arithmetic Operation Using Java Script
13. Prime Number Using Java Script
14. Find Largest Number in Array Using Java Script
15. Palindrome Using Java Script

**WEB TECHNOLOGY LAB****SUBJECT CODE: UCSP64**

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**Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

CO1: Enumeration

CO2: Polymorphism

CO3: Designing Java Streams.

CO4: Create an advertisement using Ad rotator Control

**Exercise:****VB.NET**

1. Biggest of three numbers
2. Enumeration

3. Structure Exception handling
4. Display Welcome message
5. Display address of the college
6. Constructor
7. Destructor
8. Inheritance
9. Polymorphism
10. Find factorial and Fibonacci series using Interface

## **ASP.NET**

1. Designing Login Form
2. Show the data in data grid
3. Program using request and response object
4. Program using Cookies
5. Create an advertisement using Ad rotator Control
6. Validator Control
7. String Functions
8. Program using system – data OLEDB
9. Payroll Detail in ASP.NET using Access as Background
10. Generate the Hotspots in the image

## **VB SCRIPT**

11. Greatest among three numbers using branching statements
12. Sorting
13. Fibonacci Series
14. Palindrome Checking
15. Looping through Arrays
16. Background color changing
17. Temperature color changing
18. Functions
19. Date and time function
20. String Function
21. Numeric Function

22. Quiz using Forms

23. Online Shopping

## COMPUTER GRAPHICS LAB

**SUBJECT CODE: UCSS64**

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### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

**CO1:** Line Drawing Algorithm

CO2:Circle Drawing Algorithm

CO3:Transformation – Rotation – Arbitrary point

CO4:Transformation – Rotation – Origin

CO5:Transformation – Rotation – Fixed Point

### **Exercise:**

1. Line Drawing Algorithm
2. Circle Drawing Algorithm
3. Bouncing Ball
4. Moving car with traffic light
5. Digital Clock
6. Solar System Simulation
7. Man Walking in the Rain
8. Rotating Wheel
9. Smiling Face Animation.
10. Moving Boat

## **NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**

### **HTML LAB**

#### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.

Course outcomes are,

CO1: Heading Tag

. CO2: Order and Unordered List

CO3: Creating Tables

### **HTML LAB**

1. Heading Tag
2. Formatting Tag
3. Ordered List
4. Unordered List
5. Definition List
6. Image
7. Anchor
8. Table
9. Frame
10. Forms

**NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**

**PHOTOSHOP LAB**

**Course Outcomes: Photoshop Lab**

Students are able to understand and develop own source code for the following concepts.

Course outcomes are,

CO1: Album preparation

. CO2: Invitation

**Exercises**

1. Album preparation
2. Invitation Preparation
3. Wall Papers
4. Visiting Card
5. Background Changing and Removing
6. Wedding invitation Card
7. Cloning an Image
8. Flex Designing
9. Photo Editing
10. Book Cover



## **NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**

### **Objective:**

**OBJ 1:** To understand the basics of computer.

**Course Outcomes:** Students are able to understand the basics of computer.

## **FUNDAMENTALS OF COMPUTER**

### **UNIT I**

Introduction to computers – Generation of Computers – Types of Computers  
Comparison of Micro, Mini and mainframe computers – Advantages of Computer –  
characteristics of Computer – limitations of computer.

### **UNIT II**

Block diagram of a Computer – input devices – output devices – storage devices –  
RAM – ROM – comparison b/w RAM and ROM – Secondary storage devices.

### **UNIT III**

Types of Software – Operating systems – Need for an operating systems – functions  
of OS – popular operating systems – five generation of programming languages – packages.

### **UNIT IV**

Binary number system – Binary Arithmetic operations (Addition, Subtraction,  
Multiplication, Division) – ASCII codes \_ Algorithms – Flow chart – Pseudo codes – steps in  
programming.

### **UNIT V**

Definition – Features of networks – Network Topologies –LAN – WAN – MAN –  
Comparison between LAN and WAN – Introduction to Internet – History of internet uses of  
Internet – working with windows.

### **Text Book:**

1. Fundamentals of IT – Alexis, Mathews Leon.

## **NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**

### **PRINCIPLES OF INFORMATION TECHNOLOGY**

#### **Objective:**

**OBJ 1:** To understand the principles of information technology

**Course Outcomes:** Students are able to understand the principles and technology of computer.

#### **UNIT I**

Introduction – history of Information – Quality of Information – Information processing – Database – Characteristics of Data in a Database – DBMS – Types of DBMS – Data Normalization.

#### **UNIT II**

Internet and world wide web : Introduction – getting information on the internet – providing information on the internet – compiling information from the internet – internet access – basis – protocols – internet addressing – WWW – HTML – Web browsers – searching the web.

#### **UNIT III**

Multimedia Tools: Introduction – graphics effects and techniques – sound & music – video – multimedia authoring tools – virtual reality.

#### **UNIT IV**

Data warehouse & Data Mining: Introduction – advantages of data warehouse – components – structure – uses – data mining introduction – advantages of data mining – technologies used in data mining.

#### **UNIT V**

Application of information technology: Computers in business and industry – computers in home – education and training – entertainment science and engineering and medicine.

#### **Text books:**

1. Fundamentals of information technology – Alexis Leon, Mathews Leon

#### **Reference Book:**

1. Advanced information technology – S. Jaiswal



**MOTHER TERESA WOMEN'S UNIVERSITY**

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**BACHELOR OF SCIENCE**  
**B.Sc. INFORMATION TECHNOLOGY**  
**UNDER CBCS (with effect from 2018-2019)**

**BACHELOR OF SCIENCE**  
**B.Sc. INFORMATION TECHNOLOGY**  
UNDER CBCS (with effect from 2018-2019)

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**OBJECTIVES**

1. To produce employable IT workforce, that will have sound knowledge of IT and business fundamentals that can be applied to develop and customize solutions for Small and Medium Enterprises (SME).
2. To develop academically competent and professionally motivated personnel, equipped with objective, critical thinking, right moral and ethical values that compassionately foster the scientific temper with a sense of social responsibility.
3. To develop skilled manpower in the various areas of information technology like:  
Data base management, Software Development, Computer-Languages, Software engineering, Web based applications etc.

**PROGRAMME SPECIFIC OUTCOMES FOR B.Sc. INFORMATION TECHNOLOGY**

- PSO1: Understanding of the basics of IT.
- PSO2: Apply fundamental principles and methods of Computer Technology to a wide range of applications and mathematical and scientific reasoning to a variety of computational problems.
- PSO3: Students have the opportunity to develop foundational skills to install and maintain computer networks, troubleshoot hardware and software problems.
- PSO4: Design and implement software systems that meet specified design and performance requirements
- PSO5: Apply advanced algorithmic and mathematical concepts to the design and analysis of software.
- PSO6: Adhere to do higher studies or progress as an entrepreneur.
- PSO7: Students gets the confidence to survive and get succeed in IT industry.
- PSO8: Gets proficiency in the practice of computing, and to prepare them for continued professional development.
- PSO9: Apply sound principles to the synthesis and analysis of computer systems
- PSO10: Understands manage databases and develop web pages.

**MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL**  
**BACHELOR OF SCIENCE**  
**B.Sc. INFORMATION TECHNOLOGY**  
**UNDER CBCS (with effect from 2018-2019)**

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**I SEMESTER**

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA11	Tamil	6	3	25	75	100
02.	ULEN11	English	6	3	25	75	100
03.	UITT11	Programming in C	5	4	25	75	100
04.	UITT12	Digital Principles & Computer Organization	5	4	25	75	100
05.	UITA11	Fundamentals of Computer	5	4	25	75	100
06.	UVAE11	Value Education	3	3	25	75	100
<b>Total</b>			<b>30</b>	<b>21</b>			<b>600</b>

**II SEMESTER**

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA22	Tamil	6	3	25	75	100
02.	ULEN22	English	6	3	25	75	100
03.	UITT21	Programming in C++	6	4	25	75	100
04.	UITP21	Programming in C and C++ Lab	5	4	25	75	100
05.	UITA21	Web Designing Lab	5	4	25	75	100
06.	UEVS21	Environmental Studies	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>20</b>			<b>600</b>

### III SEMESTER

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA33	Tamil	6	3	25	75	100
02.	ULEN33	English	6	3	25	75	100
03.	UITT31	Fundamentals of Data Structures	5	4	25	75	100
04.	UITA32	Operation Research	5	4	25	75	100
05.	UITE31	Management Information System	4	3	25	75	100
06.	UITN31	NME 1	2	2	25	75	100
07.	UITS31	Office Automation Lab	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>21</b>			<b>700</b>

### IV SEMESTER

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	ULTA44	Tamil	6	3	25	75	100
02.	ULEN44	English	6	3	25	75	100
03.	UITT41	Relational Database Management Systems	4	4	25	75	100
04.	UITP42	Relational Database Management Systems Lab	4	4	25	75	100
05.	UITA42	DTP Lab	3	4	25	75	100
06.	UITE42	Numerical Methods	3	3	25	75	100
07.	UITN42	NME 2	2	2	25	75	100
08.	UITS42	Linux\Unix Lab	2	2	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>800</b>

**V SEMESTER**

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	UITT51	System Software	5	4	25	75	100
02.	UITT52	Data Mining	5	4	25	75	100
03.	UITT53	Software Engineering	5	4	25	75	100
04.	UITT54	Computer Networks	5	4	25	75	100
05.	UITT55	Computer Graphics	5	4	25	75	100
06.	UITE53	Visual Basic Lab	3	3	25	75	100
07.	UITS53	Python Lab	2	2			
<b>Total</b>			<b>30</b>	<b>25</b>			<b>700</b>

**VI SEMESTER**

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	CIA	ESE	TOT
01.	UITT61	Java and Internet Programming	5	4	25	75	100
02.	UITT62	Mobile Technology	5	4	25	75	100
03.	UITT63	Information Security	5	4	25	75	100
04.	UITP63	Java And Internet Programming Lab	5	4	25	75	100
05.	UITP64	Mobile Technology Lab	5	4	25	75	100
06.	UITE64	Mini Project	3	3	25	75	100
07.	UITS64	Multimedia Lab	2	2	25	75	100
08.	UITS61	Extension Activities	-	3	25	75	100
<b>Total</b>			<b>30</b>	<b>28</b>			<b>800</b>

	I	II	III	IV	V	VI	TOTAL
<b>Total Credits</b>	<b>21</b>	<b>20</b>	<b>21</b>	<b>25</b>	<b>25</b>	<b>28</b>	<b>140</b>
<b>Total Marks</b>	<b>600</b>	<b>600</b>	<b>700</b>	<b>800</b>	<b>700</b>	<b>800</b>	<b>4200</b>

### SCHEME OF EXAMINATION

<b>Internal (Theory)</b>	- 25
<b>Test</b>	- 15
<b>Attendance</b>	- 5
<b>Assignment / Technical Quiz</b>	- 5
<b>Total</b>	- 25
<b>External (Theory)</b>	- 75

### QUESTION PATTERN

<b>1.</b>	<b>PART A</b>	<b>10*1 Marks=10</b> (Objective Type/Multiple Choice) 2 Question from each Unit	<b>10</b>
<b>2.</b>	<b>PART B</b>	<b>5*4 Marks =20</b> (From each Unit Either or Choice)	<b>20</b>
<b>3.</b>	<b>PART C</b>	<b>3*15 Marks =45</b> (Open Choice) (Any three Question out of 5,onequestion from each unit)	<b>45</b>
		<b>Total</b>	<b>75</b>

The Internal assessment for Practical : 25

The External assessment for Practical : 75



**SEMESTER I**  
**PROGRAMMING IN C**

**SUBJECT CODE: UITT11**

**Objective:**

**OBJ 1:** To understand and develop well-structured programs using C language.

**OBJ 2:** To learn the basic data structures through implementing in C language.

**Course Outcomes:**

CO1: Describes the complete overview of C Structure

CO2: Describe about Data types, functions and control statements.

CO3: Handling 'Decision making, branching and looping statements'

CO4: Understanding the concept of array and its types.

CO5: Able to allocate the Memory for structure & union.

**UNIT I**

History of C, Importance of C, Structure of C program, Programming style, Executing a C Program, keywords, identifiers, constants, variables, data types, type conversion, Types of operators and expressions, Managing Input and output operations in C.

**UNIT II**

Decision making and Branching: Decision Statement –IF-ELSE statement, and nested IF statement break, continue, goto, switch() case. Loop Control Statements –For loop, While loop, Do-while loop and nested loops.

Arrays –Definition, Initialization, characteristics, One, Two, Three and Multidimensional Arrays, Working with Strings & Standard Functions.

**UNIT III**

Functions –Declaration, Prototype, Types of functions, call by value and reference, Function with operators, function with decision statements, function with Loop statements, Function with Arrays, Types of Storage Classes.

**UNIT IV**

Structure and Union –Declaration, Initialization, structure within structure, Array of Structure, Enumerated data types, Union of structure, Files – Streams and file types, file operations, File I/O, Read, Write and Other file function

**UNIT V**

Pointers –Introduction, features, Declaration, Arithmetic operations, pointers and Arrays, Array of pointers, pointers to pointers, pointers and strings, Pointers to structures.

**Text Books**

1. Programming in ANSI C by E. Balaguruswamy, Tata McGraw Hill Publishing Company, 2002.

**Reference Books**

1. Programming Techniques through C – A beginners Companion by M.G. Vankatesh Murthy, Pearson education, New Delhi, 2002.
2. Programming in C and C++ by S. Chand & Company Ltd., New Delhi, 2002.

# DIGITAL PRINCIPLES & COMPUTER ORGANIZATION

**SUBJECT CODE: UITT12**

## **Objective:**

**OBJ 1:** To understand digital circuits and its functions.

**OBJ 2:** Students will learn the concept of flip flops and number system

## **Course Outcomes: DIGITAL PRINCIPLES & COMPUTER ORGANIZATION**

CO1: Impart the knowledge in the field of digital electronics

CO2: Design and realize the functionality of the computer hardware with basic gates.

CO3: Design digital circuits by simplifying the Boolean functions

CO4: Acquire knowledge about multiprocessor organization and parallel processing

CO5: To know about Half Adder and Full Adder.

CO6: Able to trace the execution sequence of an instruction through the process

## **UNIT I**

Number Representation: Number system – Binary – Hexa Decimal – Octal codes – BCD – Excess 3 – Gray codes – ASCII – EBCDIC – Boolean algebra: Boolean laws – Logic gates – K. Map: sum of products – Product of sum method.

## **UNIT II**

Encoder – Decoder – Multiplexer – Negative Number: 1's & 2's Complement – Half & Full adder.

## **UNIT III**

Flip – Flop: RS, D, JK - Triggering – Registers: Four shift registers - Counters.

## **UNIT IV**

Data & Instructer format fixed print & floating point – Number representation – representation of singed numbers – Alpha numeric representation – Arthimetic and logical Units -, +, \*, / with singed number – Floating point arthimetic operation logical operation.

## **UNIT V**

Central Processor unit: Processor bus organization – Instruction format – Addressing modes – data transfer & Manipulation – Memory and I/O units – Main Memory – RAM and ROM address space – Associative – Virtual cache Memory – I/O bus verses memory bus.

## **Text books**

1. Digital Principles and Design By Malvino Leach, Fourth Edition TMH Publications.
2. Digital Principles By Thomas C. Bartee, TMH Publications.
3. Computer systems Architecture by Moris Mano, M. PILL Publications.



# FUNDAMENTALS OF COMPUTER

SUBJECT CODE: UITA11

## **Objective:**

**OBJ 1:** To understand the fundamentals of computer and its organization

**OBJ 2:** To learn the concept of hardware, software and familiarize the Computer terminologies.

## **Course Outcomes:**

CO1: Describe about Hardware & Software.

CO2: Describe about Input & Output Device.

CO3: Describe about OS, overview of database

CO4: Describes about internet & www with its access to it.

## **Unit I:**

Exploring computers and their uses: Overview-The computer defined-Computers for Individual Users-Computers for Organization –Computers in Society.

Looking inside the computer system: The parts of a computer system – The information processing cycle –Essential computer hardware, software bring the machine to life

## **Unit II:**

Hardware: The Keyboard-The Mouse- Devices for the Hand-Optical Input Devices-audio visual Input Devices-Monitors-Sound systems-Commonly used Printers-High Quality Printers- magnetic Storage Devices-Optical Storage Devices-Solid State- Storage Devices.

## **Unit III:**

CPU: How computers process Data-Factors affecting processing speed- The bus- Micro Computer Processors OS: The purpose of operating system –Types of operating systems-providing a user Interface- PC Operating Systems.

## **Unit IV:**

Networks: The overview- Uses of a network- common types of network –Hybrid networks-How networks are structured –Network Topologies and protocols. Data communications: Overview-data communications with Standard Telephone Lines and Modems-Using Digital Data connections-Wireless Networks.

## **Unit V:**

Internet: Overview –History-Major Services-Understanding WWW-Navigating the web-Searching the web-E-Mail: Overview-using E-mail-more features of the Internet – Connecting to the Internet through wires-How PC applications access the internet-Connecting to the Internet wirelessly.

## **Text Book:**

1. **Introduction to Computers** by Peter Norton, Sixth edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.

**SEMESTER-II**  
**PROGRAMMING IN C++**

**SUBJECT CODE: UITT21**

**Objective:**

**OBJ 1:** To develop students' knowledge and understanding of the fundamental principles of data structures.

**OBJ 2:** To build up students' capacity to evaluate different algorithmic techniques and to write programs for developing simple applications using C++.

**Course Outcomes:**

CO1: Describes complete overview of Data types, functions, control statements, pointers.

CO2: Learning Object Oriented Programming Concepts.

CO3: Demonstrate the use of virtual functions to implement polymorphism.

CO4: Managing Console I/O Operations.

CO5: Understanding Function Overloading & Operator Overloading

CO6: Understanding about Templates, Files and Exception Handling.

**UNIT I**

Principles of object Oriented Programming : Software Evolution – Basic concepts of object Oriented Programming – Benefits of OOPS – Object Oriented Language – Application of OOPS – Beginning with C++

**UNIT II**

Token, Expressions and Control Structure Functions : Token – Keyword – Identifier and constant – Basic Data Types – User defined data type- Derived data type – Operators in C++ - Scope Resolution Operator – Member dereferencing Operator – Manipulators – Type cast Operators –Expression and their types – Implicit conversion – Control structures.

**UNIT III**

Classes and Objects – Constructor and Destructors – Operator overloading and Type conversions.

**UNIT IV**

Inheritance: Extending Classes – Pointers, Virtual Function and Polymorphism – Managing consoles I/O operations.

**UNIT V**

Working with Files – Templates – Exception Handling.

**Text Book**

1. Object oriented Programming with C++ by E. Balagurusamy Tatta McGraw Hill Publishing Company Limited 1998 Chapter: 1 to 11.
2. C++, the Complete Reference Herbert Schilitz, 1997.

## PROGRAMMING IN C and C++ LAB

**SUBJECT CODE: UITP21**

### **Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

### **Using C**

CO1. Programs using I/O Statements.

CO 2. Programs using Control Structure.

CO 3. Programs using Arrays and Strings.

CO 4. Program using Functions:

- a) Call by value b) Call by Reference c) User Defined d) Built-in

CO 5. Pointers

- a) Operators & Expressions b) Pointers and Arrays c) Pointers & Strings d) Pointers & Structures e) Pointers & Functions.

CO 6. Structure & Unions

CO 7. File Handling.

### **Exercise:**

1. Simple Programs
2. Arrays
3. Strings
4. Functions
5. Recursion
6. Structures
7. Pointers
8. Arrays with Structures
9. Arrays with Pointers
10. Files

### **Using C++**

CO 1. Inline Functions

CO 2. Function with default arguments

CO 3. Function Overloading

CO 4. Constructor, Friend Function

CO 6. Operator Overloading

CO 7. Single Inheritance, Multiple Inheritance, Multilevel Inheritance, Hierarchical Inheritance

**Exercise:**

1. Simple Programs
2. Arrays
3. Strings
4. Functions
5. Recursion
6. Structures
7. Pointers
8. Arrays with Structures
9. Arrays with Pointers
10. Files
11. Call by value & call by reference method
12. Inline function in C++
13. Function overloading
14. Default Arguments
15. Operator overloading
16. Program using Inheritance
17. Program using polymorphism and virtual functions
18. File concepts



## WEB DESIGN LAB

**SUBJECT CODE: UITA21**

### **Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

### **Using Web Design Lab**

**CO 1.** Ordered list

**CO 2.** Marquee creation

### **Exercise:**

#### **HTML**

1. Web page creation using head, title, body, h1 – h6.
2. Web page creation using formatting tags (bold, italic, underline etc)
3. Ordered list
4. Unordered list
5. Definition list
6. Marquee creation
7. Web page with images
8. Web page creation with various font styles and body colors.
9. Hyper link
10. Tables
11. Frames
12. Forms

#### **XML**

13. Simple XML Programs
14. XML and CSS
15. XML and XSLT
16. Parsing XML and the XML DOM
17. XML Output from a Server

**SEMESTER – III**  
**FUNDAMENTALS OF DATA STRUCTURES**

**SUBJECT CODE: UITT31**

**Objective:**

**OBJ 1:** To understand computer knowledge of data structures.

**OBJ 2:** Students will learn the concept arrays and Linked List.

**Course Outcomes:**

CO1: Describes overview of array and its representations.

CO2: Understanding about Stack & Queue.

CO3: Understanding about Linked List and storage management.

CO4: Understanding about tree & its traversal techniques.

CO5: Understanding about Graphs and its components.

**UNIT I**

ARRAY: Axiomatization – Ordered Lists – Sparse Matrices – Representation of Arrays.

**UNIT II**

STACKS AND QUEUES: Fundamentals – Amazing Problem – Evaluation of expressions – Multiple Stack and Queues.

**UNIT III**

LINKED LIST: Singly Linked List, Linked Stacks and Queues – The Storage Pool - Polynomial Addition – Doubly Linked list and Dynamic Storage Management – Garbage Collection and Compaction.

**UNIT IV**

TREES: Basic Terminology – Binary Trees – Binary Tree Representations – Binary Trees Traversal – More on Binary Trees – Threaded Binary trees – Binary Trees Representation of Trees

**UNIT V**

GRAPHS: Terminology and Representations: Introduction – Definitions and Terminology – Graph representations – Traversal, Connected components and Spanning Trees.

**Text Book**

1. Fundamentals of Data Structure by Ellis Horowitz Sartaj Sahnja Galgotia Publications, 1998.
2. Reference: Sam Series (Dynamic Storage Management)
3. Data Structure, Algorithms and Applications in C++ Sartaj Sahni McGraw Hill 1998.
4. Data Structure, Algorithms and Applications in C++, Sartaj Sahni, TMH 1988.

# OPERATIONAL RESEARCH

**SUBJECT CODE: UITA32**

## **Objective:**

**OBJ 1:** To understand problem solving methods.

**OBJ 2:** Students will learn the concept operation research.

## **Course Outcomes:**

CO1: Describes AND Development of OR.

CO2: Handling Mathematical Formation of L.P.P.

CO3: Understanding Simplex Method & Artificial Variables.

CO4: Understanding transportation Problem.

CO5: Understanding Assignment Problem.

## **UNIT I**

Development of OR – Definition OR – General methods for solving OR models – main characteristics and Phases of OR study – tools, techniques and methods – scientific methods in OR – Scope of OR.

## **UNIT II**

Linear Programming Problem – Mathematical formation of L.P.P. – Slack and surplus variables – graphical solution of L.P.P.

## **UNIT III**

Simplex method – computational procedure – Artificial Variables technique - two phase method – Duality in linear programming.

## **UNIT IV**

Mathematical formulation of transportation problem – optimal solution of T.P. – Methods for obtaining an initial feasible solution – Optimal solution – Degeneracy in T. Unbalance T.P.

## **UNIT V**

Mathematical Formulation of Assignment Problem- Assignment Algorithm – Optimal Solution of Assignment Problem- -Unbalance Assignment Solution – Balanced Assignment Solution.

## **Text Books:**

1. Operations Research – S.D. Sharma (Kedarnath Ramanath & COBOL) chapter 1 to 6 (all section).

## **Reference Books:**

1. Operations Research- KantiSwarup, P.K Gupta &Manmohan, Sultan Chand &Sons publications, Sixteenth Revised Edition 2009.

2. Resource Management Techniques – Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, AR Publications Revised Edition 2010.

## **MANAGEMENT INFORMATION SYSTEM**

**SUBJECT CODE: UITE31**

### **Objective:**

**OBJ 1:** To understand the concepts of information system.

**OBJ 2:** Students will learn the concept of decision making , DSS etc

### **Course Outcomes:**

CO1: Describes overview Management Information System.

CO2: Overview Of Organization Structure.

CO3: Understanding Decision Making Concepts.

CO4: Understanding Decision Support System.

CO5: Design Data Base Requirements.

### **Unit I**

Management Information System: Introduction to Management Information System – Management Information Systems – Role and Importance of Management.

### **Unit II**

Structure of MIS – operating elements of Information system – Organization structure and theory.

### **Unit III**

Basic of Information systems – Management System and decision making concepts.

### **Unit IV**

MIS and Decision Making Concepts: Decision Making – Decision support system.

### **Unit V**

Information System Requirements: Strategies for the determination of Information Requirements – Database Requirements – User Interface Requirements.

### **Text Books:**

1. Management Information System – Gorgon Davis & Margret he H.D.Dlaon, McGraw Hill International Editions, 1994.
2. MIS – Jawadekar Chapter – 1, 2,3,4,6,7,8,14.

### **Reference Books:**

1. Information System for Modern Management – RoberG.Murdick, Joel E.Ross and R.Clasggett, PHI, 1990.

2. MIS – Jawadekar – TMH – 1997.
3. Management Information System. The Manager View – R.Schultheis TMH.

## **OFFICE AUTOMATION**

**SUBJECT CODE: UITS31**

### **Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

### **Using Office Automation**

CO 1. Mail Merge

CO 2. Power Point

### **Exercise:**

#### **MS-WORD**

1. Preparing Documents Using Formatting options.
2. Table preparation
3. Find and Replace
4. Mail merge
5. Header and Footer
6. Drop cap

#### **MS-EXCEL**

1. Payroll calculation
2. Mark sheet preparation using mathematic function
3. Chart preparation

#### **MS –ACCESS**

1. Table creation
2. Query processing
3. Form
4. Report generation

#### **MS-POWER POINT**

1. Slide show animation

## SEMESTER – IV

### RELATIONAL DATA BASE MANAGEMENT SYSTEMS

**SUBJECT CODE: UITT41**

#### **Objective:**

**OBJ1:** Learn and practice data modeling using the entity-relationship and developing database Designs.

**OBJ2:** Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access.

#### **Course Outcomes:**

CO1: Describes overview of Data Base systems & Data Models.

CO2: Handling Relationship Model.

CO3: Understanding Algebra Operation.

CO4: Understanding back tracking System.

CO5: Design Relational Languages & Integrity Constraints

CO6: Understanding PLSQL / SQL.

#### **UNIT I**

Introduction: Purpose of data base systems – View of data – Data models – Database languages – Transaction management – Storage management – Database Administrator – Database users – Overall system structure.

#### **UNIT II**

Entity – Relationship Model-Basic concepts – Design issues – Mapping cardinalities – Keys – E-R Diagrams – Weak entity sets – Extended E-R features – Design of an E-R Database scheme – Reduction of an E-R scheme to table.

#### **UNIT III**

Relational Model: Structure of relational databases – Relational algebra – The tuple relational calculus – The domain relational calculus – Extended relational – Algebra operations – Modification of the database – Views.

#### **UNIT IV**

Other Relational Languages & Integrity Constraints:

Query by Example – Quel – Datalog – Domain constraints – Referential Integrity – Assertions – Triggers – Functional dependencies.

#### **UNIT V**

PL/SQL – Relationships between SQL & PL/SQL –Advantages of PL/SQL – arithmetic & expressions in PL/SQL – Loops and conditional statements in PL/SQL – Exceptions Handling – Cursor management – Triggers – Functions & Procedures.

#### **Text Book**

Data base system concepts(third edition)- abraham silberschtz, henry f.korth  
l.sudershan, mcg hill international editions, 1997.

**Reference books**

1. S.AT'RE-DS Techniques for Design, Performance& Management-John Wiley&sons.
2. James W Martin n-principles of database management-prentice hall,1979.
3. C.I.DATE an Introduction to DBS-addition Wesley,1981.

**RELATIONAL DATA BASE MANAGEMENT SYSTEMS LAB**

**SUBJECT CODE: UITP42**

**Course Outcome :**

Students are able to understand and develop own source code in the following concepts.,

**USING Linux / UNIX**

- CO1. PL/SQL tables & records & database triggers
- CO2. excepting handling & explicit cursors & implicit cursors
- CO3. ADO, DAO & RDO connectivity
- CO4. Design procedures using In, Out, Parameter
- CO5. Packages & Functions.

**Exercise:**

**PL/SQL**

1. Program using conditional control, interactive controls & sequential controls.
2. Program using excepting handling
3. Programs using explicit cursors & implicit cursors
4. Program using PL/SQL tables & records
5. Programs using database triggers
6. Program to design procedures using In, Out, Parameter
7. Program to design procedures using functions
8. Program to design procedures using packages
9. Program using ADO, DAO & RDO connectivity.

## DESK TOP PUBLISHING LAB (DTP)

**SUBJECT CODE: UITA42**

### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.

### **Page Maker**

CO1: Visiting Card in English

CO2: Advertisement

CO3: Certificate

### **Coral Draw**

CO3: India Map

CO4: Cartoon

CO5: Rangoli

CO6: Logos in Tamil

### **PhotoShop**

CO7:Album

### **Exercise:**

### **Page Maker**

1. Visiting Card in English
2. Advertisement
3. Certificate
4. Wedding Invitation card in English
5. Greeting Card
6. Prospectus
7. Flow Chart
8. Calendar

### **Corel Draw**

1. India Map
2. Cartoon
3. Rangoli
4. Logos in Tamil
5. Fashion Designing
6. Jewel Designing
7. Greeting card

### **PhotoShop**

1. Flex Designing
2. Photo Editing



## NUMERICAL METHODS

**SUBJECT CODE: UITE42**

### **Objective:**

**OBJ1:** To have the versatility to work effectively in a broad range of numerical computations.

**OBJ2:** To have a broad background in Mathematics

### **Course Outcomes:**

CO1: Describes about Numerical Computations.

CO2: Describes comparison of direct and iterative method

CO3: Understanding about Newton's Formulae.

CO4: Understanding Gaussian Quadrature.

CO5: Understanding Euler's method.

### **UNIT I**

Algebraic and transcendental equations : Errors in numerical computations – iteration methods – bisection methods – regular false methods – Newton Rap son method.

### **UNIT II**

Simultaneous equations – back substitutions – gauss elimination method – gauss serial iteration method – comparison of direct and iterative method.

### **UNIT III**

Interpolation – Newton's Formulae – gauss interpolation formulae Language's Interpolation formula – inverse interpolation.

### **UNIT IV**

Numerical Differentiation: Newton's formulae – Numerical integration – Simpson's Rule – Gaussian Quadrature.

### **UNIT V**

Numerical solution of differential equations: Euler's method - Taylor series method – Range Kati methods – Predictor Corrector methods.

### **Text books:**

1. Numerical methods by S.Arumugam and S.Thangapandi Issac, A.Somasundaram, Scitech publications, Chennai -2002

## LINUX / UNIX LAB

**SUBJECT CODE: UITS42**

### **Course Outcome:**

Students are able to understand and develop own source code in the following concepts.,

### **USING Linux / UNIX**

CO1. IPC using pipes, Message Queues.

CO 2. Demonstration of process synchronization using signal,semaphores

CO 3. Deadlock

CO4. Creation of a child, orphan and Zombie process.

### **Exercise:**

1. Creation of a child, orphan and Zombie process.
2. IPC using pipes.
3. IPC using message queues.
4. Simulation of FCFS process scheduling.
5. Simulation of ROUND ROBIN process scheduling.
6. Simulation of SJF process scheduling.
7. Demonstration of process synchronization using signals.
8. Demonstration of process synchronization using semaphores.
9. Deadlock avoidance using banker's algorithm.

## SEMESTER – V

### SYSTEM SOFTWARE

**SUBJECT CODE: UITT51**

#### **Objective:**

**OBJ1:**Review historical development of system software

**OBJ2:**Identify design levels for microcomputer structure

#### **Course Outcomes:**

CO1: Describes about Microcomputer Structure.

CO2: Learning Object 8086 Instruction.

CO3: Managing about Loader.

CO4: Demonstrate about objectives & functions.

CO5: Describe about Memory management requirements.

#### **Unit – I**

Overview of Microcomputer Structure and Operation-Execution of a Three-Instruction and Operation-Microprocessor Evolution and types-The 8086 Microprocessor Family-Overview-8086 Internal Architecture.

#### **Unit- II**

Family Assembly Language Programming:-Program Development Steps-Costructing the Machine Codes for 8086 Instructions-Writing Programs for Use with an Assembler-Assembly Language Program Development Tools.

#### **Unit-III**

System Software: Evolution Components of Programming System-Evolution of Operating System-Operating System User View Pont: Functions, Facilities, Macro Instructions & Features of Macro Facility.

Loader : Loader Schemes-Design of Absolute Loader, Direct Linking Loader-Recognizing Basic Elements-Recognizing Syntactic units and Interpreting Meaning-Intermediate Form-Storage Allocation-Code Generation.

#### **Unit- IV**

Operating system Introduction : Definition operating system objectives and functions – operating system as resource manager, operating system as a user/computer interface – Evolution of operating system – Serial processing, batch processing, Multiprogramming, time sharing system.

Semaphore- dead lock – Principles – Prevention – Avoidance – Detection.

#### **Unit-V**

Memory Management : Memory management requirements – Relocation, protection, sharing, Logical organization, Physical organization – Virtual memory – Locating and virtual memory, paging, segmentation, combined paging and segmentation – protection and sharing – operating system software – fetch policy , placement & replacement policy.

#### **Text books**

1. “MicroProcessor and Interfacing”-Douglas.Hall Second Edition.
2. “System Programming by John J.Donovan-McGram Hill Publication.

### 3. Operating system by William Stallings.

# DATA MINING

**SUBJECT CODE: UITT52**

## **Objective:**

**OBJ1:** Understand the basic knowledge of all the functionalities and classification.

**OBJ2:** Understand the basic functions of the mining.

## **Course Outcomes:**

CO1: Aware of the Functionalities, patterns, of operating system

CO2: Design and deploy appropriate classification techniques

CO3: Use association rule mining for handling large data set.

CO4: Understand the concept of classification for the retrieval purposes

CO5: Understands OLAP, various kinds of association rule and applications of data mining

## **UNIT-I**

Introduction - What is Data mining, Data mining – On kind of data - Data mining Functionalities –Classification of Data mining Systems -Data mining Task Primitives - Integration of Data Mining System - Major issues in Data Mining?

## **UNIT-II**

Data Preprocessing : Why Preprocess the Data - Descriptive Data Summarization – Data Cleaning - Data Integration and Transformation - Data Reduction-Data Discretization and Concept Hierarchy Generation

## **UNIT- III**

Data Warehouse and OLAP Technology An overview : Data Warehouse –A Multidimensional Data Model - Data Warehouse Architecture - Data Warehouse Implementation – From Data warehousing to Data Mining.

## **UNIT-IV**

Mining – Frequent Patterns ,Associations Correlations : Basic Concepts - Efficient Scalable - Frequent Item set Mining methods - Mining Various Kinds of Association rules.

## **UNIT-V**

Applications and Trends in Data mining : Data mining Applications –Data Mining System Products and Research Prototypes - Additional Themes on Data Mining - Social impact of Data mining - Trends in Data mining .

## **Text Book :**

1. Data Mining (Concepts and Techniques) Second Ed

Author : Jiawei Han and Micheline Kamber Publishers : Morgan Kaufmann Publishers ( An imprint of Elsevier )

## **Reference Books :**

1 Data Mining (Next Generation Challenges and Future Directions)

Author : Karguta, Joshi, Sivakumar & Yesha Publishers : Printice Hall of India ( 2007 )

2. Data Mining (Practical Machine Learning Tools and Techniques (II Edition)

Author : Ian H. Witten & Eibe Frank Publishers : Morgan Kaufmann Publishers (An imprint of Elsevier]

3. Data Warehousing, Data mining & OLAP (Edition 2004)

Author: Alex Benson, Stephen V. Smith Publishers: Tata McGraw – Hill

# SOFTWARE ENGINEERING

**SUBJECT CODE: UITT53**

## **Objective:**

**OBJ1:** It seeks to complement this with a detailed knowledge of techniques for the analysis and design of complex software intensive systems.

**OBJ2:** Be successful professional in the field with solid fundamental knowledge of Software Engineering.

## **Course Outcomes:**

CO1: Describe the processes of software development

CO2: Develop software design and modules for real time system

CO3: Analyze verification & validation techniques

CO4: Enhancing the software maintenance from the plan to implementation

CO5: Describe configuration management & source code

## **UNIT I**

Introduction to Software engineering some definitions – some size factors – quality to productivity factors – managerial Issue.

Planning a software project: defining the problems developing a solution strategy – planning on organization structure – other planning activities.

## **UNIT II**

Software cost estimation: Software cost factors – Software cost estimation techniques – staffing – level estimation – estimative software maintenance costs.

## **UNIT III**

Software requirements, definition: the software requirements specifications – formal specification techniques – language and processors for requirements specification.

## **UNIT IV**

Software Design: fundamentals Descartes concepts – Modules and Modularizing criteria -Design techniques – detailed design considerations – real time and distributed system design – test plan – mile – stones walk through and inspection – design guide line.

## **UNIT V**

Verification and validation techniques: Quality Assurance – static analysis – symbolic execution – unit testing and debugging system - testing formal verification.

Software maintenance: enhancing maintainability during developments managerial aspects of software maintenance – configuration management – sources code metrics – other maintenance tools and techniques.

## **Text book:**

Software Engineering Concepts, 1985 Mc Graw Hill Book company by Richard E.Fairy, chapters 1-5, 8,9

## **References books:**

1. Software Engineering: A practical Approach by Foger S.Pressman Mc Graw Hill International Books Company 1987 Edition.
2. Software Engineering-Mathur
3. Software Engineering-James

# COMPUTER NETWORKS

**SUBJECT CODE: UITT54**

## **Objective:**

**OBJ1:** Build an understanding of the fundamental concepts of computer networking.

**OBJ2:** Familiarize the student with the basic taxonomy and terminology of the computer networking area.

## **Course Outcomes:**

CO1: Understand networking concepts and basic communication model.

CO2: Understand network architectures and components required for data communication

CO3: Identify the components required to build different types of networks

CO4: Understand the working principles of various application protocols

CO5: Working with routing algorithms.

CO6: Describe about TCP/UDP/SNMP.

CO7: Understanding Domain Name System.

## **UNIT I**

Introduction: User - Hardware – Software – Reference Models – Example Network – Example Data Communication service – Network Standardization.

## **UNIT II**

Physical Layer: Transmission Media – Wireless Transmission – The Telephone system – Cellular radio – Communication satellites.\

## **UNIT III**

Data Link Layer & Medium Access Layer – D.L.L.Design Issues – Elementary Data link protocols – Multiple Access Protocols – Ethernet, Token bus, Token ring standards.

## **UNIT IV**

Networks Layer & Transport Layer: N.W.L. Design Issues – Routing - Algorithms – T.P.L. Design Issues – Elements of T.P.L.Protocol.

## **UNIT V**

Application Layer: Network Security: Cryptography – Digital Signature - E-Mail Security – Web Security – Social Issues.

## **Text Book**

1. Computer Networks by Andrew S.Tenenbaum, PHI, Third edition, 1996.

## **Reference Book**

2. Computer Networks - Fourouzan

## COMPUTER GRAPHICS

**SUBJECT CODE: UITT55**

### **Objectives:**

**OBJ1:** Know and be able to discuss hardware system architecture for computer graphics. This includes, but is not limited to: graphics pipeline, frame buffers, and graphic accelerators/co-processors.

**OBJ2:** Know and be able to use a current 3D graphics API .

### **Course Outcomes:**

CO1: Understand computational development of graphics

CO3: Analyze the Line attribute & curve attribute

CO4: Design animation with rotation, translation and scaling

CO5: Working with Multimedia Developers & Text, Graphics.

CO6: Understanding Digital Audio & Video.

**UNIT I:** Overview of graphics systems: Video display devices – Raster-scan systems – Random-scan systems – Graphics monitors and workstation – Input devices – Hard-copy devices – Graphics software.

**UNIT II:** Output primitives: Points and lines – Line-drawing algorithms – DDA algorithm – Bresenham's line algorithm – Attributes of output primitives: Line attributes – Area-fill attributes – Character attributes – Bundled attributes.

**UNIT III:** Two-dimensional Geometric transformations: Basic transformations – Matrix representations – Composite transformations – Other transformations.

**UNIT IV:** Windowing and Clipping – Windowing concepts – Clipping Algorithms – Window to view port Transformations – segments – Interactive input methods – Physical input devices – logical classification of input devices – interactive picture construction techniques – input functions.

**UNIT V:** Three dimensional concepts – 3D Display Techniques – 3D representation – polygon and curved surface – 3D transformations.

### **Text books:**

1. Computer Graphics C Version Second Edition, Donald Hearn and M.Pauline Baker, Pearson Education, 2006.
2. Donald Hearn and M.Pualine Baker "Computer Graphics", PHI , 2nd Edition.

### **Reference books:**

1. William M. Neuman and Robert F Sproul "Principles of Interactive computer Graphics" , McGraw Hill International Edition, 2nd Edition.



2. Foley, van Dam, Feiner, and Hughes. Computer Graphics: Principles and Practice, 3rd edition in C.
3. Computer Graphics, Steven Harrington, McGraw-Hill

## VISUAL BASIC LAB

**SUBJECT CODE: UITE53**

### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are

CO1:Simple Arithmetic Operators(+,-,\*,/) Using text command boxes.

CO2:Manipulation of string and data functions.

CO3:Designing Using file.

CO4: RDO, ODBC.

CO5: Game.

### **Exercise:**

1. Simple Arithmetic Operators(+,-,\*,/) Using text command boxes.
2. Manipulation of string and data functions.
3. Designing in calculator.
4. Magic square.
5. Number Puzzle, Picture Puzzle.
6. Using file, directory and drive list boxes o load a text file into a rich text box.
7. Function of Command Dialog Box( open, save color font, printer, help options)
8. Design a text editor using Rich Text Box.
9. Design a Screen Saver.
10. Animation of Picture.
11. Use list box, combo box to change the font, font size of the given text.
12. Display a popup menu in the form when you click the right mouse button.
13. Use graphical function to draw a picture and save it.
14. Data base Access using DAO, RDO, ODBC.
15. Compare the Scores of two cricket teams, by the use of graphics.
16. Design a Game(like solitaire).

## PYTHON LAB

**SUBJECT CODE: UITS53**

### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.

CO1. Print the text & Add to Numbers.

CO2. SQUARE Root & Calculate Triangle

CO3. Multiplication Table, Fibonacci Series.

### **Exercise:**

1. Python Program to Print the Text.
2. Python Program to Add Two Numbers.
3. Python Program to find the square root.
4. Python Program to calculate the area of the triangle.
5. Python Program to convert Celsius to Fahrenheit.
6. Python Program to check prime number.
7. Python Program to check leap year
8. Python Program to display multiplication table.
9. Python Program to display Fibonacci series
10. Python Program to display factorial.

## SEMESTER VI

### JAVA AND INTERNET PROGRAMMING

**SUBJECT CODE: UITT61**

#### **Objective:**

**OBJ1:** knowledge of object-oriented paradigm in the Java programming language.

**OBJ2:** the use of Java in a variety of technologies and on different platforms.

#### **Course Outcomes:**

CO1: Describes Object Oriented fundamentals

CO2: Describe about Package and Interfaces.

CO3: Handling 'Exception handling'

CO4: Handling of looping statements.

CO5: Understanding Applets.

CO6: Understanding the controlling windows..

#### **UNIT I**

Fundamentals of Object Oriented Programming - Java Evolution – overview of Java Language - Constants, Variables and Data types.

#### **UNIT II**

Operators and Expressions – Decision Making and Looping - Classes , Objects and Methods – Arrays, Strings and Vectors.

#### **UNIT III**

Interfaces : Multiple Inheritance – Packages :Putting classes together – Multithreaded Programming – Managing errors and Exception.

#### **UNIT IV**

Applet Programming – Graphics Programming – Introduction to AWT packages – Introduction to Swings - Managing Input Output in Files in Java.

#### **UNIT V**

Introduction to Java script – Data types – Variables – Operators, expressions – statements – functions, date month & type related objects, controlling windows.

#### **Text Books**

1. Introduction to Java Programming by E. Balagurusamy – Fifth Edition – McGrawHill Education Private Limited.
2. Java Complete Reference.

#### **Reference Book**

3. Krishnamoorthy & Prabu, New Age Intl Publications

## MOBILE TECHNOLOGY

**SUBJECT CODE: UITT62**

### **Objective:**

**OBJ1:** To able to know the mobile technology concepts.

**OBJ2:** To develop advanced mobile applications that accesses the databases and the web.

### **Course Outcomes:**

CO1:To design and implement the user interfaces for mobile applications.

CO2: To design the mobile applications that is aware of the resource constraints of mobile devices.

CO3: To develop useful mobile applications in the current scenario using Google Android and Eclipse simulator.

**UNIT I :INTRODUCTION** - Mobile Applications – Characteristics and Benefits – Application Model – Infrastructure and Managing Resources – Mobile Software Engineering – Frameworks and Tools – Mobile devices Profiles.

**UNIT II : USER INTERFACE** - Generic UI Development – VUIs and Mobile Applications – Text to Speech techniques – Designing the right UI – Multimodal and Multichannel UI – Gesture based UIs – Screen Elements and Layouts – Voice XML – Java API.

**UNIT III :APPLICATION DESIGN** - Memory Management – Design patterns for limited memory – Work flow for Application Development – Techniques for composing Applications – Dynamic Linking – Plug ins and rules of thumb for using DLLs – Concurrency and Resource Management – Look and feel.

**UNIT IV :APPLICATION DEVELOPMENT**- Intents and Services – Storing and Retrieving data – Communication via the Web – Notification and Alarms – Graphics and Multimedia – Telephony – Location based services – Packaging and Deployment – Security and Hacking.

**UNIT V:TOOLS**- Google Android Platform – Eclipse Simulator – Android Application Architecture – Event based programming – Apple iPhone Platform – UI tool kit interfaces – Event handling and Graphics services – Layer Animation.

### **TEXT BOOKS:**

1. Share Conder, Lauren Darcey, "Android Wireless Application Development" Pearson 3rd Edition.
2. ZigurdMednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura, —Programming Androidll, O'Reilly, 2011.

### **REFERENCES:**

1. Professional mobile Application Development paperback,2012 Jeff Mcherter (Author),Scott Gowell (Author), Wiley India Private Limited
2. Reto Meier, Wrox Wiley, —Professional Android 2 Application Developmentll, 2010.
3. Alasdair Allan, —iPhone Programmingll, O'Reilly, 2010.

# INFORMATION SECURITY

**SUBJECT CODE: UITT63**

## **Objective:**

**OBJ1:** To able to know the IT security concepts.

**OBJ2:** To able to know about the database security concepts etc.

## **Course Outcomes:**

CO1: Describes about Information Security.

CO2: Describe about Cryptography Ciphers.

CO3: Discuss about program security.

CO4: Discuss about Database Security.

CO5: Understanding Networks security controls.

## **UNIT I**

Introduction: Security, Attacks, Computer Criminals, Security Services, Security Mechanisms.

## **UNIT II**

Cryptography: Substitution ciphers, Transposition ciphers, Confusion, Diffusion, Symmetric, Asymmetric, Encryption, DES, Uses of Encryption, Hash Function, Key exchange, Digital Signatures, Digital Certificates.

## **UNIT III**

Program Security: Secure Programs, Non malicious program errors, malicious codes virus, Trap doors, Salami attacks, covert channels, Control against program.

## **UNIT IV**

Database Security: Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security.

## **UNIT V**

Security in Networks: Threats in Networks vs. Networks security controls, Firewalls, Intusion detection systems, Secure e-mails.

## **Text Books:**

1. Fourozan

## **Reference Books:**

1. W.Stallings – Network Security Essentials Applications and Standars, 4/E,2010.

## **JAVA AND INTERNET PROGRAMMING LAB**

**SUBJECT CODE: UITP63**

### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

CO1: Multi- Threading.

CO2: Manipulation of Event Handling.

CO3: Designing Java Streams.

CO4: Arithmetic Operation Using Java Script

CO5: Animation and Images

### **Exercise:**

1. Arrays and flow control statements.
2. Run time exception And I/O exception.
3. Multi- Threading.
4. Layout Management.
5. GUI Components (Labels, Check box, Menus, Text, etc.)
6. Event Handling (Focus Events, Key Events, Paint Events, Text Events, Mouse Events, Window Events, Etc.)
7. Animation and Images.
8. Java Applet.
9. Java files management methods.
10. Java Streams.
11. JDBC (Java Database Connectivity).
12. Arithmetic Operation Using Java Script
13. Prime Number Using Java Script
14. Find Largest Number in Array Using Java Script
15. Palindrome Using Java Script

## MOBILE TECHNOLOGY LAB

**SUBJECT CODE: UITP64**

### **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

CO1: Multi- Threading.

CO2:Uses GPS location information

CO3:Makes use of database.

CO4: Creates an alert upon receiving a message

CO5: Creates alarm clock

### **Exercise:**

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading.
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock.



# Multimedia LAB

**SUBJECT CODE: UITS64**

## **Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

CO1: Motion and Shape Tweening

CO2: Drawing Tools

CO3: Transparency

CO4: Modeling

CO5: Lighting

## **Exercise:**

### **Flash**

1. Animation (with Motion and Shape Tweening)
2. Flash Drawing Tools to Create Shapes
3. Transparency
4. Actions and Buttons

### **Maya**

#### **General**

- A Short Tour of Maya's UI
- Camera Controls
- Basic Selection
- Basic Manipulation
- Hierarchy

#### **Modeling**

- Polygon Selection
- Polygon Editing
- Image Planes
- Subdivision Modeling

#### **Shading**

- Basic Shading
- UV Editing
- Shading Networks

#### **Lighting**

- Basic Lighting
- Advanced Lighting

## **Animation**

- Basic Animation
- Graph Editor
- Animation Principles

## **Rendering**

- Production Rendering
- Occlusion

**NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**  
**HTML LAB**

**Course Outcomes:**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

CO1: Heading Tag

CO2: Order and Unordered List

CO3: Creating Tables

**HTML LAB**

1. Heading Tag
2. Formatting Tag
3. Ordered List
4. Unordered List
5. Definition List
6. Image
7. Anchor
8. Table
9. Frame
10. Forms

**NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**

**PHOTOSHOP LAB**

**Course Outcomes: Photoshop Lab**

Students are able to understand and develop own source code for the following concepts.,

Course outcomes are,

CO1: Album preparation

. CO2: Invitation

**Exercises :**

1. Album preparation
2. Invitation Preparation
3. Wall Papers
4. Visiting Card
5. Background Changing and Removing
6. Wedding invitation Card
7. Cloning an Image
8. Flex Designing
9. Photo Editing
10. Book Cover

## **NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**

### **Objective:**

**OBJ 1:** To understand the basics of computer.

**Course Outcomes:** Students are able to understand the basics of computer.

### **FUNDAMENTALS OF COMPUTER**

#### **UNIT I**

Introduction to computers – Generation of Computers – Types of Computers  
Comparison of Micro, Mini and mainframe computers – Advantages of Computer –  
characteristics of Computer – limitations of computer.

#### **UNIT II**

Block diagram of a Computer – input devices – output devices – storage devices –  
RAM – ROM – comparison b/w RAM and ROM – Secondary storage devices.

#### **UNIT III**

Types of Software – Operating systems – Need for an operating systems – functions of  
OS – popular operating systems – five generation of programming languages – packages.

#### **UNIT IV**

Binary number system – Binary Arithmetic operations (Addition, Subtraction,  
Multiplication, Division) – ASCII codes \_ Algorithms – Flow chart – Pseudo codes – steps in  
programming.

#### **UNIT V**

Definition – Features of networks – Network Topologies –LAN – WAN – MAN –  
Comparison between LAN and WAN – Introduction to Internet – History of internet uses of  
Internet – working with windows.

### **Text Book:**

1. Fundamentals of IT – Alexis, Mathews Leon.

**NON MAJOR ELECTIVE (OFFERED BY PARENT DEPARTMENT)**

**PRINCIPLES OF INFORMATION TECHNOLOGY**

**Objective:**

**OBJ 1:** To understand the principles of information technology

**Course Outcomes: Students are able to understand the principles and technology of computer.**

**UNIT I**

Introduction – history of Information – Quality of Information – Information processing – Database – Characteristics of Data in a Database – DBMS – Types of DBMS – Data Normalization.

**UNIT II**

Internet and world wide web : Introduction – getting information on the internet – providing information on the internet – compiling information from the internet – internet access – basis – protocols – internet addressing – WWW – HTML – Web browsers – searching the web.

**UNIT III**

Multimedia Tools: Introduction – graphics effects and techniques – sound & music – video – multimedia authoring tools – virtual reality.

**UNIT IV**

Data warehouse & Data Mining: Introduction – advantages of data ware house – components – structure – uses – data mining introduction – advantages of data mining – technologies used in data mining.

**UNIT V**

Application of information technology: Computers in business and industry – computers in home – educations and training – entertainment science and engineering and medicine.

**Text books:**

1. Fundamentals of information technology – Alexis Leon, Mathews Leon

**Reference Book:**

1. Advanced information technology – S. Jaiswal



**MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL - 624 101**



**DEPARTMENT OF MATHEMATICS**

**B.Sc. MATHEMATICS PROGRAMME**

**SYLLABI**

**2018 – 2019 Onwards**

**ALLOCATION OF PAPERS AND CREDITS(SEMESTER-WISE) FOR UG  
PROGRAMMES AS PER THE TANSCHER RULES  
MATHEMATICS**

**UG Course Structure under Choice Based Credit System (CBCS)  
with effect from 2018 - 2019 onwards**

P. No.	Paper Code	Course Title	Hours	Credits	Continuous Internal Assessment (CIS)	End Semester Exam (ESE)	Total
<b>Semester I</b>							
1.	ULTA11	Part-I- Tamil	6	3	25	75	100
2.	ULEN11	Part-II-English	6	3	25	75	100
3.	UMTT11	Core I - Calculus	5	4	25	75	100
4.	UMTT12	Core II- Classical Algebra	5	4	25	75	100
5.	UMTA11	<i>Allied Theory I - Ancillary Physics-I</i>	5	4	25	75	100
6.	UVAE11	Value Education	3	3	25	75	100
<b>Total</b>			<b>30</b>	<b>21</b>			<b>600</b>
<b>Semester II</b>							
7.	ULTA22	Part I-Tamil	6	3	25	75	100
8.	ULEN22	Part II-English	6	3	25	75	100
9.	UMTT21	Core III -Analytical Geometry 3D	6	4	25	75	100
10.	UMTT22	Core IV - Differential Equations and Laplace Transforms	5	4	25	75	100
11.	UMTA21	<i>Allied Theory/Practical I - Ancillary Physics-II</i>	5	4	25	75	100
12.	UEVS21	Environmental Studies	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>20</b>			<b>600</b>
<b>Semester III</b>							
13.	ULTA33	Part I-Tamil	6	3	25	75	100
14.	ULEN33	Part II- English	6	3	25	75	100
15.	UMTT31	Core V- Statics	5	4	25	75	100
16.	UMTA32	<i>Allied II - Ancillary Mathematical Statistics-I</i>	5	4	25	75	100
17.	UMTE31	Elective I - Vector Calculus , Fourier Series and Fourier Transform	4	3	25	75	100
18.	UMTN31	Non Major Elective Course I- Resource Management Techniques	2	2	25	75	100
19.	UMTS31	Skill Based Studies I: Astronomy –I	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>21</b>			<b>700</b>



Semester IV							
20.	ULTA44	Part I-Tamil	6	3	25	75	100
21.	ULEN44	Part II-English	6	3	25	75	100
22.	UMTT41	Core VI - Dynamics	4	4	25	75	100
23.	UMTT42	Core VII- Sequence and Series	4	4	25	75	100
24.	UMTA42	Allied Practical II- Ancillary Mathematical Statistics –II	3	4	25	75	100
25.	UMTE42	Elective II - Discrete Mathematics	3	3	25	75	100
26.	UMTN42	Non Major Elective course II - Mathematical Aptitude	2	2	25	75	100
27.	UMTS42	Skill Based Studies II – Astronomy –II	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>800</b>
Semester V							
28.	UMTT51	Core VIII- Abstract Algebra	5	4	25	75	100
29.	UMTT52	Core IX - Real Analysis	5	4	25	75	100
30.	UMTT53	Core X - Operations Research – I	5	4	25	75	100
31.	UMTT54	Core XI - Number Theory	5	4	25	75	100
32.	UMTT55	Core XII - Numerical Methods	5	4	25	75	100
33.	UMTE53	Elective III - Programming in C	3	3	25	75	100
34.	UMTS53	Skill Based Studies III - Mathematical Methods	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>700</b>
Semester VI							
35.	UMTT61	Core XIII - Linear Algebra	5	4	25	75	100
36.	UMTT62	Core XIV - Complex Analysis	5	4	25	75	100
37.	UMTT63	Core XV - Operations Research-II	5	4	25	75	100
38.	UMTT64	Core XVI- Graph Theory	5	4	25	75	100
39.	UMTT65	Core XVII- Fuzzy Sets and Fuzzy Numbers	5	4	25	75	100
40.	UMTE64	Elective IV - Programming in C <sup>++</sup>	3	3	25	75	100
41.	UMTS64	Skill Based Studies IV: Numerical Methods Lab using C <sup>++</sup>	2	2	25	75	100
42.	UEAS61	Extension Activity	-	3	25	75	100
<b>Total</b>			<b>30</b>	<b>28</b>			<b>800</b>
<b>Total credits</b>					<b>140</b>	<b>Total</b>	<b>4200</b>

### SCHEME OF EXAMINATION

<b>Internal (Theory)</b>	<b>- 25</b>
Test	- 15
Attendance	- 5
Assignment/Technical Quiz	- 5
Total	- 25

**External (Theory) - 75**

### QUESTION PATTERN

1.	10*1 Marks (Objective type / Multiple choice 2 Question from each unit)	10
2.	5*4 Marks (from each unit either or choice)	20
3.	3*15 Marks (Open choice Any Three Questions out of 5, one question from each unit )	45
Total		75

The Internal Assessment for Practical : 25

The External Assessment for Practical : 75

## Semester I

UMTT11

CALCULUS

5 Hours / 4 Credits

### Objectives

- To learn the different concepts of differential and integral calculus.
- To learn will acquire basic knowledge of integration
- To learn will become proficient in multiple integrals and its applications
- The learner will gain concepts of change of variables

**Unit I:** Successive differentiation- Expansion of function - Leibnitz Theorem and its application  
Maxima and Minima of Function of two variables.

**Unit II:** Curvature – Radius of Curvature and Center of Curvature in Cartesian Form and Polar Form  $p - r$  equation; Pedal Equation of a Curve – Chord of a Curvature.

**Unit III:** Double Integral : Definition – Evaluation of double integral – Double integral in polar Co- ordinates.

**Unit IV:** Triple Integral: Definition – Applications of multiple integrals -Change of variables in the case two variables - Change of variables in the case three variables.

**Unit V:** Beta and Gamma functions : Definitions – Covergence of  $\Gamma(n)$  – Recurrence formula of Gamma functions – Properties of Beta functions – Relation between Beta and Gamma functions – Applications of Gamma functions to multiple Integrals.

### Text Book:

**S.Narayanan and T.K.Manickachagam Pillai** – “Calculus-Volume I & II”- Viswanathan Printers and Publishers - 2011.

Unit I – Calculus – Volume I : Chapter 3 and Chapter 8-Sec 4,

Unit II - Calculus – Volume I : Chapter 10.2.1 to 3.1

Unit III - Calculus – Volume I : Chapter 5- Sec. 1 to 3.2

Unit IV – Calculus - Volume II : Chapter 5- Sec. 4 to 5.4 and Chapter 6

Unit V - Calculus - Volume II : Chapter 7 – Sec. 2.1 to 6

### Reference Books:

1. **P.Kandasamy and K.Thilagavathi** - “Mathematics for Branch I: Vol I and Vol II” - S.Chand and Company Ltd., - New Delhi - 2004.
2. **Arumugam Issac** – “ Calculus ” – New Gamma Publishing House – Jan 2011.

## Semester I

UMTT12

CLASSICAL ALGEBRA

5 Hours / 4 Credits

### Objectives

- To impart skills in the various applications of algebraic methods.
- The learner will become proficient in expansion and summation of function.
- Understanding relation between roots and coefficients of equations, sign changes, reciprocals.
- To understand terms of series, summation and its changes

**Unit I :** Binomial theorem – Greatest term in the expansion of  $(1 + x)^n$  .- sum of the coefficients - Multinomial theorem - Binomial theorem for rational index – Particular cases – Summation of binomial series - Approximate values.

**Unit II:** Exponential limit – Exponential theorem – Summation – Logarithmic series – Modification – Euler’s constant – Logarithms of Complex Numbers.

**Unit III:** Summation of series – Application of partial fraction- Summation by difference series –Recurring series – Generating function.

**Unit IV:** Theory of Equations: Remainder Theorem – Relation between roots and coefficients of equations Symmetric Function of Roots – Newton’s Theorem on the sum of the powers of the roots. Transformations of Equations: Roots with signs changes - Reciprocal roots.

**Unit V:**Reciprocal Equation - Solutionsof Numerical Equations: Solutionsof Numerical Equations – Newton’s methods of divisors – Horner’s method.

### Text Book:

**T.K.Manickachagam Pillai and others,** - “Algebra Volume I”, - S. Viswanathan Printers & Publisher Pvt, Ltd., - 2010.

Unit – I - Algebra Volume I – Chapter 3

Unit – II - Algebra Volume I – Chapter 4

Unit – III - Algebra Volume I – Chapter 5

Unit – IV - Algebra Volume I – Chapter 6 – Section 1 to 15.2

Unit – V - Algebra Volume I – Chapter 6 – Section 15.3 to 30

### Reference Book :

**P. Kandasamy and K.Thilagavathy,** - “ Mathematics, Volume I - S.Chand and Company Ltd., New Delhi - 2004.

## Semester II

UMTT21

ANALYTICAL GEOMETRY 3D

5 Hours / 4 Credits

### Objectives

- This is used to model geometric objects - points, (straight) lines, and circles being the most basic of these.
- To acquire knowledge of planes and its properties as a 3 dimensional objects.
- To understand the concepts skew lines and spheres.
- solving problems related to geometry of three dimension.

**Unit I:** Rectangular cartesian coordinates :Dirction cosines of the line –Angle between the lines – Projections – Direction cosines.

**Unit II:** The Plane – General equation – Angle between planes – Eqation of plane through the intersection of two given planes –Length of the perpendicular.

**Unit III:** Stright line – Symmetric form – Equation of Plane and straight line – Shortest distance between two given lines. (CIS)

**Unit IV:** Sphere – General equation – Length of the tangent – Plane section of a sphere – Equation of circle on sphere – Intersection of two spheres – Equation of the tangent plane to the sphere.

**Unit V:** Equation of a Cone with its vertex at the origin - equation of a quadratic cone with given vertex and given guiding curve - necessary condition for general equation of second degree to represent a cone - circular cone - equation of circular cone with given vertex - axis and semi vertical angle – Cylinder – Equation – Enveloping cylinder.

### Text Book:

**T.K.Manickavachagom Pillay and T.Natarajan**, “A Text Book of Analytical Geometry – part II - Three dimensions”, Viswanathan Printers and Publishers — 2011.

Unit I - Chapter 1

Unit II - Chapter 2

Unit III - Chapter 3

Unit IV - Chapter 4

Unit V - Chapter 5 – Sec. 1 to 8

### Reference Books:

1. **H.K.Dasse, H.C.Saxena and M.D.Raisinghania**, “Simplified Course in Solid Geometry(3D)” – S.Chand and Company.
2. **P.Duraipandian**, “Analytical Geomentry – 3 Dimensional “- Emerald publishers – 1998

## Semester II

### UMTT22 DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS 5 Hours / 4 Credits

#### Objectives

- To introduce the basic concepts of differential equations and Laplace Transforms.
- Understand the basic concepts of first order differential equation and its applications.
- Determine solutions to second order linear homogeneous, non-homogeneous differential equations with constant coefficients.
- Find solutions by applying Laplace transform methods.
- Understand the elementary theory of partial differential equations, and solve it using various techniques.

**Unit I :** Differential Equations of the first order and first degree : Variable separable Homogeneous, non – homogeneous, Linear equation, Bernoulli's equations, Exact differential equations. Equation of the first order and higher degree : Equations Solvable for  $dy/dx$  – equations solvable for  $y$  – equations solvable for  $x$  – Clairaut's form.

**Unit II :** Linear equations with constant Co – efficient : Definition – complementary function of a Linear equation with constant Co – efficient – particular Integral – General method of finding P.I – special methods for finding P.I of the functions of the type  $e^{ax}$ ,  $\cos ax$  or  $\sin ax$ ,  $e^{ax} V$  where  $V$  is any function of  $x$ ,  $x^m$  – Linear equations with Variable Co – efficient, Equations reducible to the linear equations.

**Unit III :** Simultaneous Differential equations : Simultaneous equations of the first order and first degree – Simultaneous linear differential equations: Linear equations of the second order : Complete solution given a known integral – Reduction to the normal form – Change of Independent Variables – Variation of Parameters – Methods of operations factors.

**Unit IV :** Formation of PDE – Lagrange method of solving linear PDE – Solution of PDE of type  $F(p,q)=0$ ,  $F(z,p,q)=0$ ,  $F(x,p) = G(y,q)$ , Clairaut's form and Charpit's method.

**Unit V :** Laplace Transforms : Definition, laplace transform of periodic functions – Some general theorems – The inverse Transform's.

#### Text Book:

**S. Narayanan and T.K. Manickavachagam pillai,** "Differential equations and its applications" S. Viswanathan Printers and Publishers Pvt. Ltd., Madras 2014.

Unit I - Chapter 2 and 4.

Unit II - Chapter 5 – Sec. 1 to 6.

Unit III- Chapter 6 and 8.

Unit IV –Chapter 12 Sec. 1 to 5.4 and 6.

Unit V- Chapter 9 – Sec. 1 to 7.

#### Reference Books:

**1. Arumugam and Isaac** - Differential equations and applications, - New gamma publishing house – 1999.

**2. P.Kandasamy and K. Thilagavathi** "Mathematics for Branch I: Volume III" S. Chand and Company Ltd., New Delhi - 2004.

## Semester III

UMTT31

STATICS

5 Hours / 4 Credits

### *Objectives*

- *To learn the application of geometric properties in equilibrium and motion of particles.*
- *To learn know to apply geometrical concepts in parallel forces, moments and couples*
- *Proficient in static equilibrium's three forces acting on a rigid body and friction.*
- *The learner to understand real time application.*

**Unit I:** Forces acting at a point : Resultant and Components- Parallelogram of Forces- Analytical expression for the Resultant of two forces acting at a point – Triangle of Forces – Perpendicular Triangle of Forces – Converse of the Triangle of Forces- The Polygon of Forces – Lami's Theorem – An extended form of the parallelogram law of Forces- Resolution of a Force – Components of a Force along two given directions –Theorem on Resolved parts.

**Unit II:** Resultant of any number of Coplanar Forces Acting at a Point: Analytical Method - Conditions of Equilibrium of any Number of forces Acting upon a Particle – Geometrical or Graphical Conditions - Analytical Conditions. Parallel Forces and Moments: To find the Resultant of Two like parallel forces acting on a rigid body- To find the Resultant of Two unlike and unequal parallel forces acting on a rigid body – Resultant of a Number of Parallel Forces Acting on a rigid Body – conditions of Equilibrium of Three Coplanar Parallel Forces – Centre of two Parallel Forces – Moment of a Force – Physical Significance of the Moment of a Force – Geometrical Representation of a Moment – Sign of a Moment.

**Unit III:** Unit of Moment – Varignon's theorem of moments – Generalised Theorem of Moments ( Principle of Moments)- Moment of a Force a about an axis. Couples: Definition – Equilibrium of two couples – Equivalence of two Couples- Couples in Parallel Planes – Resultant of Coplanar Couples - Resultant of a Couple and a Force.

**Unit IV:** Equilibrium of Three forces Acting on a Rigid Body: Rigid Body subjected to any Three Forces – Three Coplanar Forces – Conditions of Equilibrium- Procedure to be followed in solving any Statical Problem – Two Trigonometrical Theorems – Coplanar Forces: Introduction - Reduction of any number of Coplanar forces – analytical Proof of theorem – Conditions for a system of forces to Reduce to a single force or to a Couple.

**Unit V:** Friction: Introduction – Experimental Results – Statical, Dynamical and Limiting Friction – Law of Friction – Friction-a Passive force – coefficients of Friction – Angle of Friction – Cone of Friction – Numerical Analysis – Equilibrium of a particular on a rough

inclined plane - Equilibrium of a body on a rough inclined plane under a force parallel to the plane - Equilibrium of a body on a rough inclined plane under any force.

**Text Book:**

**M.K.Venkatraman**, ‘Statics’, 12<sup>th</sup> edn, Agasthiar Publications, Trichy,2010.

Unit I - Chapter 2 – Sec. 1 to 13.

Unit II - Chapter 2 – Sec 15, 16 and Chapter 3 – Sec 1 to 10.

Unit III- Chapter 3 – Sec. 11 to 14 and Chapter 4.

Unit IV – Chapter 5 and Chapter 6 – Sec. 1 to 5.

Unit V – Chapter 7.

**Reference Books:**

1. **A.V.Dharmapadam**, ‘‘Statics’’, S Viswanathan Printers and Publishing Pvt.,Ltd. 1993
2. **P.Duraipandian and Lakshmi Duraipandian**, ‘Mechanics’, S.Chand and Company Ltd,New Delhi - 1985.
3. **Dr.P.P.Gupta**, ‘Statics’, Kedal Nath Ram Nath, Meerut,1983-1984.



## Semester III

**UMTA32      ANCILLARY MATHEMATICAL STATISTICS-I      5 Hours / 4 Credits**

### **Objectives**

- *To impart skills in various applications of statistical methods.*
- *Analyze the given data by using statistical methods.*
- *Understand the basic concepts of probability and related results.*
- *Use different probabilistic methods to solve problems arise in different situations.*

**Unit I :** Measures of Dispersion: Dispersion – range, quartile deviation – mean deviation – standard deviation – root mean square deviation – Relation between standard deviation and root mean square deviation – effect of change of origin and scale on moments – Karl pearson’s beta and gamma co-coefficient – measures of Skewness – Kurtosis.

**Unit II** Theory of Probability : Definition of various terms – Law of addition of probabilities for two events – statement of general law of addition of probabilities – Bayes Theorem.

**Unit III** Continuous random variables : Probability density function – various measures of central tendency, dispersion, Skewness and Kurtosis for continuous probability distribution.

**Unit IV** Mathematical Expectation : Addition and Multiplication Theorem – covariance – Expectation and variance of a linear combination of random variables – Expectation of continuous random variable – Moment generating function and its properties – uniqueness Theorem on Characteristic function- Chebyshev’s inequality – weak law and bernoulie’s law of large numbers.

**Unit V** Theoretical Discrete Distribution :Bernoulli Distribution and its moments – Binomial Distribution – moments, mean deviation about mean, mode, M.G.F and Characteristic function – recurrence relation for the moments – additive property of independent Poission variants – recurrence formula for the probability of the Binomial Distribution and Poission Distribution.

### **Text Book :**

**S.C Gupta and V.K. Kapoor** , “Elements of Mathematical Statistics “,Sultan Chand Publishers, New Delhi. 2009.

Unit I - Chapter 3.

Unit II - Chapter 4.

Unit III- Chapter 5.

Unit IV- Chapter 6.

Unit V – Chapter 7.

### **Reference Book:**

**P.R.Vittal**, “Mathematical Statistics ”, Margham Publications -2002- Reprint 2012.

## Semester III

### UMTE31 VECTOR CALCULUS, FOURIER SERIES AND FOURIER TRANSFORM 4 Hours / 3 Credits

#### Objectives

- To enhance basic skills in the areas of vector calculus , Fourier series and Fourier transforms
- Vectors and its product
- Multiple vector integration
- To study about Fourier series and their applications.

**Unit I:** Differentiation of Vector – Vector operator del - Grad, Div and Curl –Directional derivative - Solenoidal, Irrotational vector –formulas involving del operator – Angle between the surfaces.

**Unit II:** Vector Integration – Line, Surface and volume integrals – Gauss divergence, Green’s and Stoke’s theorems – Verification of these theorems.

**Unit III:** Fourier Series: Definition- Dirchlet’s conditions- Fourier Series of periodicity  $2\pi$  and  $2l$  - Odd and even functions –Root mean square value of a function - Parseval’s theorem.

**Unit IV:** Half range series – Parseval’s theorem - Harmonic analysis- Complex form of Fourier Series.

**Unit V:** Fourier Transform – Properties – Fourier integral theorem – convolution theorem – problems.

#### Text Books:

1. **Arumugam and Issac** , “Analytical Geometry 3D and vector calculus, Sci. Tech Publishers – 2011.  
Unit I – Chapter 5.  
Unit II – Chapter 6 – Sec 6.1,6.2.
2. **P. Kandasamy and K.Thilagavathy**, “ Mathematics, Vol IV, S.Chand and Company Ltd.,- 2004.  
Unit III – Chapter I .  
Unit IV – Chapter I.  
Unit V - Chapter IV.

#### Reference Book:

**T.K.Manickavasagam pillay and Narayanan** , “Vector Algebra and Analysis” Viswanathan printers and publishers Pvt Ltd.,

### Semester III

UMTN31      **RESOURCE MANAGEMENT TECHNIQUES**

**2 Hours / 2 Credits**

#### *Objectives*

- *To impart the basic concepts and applications of linear programming.*
- *The learner will analyze the different aspects of transportation problems , assignment problems and also sequencing problem.*
- *The learner will develop, organize, evaluate short, long term processes and solve problems*
- *The learner will acquire the knowledge of basics in game theory*

**Unit I:** Definition-Mathematical formation of the Linear Programming Problem— Basic Solution- Degenerate Solution- Basic Feasible Solution of the Linear Programming Problem.

**Unit II:** Transportation Problem: Definition-Mathematical form of L.P.P-Table-Find Intial Basic Feasible Solution – North West Corner Rule -Row Minima-Colum Minima- Least Cost Method- Vogel’s Approximations Method(VAM) - Un balanced Transportation problem- Only upto Intial Basic Feasible Solution.

**Unit III:** Assignment Problem: Definition-Mathematical formulation of the problem– Hungarian Algorithm – Simple Problem .

**Unit IV:** Sequencing Problem: Definition-Problem of Sequencing- Basic Terms Used in Sequencing- Processing n jobs & Two machine- Processing n jobs Through two Machines.

**Unit V:** Game Theory: Definition- Two-Person Zero-Sum Games- Some basic terms- The Maximin-Minimax Principle- Game without Saddle point- Mixed Strategies - Graphic Solution of  $2 \times n$  and  $m \times 2$  games.

#### **Text Book:**

**Kanti Swarup, P.K .Gupta,Man Mohan**“Operations Research”, Sultanchand and sons , Edition - 2017.

Unit I – Chapter 2 and 4.

Unit II – Chapter 10.

Unit III – Chapter 11.

Unit IV - Chapter 12.

Unit V – Chapter 17.

#### **Reference Book :**

**P.R.Vittal and V.Malini**, “ Operations Research “ Margham Publishers – 2002.

## Semester III

UMTS31

ASTRONOMY- I

2 Hours / 2 Credits

### *Objectives*

- *The learner understand basic knowledge about natural science.*
- *The learner will acquire the knowledge of the celestial objects and origin of those objects and phenomena and their evolution*
- *The learner will acquire basic knowledge about morning , evening stars , circumpolar stars*
- *The learner will acquire basic knowledge about the diurnal motion of sun and stars.*

**Unit I:** Spherical trigonometry: Sphere - Great circles and small circles- Axis and poles of circle – distance between two points on a sphere-angle between two circles-secondaries-angular radius or spherical radius – spherical figures –spherical triangles –polar triangle –theorems - Relation between spherical triangles and its polar triangle- Some properties of Spherical triangles-principal of duality-colunar and anti podal triangles –Relation between sides and angles of a spherical triangle- Cosine formul- cotangent formula-supplemental cosine formula.

**Unit II:** Functions of half an angle- functions of half a side – Delambre’s analogies –Napier’s analogies- right angled spherical triangle –Napier’s rules- Spherical Coordinates – relation between the Spherical and rectangular coordinates – general proof of the cosine formula – formula in plane trigonometry –Important note.

**Unit III:** Astronomy-celestial sphere – Diurnal motion, celestial axis and equator –celestial Horizon – Zenith and Nadir –celestial Meridian – Cardinal points – Northern and southern hemispheres – Eastern and southern hemispheres – Eastern and western hemispheres – visible and invisible hemispheres – Declination circles –verticals – parallactic angle –Rising and setting – transit or culmination- Due east and due west – due south and due north – annual motion of the sun, ecliptic , obliquity-first point of Aries and first point of libra – equinoxes and solstices – colours - Celestial Coordinates: Horizontal system – equatorial system- meridian system – ecliptic system – to represent the different systems of coordinates in the same figure – conversion of coordinates –relation between right ascension and longitude of the sun- to trace the changes in the coordinates of the sun in the course of a year – the longitude of the sun on any day. ( with worked examples)

**Unit IV:** Sidereal time –west hour angle of a body expressed in time units – theorem- latitude of a place – theorem- to determine – the R.A. and Declination of a body- to find the hour angle of a body at rising or setting – to find the duration of day time –to trace the changes in the azimuth of a star in the course of a day. ( with worked examples)

**Unit V:** Morning and evening stars –circumpolar stars – to find the condition that a star is circumpolar. ( with worked examples)

**Text Book:**

**S.Kumaravelu and Susheela Kumaravelu**, “Astronomy for degree classes, Rainbow Printers, Nagarcoil, Reprint 2000.(Copies can be had of S.Kumaravelu, Muruga Bhavanam, Chidambaranager, Nagercoil)

Unit I – Chapter I: Subsection 1- 24

Unit II – Chapter I: Subsection 25 -38

Unit III – Chapter II: Subsections: 39 – 68

Unit IV - Chapter II: Subsection 70 - 79

Unit V – Chapter II: Subsection 80 – 86

**Reference Book:**

**Prophet Muhammad**, “Astronomy: Supplemental Guide”, Core Knowledge Foundation, 2013

## Semester IV

UMTT41

DYNAMICS

4 Hours / 4 Credits

### *Objectives*

- *Proficient in Newton's laws of motion and projectiles*
- *Proficient in collision of elastic bodies*
- *Proficient in motion under action of central forces*
- *To defines the path of orbiting body around central body relative to , without specifying position as a function of time.*

**Unit I:** Newton Laws of Motion and Applications.

**Unit II:** Projectiles – Equation of path range etc. –Range of a particle projected on an inclined plan etc.

**Unit III:** Impulses – Impact in a fixed plane – Direct and Oblique impact.

**Unit IV:** Simple harmonic motion – Equation of motion – composition of two simple harmonic motions – simple pendulum.

**Unit V:** Central Orbits – components velocity and accelerations along and perpendicular to the radius vector – differential equations of a central orbit pedal equation.

### **Text Book:**

**M.K.Venkatraman**, 'Dynamics', 9<sup>th</sup> edn, Agasthiar Publications, Trichy,1997.

Unit I – Chapter 4 – Sec. 4.1 to 4.37

Unit II – Chapter 6 – Sec. 6.1 to 6.17.

Unit III – Chapter 8 – Sec. 8.1 to 8.10.

Unit IV – Chapter 10 – Sec. 10.1 to 10.16.

Unit V – Chapter 11 – Sec. 11.1 to 11.15.

### **Reference Books:**

1.**A.V.Dharmapadam**, 'Dynamics', S.Viswanathan Printers and Publisher Pvt.,Ltd.,Chennai 1993.

2. **K.Viswantham Naik and M.S.Kasi**, 'Dynamics', Emerald Publishers, 1992 .

3. **Narayanamurthy and N.Nagarathnam** , 'Dynamics', National Publishers, New Delhi,1991..

## Semester IV

UMTT42

### SEQUENCES AND SERIES

4 Hours / 4 Credits

#### *Objectives*

- *To enhance basic skills in the areas of sequences and series.*
- *Types of sets, inequalities and sequences*
- *Behavior of sequences and its subsequences*
- *Infinite series and various tests for finding rearrangements its convergence*

**Unit I :** Sequences: Definition – Bounded sequences – Monotonic sequences – Convergent sequences – Divergent and Oscillating sequences – Solved problems – Behaviour of monotonic sequences.

**Unit II :** Some theorems on Limits – subsequences – Limit points – Cauchy sequences – the upper and Lower limits of a sequence – solved problems.

**Unit III :** Series of Positive terms : Definition – Cauchy's general Principle of convergence – comparison test – Kummer's Test – D' Alembert's ratio test – Raabe's Test – De morgan and Bertrand's test , Gauss's test.

**Unit IV :** Cauchy's root test – Cauchy's Condensation test – Integral test – Series of arbitrary terms: Alternating series – Leibnitz's test – Absolute convergence – Test for Convergence of Series of Arbitrary terms – Dirichlet's test – Abel's test.

**Unit V :** Rearrangement of series: Definition – Riemann's theorem – multiplication of series : Definition – Abel's theorem – Merten's theorem – Power series.

#### **Text Book:**

**Arumugam and Issac**, "Sequences and series", New Gamma publishing House, December 2015. **Brouch(efeold writes Algebra,)**

Unit I – Chapter 3 – 3.1 to 3.7.

Unit II – Chapter 3 – 3.8 to 3.12.

Unit III – Chapter 4 – 4.1 to 4.3.

Unit IV – Chapter 4 – 4.4 and 4.5, Chapter 5 – 5.1 to 5.3.

Unit V – Chapter 5 – 5.4 to 5.6.

#### **Reference Book:**

**S.C.Malik ,Savita Arora.,**"Mathematical Analysis", New Age International Private Limited.

## Semester IV

UMTA42    ANCILLARY MATHEMATICAL STATISTICS - II    3 Hours / 4 Credits

### *Objectives*

- *To impart skills in various applications of statistical methods.*
- *Analyze the given data by using statistical methods.*
- *Construct and evaluate hypothesis tests.*
- *Apply sampling techniques to real life situations.*

**Unit I:** Theoretical Continuous Distributions – Rectangular Distribution – Normal Distribution as Limiting form of Binomial Distribution – Chief Characteristic of Normal Distribution and Normal Probability curve – Mode, Median, M.G.F, Moments, Mean Deviation from the Mean of Normal Distribution – A linear combinations of Independent Normal variants – Points of Inflection of Normal Curve – Area property- Fitting of Normal distribution.

**Unit II :** Curve fitting – Fitting of a straight Line, Second degree Parabola Polynomial of  $k^{\text{th}}$  degree change of Origin – fitting of power curve  $y=ax^b$  fitting of Exponential curves  $y=ab^x$ ,  $y=ae^{bx}$  - Theory of attributes – Notations – Dichotomy Classes and Class frequencies – order – relation between class frequencies – class symbols as operators – Condition, for consistency of data – Independence of Attributes and its criterion – association of Attributes – Yules – Co-efficient of association.

**Unit III :** Correlation and regression bivariate Distribution – Correlation – Scatter diagram- Karl Pearson Co-efficient for correlation and Limits – calculation of Correlation Co-efficient for a bivariate frequency Distribution- Rank Correlation- Repeated Ranks – Regression – Line of Regression – Regression Co-efficient and Its Properties – Angles between two lines of regression.

**Unit IV:** Sampling and Large sample test – Introduction- Types of sampling – parameters and Statistics – Test of Significance – Null – Hypotheses – test of Significance for single mean, Difference of Means – Difference of standard Deviation, Exact Sampling Distribution – Chi-square variate – Derivation- M.G.F.Mode, Skewness of Chi-square Distribution – additive property of Chi-square variates – Application Chi-square Distribution – Chi-square test for population Variance and Goodness of Fit – Independence of Attributes.

**Unit V:** Exact Sampling distribution – t,f and z distribution, definitions and Applications to t,f and z distribution – test for single mean, differencesw of mean, Observed Correlation Co-efficient – f test for quality of population on variance .



**Text book :**

**S.C.Gupta&V.K.Kapoor** ,”Elements of Mathematical Staistics”, course of Madras: Madurai University, Sultan Chand Publishers, New Delhi 2009.

Unit I - Chapter 8 -8.1 to 8.2.11,8.2.14.

Unit II -Chapter 9- 9.1 to 9.3 and chapter 11

Unit III -Chapter 10.

Unit IV - Chapter 12.

Unit V -Chapter 13 and 14.

**Reference Books :**

1. **Arumugam and Thangpandi** “Probability and Statistics”, New Gamma Publishing House,2006.
2. **P.R. Vittal**, “ Mathematical Statistics”, Margham Publications, 2012.

## Semester IV

UMTE42

DISCRETE MATHEMATICS

3 Hours / 3 Credits

### Objectives

- To study of and, or and nor logics by truth tables.
- To study of normal forms.
- Analysis Free and Bound variable formulas.
- Understand Types of Grammer, function of Pushdown automata.

**Unit I:** Mathematical Logic Statement and Notation – Connection – Negation Conjunction – Disjunction – Statement Formulas and Truth Tables – Logical Capabilities of Programming Languages – Conditional and Bi Conditional – Well Formed Formula – Tautologies – Equivalence of Formula – Duality Law Tautological Implication.

**Unit II:** Normal Forms: Disjunctive Normal Forms – Conjunctive Normal Forms – Principal Disjunctive Normal Forms – Principal Conjunctive Norms.

**Unit III:** Theory of Inference – Truth Table Technique – Rules of Inference - Inconsistent Premises – Indirect Method of Proof – Predicate calculus- Free and Bound Variables – Valid Formulas and Equivalences – Inference Theory of Predicate Calculus.

**Unit IV:** Grammar : Definition – Types of Grammar – Phrase Structure Grammar – Context Sensitive Grammar – Context Free Grammar – Regular Grammar – Languages Generated by these Grammars.

**Unit V:** Automata -Definition – Deterministic Automation – Non-Deterministic Automates – Conversion of NDFSA to DFSA- Pushdown automata.

### Text Book:

1. **J.P.Tremblay, R. Manohar** – “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw – Hill Edition 1997. **(Ref) Murukesan from Kovai**  
Unit I- Chapter :1- 1-1,1-2:1-2.1 to 1-2.11.  
Unit II-Chapter :1-3.1 to 1-3.4  
Unit III- Chapter: 1-4.1to 1- 4.3 .1-5 to1-5.4,1-6:1-6.1 -1-6.4
2. **Dr.Rani Siromoney, Formal Languages and Automata, The Christian Literature Society, Revised Edition 1979.**  
Unit IV-Chapter2 : 2.1 to 2.6  
Unit V-Chapter 5: 5.1 and Chapter 6

### Reference Books:

1. **B.S.Vatssa**, “Discrete Mathematics”, WISHWA PRAKASHAN, 1993.
2. **V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan**, “Discrete Mathematics”, A.Rd.Publications, 1998.
3. **T.Veerarajan**, “Discrete Mathematics”, McGraw Hill Education (India) Pvt.Ltd, New Delhi, 2014.

## Semester IV

UMTN42

MATHEMATICAL APTITUDE

2 Hours / 2 Credits

### *Objectives*

- *To impart skills in numerical and quantitative techniques.*
- *able to critically evaluate various real life situations by resorting to Analysis of key issues and factors.*
- *able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.*

**Unit I :** Numbers – HCF – LCM – Problems on numbers. (Chapters 1, 2 & 7)

**Unit II :** Decimal Fractions and Simplification. (Chapter 3 & 4)

**Unit III :** Surds and Indices – Percentage – Profit and Loss. (Chapters 9, 10 & 11)

**Unit IV:** Ratio and Proportion – Partnership – Allegation or Mixture. (Chapters 12, 13 & 20)

**Unit V :** Average – Problems on Age. (Chapters 6 & 8)

### **Text Book:**

**R.S.Aggarwal**, Scope and treatment as in “Quantitative Aptitude” , S.Chand & Company Ltd., Ram Nagar, New Delhi -2007.

## Semester IV

UMTS42

ASTRONOMY-II

2 Hours / 2 Credits

### *Objectives*

- *Learnre able to knowledge about the Earth's pole, it is counterclockwise rotation.*
- *Knowledge of equation of Time, seasons from earth rotation*
- *Calculation to prepar calender and conservation of Time.*
- *It applies mathematics, physics, and chemistry.*

**Unit I:** The zones of earth –to trace the variations in the durations of day and night during the year at different stations –to find the duration of perpetual day in a place of latitude – to find analytically the conditions for perpetual day and night –Terrestrial latitudes and longitudes – Phenomena depending on the change of latitudes and longitudes-Date line – Shape of Earth – Geographical and geocentric latitudes of a place – to find the reduction of latitude –Ellipicity – to prove that reduction of latitude is  $c \sin 2\phi$ - to find the geocentric distance of a station of geographical latitude  $\phi$  - to find the radius of curvature of the earth at a station of geographical latitude  $\phi$  - Geographical and Nautical mile.

**Unit II:** Radius of earth – Another method to determine the radius of earth -arguments in favour of earth's rotation- experimental proofs for the rotation of earthDip of Horizon –to find a expression for Dip.

**Unit III:** To find the distance between two mountains whose tops are just visible from each other – Effects of Dip- to find the acceleration in the time of rising of a star due to dip-Twilight –to find the duration of twilight- to find the condition that twilight may last throughout night –to find the number of consecutive nights having twilight throughout night – to find the duration of twilight when it is shortest- civil, nautical and astronomical twilights.

**Unit IV:** Equation of time: Introduction- Dynamical mean sun- equation of time – analytical expression for the equation of time –effect of equation of time on the lengths of morning and evening-to prove that the equation of time vanishes four times a year –seasons –causes of seasons.

**Unit V:** Calendar:Different kinds of year –civil year, Julian calendar – Gregorian calendar – Julian date –Besselian year -Conversion of Time: Relation between sidereal and mean times –to convert mean solar time into sidereal time - to convert sidereal time into mean solar time – to find the sidereal time at a given instant of mean solar time on a given date at Greenwich – to find the mean time corresponding to a given instant of sidereal time at Greenwich – the difference between local times – to find the sidereal time from local mean time for a given place- to find the

mean time from the sidereal time for a given place- given the right ascensions of a star and the mean sun, to find the mean time of transit of the star.

**Text Book:**

**S.Kumaravelu and Susheela Kumaravelu** , Astronomy for degree classes, Rainbow Printers, Nagarcoil,2005.

Unit I : Chapter III: Subsection 87 -101

Unit II : Chapter III: Subsection 102 -107.

Unit III : Chapter III: Subsection 108-116

Unit IV : Chapter VII: Subsection 166- 170 and 172-174

Unit V : Chapter VII: Subsection 175- 184 and 186- 189.

**Reference Book:**

**Prophet Muhammad**, “Astronomy: Supplemental Guide”, Core Knowledge Foundation,2013

## Semester V

UMTT51

ABSTRACT ALGEBRA

5 Hours / 4 Credits

### *Objectives*

- *To provide some knowledge about various algebraic structures.*
- *recognize the basic properties of groups and subgroups.*
- *understand the types of homomorphism and use them to classify groups.*
- *apply the theorems to study the structure of groups.*
- *recognize the basic properties of rings, fields and integral domains.*
- *using the algebraic methods for solving problems.*

**Unit I:** Groups – Definition and Examples – Elementary Properties of a Group Quaternion group Groups of symmetries - Order of an Element.

**Unit II:** Subgroups – Homomorphism- Cayley’s Theorem - Group of Permutation - Cyclic Groups- Automorphism .

**Unit III:** Cosets and Lagranges Theorem – Normal Subgroups and Quotient Groups- Fundamental theorem of homomorphism.

**Unit IV:** Rings-Definitions and Examples - Elementary properties of rings – division rings and fields Ordered integral domain –subring and sub field-prime fields.

**Unit V:** Homomorphism of rings and their types- Ideals – Quotient structure and Isomorphism theorems- Maximal and Prime Ideals-Field of quotient of an integral domain.

### **Text Book:**

**T.K.Manickavasagampillai and Narayanan** , “Modern Algebra” volume I & II Viswanathan printers and publishers Pvt Ltd., Edition 1982.

Unit I- Chapter 6 – 6.1 to 6.2

Unit II- Chapter 6 – 6.3 to 6.7

Unit III- Chapter 6 – 6.8 to 6.10

Unit IV- Chapter 7 – 7.1 to 7.4

Unit V- Chapter 7 – 7.5 to 7.9

### **Reference Books:**

1. **Arumugam S and Thangapandi Issac** ,” Modern Algebra”, SCITECH Publications, Chennai, Edition 2003.
2. **A.R.Vasishtha**, “Modern Algebra”, Krishna Prakashan Mandir, Meerut, 1994 – 95.

**Objectives**

- Understand the basic concepts of sets
- To provide knowledge about Metric Spaces
- The learner will acquire knowledge of open/closed sets and its properties
- The learner will acquire knowledge of Continuity, Connectedness, and Compactness and apply theorem

**Unit I:** Countable and Uncountable sets- Inequalities of Holder and Minkowski- Metric spaces- Definition and Examples-Bounded set in a metric spaces- Open balls in a metric spaces- open sets-subspaces- Interior of a set.

**Unit II:** Closed sets – Closure- Limit point- Dense sets- Complete metric space- Introduction- Completeness-Baire’s Category theorem.

**Unit III:** Continuity: Introduction- Continuity-Homeomorphism-Uniform continuity –Discontinuous function on  $\mathbb{R}$ .

**Unit IV:** Connectedness: Introduction- Definition and Examples –Connected subset of  $\mathbb{R}$  – connectedness and continuity.

**Unit V:** Compactness: Introduction- compact space –compact subset of  $\mathbb{R}$ -equivalent characterisation for compactness –Compactness and continuity.

**Text Book:**

**Arumugam S and Thangapandi Issac ,” Modern Analysis”, New gamma Publishing house , Edition 2013.**

Unit I – Chapter 1 & 2 – 1.2 to 2.6)

Unit II – Chapter 2 & 3 – 2.7 to 3.2)

Unit III – Chapter 4 – 4.1 to 4.4)

Unit IV –Chapter 5

Unit V – Chapter 6

**Reference Books:**

1. **Walter Rudin**, “Principles of Mathematical Analysis”, McGraw-Hill International. Editions (3<sup>rd</sup>) – 1976.
2. **V.Karunakaran**, “Real Analysis”, Pearson Publications, Edition-2012.
3. **Appostol**, “Mathematical Analysis”, Narosa Publishing House-Second Edition-2002.

## Semester V

UMTT53

OPERATIONS RESEARCH – I

5 Hours / 4 Credits

### Objectives

- To impart the basic concepts and applications of linear programming.
- The learner will formulate a linear programming problem and solve them graphically and simplex method
- The learner will be able to understand the concepts of duality programming
- The learner will analyze the different aspects of transportation problems and also assignment problems
- Students will be able to identify the basic analysis of various inventory models.
- The learner will develop, organize, evaluate short, long term processes and solve problems

**Unit I:** Linear Programming : Mathematical formulation of linear programming problem- Graphical solution- Simplex method - Use of Artificial Variables: – Big M Method – Two Phase Method .

**Unit II:** Degeneracy in Linear Programming – Duality - Duality Theorem – Duality and Simplex Method – Dual Simplex Method .

**Unit III:** Transportation Problem: Mathematical formulation of the problem - Finding Initial Basic Feasible Solution using North - West Corner Rule - Matrix Minima Method - Vogel's Approximation Method - Optimum solution – MODI method .

**Unit IV:** Assignment Problem: Mathematical formulation of Assignment Problem- Assignment Algorithm-Minimization case Routing problem.

**Unit V:** Inventory Control: Types of Inventories – The inventory decisions economic order quantity – Deterministic Inventory Problems: EOQ Problem with no shortages – EOQ Problem with price break – EOQ Problem with two price break – EOQ Problem with n price break.

### Text Book:

**Kantiswarup, P.K.Gupta, Manmohan**“Operations Research”, Sultanchand and sons , Edition 2000.

Unit I- Chapter 2,3,and 4 - 4.1 to 4.5  
Unit II- Chapter 5 -5.1 to 5.7  
Unit III- Chapter 10  
Unit IV- Chapter 11  
UnitV- Chapter 19 – 19.1 to 19.10,19.12

### Reference Books:

1. **J.K.Sharma**, “Operations Research”,Macmillan India Ltd. 1997.
2. **Prem Kumar Gupta, D.S. Hijra**, “Operations Research”,S. Chand & Company Ltd,2002.
3. **P.R.Vittal**, “Operations Research, Margham Publicatioons, 2002.



## Semester V

UMTT53

NUMBER THEORY

5 Hours / 4 Credits

### Objectives

- The learner will acquire knowledge of basic concepts of number theory
- The learner will become proficient in various types of functions
- The learner will be know the primitive roots
- apply the theorems to study the numbers.

**Unit I:** Well – Ordering Principle(WOP)- Principle of Finite Induction- The Division Algorithm – Basis Representation Theorem- Binomial Coefficients- Divisibility Theory : Greatest Common Divisor-Least common Multiple- Linear Diophantine Equations- Fundamental Theorem of Arithmetic - Some Question Regarding Primes.

**Unit II:** Congruences: Definition – Residue System – Test of Divisibility – Linear congruences - Solving Polynomial congruences – An Application of Congruences to Diophantine Equations - Fermat’s Little theorem –Euler’s Generalisation of  $FLT_1$  .

**Unit III:** Wilson’s Theorem- Euler’s  $\Phi$ -Function- Arithmetic Functions: The Function  $\tau$  and  $\sigma$  – The Möbius Function- Multiplicative Arithmetic Functions- Inversion Formula- Greastest Integer Function.

**Unit IV:** Primitive roots : Exponents – Primitive roots Modulo a Prime – Determination of Integers having Primitive roots – Indices – Euler’s Criterion – Legendre Symbol and its Properties – Gauss Lemma.

**Unit V:** Quadratic Reciprocity Law and its applications – Jaccobi Symbol – Perfect Numbers – Mersenne Primes-Fermat Numbers-Phythagorean Triples-Fermat’s Last Theorem.

### Text Book:

**S.B.Malik** ,” Basic Number Theory”,Second Revised Edition, Vikas Publishing House PVT LTD, 2009

Unit I – Chapter : 1&2

Unit II – Chapter Chapter : 3 , Chapter : 4 – 4.1 ,4.2

Unit III – Chapter : 4 – 4.3 , 4.4 & Chapter : 5

Unit IV – Chapter :6 ,7- 7.1 to 7.3

Unit V – Chapter : 7- 7.4 to 7.6 , Chapter : 8

### Reference Book:

1. **Ivan Niven and Herbert S Zuckerman**, “An Introduction to the theory of Numbers”, 3<sup>rd</sup> Edition, Wiley Eastern Ltd., New Delhi, 2000.

## Semester V

UMTT55

NUMERICAL METHODS

5 Hours / 4 Credits

### *Objectives*

- *To develop efficient algorithms for solving problems in Science, Engineering and Technology.*
- *The learner will analyze the different aspects of numerical solution of algebraic and transcendental equations.*
- *Students will be able to identify the basic concept of numerical differentiation and integration, principle of least squares.*
- *The learner will become knowledgeable in solving solution to simultaneous linearequations.*

**Unit I:** Solution of Algebraic and Transcendental Equations: Bisection Method – Iteration Method – Condition for Convergence-Regula Falsi Method-Newton’s Method.

**Unit II:** Solutions of simultaneous Linear Algebraic Equations: Gauss Elimination Method – Gauss Jordan Method – Method of Factorization-Gauss Jacobi – Gauss Siedel Method .

**Unit III:** Finite Differences: First and Higher Order Differences –Forward and Backward Differences –Properties of Operator - Differences of a Polynomial - Factorial Polynomials-Relation between the Operators  $\Delta$ ,  $E$  and  $D$ - Summation of the series.

**Unit IV:** Interpolation- Gregory Newton Forward and Backward Formula – Gauss Forward and Backward Formula- Stirlings Formula- Interpolation with Unequal Intervals: Divided differences- Newton’s Interpolation Formula-Lagrange’s Interpolation Inverse Interpolation.

**Unit V:** Numerical Differentiation and Integration: Newtons Forward and Backward Difference Formula - Stirlings Formule to Compute Derivatives-Trapezoidal rule- Simpsons 1/3<sup>rd</sup> and 3/8<sup>th</sup>

### **Text Book:**

**P.Kandasamy , K.Thilagavathi and K. Gunavathi**, “Numerical Methods”, S.Chand and Company Ltd , New Delhi 2013.

Unit I – Chapter 3 -3.1 to 3.4

Unit II – Chapter 4 -4.1 ,4.2,4.4,4.7 to 4.9

Unit III – Chapter 5- 5.1 to5.4,5.7

Unit IV –Chapter 6, 7 -7.1 to 7.5 & 8

Unit V – Chapter 9

### **Reference Books:**

1. **Arumuga, Issac, Somasundaram**,”Numerical Analysis”, New Gamma Publishing House, Palayam Kottai 2003.
2. **G. Balaji**, “Numerical Methods”, G.Balaji Publishers, Chennai 2007.

## Semester V

UMTE53

### PROGRAMMING IN C

3 Hours / 3 Credits

#### Objectives

- To develop programming skills in C and its object oriented concepts.
- The learner will become proficient in object oriented programming concept and proficient in C tokens
- Proficient in C operators , class declaration and definition and its objects
- Proficient in conditional statements and loop concept

**Unit I:** Overview of C :Importance of C - Sample C Programs - Basic structure of C program- Programming style - Executing a C Program.Constants, Variables and Data types : – Character set – C tokens – Keywords and Identifiers – Constants – Variables – Data types – Declaration of Variables – Assigning Values to Variables – Defining Symbolic Constants.

**Unit II:** Operators and Expression : Arithmetic of Operators – Relational Operators – Logical Operators – Assignment Operators- Increment and decrement Operators – Conditional Operator – Bitwise Operators- 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 III:** Managing Input and Output Operations: Reading a Character – Writing a Character – Formatted Input – Formatted Output.

**Unit IV:** 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.

**Unit V:** Decision Making and Looping : The WHILE statement – The DO statement – The FOR statement – Jumps in loops.

#### Text Book:

**E.Balagurusamy**, “Programming in ANSI C” , 4<sup>th</sup> Edition , Tata McGraw- Hill Publishing Company Ltd., New Delhi, Ninth Reprint 2009.

Unit I – Chapter 1&2

Unit II – Chapter 3

Unit III – Chapter 4

UnitIV–Chapter

5

Unit V – Chapter 6

#### Reference Books:

1. **Kris A.Jamsa**, “ Programming in C”, Gazlgotia Publication, New Delhi 1990.
2. **V.Rajaraman**, “Computer Programming in C”, Prentice Hall of India, New Delhi, 1994.
3. **Stephen .G Kochan**, “ Programming in C”, CBS Publishers, New Delhi, 1991.

## Semester V

UMTS53      MATHEMATICAL APTITUDE

2 Hours / 2 Credits

### *Objectives*

- *To impart skills in numerical and quantitative techniques.*
- *able to critically evaluate various real life situations by resorting to Analysis of key issues and factors.*
- *proficient in applying graphs, charts and probability techniques on various problems.*
- *proficient in the problems on relations, coding and decoding.*
- *able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.*
- *able to do fast calculation.*

**Unit I:** Problems on Ages-Time and Work-Time and Distance- Problems on Trains

**Unit II:** Permutation and Combination-Odd Man out Series

**Unit III:** Coding-Decoding- puzzle test .

**Unit IV:** Direction sense test –Logical venn diagrams.

**Unit V:** Logic- Statement – Assumptions-Arguments- Statements-Conclusion-Deriving conclusion from passages.

### **Text Books:**

1. **R.S.Agarwal**, “Quantitative Aptitude For Competitive exams” 7 th revised edition
  2. **R.S.Agarwal**,”A Modern Approach to Verbal and Non-verbal Reasoning “3 th revised edition
- Unit I- TB1: Chapter 8,15,17,&18  
Unit II- TB1:Chapter 30&35  
Unit III- TB2:Part I-Section I-Chapter 4&6  
Unit IV- TB2:Part I-Section I-Chapter 7&9  
Unit V- TB2:Part I-Section I-Chapter 1,2,3,5&6

## Semester VI

UMTT61

LINEAR ALGEBRA

5 Hours / 4 Credits

### Objectives

- *To introduce the fundamentals of Vector spaces.*
- *recognize the basic properties of vector spaces*
- *understand the concepts of linear algebra in geometric point of view*
- *visualize linear transformations as a matrix form*
- *formulate the importance and applications of linear algebra in many branches of mathematics*

**Unit I:** Vector spaces: Definition and examples – Properties of vector space-Linear combination –linear span – linear dependence and independence .

**Unit II:** Basis and Dimension – Quotient space – Isomorphism of vector spaces –Direct sums.

**Unit III:** Matrix of a linear transformation - Rank and nullity of a Linear transformation-characteristic equation of a matrix- Matrix Polynomial – Elementary matrix and transformations.

**Unit IV:** Row rank ,column rank and rank of a matrix-Row space and column space – linear equation –consistency of equation – non homogeneous linear system.

**Unit V:** Similar and Congruvant matrices-Inner product spaces : Definition and examples – Orthogonality –Orthogonalization - Orthogonal complement

### Text Book:

**T.K.Manickavasagampillai and Narayanan** , “Modern Algebra”volume II Viswanathan printers and publishers Pvt Ltd., Edition 1982.

Unit I- Chapter 8 -8.1 to 8.5

Unit II- Chapter 8 -8.6 to 8.10

Unit III- Chapter 8 -8.14 to 8.18

Unit IV- Chapter 8 -8.20 ,8.21

Unit V-Chapter 8 -8.22 to 8.24

### Reference Books:

1. **Arumugam S and Thangapandi Issac** ,” Modern Algebra”, SCITECH Publications, Chennai, Edition 2003.
2. **A.R.Vasishtha**, “Modern Algebra”, Krishna Prakashan Mandir, Meerut, 1994 – 95

## Semester VI

UMTT62

COMPLEX ANALYSIS

5 Hours / 4 Credits

### Objectives

- To introduce the concepts of complex numbers and analytic functions.
- The learner will acquire basic concepts of analytic function and its properties
- The learner will acquire basic knowledge about conformal and bilinear transformation
- The learner will gain knowledge of integration of complex valued function
- The learner will become proficient in series of analytic function
- The learner will acquire skills of finding integral values of complex function using residues

**Unit I:** Analytic functions – Cauchy-Riemann equations – Sufficient conditions – Harmonic functions – Cauchy- Riemann equations in polar co-ordinates – Milne Thomson’s method. - Conformal Mapping- Bilinear Transformation.

**Unit II :** Complex integration – Cauchy’s integral theorem – Cauchy’s integral formula – Derivatives of analytic functions – Morera’s theorem – Cauchy’s inequality – Liouville’s theorem – Fundamental theorem of algebra

**Unit III :**Expansion of functions in power series– Taylor’s theorem – Taylor’s series and Laurent’s series

**Unit IV :**Zero s of an analytic function-singular points - essential singularity - study of the function for the infinite value of Z- Argument Principle – Rouché’s theorem - Fundamental theorem of algebra

**Unit V :** Calculus of Residues – Introduction- Residues - Cauchy’s Residue Theorem - evaluation of definite integrals .

### Text Book:

**Arumugam S and Thangapandi Issac ,**” Complex Analysis”, Scitech Publication pvt ltd, Edition 2014.

Unit I – Chapter 2&3

Unit II – Chapter 6

Unit III – Chapter 7 -7.0 to 7.2

Unit IV – Chapter 7 -7.3 ,7.4

Unit V – Chapter 8

### Reference Books:

- 1.Santhinarayan, “Theory of functions of Complex Variable’, S.Chand and Company, Meerut,1995.
2. T.K.M.Pillay, Dr.S.P.Rajagopalan & Dr.R.S. Sattanathan,”Complex Analusis”, S. Viswanathan (Printers & Publisers),Pvt.Ltd. Revised Edition 2007 Reprint 2013.
3. Lars V Ahlfors “Complex Analysis” McGraw – Hill Kogakusha, Ltd. 3<sup>rd</sup> Edition, 1999.

## Semester VI

UMTT63

OPERATIONS RESEARCH - II

5 Hours / 4 Credits

### Objectives

- To impart mathematical modeling skills through operations research techniques.
- The learner will become proficient in sequence modeling and processes in mathematics and engineering.
- The learner will acquire the knowledge of Simulation
- The learner will acquire the knowledge of basics in game theory and replacement problems
- The learner will become to understand the role and application of PERT/CPM for project scheduling.

**Unit I:** Sequencing models and related problems: Sequencing Problems- assumption in Sequencing Problems – processing n jobs through one machine - processing n jobs through two machines - processing n jobs through three machines - processing 2 jobs through m machines - processing n jobs through m machines – solution of complicated Sequencing Problems- problems related to sequencing(routing problem in networks) – minimal path problem(shortest acyclic route models).

**Unit II:** Simulation: Introduction-when to use Simulation?- what is Simulation?- advantage of the Simulation technique- limitation of the Simulation- application of Simulation- Monte Carlo Simulation – generation of random numbers – Simulation languages.

**Unit III:** Theory of Games: Two person zero sum game-The maximin and minimax principle- Games without saddle points-Mixed strategies-Dominance property-solution of 2×2 rectangle game- Graphical Method.

**Unit IV:** Replacement Problem: Replace problem and System Reliability – Replacement of Equipment that Deteriorates Gradually- Replacement of Equipment that Fails Suddenly.

**Unit V:** Network Scheduling by PERT/CPM: Introduction network and Basic Components- Rules of Construction – Critical Path Analysis – Probability Considerations in PERT – Distinction between PERT and CPM.

### Text Book:

Kantiswarup, Gupta, P.K.Manmohan, “**Operations Research**” , Sultanchand and sons Edition 2002 ,Reprint 2017.

Unit I – Chapter 12

Unit II – Chapter 22

Unit III – Chapter 17

Unit IV – Chapter 18

Unit V – Chapter 25

### Reference Books:

1. P.K.Gupta and D.Shira, **OPERATIONS RESEARCH** (S.Chand and Company Ltd New Delhi-.1992, Reprint 1994.
2. Taha H.A. ,**OPERATIONS RESEARCH** , “An introduction Prentice Hall of India Private Ltd 1<sup>st</sup> Edition New Delhi (2008) .

## Semester VI

UMTT64

### GRAPH THEORY

5 Hours / 4 Credits

#### *Objectives*

- To acquire knowledge of different types of graphs.
- To understand different Models of a graph
- To understand how to solve different real life problems
- To understand many techniques to solve a particular problem
- To understand directed graphs.

**Unit I:** Graphs –Pictorial representation- subgraphs-Isomorphism and degrees- Walks and connected graphs- cycles in graphs –cut –vertices and cut edges.

**Unit II:** Eulerian and Hamiltonian graphs:Eulerian graphs - Fleury’s Algorithm - Hamiltonian Graphs – Weighted graphs.

**Unit III:** Bipartite Graphs: Bipartite graphs-Marriage problem-trees.Matrix representations.

**Unit IV:** Planar Graphs: Planer graphs- Euler’s Formula –Platonic solids-Dual of a plane graphs-Characterization of planer graphs.

**Unit V:** Directed Graphs:Directed graphs-Connectivity in diagraphs-Strong orientation of graphs-Eulerian digraphs-Tournaments.

#### **Text Book:**

**S.A.Choudum**, “A first Course in Graph Theory”, Macmillan india limited,1999.

Unit I: Chapter 1

Unit II: Chapter 2

Unit III: Chapter 3 -3.1 to 3.3 &4-4.1

Unit IV: Chapter 5

Unit V: Chapter 7

#### **Reference books:**

**1.Arumugam S and Thangapandi Issac** ,” Graph theory”, Scitech Publication pvt ltd, Edition 2014.

**2. S.A.Choudum**, “A first Course in Graph Theory”, Macmillan india limited,2007.



## Semester VI

UMTT65

**FUZZY SETS AND FUZZY NUMBERS**

**5 Hours / 4 Credits**

### **Objectives**

- *recognize the concept of fuzzy sets and its properties.*
- *distinguish fuzzy sets from crisp sets.*
- *perform various types on fuzzy sets.*
- *understand the fuzzy numbers and fuzzy Lattice relations.*

**Unit I:** From classical (crisp) sets to Fuzzy sets – Introduction – Crisp sets: An overview – Fuzzy sets: Basic types - Fuzzy sets: Basic concepts.

**Unit II :** Fuzzy sets vs Crisp sets: Additional properties of  $\alpha(\alpha)$ -cuts – Representations of fuzzy sets- Extension Principle for fuzzy sets.

**Unit III :** Operations on fuzzy sets : Types of operations – Fuzzy complements- Fuzzy intersections:  $t$  – Norms- Fuzzy unions :  $t$  – Conorms - Combinations of operations.

**Unit IV :** Aggregation operations - Fuzzy Numbers – Linguistic Variables-Arithmetic Operations on Intervals - Arithmetic Operations on Fuzzy numbers.

**Unit V :** Lattice of Fuzzy numbers - Fuzzy equations- Crisp vs Fuzzy Relations – Projections and Cylindric Extension – binary Fuzzy Relations – Binary Relations on a Single Set- Fuzzy Equivalence Relations.

### **Text Book :**

**George J. Klir / Bo Yuan, Fuzzy sets and Fuzzy Logic, Theory and Applications,** Prentice Hall of India Pvt. Ltd., New Delhi, 2008.

Unit – I : Chapter 1: Sections 1.1 – 1.4

Unit – II : Chapter 2: Sections 2.1 - 2.3

Unit – III: Chapter 3: Sections 3.1 - 3.5

Unit – IV: Chapter 3: Sections 3.6 and Chapter 4: Sections 4.1 -4.4

Unit – V : Chapter 4: Sections 4.6 and Chapter 5: Sections 5.1 – 5.5

### **Reference Book:**

1. George J. Klir & Tina A. Folger “Fuzzy Sets, Uncertainty & Information” PHI Learning Private Limited, 2012.
2. D. Driankov, Hellendoorn & M. Reinfrank “An Introduction to Fuzzy Control” Narosa Publishing House, Reprint 2001.

## Semester VI

UMTE64

PROGRAMMING IN C++

3 Hours / 3 Credits

### *Objectives*

- *To develop programming skills in C++ and its object oriented concepts.*
- *The learner will become proficient in object oriented programming concept and proficient in C++ tokens*
- *Proficient in C++ operators*
- *Proficient in C++ class declaration and definition and its objects*
- *Proficient in constructors, destructors*

**Unit I:** Principles of Object- Oriented Programming: Software crisis – Software evolution – A look at procedure-oriented programming – Object oriented programming paradigm – Basic concept of Object -oriented programming – Benefits of OOP – Object Oriented Languages – Applications of OOP.

**Unit II:** Tokens, Expressions and Control Structures: Introduction – Tokens – Keywords – Identifiers and constants – Basic data types – User Defined data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables – Reference variables – Operators in C++ - Scope resolution operator – Member Dereferencing operators - Memory management operators – Manipulators – Type cast operator – Expressions and their Types – Special assignment expressions – Implicit conversions – Operator overloading – Operator precedence – Control structures.

**Unit III:** Functions in C++: Introduction – The main function – Function prototyping – Call by reference – Return by reference- Inline functions – Default arguments – Constant arguments – Function overloading – Friend and Virtual Functions – Math Library functions. Managing Console I/O operations Introduction – C++ streams - C++ stream classes – Unformatted I/O operations – Formatted Console I/O operations – Managing Output with Manipulators.

**Unit IV:** Classes and Objects: Introduction – C Structures Revisited – Specifying a Class – Defining Member Functions – A C++ program with class – Making an Outside Function Inline – Nesting of Member Functions – Private Member Functions – Arrays within a class – Memory Allocation for Objects.

**Unit V:** Constructors and Destructors: Introduction – Constructors – Parameterized Constructors – Multiple constructors in a Class – Constructors with Default Arguments – Dynamic Initializations of objects – Copy Constructor-Destructors .

**Text Book:**

**E.Balaguruswamy**, “Object - Oriented Programming with C++”, Tata McGraw Hill Education Private Limited, New Delhi, Tenth Reprint 2010.

Unit I – Chapter 1 & 2

Unit II – Chapter 3

Unit III -Chapter 4 & 10

Unit IV – Chapter 5-5.1 to 5.10

Unit V – Chapter 6-6.1 to 6.7,6.11`

**Reference Books:**

1. **Ashok N.Kamthane**, “Object Oriented Programming with ANSI and TURBO C++”, Pearson Education (P) Ltd, 2003.
2. **Bjarne Stroustrup**, “ The C++ Programming Language”, AT & T Labs, Murray Hill, New Jersey, 1998.

## Semester VI

UMTS64

NUMERICAL METHODS LAB USING C++

2 Hours / 2 Credits

1. Write a Program to find the Smallest positive / Largest negative root using simple iteration method
2. Write a Program to find the Smallest positive / Negative root using Regula Falsi method.
3. Write a Program to find the Smallest positive / Negative root using Newton-Raphson's method.
4. Write a Program to find the solution of system of equation using Gauss Jacobi method..
5. Write a Program to find the Matrix inversion using Gauss Jordan method
6. Write a Program to interpolate y for given x from the given sets of values of x and y by Newton's forward method.
7. Write a Program to find interpolate y for given x from the given sets of values of x and y by Newton's backward method.
8. Write a Program to find interpolate y using the Lagrange's method
9. Write a Program to derivative at initial point by Newton's forward method
10. Write a Program to integration using Trapezoidal & Simpson's method

### Text Book:

1. **T.VEERARAJAN & T.RAMACHANDRAN**, "Theory and Problems in Numerical Methods with Programs in C and C++", Tata McGraw Hill Publishing Company Ltd, 2004.

**B.Sc. Physics / Chemistry**

**Semester I**

**ANCILLARY MATHEMATICS I**

**5 Hours/ 4 credits**

***Objectives***

- *The learner will become proficient in expansion and summation of function*
- *The learner will acquire knowledge of solving problems in matrices*
- *The learner will be capable of solving the interpolation problems.*
- *The learner will gain knowledge of trigonometric functions and related problems*
- *The learner will become proficient in various types of hyperbolic functions*

**Unit I:** Partial Fractions : Binomial Theorem : The General Term – Expansion of Rational Fractions – Summation of Series. Exponential Theorem: Summation of Series, The Logarithmic Series

**Unit II:** Theory of Equations: Fundamental Theorem of Algebra – Symmetric Function of Roots – Relation between Roots and Coefficient of Equation – Formation of Equation – Diminish the Roots of the Equation – Reciprocal Equation. Newton- Raphson Method.

**Unit III:** Matrices: Fundamental Concepts :Special Types of Matrices –Addition and Subtraction of Matrices – Matrix Multiplication – Associated Matrices.Rank of a Matrix: Elementary Operations or Transformation. Linear Equations: Homogeneous linear Equation – Non-Homogeneous Equation Characteristic Roots and Vectors: Eigen Value and Eigen Vectors – Properties of the Eigen Vectors – Cayley-Hamilton theorem.

**Unit IV:** Interpolations: Newton’s Forward Method - Newton’s Backward Method- Lagrange’s Interpolation Formula: Different form of Lagrange’s Interpolation Formula.

**Unit V:** Trigonometry: Expansions:  $\cos^n \theta$  ,  $\sin^n \theta$  –  $\cos n\theta$  and  $\sin n\theta$  –Expansion of  $\sin \theta$  ,  $\cos \theta$  and  $\tan \theta$  in powers of  $\theta$ . Hyperbolic Function: Relation between Hyperbolic Functions and Circular Functions – Periods of Hyperbolic Functions – Inverse Hyperbolic Functions. Logarithm of Complex Quantities.

**Text Book:**

1. **P.Kandasamy, K.Thilagavathy**, “Allied Mathematics Paper I”, 1<sup>st</sup> Semester, S. Chand Publishing . A Division of S. Chand & Company Pvt. Ltd, Edition 2013.

**Semester II**  
**ANCILLARY MATHEMATICS II**

**5 Hours /4 Credits**

**Objectives**

- *To learn methods of integration and properties and its solving related problems.*
- *Understand the basic concepts of first order differential equation and its applications.*
- *Find solutions by applying Laplace transform methods.*
- *Vectors and its product and its integrations.*

**Unit I:** Methods of Integration: Standard Results – Integration by Substitution – Definite Integral – Types of Integrals (I &II).

**Unit II:** Properties of Definite Integrals: Theorems, Reduction Formula: Theorems & Problems.

**Unit III:** Ordinary Differential Equations: Equation of First Order and of a Degree Higher than one - Equations Solvable for P - Equations Solvable for X - Equations Solvable for Y.

**Unit IV:** Laplace Transformation: Definition – Laplace Transform for Standard Functions – Linear Properties – First Shifting Theorem.

**Unit V:** Vector Analysis: Differentiation of Vectors – Gradient – Divergence and Curl – Integration of Vectors.

**Text Book:**

1. **P.Kandasamy and K.Thilagavathy.** “Allied Mathematics Paper II”, 2<sup>nd</sup> Semester .  
S. Chand Publishing, A Division of S. Chand & Company Pvt. Ltd, Edition 2013.

**MOTHER TERESA WOMEN'S UNIVERSITY**  
**KODAIKANAL – 624 101.**

**CHOICE BASE CREDIT SYSTEM (CBCS)**

**Syllabus for candidates admitted from 2018 – 2019**

**Course Name: B.Sc Physics**

Eligibility: Science Students with mathematics at the higher secondary level.

S. No	Paper Code	Course Title	Credits	Hour	Continuous Internal Assessment (CIS)	End Semester Exam (ESE)	Total
<b>SEMESTER-I</b>							
1	ULTA11	Part I - Tamil	3	6	25	75	100
2	ULEN11	Part II- English	3	6	25	75	100
3	UPHT11	Core I Properties of Matter	4	5	25	75	100
4	UPHT12	Core II Thermal Physics	4	5	25	75	100
5	UPHA11	Allied Mathematics I	4	5	25	75	100
6	UVAE11	Value education	3	3	25	75	100
		<b>Total</b>	<b>21</b>	<b>30</b>			600
<b>SEMESTER II</b>							
7	ULTA22	Part I Tamil	3	6	25	75	100
8	ULEN22	Part II English	3	6	25	75	100
9	UPHT21	Core III Electricity and Electromagnetism	4	6	25	75	100
10	UPHP21	Core Practical I	4	5	25	75	100
11	UPHA22	Allied Mathematics II	4	5	25	75	100
12	UEVS21	Environmental Studies	2	2	25	75	100
		<b>Total</b>	<b>20</b>	<b>30</b>			600
<b>SEMESTER III</b>							
13	ULTA33	Part I Tamil	3	6	25	75	100
14	ULEN33	Part II English	3	6	25	75	100
15	UPHT31	Core IV Mathematical Physics	4	5	25	75	100
16	UPHA33	Allied chemistry paper	4	5	25	75	100

17	UPHE31	Elective paper I Fiber optics	3	4	25	75	100
18	UPHS31	SBE I	2	2	25	75	100
19	UPHN31	ONME I	2	2	25	75	100
		<b>Total</b>	<b>21</b>	<b>30</b>			700
<b>SEMESTER IV</b>							
20	ULTA44	Part I Tamil	3	6	25	75	100
21	ULEN44	Part II English	3	6	25	75	100
22	UPHT41	Core V Solid State Physics	4	4	25	75	100
23	UPHP42	Core Practical II	4	4	25	75	100
24	UPHA41	Allied Practical	4	4	25	75	100
25	UPHE42	Elective-II-Solar thermal and renewable energy systems	3	3	25	75	100
26	UPHS42	Skill based Elective courses II	2	2			
27	UPHN42	ONME II	2	2	25	75	100
		<b>Total</b>	<b>25</b>	<b>30</b>			800
<b>SEMESTER V</b>							
28	UPHT51	Core VI Electronics I	4	5	25	75	100
29	UPHT52	Core VII Classical Mechanics	4	5	25	75	100
30	UPHT53	Core VIII Quantum Physics	4	5	25	75	100
31	UPHT54	Core IX-Laser Physics	4	5	25	75	100
32	UPHT55	Core X Optics and Spectroscopy	4	5	25	75	100
33	UPHE53	Elective-III-Medical Physics	3	3	25	75	100
34	UPHS53	SBE III	2	2	25	75	100
		<b>Total</b>	<b>25</b>	<b>30</b>			700
<b>SEMESTER VI</b>							
35	UPHT61	Core XI Digital Electronics	4	5	25	75	100
36	UPHT62	Core XII Nuclear Physics	4	5	25	75	100
37	UPHT63	Core XIII Atomic Physics	4	5	25	75	100
38	UPHP63	Core Practical III (Non Electronics)	4	5	25	75	100
39	UPHP64	Core Practical IV	4	5	25	75	100



		(Electronics)					
40	UPHE64	Elective IV Astrophysics	3	3	25	75	100
41	UPHS64	SBE IV	2	2	25	75	100
42	UEAS61	Extension Activity	-	2	25	75	100
		<b>Total</b>	<b>28</b>	<b>30</b>			800
	<b>Total Credits</b>		<b>140</b>		<b>4200</b>		

## EVALUATION SCHEME

### INTERNAL

#### **THEORY: Test: 20 Marks**

(Three theory tests should be conducted and average of best two should be taken into account)

Seminar – Assignment – Attendance – 5 Marks

Total: 25 Marks

Practical: Test – 10 Marks

(Three Practical tests should be conducted and average of best two should be taken in to account)

Observation Notebook: 10 Marks

Attendance and Performance in the laboratory – 5 Marks

Total – 25 Marks

### EXTERNAL

Theory Question Pattern

Section – A

(Answer any ten out of 16 questions (open choice) each questions carries two marks)

(10X2 = 20 marks)

Section – B

(Answer any 5 out of 8 questions, each questions carries five marks) (5X5 =25 marks)

(open choice)

Section – C

Answer all the three questions, each questions carries ten marks) (3X10 =30) either

(a) or (b) type questions)

External Practical – 75

Theory - 25+75

Practical - 25+75

## SEMESTER –I

UPHT11

PROPERTIES OF MATTER

5 Hours/4 Credits

### Objectives:

1. To refresh the knowledge of undergraduate students on fundamental properties of matter.
2. Conceptual understanding of gravitation, elasticity, viscosity and diffusion.
3. Determination of various physical quantities related to matter.
4. Students will be able to apply theoretical concepts to solve numerical and practical based problems.

### Unit – I

#### Acceleration due to gravity

Acceleration due to gravity – The simple pendulum- Borda's pendulum Compound Pendulum – Interchangeability of the Centre of suspension and oscillation – Centre of Percussion – other points. Variation of the value of  $g$  at sea- Local changes in the value of  $g$ .

### Unit II

#### Gravitation

Historical – Kepler's laws- Note on Newton's deductions from Kepler's laws- Newton's Law of Gravitation – Determination of the gravitational constant – Density of the Earth- Qualities of Gravitation- Law of Gravitation and theory of relativity –Gravitational field- Intensity of the field – Gravitational potential – Potential energy – Gravitational potential at a point distant  $r$  from a body of mass –  $m$ - Velocity of escape – Equipotential Surface - Potential at a point outside and inside a Spherical Shell.

### Unit III

#### Elasticity

Introductory- Stress and strain – Hook's law- Three types of elasticity – Equivalence of a shear to a compression and an extension at right angles to each other- Shearing and an extension at right angles to each other- Shearing stress equivalent to an equal linear stress and an equal compression stress at right angles to each other- Work done in unit volume in a strain- Deformation of a cube- Bulk Modulus- Modulus rigidity Young's Modulus- Relation connecting the elastic constant – Poisson's ratio – Determination of Young's modulus- Determination of Poisson's ratio for rubber.

### Unit IV

#### Flow of Liquids – Viscosity

Rate of flow of liquid – lines and tubes of flow- energy of the liquid – Bernoulli's theorem and its important applications Viscosity – Coefficient of viscosity – Fugitive elasticity – Critical Velocity – Poiseuille's equation for flow of liquid through a tube –Determination of coefficient of viscosity of

a liquid – Stoke's Method – Rotation Viscometer – Variation of viscosity of a liquid with temperature Comparison of viscosities – Ostwald Viscometer.

## **Unit V**

### **Diffusion and Osmosis**

Diffusion – Fick's law – relation between time of diffusion and length of column. Experimental measurement of diffusivity – Graham's law for diffusion of gases – Effusion – Transpiration and Transfusion and Osmotic pressure – Laws of Osmotic Pressure Kinetic theory of solutions – Osmosis and Vapor pressure of a solution – Osmosis and boiling point of a solution. Osmosis and freezing point of a solution.

### **Books for study**

1. Elements of Properties of Matter D.S. Mathur

Unit I – Chapter – VI

Unit II – Chapter – VII

Unit III – Chapter – VIII

Unit IV – Chapter – XII

Unit V – Chapter – XIII

### **Books for Reference:**

1. Mechanics – Prof. D.S Mathur. Revised by : Dr. P.S. Hemne. S. Chand and Co. New Delhi. First edition 1981, Reprint 2015

2. Properties of matter – Brij Lal and Subramanyam. Eurasia publishing house (pvt.) LTD. New Delhi. Sixth Edition 1991.

## SEMESTER –I

UPHT12

THERMAL PHYSICS

5 Hours/4 Credits

### Objectives:

1. This course aims to study the response of gases, liquids and solids to heat both at the macroscopic and at the microscope level.
2. They will learn basic concepts of heat conduction and famous laws of thermodynamics.
3. Low temperature physics and superconductivity will be introduced to them.
4. Students will be able to apply theoretical concepts in performing thermal conductivity experiments.

### Unit- I

#### Kinetic theory of Gases

Derivation of ideal gas equation- degrees of freedom- Maxwell's law of equi-partition energy- Ratio of specific heat capacities- Maxwell's Law of distribution of molecular velocities- Experimental verification- Mean free path – Transport phenomena – Diffusion viscosity and Thermal conduction of gases.

### Unit – II

#### Transmission of heat conduction

Conduction Co-efficient of thermal conductivity- cylindrical flow of heat – K of rubber-K of bad conductor – Lee's disc method. Blank body – Stefan's law – Experimental determinations of Stefan's constant – Mathematical derivation of Stefan's constant – Solar constant temperature of the sun – solar spectrum

### Unit III

#### Thermodynamics

I law of thermodynamics – gas equation during an adiabatic process determined by Clement and Desorme's method.

II Law of thermodynamics and entropy – Change of entropy in reversible and irreversible process- Maxwell's thermodynamical relations- Application to Joule Kelvin effect – Claudius Claperyron equation.

### Unit IV

#### Low temperature Physics

Joule Kelvin effect – Simple theory of porous plug experimental adiabatic demagnetization – Curie's Law – Giauque's method- Superconductivity.

### Unit V

## **Calorimetry**

$C_v$  and  $C_p$  of a gas Meyer's relation experimental determination of  $C_v$  by expand method – specific heat of gas by Calender Barn's method.

### **Books for study**

1. Heat and Thermodynamics – D.S. Mathur, Sultan Chand & Sons – Tb, 2014

### **Books for reference**

1. Thermal Physics – A.B.Gupta and H.P. Roy- Books and Allied PVT Ltd, 3rd Revised edition edition
2. Heat and Thermodynamics – Brij lal and Dr.N. subrahmanyam, P.S. Hemne. S.Chand and Co. New Delhi. First Edition 1968. Reprint 2015
3. Thermal physics – S.C Garg, Tata Mcgraw Hill Education Private Limited, 1st, 2007

## SEMESTER II

UPHT21

ELECTRICITY AND MAGNETISM

6 Hours/4 Credits

### Objectives:

1. To give the students a firm understanding of the basics of Electricity and Magnetism.
2. To disseminate the knowledge on various current laws and magnetic laws.
3. To introduce to the students the application of Electricity and Magnetism and firm their understanding on alternating currents
4. Students will be capable to apply their knowledge in performing electricity and magnetism based experiments have firm base in theory.

### UNIT I

#### Current electricity

Current – current density – expression for current density – kirchoff's laws – Wheat stone's network – Carey Foster's bridge – Determination of resistivity and temperature coefficient of resistance – potentiometer: principle – calibration of ammeter, voltmeter.

### UNIT II

#### Magnetic fields of electric current

Magnetic field – flux – Biot-Savart law – magnetic induction due to straight conductor – force on a current element – torque on current loop – ampere's law – Maxwell's equations – magnetic induction due to circular loop – solenoid and toroid moving coil galvanometer's dead beat and ballistic. Properties of magnetic material: the three magnetic vectors – dia – para – ferromagnetism.

### UNIT III

#### Electrostatics

Electric field and flux – gauss law – application of gauss law – field due to a charged sphere – coulomb's theorem – mechanical force on the surface of charged conductor. Electrical potential – equipotential surface – relation between field and potential – electric potential energy. Capacity of a parallel plate capacitor – spherical, cylindrical and parallel plate capacitors – types of condensers – energy stored in a capacitor.

### UNIT IV

#### Electromagnetic induction

Law of electromagnetic induction – Maxwell equation self and mutual induction – determination of L by Rayleigh's methods – determination of M coefficient of coupling – Eddy current – uses.

### UNIT V

**Alternating currents**

AC circuits RC, RL series, parallel – power of an ac circuit – Q factor – Bridges – Owen – Anderson's Maxwell bridges.

**Books for study**

1. Basic electrical, electronic and computer engineering – R. Muthusubramaniam, s. Salivahanan, K.A.Muraleedharan., 1994

**Books for references**

1. Electricity and Magnetism – D.Chattopadhyay & P.C. Rakshit – New Central Book Agency Pvt.Ltd.,2015

UPHP21

**I B.SC. PHYSICS  
SEMESTER II  
CORE PRACTICAL-I**

**5 Hours/4 Credits**

**Any Twelve**

**Objective :** It is aimed at exposing the under graduate students of the Physics department to the techniques of handling equipments, making error free measurements and error analysis

Estimation of errors

Young's modulus – Uniform bending pin and microscope method

Young's modulus – Non Uniform bending pin and microscope method.

Young's modulus – Uniform bending optical lever method.

Young's modulus – Non Uniform bending optical lever method.

Compound Pendulum – g and k.

Spectrometer – Dispersive power of prism .

Spectrometer –Grating minimum deviation.

Potentiometer – Low range voltmeter calibration.

Potentiometer – Low range ammeter calibration .

Sonometer – Laws verification.

Sonometer – Frequency of the tuning fork.

Melde's Experiment.

Determination of coefficient of viscosity – Stoke's method.

Potentiometer - resistivity & comparison of resistance.

Potentiometer – Ammeter calibration.

Potentiometer – EMF.

Newton's law of cooling.

**SUGGESTED BOOKS**

1. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher- Part I (1990).
2. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.Viswanathan Publisher-Part II ( 1996)
- 3.S.L Gupta and V.Kumar- Practical Physics- Pragati Prakashan – 25<sup>th</sup>,Edition (2002)



## SEMESTER III

UPHT31

MATHEMATICAL PHYSICS

5 Hours/4 Credits

### Objectives:

1. Clear understanding of vector analysis, matrices and problems related to them.
2. Infinite series and their convergence are learnt.
3. Complex variables of various Physics problems are understood also, Fourier series and integrals are introduced.
4. To introduce the undergraduate students with various mathematical concepts and tools to solve numerical problems of physics.

### Unit I

#### Vectors

Gradient of a scalar field - line, surface and volume Integrals – Divergence of vector function- Curl of a vector function and its physical significance- Gauss divergence theorem – Stoke's theorem – Green's theorem.

### Unit II

#### Matrices

Algebraic operation on matrices- transpose of a matrix – the conjugate of matrix – the conjugate transpose of a matrix- symmetric and anti-symmetric matrix- hermitian and skew- hermitian matrix- determinant of matrix – co-factor of a determinant-minors of a matrix- singular and non-singular matrix – adjoint matrix – invertible matrix- inverse of a matrix- orthogonal matrix – unitary matrix.

### Unit III

#### Fourier series

Fourier series- Change of interval form – complex form of Fourier series- Fourier series of a function  $f(x)$  - Fourier series in interval – Uses of Fourier series – Physical examples of Fourier series- properties of Fourier series.

### Unit IV

#### Beta and Gamma Function

Definition – Symmetry property of Beta function – Evaluation of Beta function – Transformation of Beta function – Evaluation and transformation of Gamma function – relation between Beta and Gamma function.

## **Unit V**

### **Partial Differential equation in Physics**

Solution of Partial Differential Equation by the method of separation of Variables – Solution of Laplace's Equation in Two – dimensional cylindrical co-ordinates  $(r,\theta)$ : Circular Harmonics. – Solution of Laplace's Equation in General Cylindrical Co-ordinates – Solution of Laplace's Equation in Spherical Polar Co-ordinates – Spherical Harmonics.

#### **Books for study:**

1. Mathematical Physics – Sathyaprakash, Sultan Chand and Sons, New Delhi. First Edition 1985-86, Reprint -2013.
2. Mathematical Physics – B.D.Gupta, Vikas Publishing house PVT Ltd. Fourth Edition.

#### **Books for reference:**

1. Mathematical Physics – H.K. Dass , Dr. Rama Verma. S. Chand and Co. New Delhi. First Edition 1997. Reprint 2014.

**SEMESTER III  
ANCILLARY PHYSICS**

**UPHA33 MECHANICS, PROPERTIES OF MATTER, ELECTRICITY,  
ELECTRONICS AND MODERN PHYSICS**

**5 Hours/4 Credits**

**Objective:** To impart preliminary knowledge on basic concepts of physics to chemistry and mathematic students to make them understand the fundamentals of core physics.

**Unit I**

**Force, work, power and energy**

Forces in nature—central force-gravitational and electromagnetic-conservative and non-conservative forces- examples- nuclear force- friction- angle of friction – motion of bodies along an inclined plane – work done by a force- work done by a inclined plane- work done by a varying force- expression for kinetic energy- expression for potential energy- power.

**Rotational motion**

Angular velocity- normal acceleration (No derivation) centrifugal and centripetal forces- torque and angular acceleration - work and power in rotational motion- angular momentum-K. E. of rotation – moment of inertia- Laws of parallel and perpendicular axes theorems – M. I. of a circular ring. Circular Disc, solid spheres, Hollow spheres and Cylinder.

**Unit II**

**Gravitation**

Kepler's Law of planetary motion – law of gravitation-Boy's Method –determination of g- compound pendulum- expression for period experiment to find g- variation of g with latitude, attitude and depth- artificial satellites.

**Viscosity**

Derivation of poiseuille's formula (analytical method)-Bernoulli's theorem- proof- applications- Venturimeter- pitot tube.

**Unit III**

## **Electrostatics**

Gauss law (no proof)- application field due to a charged sphere and an infinite plane sheet – field near a charge conducting cylinder coulomb's theorem – electric potential capacitors- expression for  $\pi$  of parallel plate.

## **Magnetic Effect**

Torque on a current loop, galvanometer, dead beat and ballistic- current sensitiveness- experiment- charge sensitiveness- damping – damping correction- experiments for charge sensitiveness- comparison of emf's and comparison of capacitors.

## **Unit IV**

### **Electronics**

Junction diodes- forward and reverse bias – diode characteristics- types of diodes- LED and Zener diode- bridge rectifier using junctions diodes-  $\pi$  filter- basic gates- Universal gates- Demorgan's theorem.

## **Unit V**

### **Photoelectricity**

Laws of photoelectricity, Einstein's equation photo cells and their uses, photoemissive, photoconductive and photovoltaic cells – solar cells-photo detectors – fibre optics- light propagation in fibers- fiber optic communication systems.

### **Reference:**

1. Mechanics – Prof. D.S Mathur. Revised by : Dr. P.S. Hemne. S. Chand and Co. New Delhi. First edition 1981, Reprint 2015.
2. Properties of matter – Brij Lal and Subramanyam. Eurasia publishing house (pvt.) LTD. New Delhi. Sixth Edition 1991 Solid State Electronics- B. L. Theraja
3. Electricity and Magnetism – D.Chattopadhyay & P.C. Rakshit – New Central Book Agency Pvt.Ltd.,2015
4. Ancillary Physics- M. Palinappan, LMN Publication, 1993.

5. University Physics with Modern Physics - Sears zemansky and Ground, 13<sup>th</sup> edition,2013.
6. Modern Physics- R. Murugesan, S. Chand Publishing, 2011.
7. Optics and Spectroscopy- R. Murugesan, S. Chand Publishing,1997.

**SEMESTER III  
ELECTIVE PAPER I**

**UPHE31**

**FIBER OPTICS**

**4 Hours/3 Credits**

**Objectives:** The main objective of this course is to introduce the basic concept of fiber optics to them so that they can understand the deep theory and working of optical communications.

**Unit I**

**Optical fibers**

Advantages of optical fiber communication – optical fiber waveguide: single mode fiber-step index fiber- graded index fiber.

**Unit II**

**Transmission characteristic of optical fiber:**

Attenuation – Material absorption losses – linear scattering losses – Non – linear scattering losses- Dispersion – intermodal dispersion – intermodal dispersion.

**Unit III**

**Preparation techniques**

Preparation of optical fibers – liquid phase techniques – vapour phase deposition techniques- cable design – fiber splices – fiber connection

**UNIT IV**

**Lasers**

Lasers – induced absorption – spontaneous and stimulated emission – Ruby laser – He–Ne lasers –semiconductor laser – properties of laser beam

**UNIT V**

**Optical sources:**

Semiconductor injection laser – Light emitting diode(LED) structures – LED characteristics – optical detector – P-N photo diode – P-I-N photo diode – Avalanche photo diodes – planer wave guides

**Books for study**

1. Optical fiber communication principles and practice – John M. Senior. Dorling Kindersley Pvt. India. 2012.
2. Optical fiber communications – Gerd Keiser, Mc-Graw Hill, 2<sup>nd</sup>, Edition, 1991

**UNIT I:** Chapter 1 & Chapter IV: Optical Fiber Communications Principles and Practice Third edition John M. Senior

**UNIT II:** Chapter 3: Optical Fiber Communications Principles and Practice Third edition John M. Senior

**UNIT III:** Chapter 4: Optical Fiber Communications Principles and Practice Third edition John M. Senior

**UNIT IV:** Chapter 22: A text book of Optics –Dr. N.Subramanyan , Brij Lal, and Dr. M.N. Avadhanulu. S.Chand and Co. New Delhi. 24<sup>th</sup> revised Edition 2010. Reprint 2012.

**UNIT V:** Chapter 8: Optical Fiber Communications Principles and Practice Third edition John M. Senior

**Books for references**

1. Optical fiber and fiber optic communication systems- subir kumar sarkar. S. Chand and Co. New Delhi. 2008.
2. Fundamentals of fiber optics in telecommunications and sensor systems – B.P. Pal, Wiley Eastern, 1992.
3. Applied Physics for engineering course (Photography) – Dr.P. Murugakoothan, Dr S. Sivasankaran, Dr.K.Sadayandi

**SEMESTER III**  
**SKILL BASED ELECTIVE PAPER I**

**UPHS31**

**HOME APPLIANCES**

**2 Hours/2 Credits**

**Objective :** To introduce students with conceptual knowledge and skills regarding simple home appliance and its working.

**UNIT I:**

Electrical wiring – Earthing -switches & sockets-fuse-circuits breaker  
wiring of tube lights

**UNIT II:**

Geiser- protection –washing machine-top loading & front loading –drier-dish washer

**UNIT III:**

Microwave oven- induction stove-conventional oven- bread toaster- electric cooker-mixer  
grinder- vacuum cleaner

**UNIT IV:**

Emergency lamp-UPS-automatic street light- refrigerator

**UNIT IV:**

Air-conditioner- window & spilt- air cooler- electric chimney- exhaust fans



**SEMESTER III  
NON MAJOR ELECTIVE PAPER I**

**UPHN31**

**FUNDAMENTALS OF PHYSICS**

**2 Hours/2 Credits**

**Objective:** To introduce non physics students with the basic concepts of physics

**Unit I**

Atomic constituents - Duality - Particles and waves - Uncertainty principle Phases of matter Internal energy and temperature - If Law of Thermodynamics - Conductors, Insulators & Semi-conductors Superconductivity and super fluidity.

**Unit II**

Particle dynamics: Displacement, velocity and acceleration- distance –time graph-velocity – time graph – projectile motion – uniform circular motion – tangential acceleration in circular motion – relative velocity and acceleration

**Unit III**

Gravitational force – Newton’s law of gravitation – Electromagnetic force – Nuclear force- Central force – conservative force – Non conservative force – Work – Work done by a varying force – Energy – Kinetic Energy, Potential Energy – Power.

**Unit IV**

Crystal structures: Introduction – periodic array of atoms – crystal lattice – unit cell – basis – symmetry considerations – classification of crystals – Bravais lattices in three dimensions – crystal planes and Miller indices – simple crystal structures.

**Unit V**

Conservation of energy - Planck’s hypothesis - Mass-energy equivalence - Nuclear energy – Solar energy - Non-conventional sources of energy

**Reference:**

1. Mechanics – Prof. D.S Mathur. Revised by : Dr. P.S. Hemne. S. Chand and Co. New Delhi. First edition 1981, Reprint 2015.
2. D.S.Mathur, Elements of properties of matter, S.Chand and Co., New Delhi, 1949.
3. C.Kittel , Introduction to solid state physics – Wiley eastern 6<sup>th</sup> edition, 1953.
4. Physics of particles, Matter and the Universe: Roger J Binstoyle - Institute of Physics Publishing, Bristol (1997)
5. Science Matters, Robert’ M. Hazen & James Trefil - Universities Press (India) Ltd., (1991)

6. Almost Everyone's guide to science, John Gribin - Universities Press (1998)
7. Inside Science, Edited by John Allen - BBC Books, (1988).
8. Physical Science Fundamentals, John J Merrill, W Kenneth Hamblin, James M Thorne - Macmillan, NY (1982)

## SEMESTER IV

UPHT41

SOLID STATE PHYSICS

4 Hours/4 Credits

### Objectives:

1. To give the students a firm understanding of the basics of fundamental building blocks atoms and crystal structure through introduction of Solid State Physics.
2. To introduce the students the application of Solid State Physics.
3. The various physical properties of solids will be introduced.
4. They will be able to identify the various crystal structures and solve xrd based problems.

### Unit I

#### Crystal Structure

Introduction – lattice translation – vectors – lattices – the basis – crystal structure, Fundamentals types of lattices – Three dimensional lattice types – simple crystal structure – NaCl – hexagonal close packed, diamond structure – Miller indices.

### Unit II

#### X-Ray Diffraction and Reciprocal Lattice

X- Ray diffraction –Bragg's law –Bragg's X-ray spectrometer- Powder crystal method – Rotating crystal method-Reciprocal Lattice vector – Diffraction conditions –Brillouin zones- Reciprocal lattice to sc., bcc., fcc., lattice.

### Unit III

#### Phonons

Vibrations of crystals with monatomic basis: First Brillouin zone-group velocity- long wavelength limit-derivation of force constants from experiment. Two atoms per primitive basis- quantization of elastic waves- phonon momentum- inelastic scattering by phonons.

### Unit IV

#### Electron Theory of Solids

Introduction – Classical free electron theory, Quantum theory- Thermionic emission- photoelectric emission – Electric work function in metals – field emission – Schottky Richardson equation – Tunnel Diode.

### Unit V

#### Thermal Properties of Solids

Anharmonic crystal interaction – Thermal expansion, thermal conductivity – Lattice thermal resistivity – Umklapp processes – imperfections.

### Books for Study:

1. Solid State Physics – S.O.Pillai. New age international publishers, 6<sup>th</sup> Edition.2012.

2. Introduction to Solid State Physics – Charles Kittel, Seventh Edition. 2011.

**Books for References:**

1. Solid State Physics Principles and Applications – R. Asokamani, Anamaya Publishers, New Delhi, cop. 2007. Edition/Format:

UPHP42

**II B.SC. PHYSICS**  
**SEMESTER IV**  
**CORE PRACTICAL-II**

**4 Hours/4 Credits**

**Any Twelve**

**Objective** :-It is aimed at exposing the under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical and optical properties of matter

Spectrometer – Prism – i-d curve to find  $\mu$ .  
Spectrometer –i-d curve – i-i' curve.  
Spectrometer –Grating – resolving power & dispersive power.  
Galvanometer / B.G – conversion Ammeter.  
Galvanometer / B.G – conversion Voltmeter.  
Galvanometer Emfs.  
Galvanometer Comparison of capacitances.  
Carey Foster Bridge – P and r.  
Carey Foster Bridge – temperature coefficient .  
Galvanometer / B.G Charge sensitivity.  
L- Owen' bridge.  
LCR – series Resonance Circuit.  
LCR –Parallel Resonance Circuit.  
L-Anderson's Bridge.  
L. Maxwell's Bridge.  
L. Rayleigh's Bridge.  
Spectrometer – Cauchy's Constant.  
Spectrometer – Resolving power of prism.  
Zener diode – break down voltage.  
Zener diode – voltage regulation.  
Transistor characteristics – CE mode.  
Transistor characteristics – CC mode.  
Transistor characteristics – CB mode

**SUGGESTED BOOKS**

1. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher- Part I (1990).
2. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.Viswanathan Publisher-Part II ( 1996)
- 3.S.L Gupta and V.Kumar- Practical Physics- Pragati Prakashan – 25<sup>th</sup>,Edition (2002)



## SEMESTER IV

### ELECTIVE PAPER II

#### UPHE42 SOLAR THERMAL & RENEWABLE ENERGY SYSTEMS

3 Hours/3 Credits

**Objectives:** The objective of this paper is to impart knowledge to students on energy and its resources, also they will be introduced with conventional and non conventional resources of energy.

#### Unit I

Solar Radiation and its Measurement – Solar constant – Solar Radiation at the Earth's surface, Solar Radiation Geometry – Measurements and Data. Estimation of average Solar Radiation and Solar radiation on titled surfaces.

#### Unit II

##### Solar energy Collectors

Physics Principles of the conversion of solar radiation into heat – Flat Plate collector (FPC) – Performance analysis of FPC – Concentrating collector (CC) over FPC – Selective coatings – Photo voltaic Cell.

#### Unit III

##### Application of Solar energy

Solar water heating – Space heating – Space Cooling – Solar Electric Power generation – agricultural and industrial process heat – Solar distillation – Solar Pumping – Solar furnace – Solar cooking.

#### Unit IV

##### Wind energy

Basic principles of wind energy conversion – Nature of the wind – the power in the wind – forces on the blades and thrust on turbines – wind energy conversion (WEC) – basic components of wind energy conversion – classification of types of WEC systems – advantages and disadvantages of WECs.

#### Unit V

##### Biomass

Introduction – biomass conversion technologies – photosynthesis – biogas generation – factors affecting biogas generation on generation of gas – classification and types of biogas plants – advantages and disadvantages of floating drum plant and fixed dome type plant

#### Book for study

1. Solar energy utilization – G.D. Rai, Edition, 3. Publisher, Khanna Publishers, 1987.
2. Non-Conventional Energy Sources”, G.D. Rai ,4<sup>th</sup> Edition, Khanna Publishers, 2000.

**SEMESTER IV  
SKILL BASED ELECTIVE PAPER II**

**UPHS42**

**BIOMEDICAL INSTRUMENTATION**

**2 Hours/2 Credits**

**Objective:** To introduce the undergraduate students with important biomedical instruments to know their body functions and its measurements through technical instruments.

**Unit I**

**Bio-Potential Electrodes**

Electrodes- half of potential – purpose of electrode paste- Electrode material- types of electrode.

**Unit II**

Microelectrode-Metal microelectrode, Micropiper, depth and needle electrodes, surface electrodes.

**Unit III**

Metal plate electrodes, multi point electrode, chemical electrode, hydrogen electrode.

**Unit IV**

System Characteristics for ECG, EEG, EMG, ERC- EOC.

**Unit V**

Pace Maker- Pace Maker batteries- defibrillators, synchronized and square pulse defibrillators- nerve and muscle stimulators.

Books for study:

1. Biomedical Instrumentations – M. Arumugam- Anuradha agencies, Kumbakonam,2002.



**SEMESTER IV  
NON MAJOR ELECTIVE PAPER II**

**UPHN42**

**ELECTRONICS IN DAILY LIFE**

**2 Hours/2 Credits**

**Objective:** To make non physics students understand basic electronic concepts and its applications in daily life.

**UNIT I**

**FUNDAMENTALS**

Electrical and Electronic symbols – Resistors - Capacitors – Resistance wale – Capacitor wale – Electrical quantities – Electrical formulas – Magnetism – Meters – Fuse wire Transistors – Integrated chips.

**UNIT II**

**ELECTRICAL APPLIANCES**

Switchboard – Main box – Metal circular breakers (MCB) – AC – DC currents – Two phase – Three phase electrical connections – generators – uninterrupter power supply (UPS) – stabilizer – voltage regulators – Electrical devices – Iron box – Fan

**UNIT III**

**ELECTRONIC HOME APPLIANCES**

Radio – Audio taper veaulem, speaker – televisions – VCR – CD Player –DVD – calculators – Computers – Block diagram of a computer – Input device – Memory device – control unit – Arithmetic and logic unit – output device – microprocessor – RAM –ROM – scanner – printer – Digital camera – LCD Projectors – Display devices

**UNIT IV**

**COMMUNICATION ELECTRONICS**

Principles of optical fiber cables(OFC) – Telephone – Mobile Phones – wire less phone – Antenna – Internet – Intranet

**UNIT V**

**SAFETY MECHANISM**

Handling electrical appliances – power saving methods – hazards prevention methods – protection of Hi-Fi electronic devices.

**Books for Study and reference:**

1. S.S. Kamble – Electronics and Mathematics Data Book – Allied Publishers Ltd – 1997
2. William David Cooper, Electronic and Instrumentation and Measurement Technique (2<sup>nd</sup> Edition), 1978.

## SEMESTER V

UPHT51

ELECTRONICS

5 Hours/4 Credits

### Objectives :

1. It is aimed at exposing the under graduate students of the Physics department to the fundamentals of analog and digital electronics.
2. They will learn basics of semiconductors
3. Familiarise them with the concepts of amplifiers, oscillators and OPAMPS
4. The various topics have been selected to augment the electronics experiment they will be doing in their practical sessions

### Unit I

#### Band Structures of Semiconductor

Band structures- carrier energy distribution – carrier concentration in an intrinsic crystal. Donor and acceptor impurities – Fermi level continuity equation – theory of Tunnel diode – Avalanche and Zener Break down – Zener Diode. Photodiode.

### Unit II

Two port network analysis – h - parameter – transistors – input and output characteristics – load line – quiescent point – fixed bias – universal divider bias – Emitter feedback bias- Amplifiers – C.E. amplifiers.

### Unit III

#### Amplifiers

Cascade amplifier: RC coupled- transformed coupled - direct coupled – power amplifier : class A and Class B – Push pull amplifiers – frequency response of amplifiers.

### Unit IV

#### Oscillators

Feedback – types of feedback – advantage of negative feedback – Barkhausen criterion - Hartley, colpitt and phase shift oscillators – Multivibrators using transistors: Astable, Monostable and bistable.

### Unit V

#### Integrated Electronics

Op- amp characteristics – Expression for gain (inverting mode only) – application as adder, subtractor, integrator and differentiator – analog computer.

**Books for study:**

1. Electronic devices and circuits – S. Salivahana, N. Suresh kumar and Villa Raj, McGraw Hill Publishing co.Ltd., New Delhi 1998.
2. Principles of Electronics- V.K.Mehta S. Chand and Co. New Delhi. 2014.

**Books for references:**

1. Text book of applied Electronics – R.S.Sedha, Edition, 2. Publisher, S.Chand Limited, 2008.
2. Electronics Principles- 8<sup>th</sup> Edition,By Albert Malvino and David Bates ,Copyright: 2016 .
3. Basic Electronics for Scientist and Engineers J.J.Brophy – TMH, 2007
4. Basic Electronics – A. Ubald Raj and G. Jose Robin. Indira Publications, Marthandam. First Edition 2014
5. Basic electrical and electronics engineering – R. Muthusubramanian and S. Salivahanan. Mc Graw Hill education, New Delhi. 2015.
5. Electronics Fundamentals and Applications – Millman and Halkias, McGraw-Hill, 1976.
6. Transistors circuit approximations – Malvino. TMH, A.P. Publisher: TMH 1980Edition:
7. Elements of Solid State Electronics – Ambrose and Vincent Devaraj, Mera publications - 1993.

## SEMESTER V

UPHT52

CLASSICAL AND STATISTICAL MECHANICS

5 Hours/4 Credits

### Objectives:

1. To develop familiarity with the physical concepts of classical mechanics
2. Facility with the mathematical methods of classical mechanics.
3. To introduce statistical mechanics to them.
4. To develop skills in formulating and solving physics problems.

### Unit I

#### D'Alembert's principle and Lagrange's equation

Mechanics of system of particles – constraints – D'Alembert's principle and Lagrange's equations – velocity dependent potential and dissipation functions – application of Lagrange's formulation.

### Unit II

#### Variational principles and Lagrange's equations:

Hamiltonian's principle – some techniques of the calculus of variations – derivation of Lagrange's equation Hamiltonian's principle – extension of Hamilton's principles to non holonomic systems. Advantages of the variational principles formulation- conservation theorem – symmetry properties.

### Unit III

#### The two- body central force problem

The Kepler problems – derivation of Kepler's law (I, II, III law) – center of mass – motion of the center of mass of a system of particles – two body problem and the reduced mass.

### Unit IV

#### Statistical Physics

Equilibrium of distribution and partition function – molecular energies in an ideal gas- equipartition theorem – Einstein and Debye's theory of specific heat capacity – thermal properties of non - metals (no derivations) and metals.

### Unit V

#### Classical and quantum statistics

Phase space – probability of distribution – Maxwell's Boltzmann's statistics – Bose Einstein statistics – Planck's radiation – Fermi Dirac statistics – Fermi energy – electron gas in metals.

**Books for study****Unit-I** D Alambert's principle and Lagrange's Equation

Classical mechanics-Gupta, Kumar, Sharma

Classical mechanics-G.Aruldas

**Unit-II** Variational principle and Lagrange's Equation

Classical mechanics-H.Goldstein

Classical mechanics-N.C.Rana & PS Jog

**Unit-III** Two- body central force problem

Classical Mechanics -H.Goldstein

**Unit-IV &Unit-V** Statistical physics & Classical and quantum statistics

Statistical mechanics –B.B.Laud

**Books for Study:**

1. Classical Mechanics- H.Goldstein, Narosa publisher, new delhi. Second Edition.2001.
2. Statistical Mechanics – Gupta and Kumar. Pragati prakashanm Meerut. 2009

**Books for references:**

1. Thermodynamics, Kinetic theory of Statistical thermodynamics – E.W.Sears and G.L.Salinger – Edition III, Narosa Publishing House, 2013
2. Classical mechanics, Rana, Jog, Mcgraw Higher Ed, 1st Edition, 2001

## SEMESTER V

UPHT53

QUANTUM PHYSICS

5 Hours/4 Credits

### Objectives:

- 1.To make the students understand the basic concepts of Quantum Mechanics.
- 2.To make them understand failure of classical and evolution of quantum physics.
- 3.To introduce the wave mechanics, eigen functions and eigen values and problems based on that.
- 4.Know thoroughly the applications of Quantum Mechanics.

### Unit I

#### Origin of the quantum mechanics

Limitations of classical physics –Planck’ quantum hypothesis – Quantum theory of specific heat – Bohr Model of hydrogen atom – existence of stationary states- Wilson Somerfield quantization rule-elliptic orbits of hydrogen atom- the rigid rotator – particle in the box- the correspondence principle – The stern Gerlach experiment – inadequacy of quantum theory.

### Unit II

#### Wave mechanical concepts

Wave nature of particles – the uncertainty principle- the of superposition – wave packet- time dependent schrodinger equations – interpretation of wave functions – Ehrenfest’s theorem –time independent schrodinger equation.

### Unit III

#### General formalism of quantum mechanics

Linear vector space – linear operator – Eigen functions and eigenvalues – Hermitian operator- postulates of quantum mechanics- simultaneous measurability of observables- general uncertainty relation – Dirac’s notation – equations of motion – momentum representation.

### Unit IV

#### One dimensional energy eigenvalue problems

Square well potential with rigid walls- square well potential with finite walls-kronig penney square well periodic potential – linear harmonic oscillator-Schrodinger method – linear harmonic oscillator – operator method – free particle.

### Unit V

#### Three-dimensional energy eigenvalue problems

Particle moving in spherically symmetric potential – system of two interacting particles- Rigid rotator – hydrogen atom – hydrogenise orbital's – the free particle – three dimensional square well potential – the deuteron.

**Books for study:**

1. Quantum mechanics – G.Aruldas second edition –PHI learning private ltd. New Delhi, 2009.
2. Modren Physics – Richmaire, Kennard and cooper, Mcgraw Hill , 2015

**CHAPTERS TAKEN FROM**

Quantum mechanics – G.Aruldas second edition –PHI learning private ltd. New Delhi,2009. `

Unit I – Chapter – I

Unit II – Chapter – II

Unit III – Chapter – III

Unit IV – Chapter – IV

Unit V – Chapter – V

**Books for reference:**

1. Quantum Mechanics – S.L. Kakani and H.M. Chandalia. S. Chand and Co. New Delhi. 2007.
2. Quantum mechanics – Leonard I Schiff – 3<sup>rd</sup> edition. TATA Mc Graw Hills, 4<sup>TH</sup> Edition, 2014.
3. Quantum Mechanics - A. Ubald Raj and G. Jose Robin. Indira Publications, Marthandam. First Edition 2014
4. Quantum Mechanics – P.M. Mathews and K. Venkatesan. McGraw Hill Education Pvt, New Delhi. 2013.
5. Introduction to quantum mechanics – David J.Griffiths – 2<sup>nd</sup> edition – publishing by Dorling Kindersley Pvt Ltd, 2004.

## SEMESTER V

UPHT54

LASER PHYSICS

5 Hours/4 Credits

### Objectives:

The learning objectives of the course are that the student demonstrates the ability to:

1. Explain and use most basic principles of laser physics and laser spectroscopy.
2. Will learn characteristics of lasers, notably the coherence and intensity.
3. By studying the basic physics of laser media together with the system configurations that facilitate a range of desirable options for their operation.
4. They will have vivid knowledge of holography and deep insight into optical fibre communication.

### Unit I

#### Introduction

Directionality – Intensity – Monochromaticity – Coherence – Principles, population inversion- Laser pumping.

### Unit II

#### Einstein's Quantum theory of Radiation

Einstein coefficients – momentum transfer – life time - possibility of amplification.

### Unit III

#### Interaction of radiation with matter

Time dependent perturbation theory- Creations and annihilation operators – Fock States – Quantization of the field – Zero – point energy – Coherent – state description of the electromagnetic field- Interaction of radiation with matter.

### Unit IV

#### Lasers: Types and applications of Lasers

Solid state lasers: Ruby Laser- Nd: YAG Lasers - Gas Lasers: Helium –Neon Laser, Argon Ion Laser- CO<sub>2</sub> Laser - Semiconductor Lasers: Doped semiconductor – condition for Laser action - Liquid Lasers- Dye Lasers - Application of Lasers in Industry, Medicine and Communication.

### Unit V

#### Theory Some Simple Optical Processes

Waves and interference – Coherence – Coherence of the field and the size of the source- Visibility and the size of the source – Coherence and monochromaticity – shape and width of spectral lines – line broadening mechanisms – Natural or intrinsic broadening – Collision broadening Doppler broadening.



**Books for study:**

1. Laser and nonlinear optics – B.B.Laud, New age international publications, New Delhi.  
Third Edition. 2011.
2. Lasers: Fundamentals and applications – Ajay Ghatak, 2<sup>nd</sup> edition, 2010

## SEMESTER V

UPHT55

OPTICS AND SPECTROSCOPY

5 Hours/4 Credits

### Objectives:

1. To expose the students to the fundamentals of light optics and related phenomena.
2. Deep knowledge in physical and classical optics.
3. Concept of polarization and its applications is introduced.
4. Basic concepts of molecular spectroscopy is known.

### Unit I

#### Interference

Introduction: Light Waves; Superposition of Waves; Interference; Young's Double slit Experiment – Wavefront Division; Coherence; Conditions for Interference; Techniques of Obtaining Interference; Fresnel Biprism; Lloyd's Single Mirror; Fresnel's Double Mirror; Achromatic Fringes; Non-Localized Fringes; Visibility of Fringes; Fringe Pattern with white Light; Interferometry.

### Unit II

#### Interference in thin films

Colours of thin film- Air Wedge – determination of diameter of a thin wire- Newton's rings – determination of refractive index for liquid- Michelson's interferometer – determination of  $\lambda$  and  $d\lambda$  –uses.

### Unit III

#### Diffraction

Fresnel and Fraunhofer classes of diffraction – Fresnel's explanation for the rectilinear propagation of light zone plate- Fresnel's diffraction at a straight edge – Theory of diffraction grating- determination of wavelength – dispersive and Rayleigh's criterion for resolving power of grating – comparison between prism and grating spectra.

### Unit IV

#### Polarisation

Double refraction Huygen's explanation – production, detection and analysis of plane, circularly and elliptically polarized light – quarter and half wave plates- optical rotation – Biot's law – Laurent half shade polarimeter – Fresnel's theory of optical rotation.

### Unit V

#### Spectroscopy

Classification of line, band and continuous spectra- Infrared spectroscopy - application Raman effect experimental set up characteristics of Raman lines – basis concepts of resonance spectroscopy.

**Books for study:**

1. A text book of Optics –Dr. N.Subramanyan , Brij Lal, and Dr. M.N. Avadhanulu. S. Chand and Co. New Delhi. 24<sup>th</sup> revised Edition 2010. Reprint 2012.

**Books for Reference:**

1. Optics and Spectroscopy – R. Murugesan . Mrs . M. Shantha, Madurai. First Edition 2003.
2. Optics – A. Ubald Raj and G. Jose Robin. Indira Publications, Marthandam. First Edition 2016.
3. Spectroscopy - A. Ubald Raj and G. Jose Robin. Indira Publications, Marthandam. First Edition 2014.

**SEMESTER V  
ELECTIVE PAPER – III**

**UPHE53**

**MEDICAL PHYSICS**

**3 Hours/3 Credits**

**Objectives:** The aim of this course is to introduce the student to a number of applications of physics to medicine with particular emphasis on those commonly used in the work of the medical physicist

**Unit I**

**Human Physiological systems**

Cells and their structure – transport of ions through Membrane – resting and action potential – bioelectric potentials – nerve fissures and organs – difference systems of human body.

**Unit II**

**X – Ray and Radio Isotope Instrumentation**

Generation of ionizing Radiation – Detection of Radiation – Instrumentation for diagnostic X-rays – visualization of X- rays – X-ray machines - Special techniques – Instrumentation for the medical of radio isotopes

**Unit III**

**Measurements in the Respiratory System**

The Physiology of the Respiratory system – Tests and instrumentation for the Mechanics of breathing – Mechanical measurements – Instrumentation for Measuring the mechanics of Breathing – measurements of residual volume

**Unit IV**

**Patient care and monitoring**

The elements of intensive care monitoring – patient monitoring display – diagnosis calibration and reparability of patient Monitoring equipment – the organization of the hospital for patient care monitoring.

**Unit V**

**Operation theater equipments**

Surgical diathermy – short wave diathermy – microwave diathermy – ultrasonic diathermy.

**Bio- telemetry**

Basic and design of a bio-telemetry system – Radio Telemetry systems – Single channel telemetry system – transmission of bioelectric variables – active and passive measurements – tunnel diode FM transmitter – radio telemetry with sub carrier – multiple channel telemetry system.

**Books for Study:**

1. Biomedical Instrumentations – M. Arumugam- Anuradha agencies, Kumbakonam,2002.

**Books for reference:**

1. Bio Medical Instrumentations and measurement Leslicromwell, Leslie Cromwell. Edition, illustrated. Publisher, Prentice-Hall, 1973

2. Principles of applied biomedical Instruments – Geddes & Bakker, Wiley, New York, 1968.

3. Medicine and clinical Engineering – Prentice Hall of India, Prentice Hall (1 March 1977)

4. Bio Medical Telemetry: Sensing and Transmitting– Mackay, Stuart & John Wiley, Wiley-IEEE Press, 2nd Edition,. 1968.

5. Bio Medical Instrumentation – Chandpur, 3<sup>rd</sup> Edition, 1987

**SEMESTER V**  
**SKILL BASED ELECTIVE PAPER III**

**UPHS53**

**ENTERTAINMENT ELECTRONICS**

**2 Hours/2 Credits**

**Objective:** To impart knowledge on basic electronic devices used for media and entertainment. Also to make them learn its construction and working in detail.

**UNIT I :**

Television, tape recorder and loud speaker, public address system, basic theory and working

**UNIT II:**

Introduction to DVD, Cameras-film and digital camera

**UNIT III:**

Basic theory of VCD and Computer

**UNIT IV:**

i-pod, i-phone, cell phone and laptop

**UNIT V:**

Introduction to Internet-film and video projector-DTH

## SEMESTER VI

UPHT61

DIGITAL ELECTRONICS

5 Hours/4 Credits

**Objectives:** Explain concepts and terminology of digital electronics. Application of logic to design and creation, using gates, to solutions to a problem.

### Unit I

#### Binary Number System

Number system – conversion of decimal number into binary number – binary to decimal conversion – binary addition - binary subtraction's complement methods – binary multiplication and divisions – hexa decimal number binary coded decimals.

### Unit II

#### Logic Gates

Basic logic gates – implementation – OR and AND gates using diodes and transistors – NOT using Transistors – Characteristics of logic gates – Calculation of input voltage in OR and AND gates – logic family TTL and DTL universal logic gates NOR and NAND logic gate – Exclusive OR gates.

#### De Morgan's Law and Applications:

Boolean algebra – De Morgan's law – Applications – different expression for Ex-OR gate – binary adders – Half adder – Full adder.

### Unit III

#### Multivibrators

Schmit trigger (555 timer) monostable and astable Multivibrators using 555 timer - logic gate Flip – flops – R.S. Flip – Flop – J.K. Flip - Flop – R.S.Master slave Flip – Flop – J.K.Master slave Flip – Flop.

### Unit IV

#### Counters and Registers

Types of counters – Binary Counter – Decade counter – four bit binary counter – shift register – ring counter – memory systems in computers – magnetic core as memory device magnetic disc memories – floppy disc.

### Unit V

#### D/A and A/D Converter

Binary weighted resistor – D/A converter – R2R Resistive ladder D/A converter – Counter type A/D converter – successive approximation A/D converter – Dual Slope A/D converter parallel comparator A/D converter.

### **Books for study**

Unit-I Binary number system

Digital circuits and design by S.Salivahanan and S.Arivazhagan

Unit-II Logicgates and Demorgan's law and applications

Digital principles and applications

Donald P.Leach Albert Paul Malvino Goutam saha

Unit-III Multivibrators

Digital principles and applications

Donald P.Leach Albert Paul Malvino Goutam saha

Unit-IV &Unit-V Counters and Registers & D/A and A/D converter

Digital circuits and design by S.Salivahanan and S.Arivazhagan

**ALL UNITS Covered in the book Fundamental of Digital circuits- A.Anandkumar**

### **Books for study:**

1. Digital circuits and design – S.Salivagahanan and S.Arivazhagan. Vikas publishing house pvt ltd . Third Edition 2007.
2. Digital principles and computer design – Malvino and Leech, McGraw Higher Ed, 8th Edition, 2014

### **Books for Reference:**

1. Digital electronics circuits and systems – V.K. Puri. Tata McGraw – Hill publishing company limited, New Delhi. 1997.
2. Digital Electronics - A. Ubald Raj and G. Jose Robin. Indira Publications, Marthandam. First Edition 2014.
3. Integrated Electronics - Milman and Halkies, McGraw Higher Ed, Edition: 2, 2011.
4. Digital principles and computer design – Morris Mano, Pearson India, 1st Edition, 1979.



## SEMESTER VI

UPHT62

NUCLEAR PHYSICS

5 Hours/4 Credits

### Objectives:

- 1.To enable the students to understand and appreciate the fundamental concepts of Nuclear Physics.
- 2.Problem solving capability is increased.
- 3.Concept of elementary particles and radioactivity is understood.
4. They will learn practical applications of nuclear reactors and accelerators and detectors.

### Unit I

#### Structure and Properties of Nucleus

Nuclear mass – Bain Bridge Astors – mass spectrum – Radius , mass defect – Binding energy – Einstein's mass energy relation – Nuclear moments Isotopes – Isobars.

### Unit II

#### Radio Activity

Natural radioactive series , age of earth- carbon dating – successive radioactivity transient and secular equilibrium – Gieger – Nuttal rule – Decay Gamov's theory of decay – spectrum of rays – neutrino hypothesis.

### Unit III

#### Accelerators and Detectors

Cyclotron- bunching effect – synchro cyclotron – Betatron – linear accelerators – basic ideas on GM counter – cloud chamber – photographic emulsion.

### Unit IV

#### Nuclear Reactor

Four factor formula – moderator - coolant reactor assembly, thermo nuclear reation – Bathe's theory for fusion energy – Hydrogen cycle – atom bomb – Hydrogen bomb.

### Unit V

#### Sub Nuclear Reactions

Cosmic ray shower – pair production – annihilation – Van Allen belt – mesons – Mu meson (muonium atom) – classification of elementary particles – conservation laws.

### Books for study:

1. Nuclear Physics - D.C.Tayal, Himalaya publishing house. 2013.

**Books for Reference:**

1. Nuclear Physics – R.R. Roy and B.P. Nigam. New age international pvt. 2011.
2. Nuclear physics – S.N. Ghoshal. S. Chand and Co., New Delhi. 2012.
3. Nuclear Physics and particle physics- Satya prakash., Sultan Chand and Sons, 2014
4. Modern Physics – R. Murugesan and Er. Kiruthiga sivaprasath. S. Chand and Co., New Delhi. 2015.

## SEMESTER VI

UPHT63

ATOMIC PHYSICS

5 Hours/4 Credits

### Objectives:

- 1.To enable the students to understand the basic concept of atoms and its primitive models.
2. Also to introduce them with the powerful phenomenas of relativity and wave mechanics.
- 3.Origin of X-Rays will be introduced.
- 4.will thouroughly understand the structure of atoms and tools to study their phenomenas.

### Unit I

#### Structure of the Atom

Critical potentials – Frank and Hertz experiments –Discovery of Photoelectric effect – results on photo electric effect – failure of the electromagnetic theory – Einstein’s photoelectric effect – Milliken’s experiment – photoelectric cell.

### Unit II

#### X-rays

Diffraction of X – ray – Bragg’s law – X- ray spectrometer – X- ray spectra- characteristics of X- ray spectrum – Mosley’s law – Compton scattering – theory of experimental verification.

### Unit III

#### Atom models

Review of Bohr atom model – Somerfield’s relativistic model – vector atom model – various quantum number – LS and JJ coupling – Pauli’s exclusion principle – electronic configuration of elements – magnetic dipole moment due to orbital motion and spin motion – Bohr magnetron – Stren Gerlach experiments.

### Unit IV

#### Theory of relativity

Michelson – Morley experiment – interpretation of the Michelson Morley experiments – relative time – the Lorentz transformation – the relativistic velocity transformation – time dilation – illustration of time dilation – the twin paradox – length contraction – relativity of mass – mass – energy equivalence.

### Unit V

#### Wave Mechanics

De- Broglie’s concept of matter wave – De- Broglie wavelength – Characteristics of De-Broglie matter wave. Davisson and Germaer’s experiments – G.P.Thomson’s experiments – Heisenberg

uncertainty principle principle – basic postulates of wave mechanics – derivation of time dependent form of Schrodinger's equation.

**Books for study:**

1.Modern Physics – Richtmyer , Kennard and cooper, McGraw-Hill, 1969.

**Books for Reference:**

1. Modern Physics – R. Murugesan and Er. Kiruthiga sivaprasath. S. Chand and Co.,  
New Delhi. 2015.

2.Modern Physics – Sehgal, Chopra, S. Chand Publishing,2013.

**III B.SC PHYSICS**  
**SEMESTER VI**

**UPHP63            CORE PRACTICAL III   NON-ELECTRONICS            5 Hours/4 Credits**

**Any 12 Experiments**

**Objective** :-It is aimed at exposing the under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical, electrical and optical properties of matter

1. LCR – Series Resonance
2. LCR – Parallel Resonance
3. Spectrometer –  $i - d$  curve
4. Spectrometer –  $i - i'$  curve
5. Spectrometer – small angled prism
6. L – Anderson's bridge
7. L – Maxwell's bridge
8. L – Rayleigh's bridge
9. Potentiometer – high range ammeter
10. C1/C2 – Desauty's bridge
11. L – Owens's bridge
12. Impedance and power factor – LR circuit
13. B.G. – Absolute capacity of a condenser
14. Field along the axis of a coil – determination of B & M
15. M.G – emf of a thermocouple
16. M1/M2 – B.G.

**SUGGESTED BOOKS**

1. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan Publisher- Part I (1990).
2. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.Viswanathan Publisher-Part II ( 1996)
- 3.S.L Gupta and V.Kumar- Practical Physics- Pragati Prakashan – 25<sup>th</sup>,Edition (2002)

**III B.SC. PHYSICS  
SEMESTER VI**

**UPHP64**

**CORE PRACTICAL- IV – ELECTRONICS**

**5 Hours/4 Credits**

**Any Fifteen**

**Objectives:** Provide opportunity for students to learn about basic concepts of electronics through practical settings eg test conductors, insulators and semiconductors for their various properties and characteristics.

Zener diode – break down voltage.  
Zener diode – voltage regulation.  
Transistor characteristics – CE mode.  
Transistor characteristics – CC mode.  
Transistor characteristics – CB mode.  
Single stage amplifier.  
Two stage amplifier.  
Two stage amplifier – without feedback.  
LC- II filters.  
Clippers and clampers using diode and CRO.  
Colpitt's oscillator – L.Determination.  
Hartley oscillator – L.Determination.  
UJT relaxation oscillator.  
Voltage doubler.  
Dual power supply – IC 7812 IC 7912.  
Astable multivibrator – transistor/ IC 555.  
Monostable multivibrator – transistors.  
Bistable multivibrator - RS flip flop (transistors)  
Op-amp IC 741 – characteristics.  
Op-amp IC 741 – differentiator and integrator.  
Op-amp IC 741 – adder and subtractor.  
All gates – using discrete components.  
XOR and XNOR gates – using IC's –truth table verification.  
Universal NAND gate.  
Universal NOR gate.  
Verification of demorgan's theorem.  
RS,D and JK flip flop.  
Design of half adder.  
Design of full adder.  
Design of half subtractor.

Design of full subtractor.

**TEXT BOOKS**

1. Adrian C. Melissinos, Jim Napolitano, Experiments in Modern Physics, 2003.
2. Paul B. Zbar and Albert B. Malvino, Basic Electronics (A Text-Lab Manual), Tata McGraw Hill, Edition, 5. Publisher, 1983.
3. A. P. Malvino, Electronics, cybergear, 2010.
4. John Morris, Analog Electronics, Import, 1999.

**SEMESTER VI  
ELECTIVE PAPER – IV**

**UPHE64**

**ASTRO PHYSICS**

**3 Hours/3 Credits**

**Objectives:** Students in the undergraduate will learn how to unravel the secrets of the universe. The primary learning objectives are: Apply basic physical principles from a broad range of topics in physics to astronomical situations.

**Unit I**

**Introduction**

Sunlight and Spectroscopy – Atoms and Matter a Model of the atom – Simple spectroscopy – Analyzing sunlight – Kirchhoff's Rules – The conservation of energy – electromagnetic Spectrum .

**Unit II**

**Our Star: The Sun**

Ordinary Gases – The Sun's continuous spectrum – The solar absorption line spectrum – energy flow in the sun – The solar Interior – The active sun.

**Unit III**

**The Universe of Stars**

Birth of Stars – energy generation and the chemical composition of stars – Stellar Evolution and the hertz sprung (Russell Diagram) – Stellar Anatomy – Star models – theoretical Evolution of solar Mass star observational Evidence for Stellar Evolution.

**Unit IV**

**Solar System**

**The Earth and the Moon**

History of the Earth – Temperature of a planet – the atmosphere – pressure and Temperature distribution – the magnetosphere – The magnetosphere – the Moon – The Lunar surface – the lunar interior.

**Galaxies**

Introduction – Classification of Galaxies – Milky way galaxies – Over View – Differential galactic rotation – Rotation and Mass distribution – rotation curve and Doppler shift – Determination of the Rotation curve – Average gas distribution – spiral structure in the milky way – optical traces of spiral structure – Radio tracers of spiral structure – The galactic center – Distribution of Material near the center – A massive black hole.

**Unit V**

**Cosmology**



Introduction – cosmological models – steady state model – Big Bang theory.

**Book for study:**

1. Introduction to Advanced Astrophysics – Kurganoff. V, D. Reidel Publication company, 1980.

**Books for Reference:**

1. Astronomy – The Evolving Universe – Michael Zeilik, 1976.

2. Astronomy – A Physical Perspective – Mark L. Kutner, 2<sup>nd</sup> edition, 1987.

## SEMESTER VI

### SKILL BASED ELECTIVE PAPER IV

**UPHS64**

**MICROPROCESSOR**

**2 Hours/2 Credits**

**Objective:** To make undergraduate students of physics aware of basic concepts of microprocessor, Architecture of 8085 and its applications, solve simple numerical using the concept.

#### **Unit I**

Architecture of 8085 – Register organization – Concept of buses – control signals

#### **Unit II**

Pin Configuration of 8085 – Addressing mode of 8085 with examples.

#### **Unit III**

Instruction Set – Types of Instruction – Classification – Classification of Instruction

#### **Unit IV**

Data Transfer Instruction – Branch Instruction – Arithmetic and Logic Instruction

#### **Unit V**

Sub-routines – Assemble Language – programming Simple Programs

#### **Books for Study:**

1. Microprocessor – B. Ram, Dhanpat Rai Publications, 2005.
2. Microprocessor, Architecture, Programming and Applications – Ramesh Goanker, Wiley Eastern Ltd, Wiley Eastern Ltd. (1993).



**MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL - 624 101**



**BBA (BACHELOR OF BUSINESS ADMINISTRATION)**

**UNDER CBCS**

**SYLLABUS 2018-2019 ONWARDS**

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEO's)**

1. The three year BBA program aims at developing a student's intellectual ability, executive personality and management skills through an appropriate blending of business and general education.
2. The program assists the student in understanding and developing the unique leadership qualities required for successfully managing business functions in an organizational unit or an enterprise.
3. The program also seeks to prepare students for higher education in business at home and abroad.

## **PROGRAMME OUTCOMES (PO's)**

Upon completion of the program, the BBA graduate should be able to

1. Equip with advanced business acumen that helps them to understand the key business functions and organizational resources for efficient business management.
2. Acquire knowledge and skills in management, finance, accounting, marketing, human resource, technology, organizational behavior, economics, operations and business law.
3. Demonstrate the ability to analyze complex, unstructured qualitative and quantitative problems by collecting, analyzing data by using accounting, financial, mathematical, statistical tools, information and communication technologies to solve the complex business problems.
4. Apply technology to enhance organizational efficiency and create innovative business solutions.
5. Exhibit business-related behavioral skills including leadership, interpersonal, communication (written and oral), team, and lifelong learning skills.
6. Analyze global market opportunities and their influence on strategic marketing decisions.
7. Develop legal and ethical strategic plans that align with an organization's mission.

8. Demonstrate critical thinking skills in understanding managerial issues and problems related to the global economy and international business.

9. Familiarize with social responsibility issues that managers must address, including business ethics, cultural diversity, and environmental concerns.

10. Acquire entrepreneurial traits to start and manage their own innovative business successfully.

**B.B.A**

P. No.	Paper Code	Course Title	Hours	Credits	Continuous Internal Assessment (CIS)	End Semester Exam (ESE)	Total
<b>Semester I</b>							
1.	ULTA11	Part-I- Tamil	6	3	25	75	100
2.	ULEN11	Part-II-English	6	3	25	75	100
3.	UBAT11	Core I : Fundamentals of Management	5	4	25	75	100
4.	UBAT12	Core II : Financial Accounting	5	4	25	75	100
5.	UBAA11	<i>Allied</i> Managerial Economics	5	4	25	75	100
6.	UVAE11	Value Education	3	3	25	75	100
<b>Total</b>			<b>30</b>	<b>21</b>			<b>600</b>
<b>Semester II</b>							
7.	ULTA22	Part I-Tamil	6	3	25	75	100
8.	ULEN22	Part II-English	6	3	25	75	100
9.	UBAT21	Core III : Organizational Behavior	6	4	25	75	100
10.	UBAT22	Core IV: Business Environment	5	4	25	75	100
11.	UBAA22	<i>Allied</i> : Computer Applications-I Theory	5	4	25	75	100
12.	UEVS21	Environmental Studies	2	2	25	75	100

			<b>Total</b>	<b>30</b>	<b>20</b>			<b>600</b>
<b>Semester III</b>								
13.	ULTA33	Part I-Tamil	6	3	25	75	100	
14.	ULEN33	Part II- English	6	3	25	75	100	
15.	UBAT31	Core V : Cost Accounting	5	4	25	75	100	
16.	UBAA33	<i>Allied II: Computer application -II Tally</i>	5	4	25	75	100	
17.	UBAE31	Elective I : Personality Development	4	3	25	75	100	
18.	UBAN31	NME : Office Management	2	2	25	75	100	
19.	UBAS31	SBE I : Fundamentals of Insurance	2	2	25	75	100	
			<b>Total</b>	<b>30</b>	<b>21</b>			<b>700</b>
<b>Semester IV</b>								
20.	ULTA44	Part I-Tamil	6	3	25	75	100	
21.	ULEN44	Part II-English	6	3	25	75	100	
22.	UBAT41	Core VI: Business Communication	4	4	25	75	100	
23.	UBAT42	Core VII: Entrepreneurship Development	4	4	25	75	100	
24.	UBAA44	<i>Allied: Business Statistics</i>	3	4	25	75	100	
25.	UBAE42	Elective II : Merchant Banking & Services	3	3	25	75	100	
26.	UBAN42	NME II : Essentials of Management	2	2	25	75	100	
27.	UBAS42	SBE II: Project Management	2	2	25	75	100	
			<b>Total</b>	<b>30</b>	<b>25</b>			<b>800</b>
<b>Semester V</b>								
28.	UBAT51	Core VIII : Management Accounting	5	4	25	75	100	

29.	UBAT52	Core IX : Marketing Management	5	4	25	75	100
30.	UBAT53	Core X : Production Management	5	4	25	75	100
31.	UBAT54	Core XI : Human Resource Management	5	4	25	75	100
32.	UBAT55	Core XII: Operations Research	5	4	25	75	100
33.	UBAE53	Elective III: Business Law	3	3	25	75	100
34.	UBAS53	SBE III: General Aptitude and Reasoning– I	2	2	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>700</b>
<b>Semester VI</b>							
35.	UBAT61	Core XIII: Total Quality Management	5	4	25	75	100
36.	UBAT62	Core XIV: Management Information System	5	4	25	75	100
37.	UBAT63	Core XV: E-Commerce	5	4	25	75	100
38.	UBAT64	Core XVI: Financial Management	5	4	25	75	100
39.	UBAT65	Core XVII: Research Methods for Management	5	4	25	75	100
40.	UBAE64	Elective IV: Service Marketing	3	3	25	75	100
41.	UBAS64	SBE IV: General Aptitude and Reasoning– II	2	2	25	75	100
42.	USEA61	Extension Activity	-	3	25	75	100
<b>Total</b>			<b>30</b>	<b>28</b>			<b>800</b>
<b>Total credits</b>				<b>140</b>		<b>Total</b>	<b>4200</b>

SBE – Skill Based Elective, ONME – Other Non Major Elective

CIA – Continuous Internal Examination, ESE – End semester Examination

## **UBAT11 - FUNDAMENTALS OF MANAGEMENT (MAJOR)**

### **OBJECTIVES:**

1. To introduce the basics of management knowledge and to enable the student to correlate it with the practical aspect.
2. To build a base for learning management knowledge and to acquire prerequisite skills.
3. To provide a basis of understanding to the students with reference to working of business organization through the process of management.
4. To enable the student to understand the basic principles of management and functions.

### **Semester I**

**No. of Credit – 4**

#### **UNIT-I**

Management Definition – Nature, Scope & Importance, Process – Skills of a manager – Administration Vs Management – Management Function – Approaches of Management – Theories of Management.

#### **UNIT –II**

Planning – Nature and Importance – Principles and Process- Types of Plan – Management By Objectives (MBO) – Decision making – Types – Co-ordination.

#### **UNIT-III**

Organization – Principles and process – Organization structure – Formal & Informal organization – Delegation – Authority & Responsibility – Decentralization

#### **UNIT-IV**

Direction – Motivation – Leadership styles – Communication process- Communication Channels – Barriers to Communication

#### **UNIT-V**

Controlling – Types of control – Concurrent and forward control – Principles of control – Control techniques

### **Text & Reference:**

1. Principles of Management – K. Natarajan & K.P. Ganesan
2. Management Theory & Practice – C.B. Gupta
3. Principles of Management – Koontz and O'Donnell
4. Essentials of Management – L.M. Prasad



## **UBAT12 -FINANCIAL ACCOUNTING (MAJOR)**

### **Objective:**

1. To impart basic accounting knowledge
2. To inculcate basic accounting concepts and postulates
3. To provide wide knowledge about final accounts
4. To build a base for income and expenditure and receipts and payments accounts.

### **Semester I**

**No. of Credits – 4**

#### **UNIT – I**

Definition of Account – Nature of Accounting – Accounting Concepts and Postulates - Double Entry Vs Single entry – Books of Accounts, Journal – Ledger - Subsidiary Books, - Cash book – Purchase book – Sales book – Sales return book – Purchase return book.

#### **UNIT - II**

Trial Balance – Errors – Verifications of Errors – Bank reconciliation statement

#### **UNIT - III**

Final Accounts of Sole Trader – Trading & Profit and Loss Account and Balance Sheet with simple Adjustments

#### **UNIT - IV**

Methods of Depreciation –Straight Line Method, Written Down Value Method and Annuity Method

#### **UNIT - V**

Capital and Revenue – Accounts of Non-trading organizations - Income and Expenditure Account – Receipts and Payments Account

**(Marks – Theory 20% and Problems 80%)**

#### **Text & Reference:**

1. Advanced Accountancy – S.P.JAIN& K.L.NARANG, Kalyani Publishers
2. Advanced Accountancy – M.C.SHUKLA, T.S.GREWAL & S.C.GUPTA  
Sultan Chan & Sons
3. Advanced Accountancy – R.L.GUPTA& RADHASAMY.
4. Principles of Accountancy – VINAYAKAM, MANI & NAGARAJAN.
5. Advanced Accountancy – Reddy & Mouthy

## **UBAA11 -MANAGERIAL ECONOMICS (ALLIED)**

### **Objective:**

1. To expose students to basic micro economic concepts.
2. To enable students to apply economic analysis in the formulation of business policies.
3. To enable students to use economic reasoning to problems of business.
4. To build a wide knowledge about basic Indian economic system.

### **Semester I**

**No. of Credit – 4**

#### **UNIT I**

Managerial Economics - Definition, Nature and Scope – Relationship between Managerial Economics with other disciplines – Role of Managerial Economics - Concept of Utility – Law of Diminishing Marginal Utility

#### **UNIT –II**

Theory of demand – determinants – Law of demand – demand functions– demand curve – types of demand – elasticity of demand – methods of measuring elasticity of demand – Supply - Law of supply – Elasticity of Supply

#### **UNIT-III**

Production Function – Laws of Production function – Law of Variable Proportion – Isoquants – Marginal rate of substitution – Economies of Scale - Law of Returns to Scale – Cobb Douglas Production function.

#### **UNIT-IV**

Cost concepts – Cost and output relationship – Total, Average and Marginal cost analysis – short run and Long run – Break even Analysis.

#### **UNIT-V**

Market structure – Different types of market – Pricing under Perfect competition, Monopoly – Monopolistic competition and Oligopoly –Pricing - Methods of Pricing.

### **Text & Reference:**

1. Managerial Economics – R.L. Varshini & K.L. Maheswari
2. Managerial Economics – S. Sankaran
3. Managerial Economics – Sundaran
4. Managerial Economics – S.N. Srinivasan

## UVAE11 -VALUE EDUCATION (SBS)

### Objective:

1. To impart basic knowledge on value system.
2. To inculcate value concepts of family and health.
3. To provide wide knowledge about ethics in life.
4. To build a social stigma among students.

### Semester I

No. of Credits -3

#### UNIT I

Values – Definition- Value Crisis – Need for practicing positive values for good life – value Erosion – its impact on individual, societal, cultural level – way out.

#### UNIT II

Family, Material, Human values – Good Health – Individual and Intellectual freedom – Human progress – Production and Distribution – Prosperity and peace – Aesthetic values – Sense of Beauty – Moral and Ethical values – Conscience – Integrity – Fairness.

#### UNIT III

Societal values – Cooperative living – Healthy Behavior – Justice – Social Responsibility – Free from Bribery and Corruption – Good Citizen – Good Society – Pursuit of Excellence – Psychological values – Self Esteem and Acceptance – Emotional Intelligence – Spiritual values – Devotion and Self – Fulfillment.

#### UNIT IV

Bio-Ethics – Definition – Goals and Objectives – Love of life – Animal abuse and Ethics – Negligence and wrong judgments – Issues in genome and organ transplantation- donors-Drugs – Morality – Social Ethics – Child Labor and Bonded Labor.

#### UNIT V

Women and Development – Sex Vs Gender – Women’s Rights -Factors affecting development – Violence against women -Right to privacy – Abortion and reproductive rights – Social stigma – Women empowerment – Social, Economic and Political – Government programs and policies.

### Text & Reference:

1. Value Education – N. S. Ragunathan
2. Business Ethics and Values – Dr. S. Sankara

## **UBAT21 -ORGANISATIONAL BEHAVIOUR (MAJOR)**

### **Objective:**

1. To gain a solid understanding of human behavior in the workplace from an individual, group, and organizational perspective and frameworks and tools to effectively analyze and approach various organizational situations.
2. To familiarize students with contemporary organizational behavior theories and help them to understand predict and manage people better.
3. To acquaint the students with the fundamentals of managing business.
4. To understand individual and group behavior at work place so as to improve the effectiveness of an organization.

### **Semester II**

**No. of Credits – 4**

#### **UNIT- I**

Meaning- Objectives, Nature and Scope of organizational behavior – Importance of OB - Disciplines contribution to organizational behavior –Concept of organizational behavior - Theories of organization behavior –Classical – Neo classical and Modern theories – Approaches to OB.

#### **UNIT –II**

Foundations of Individual Behavior – Nature of Individual behavior – Group behavior – Meaning , Difference between Individual and Group Behavior - Personality – Definition - Factors /Determinants of Personality – Types of Personality – Attitude and Values.

#### **UNIT- III**

Leadership – Concept – Qualities of effective Leadership – Leadership Styles – Definition and concept of Learning. Morale, Motivation – Theories and Process of Motivation

#### **UNIT- IV**

Types of groups – formation of Group - Group dynamics – Group cohesiveness – Group decision making- Conflict - Types of Conflict – Methods of Managing Conflict - Resolution of conflict - Stress – Meaning and concept – Causes of stress – Effects of stress - Managing stress.

#### **UNIT –V**

Organizational Change – Meaning, nature – Causes of change – Resistance to change - overcoming the resistance – Organization Effectiveness – Organization Climate – Organization Culture, Organization Development – Counseling – types of counseling.

**Text & Reference:**

1. Organisational Behaviour - LM. Prasad, , Sultan Chand & Sons, New Delhi.
2. Organizational Behavior,-Khanka, Sultan Chand & Sons, New Delhi.
3. Organizational Behavior- Aswathappa
4. Organisational Behavior - Fred Luthans, McGraw Hill.

**UBAT22 -BUSINESS ENVIRONMENT (MAJOR)****Objective:**

1. To familiarize students with the nature of business environment and its components in business decision making.
2. To increase the awareness of the interconnected nature of today's world, and how economic, social, political and environmental issues can impact international integration and business.
3. To impart the environmental scanning skills to student to identify the business opportunity and challenges.
4. To enable students to analyze and interpret the current events relating to globalization and international business.

**Semester III****No. of Credits 4****UNIT – I**

Business Environment - Meaning –concept – Nature – Significance - various environments affecting Business – social economic political and legal, culture, competitive, demographic, technological and their impact in Business.

**UNIT – II**

Government & Political: Government and business relationship in India – Provision of Indian constitution pertaining to business - State regulations on business – Industrial licensing policy.

**UNIT – III**

Society and Culture: Culture – Elements of culture – Impact of foreign culture - Traditional values and its Impact – Castes and communities – linguistics religious groups – Joint family system. Social responsibilities of Business – Responsibilities to shareholders, customer, community, the government –Business Ethics.

## **UNIT – IV**

Economic Environment: Economic system, Socialism – Capitalism – Mixed economy – their impact on business – Public sector, Private sector, Joint sector – Objectives, Growth, Achievements and failures of Public sector in India.

## **UNIT – V**

Legal and Technological Environment: Industrial Licensing Policy 1991 – FEMA- SEBI - TRIP's -WTO – GATT - Impact of technological changes in business

### **Text & Reference:**

1. Business Environment - Francis Cherunilam
2. Essentials of Business Environment. - Aswathappa K.-
3. Business and Society - Sankaran. S.
4. Economic Environment of Business - Sampath, Mukerji
5. Business and Government - Ghosh P.K.
6. Business Environment – Rosy Joshi

## **UBAA22- COMPUTER APPLICATION (ALLIED)**

### **Objective:**

1. To held the students to know the Fundamentals of Computers.
2. To held them to understand how to use Computer applications in day to day Applications.
3. To introduce the students to the fundamentals of computers and familiarize them MS Office.
4. To introduce the students with some basic tools and applications on power point presentation.

## **Semester II**

**No. of Credits – 4**

### **UNIT – I**

Meaning of computer – Characteristics – Area of application cycle – components –Memory unit – Input and Output devices – Hardware and Software operation system –Introduction to Windows 2007 logging on Desk top and task Icons on desk top – Start menu options - Creations of files and folders, Office Automation –MS word - Short cut for MS word – Creating word documents-moving, correcting and inserting text – Printing a document.

### **UNIT – II**

Editing MS word document -Selecting, Copying, moving text – using Redo and undo features – spell check – formatting text – inserting page numbers – headers and footers - Word count –Auto

correct - Working with tables, using graphics – Saving, opening and closing documents, mail merge.

### **UNIT – III**

Introduction to MS Excel and its features – Programmes and applications - spread sheets – Building worksheets – Entering data, editing and formatting worksheets – Creating and formatting different types of charts – Application of financial and statistical function – Organizing data using Automatic rule saving, opening and closing of work books.

### **UNIT – IV**

MS -Access – Creating a new database – creating a new table - saving – creating primary key – adding fields, deleting fields- changing the views and moving fields.

### **UNIT-V**

**MS POWER POINT** Introduction — Opening new Presentation — Different presentation templates — Setting backgrounds — Selecting presentation layouts -Creating a presentation — Setting presentation style — Adding Text to the presentation ,Formatting a presentation — Adding style — Color and gradient fills — Arranging objects — Adding Header & Footer — Slide Background — Slide layout Adding Graphics to the presentation — Inserting pictures, movies, tables, etc. Drawing Pictures - Setting Animation & transition effects — adding audio and video Printing Handouts and generating standalone presentation viewer

### **Text & Reference:**

- 1. Windows XP Professional black book, the ultimate user's Guide, Published by Dream Tech, New Delhi.**
- 2. PC Software for windows made simple – R.K. Taxali, TMH -1998.**
- 3. Computer & information processing – William M. Fuori and Lawerence J. Aufiero.**
- 4. Microsoft Office 2007 by Greg Perry – Pearson Education, Low price Edition 2007.**
- 5. Working in Microsoft Office by Ron Mansfield, Tata McGraw Hill Publishing, New Delhi.**

## UEVS21 -ENVIRONMENTAL STUDIES

### Objectives:

- 1) To develop knowledge base of students about the demographic and environmental factors affecting Business.
- 2) To make the students aware of environmental problems related to Business and Commerce.
- 3) To inculcate values of Environmental ethics amongst the students.
- 4) To build knowledge about the environment which is helpful to the society.

### Semester II

No. of Credits – 2

#### UNIT I

Environmental Studies: Definition – Multidisciplinary nature – Scope and importance – Need for public awareness. Natural Resources : Forest resources: Use and over- exploitation – Deforestation – Timber extraction – Mining – Dams and their effects on forests and tribal people – Water Resources: Use and over utilization of surface and ground water – Flood – Drought – Conflicts over water – Dams- Benefits and problems – Mineral resources: Use and exploitation – Environmental effects of extracting and using mineral resources – Food resources: World food problems – changes caused by agriculture and overgrazing – Effects of modern agriculture – Fertilizer and pesticides problems – Water logging – Salinity – Energy Resources: Growing energy needs – Renewable and non-renewable energy sources – Use of alternate energy sources – Land Resources: Land as a resource – Land degradation – Man induced landslides – soil erosion- Desertification – Case studies – Role of individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

#### UNIT II

Ecosystems: Concept – Structure and function – producers, consumers and decomposers – Energy flow – Ecological system – Food chains, food webs and ecological pyramids – Introduction, characteristics, Types, structure and function of Forest ecosystem – Grassland ecosystem – Desert ecosystem – Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

#### UNIT III

Biodiversity and its Conservation: Definition, Genetic, species and ecosystem diversity – Biogeographical classification of India – Value of biodiversity: Consumptive use – Productive use –



Social, Ethical, Aesthetic and Option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: Habitat loss – Poaching of wild life, man wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-Situ and Ex-Situ conservation of biodiversity.

#### **UNIT IV**

Environmental Pollution: Definition- Causes, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal pollution and Nuclear hazards – Solid waste management; Causes, effects and control measures of urban and industrial wastes- Disaster management: Floods, earthquakes, cyclone and landslides – Role of individual in prevention of pollution – Case studies.

#### **UNIT V**

Social Issues and the Environment: From unsustainable to sustainable development – Urban problems related to energy – water conservation, rainwater harvesting, watershed management – Resettlement and rehabilitation of people – Its problems and concerns – Environmental ethics; Issues and solutions – Climate change, Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust – Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environment legislation – Public awareness.

Human population and the Environment: Population growth – variation among nations – Population explosion – Family welfare program – Environment any human health – Human rights – value education – HIV/AIDS – Women and child welfare – Role of Information Technology in environment and human health – Case studies.

Field Work (25 marks)

- Visit to a local area to document environmental assets – River, Forest, grassland, hill, mountain.
- Visit to a local polluted site -Urban, rural, industrial, Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes etc.,

**Text & Reference:**

1. Arul P, (2008) “A Textbook of Environmental Studies” Selvi Publications.
2. Miller T.G. “Environmental Science: Wadsworth Publishing Co.
3. Townsend C, Harpet J and Michael Gagon “Essentials of Ecology”, Blackwell Science.
4. Trivedi R.K and Goel P.K “Introduction to Air Pollution”, Techno-Science Publication.
5. Jadhav, H &Bhosafe, V.M (1995) “Environmental Protection and Laws”, Himalaya Publishing house.

### **UBAT31 -COST ACCOUNTING (MAJOR)**

#### **Objectives:**

- 1) To impart the knowledge of basic cost concepts, element of cost & preparation of Cost Sheet.
- 2) To provide basic knowledge of important methods & techniques of costing.
- 3) To introduce the basics of cost accounting and enabling the student to correlate the two branches namely financial and cost accounting.
- 4). to build a base for learning management accounting.

#### **Semester III**

**No. of Credits 4**

#### **UNIT - I**

Meaning, Nature and Scope of Cost Accounting – Concept and Classification of Cost – Elements and Methods of Cost -Advantages – limitations –Relationship of Cost Accounting and Financial Accounting –Preparation of Cost Sheet.

#### **UNIT - II**

Materials – Materials control – Meaning – Objectives – Advantages - Methods of Stock Control –EOQ - Levels of Stock – Receipts and Issues of materials – ABC Analysis -Stores Ledger – FIFO, LIFO, Simple Average and Weighted Average Method.

#### **UNIT - III**

Labor cost – Time-Keeping and Time-Booking – Methods of Remuneration and Incentive Schemes – Methods of wage payment -Time rate and Piece rate system - Overtime and Idle time – Labor Turnover – Causes, Types and Measurement.

#### **UNIT - IV**

Overheads – Collection, Classification, Allocation, Apportionment and Absorption – Recovery Rates – Over and Under Absorption -Machine Hour Rate – Job Costing –Contract Costing.

## **UNIT - V**

Operating Costing – Process Costing: Normal Loss, Abnormal Loss and Abnormal Gains (excluding Equivalent Production and Inter process). Marginal Costing - Nature of marginal Costing – Advantages – Limitations – Break Even Analysis – Decision making Problems.

**(Marks: Theory 40% and Problems 60%)**

### **Text & Reference:**

1. Cost Accounting – R.S.N. PILLAI AND V. BAGHAVAGHI, S. Chand & Company Ltd.
2. Cost Accounting – S.N. MAHESHWARI, Sultan Chand & Sons.
3. Cost Accounting Principles and Practice– S.P. JAIN AND K.L. NARANG, Kalyani Publishers
4. Cost Accounting – S.P.IYENGAR, Sultan Chand & Sons.
5. Principles and Practice of Cost Accounting – N.K. PRASAD, Book Syndicate Pvt. Ltd.

## **UBAA33 - COMPUTER APPLICATION -II TALLY (ALLIED)**

### **Objective**

1. To introduce the students to the fundamentals of computers and familiarize them with the jargon commonly used by computer literates.
2. To introduce the students with some basic tools and applications in MS office.
3. To enable them in preparing report, presentation, and calculation effectively and analyze data for decision making using data of different kind.
4. To introduce the student to the Tally and its applications and thereby empowering them.

### **Semester III**

**No. of Credits 4**

### **UNIT – I**

Data analysis using spread sheets (MS EXCEL), sorting data, editing data, converting data.

### **UNIT -II**

Deriving simple univariate (single variables) tables, presentations using bar chart, pie chart, and histograms, Deriving mean, median, mode and standard deviations.

### **UNIT III**

Exporting the data from MS EXCEL to SPSS, inserting new variables in SPSS, Deriving cross tables with multiple variables, Chi square, ANOVA, Regression output.

### **UNIT IV**

Basics in TALLY – installation and overview of the important terminology.

### **UNIT V**

Creations, Entering transactions and preparation of Tribal balance and final accounts, ratio analysis and comparative analysis.

#### **Text & Reference:**

1. Naamrata Agarwal, “Financial Accounting using Tally”, dream tech publisher New Delhi, 2003.
2. K.K. Nidhani, Implementing Tally.

## **UBAE31 -PERSONALITY DEVELOPMENT (ELECTIVE)**

#### **Objective:**

1. To encourage students to develop balanced self-determined behavior
2. To help students in enhancing self, increasing life satisfaction and improving the relationship with others.
3. To develop new ability to develop new problem solving skills in group and use these skills in personal life.
4. To encourage students to develop their personality by understanding the influence of environmental, educational and situational factors and how to modify the behavior

#### **Semester III**

**No. of Credits 3**

#### **UNIT I**

**INTRODUCTION:** Definition of Personality – Determinants of personality – biological, psychological and socio-cultural factors – Misconceptions and clarifications, need for personality development.

#### **UNIT – II**

**SELF AWARENESS AND SELF MOTIVATION:** Self-analysis through SWOT and Johari Window, elements of motivation – Seven rules of motivation – Techniques and strategies for self-motivation –goal setting based on principles of SMART –self-esteem.

### **UNIT-III**

**INTERPERSONAL SKILLS:** Concept of team in work situation – promotion of team spirit – characteristics of team player – awareness of one’s own leadership style and performance – nurturing leadership qualities – Emotional intelligence and leadership effectiveness –Empathy and social skills - Negotiation skills –Definition of ground rules, clarification and justification, bargaining and problem solving, closure and implementation

### **UNIT – IV**

#### **MEMORY AND STUDY SKILLS**

Definition and Importance of memory – causes of forgetting – how to forget? (thought stopping), how to remember? (Techniques for improving Memory) – Techniques of passing Exams – Management of Examination fear.

### **UNIT – V**

**POWER OF POSITIVE THINKING:** Nurturing creativity – decision making and problem solving – thinking power – seven steps for dealing with doubt – Traits of positive thinkers and high achievers, goals and techniques for positive thinking – enhancement of concentration through positive thinking – practicing positive lifestyle.

#### **Text and Reference**

1. Swaminathan V.D & Kaliappan. K.V. (2001) Psychology for Effective living, Chennai, The Madras Psychology society.
2. Robbins, S.B (2005) Organizational Behavior, New Delhi, Prentice Hall of India.
3. Smith. B (2004) Body Language, Delhi, Rohan Book Company.

## **UBAS31 - FUNDAMENTALS OF INSURANCE (SBE)**

### **Objective:**

1. To encourage students to develop the knowledge about Insurance.
2. To help students to understand the role of micro finance institution in enhancing self, increasing life satisfaction and improving the relationship with others.
3. To develop new ability to develop awareness on insurance types.

### **Semester III**

**No. of Credit – 2**

#### **UNIT – I**

Definition of Insurance – Classification of contracts of insurance – Marine and Non-Marine Insurance.

#### **UNIT – II**

Life Assurance – Objects of Life assurance – Principles of Life Assurance – Assignment and Nomination – Lapses and Revivals – Surrender values and loans – Claims – Double Insurance.

#### **UNIT – III**

Marine – Insurance – Principles of Marine insurance – Functions of marine insurance – Types of marine policies – Warranties – kinds of marine Losses.

#### **UNIT – IV**

Fire Insurance – Principles of law as applied to fire insurance. Fire waste – Hazard Types of fire policies.

#### **UNIT – V**

Cover Notes – Surveys and Inspections Average – Reinsurance Renewals.

#### **REFERENCE BOOKS**

1. Sharma R.S., Insurance: Principles and Practices, Vora, Bombay.
2. Arifkhan M, Theory and Practice of Insurance, Education Book House.
3. Srinivasan M.N., Principles of Insurance Law, Ramanuja Publishers, Bangalore.
4. Dr. B. Varadharajan, Insurance: Vols. I and II, Tamil Nadu Text Book Society IV - SBEC
5. Dr. R. Haridas, Life Insurance in India, New Century Publication, New Delhi.

## **UBAN31 - OFFICE MANAGEMENT (ONM)**

### **Objective:**

1. To acquaint the students to the basic office management concepts and theory to understand how organizations functions and apply those ideas in real world situations.
2. To impart the planning skills to students to formulate long-term and short term objectives of the organization through tools and processes.
3. To familiarize the students with the complexity and wide variety of issues the managers face in directing and organizing today's business.

**Semester – III****No. of credits 2****Unit –I**

**Office Management:** Basic concepts of office – Meaning, Importance – Functions – size of the office – Office Management – Meaning and Scope, Functions and Qualifications of Office manager.

**Unit- II**

**Administrative arrangements and Physical conditions:** Office location – characteristics / Qualities of office building –Office layout – preparing the layout; Office Administration – Administrative Office Management- Objectives, Functions and Principles,

**Unit –III**

Office equipment-Computer – Fax- Duplicator – Telephone – Intercom – Storage equipment

**Unit –IV**

Mail services and Communication – Office Correspondences – Handling mail.

**Unit –V**

Office Supervisor – Qualifications and Qualities – Duties and Responsibilities

**Text and Reference Books:**

1. Office Management – Dr. I.M.SAHAI –Sathiya Bhawan Agra
2. Office organization And Management – S.P Arora – Vikas publishing House Pvt Ltd.
3. Office Management - R.K.Chopra
4. Office Management – R. S. N. Pillai & Bagavathy, S. Chand Publications.

## **UBAT41 -BUSINESS COMMUNICATION (MAJOR)**

### **Objectives:**

- 1) To teach the students to understand the concept, process and importance of communication.
- 2) To enable students to gain knowledge of media of communication.
- 3) To help the students to develop skills of effective communication - both written and oral.
- 4) To help students to acquaint with application of communication skills in the business world.

### **Semester IV**

**No. of Credit – 4**

#### **UNIT I**

Understanding Communication – Definition of Business Communication – Difference between communication & Business Communication, Business Communication – Objectives, Importance- Process of Communication – Principles of Effective Communication – Barriers of Communication - Communication Ethics.

#### **UNIT –II**

Types of Communication - Formal and Informal Communication, Inter – Personal and Intra Personal Communication – Verbal Communication and its types – Non-Verbal Communication and its types

#### **UNIT-III**

Business Correspondence – Need, Functions, Kinds of Business letter- Planning Business Messages-Structure and Layout of business letter.

#### **UNIT-IV**

Employment related Communication – Introduction to Application Letter – Types of Application Letter – Forms and content of an Application Letter – Resume / Bio Data / Curriculum Vitae. Enquiries and Replies, order and Execution, Specimen Letters, Collection Letter, Circular Letter, Sales Letter.

#### **UNIT-V**

Other Forms of Communication; Report Writing – Importance – Types – Preparation of a Report – Executive Summaries – Presentation Skills – Writing Proposals – Group discussions –Legal Aspects of Business Communication

### **Text & Reference:**

1. Essentials of Business Communication – Rajendra Pal, J.S. Korlahalli.
2. Business Communication – Paten Shetty
3. Business English and Correspondence – Agarwal A.N.



4. Business Communication – Dr. Kathiresan and Radha

## **UBAT42 - ENTREPRENEURSHIP DEVELOPMENT**

### **Objective:**

- 1.To provide knowledge of entrepreneurship and also provide necessary inputs for the creation of the new ventures.
- 2.To enable them to meet out challenges of starting new ventures and introducing new product and service ideas.
- 3.To familiarize the students with the different stages of project preparation.
4. To build entrepreneurship development activities undertaken by Indian government

### **Semester IV**

**No. of Credit – 4**

#### **UNIT – I**

Entrepreneurship: Concepts, types and functions of entrepreneurs – Entrepreneurial Development in India – Role of entrepreneurs in economic development.

#### **UNIT – II**

Business ideas: Steps to start a business- Licensing, Registration and local laws- problem and prospectus to start a business. Preparation, of project report- format of project, appraisal-market, technical, financial and economic feasibility.

#### **Unit – III**

Institutions and development of entrepreneurs – Role of DIC, SISI, SIDCO, NSIC, MAYE, KVIC, TCO'S, ITCOT and Entrepreneurial Guidance Bureau – incentives and subsidies to entrepreneurs and commercial banks in financing entrepreneurs.

#### **UNIT – IV**

Promoting enterprises – SSI – MSME – Role and growth of SSI – Regulations governing SSI – incentives and concessions for SSI units – sickness in SSI – causes and remedies

#### **UNIT – V**

Problems and prospects of Entrepreneurs – Developing women and rural entrepreneurs – Entrepreneurs' motivation.

### **Text & Reference:**

1. Entrepreneurial Development - Gupta, C.B. and Srinivasan N.P.,
2. Entrepreneurial Development -Dr. V.R. Palanivelu, Himalaya Publishing House Mumbai.
3. Entrepreneurial Development- Dr.K. Arul & Dr.A. Subanginidevi, Shanlax Publication, Madurai.
4. Organisation and Management of Small Industries- Vasanth Desai,
5. Entrepreneurship Development -Saravanel, P.,

6. Environment and Entrepreneurship - Tandon, B.C.,
7. Developing Entrepreneurship - Rao T.V., and Udaipareek,

## **UBAA44 -BUSINESS STATISTICS (ALLIED)**

### **Objectives:**

1. To understand the concept of population and sample.
2. To use frequency distribution to make decision.
3. To understand and to calculate various types of averages and variation.
4. To use regression analysis to estimate the relationship between two variables and to solve LPP to maximize the profit and to minimize the cost.

### **Semester IV**

**No. of Credits 4**

#### **UNIT-I**

Introduction – Classification and tabulation of statistical data – Diagrammatic and graphical representation of data

#### **UNIT –II**

Frequency distribution – Simple and Cumulative – Average, Mean , Median , Mode and Geocentric Mean – Measures of Dispersion , Range , Quartile deviation – Standard Deviation and their co-efficient

#### **UNIT –III**

Types of Samples – use of sampling in Business – Probability – Addition and Multiplication laws – Conditional probability

#### **UNIT –IV**

Correlation – Karl Pearson’s Rank and Correlation co-efficient – Simple curve fittings by method of least squares – Regression analysis

#### **UNIT –V**

Time series Analysis – Trend – Seasonal variation, Calculation of straight line and moving average trend – Seasonal variation – Sales analysis and business forecasting

### **Text and Reference:**

1. S.P.Gupta – Statistical Methods
2. R.S.N. Pillai and Bagavathi – Statistics.

**Note: Theory – 40% and Problem – 60%**

## **UBAE42 -MERCHANT BANKING AND SERVICES (ELECTIVE)**

### **Objective:**

1. To give in-depth understanding of the concept and issues and various aspects of merchant banking and financial services.
2. To impart the skills in deciding leasing, hire purchase and bill discounting schemes offered by financial institution.
3. To familiarize the students with the corporate advisory services of financial institution and issue procedure involved in equity and debenture issue

### **Semester IV**

**No. of Credits 3**

#### **UNIT I**

Indian financial system – Institutional arrangements – Money market and capital market – Reserve bank of India – Commercial banks – Cooperative banks – Regional banks – Foreign banks.

#### **UNIT II**

Financial services – An overview – Growth of financial services in India – Financial services sector problems – Regulatory frame work – RBI – SEBI.

#### **UNIT III**

Recent developments in financial services – Consumer finance – Credit cards – Debit cards and smart cards – Hire purchase – Leasing – Bill discounting - Loan syndication.

#### **UNIT IV**

Merchant banking – Mutual funds – Venture capital – Factoring – Forfeiting – Portfolio management services – Mergers and Acquisition.

#### **UNIT V**

Financial from international sources and financing of exports – EXIM BANK – Export Credit Guarantee Corporation (ECGC).

#### **Reference Books:**

1. Financial Services – M.Y.Khan – Tata McGraw Hill Publishing Co-Ltd.
2. Indian Financial and Hire Purchase System – Vikas Publication House.
3. Merchant Banking and Financial Services – Dr.S.Gurusamy, Thomson.

## **UBAS42 - PROJECT MANAGEMENT (THEORY)**

### **Objective:**

1. To give in-depth understanding of the concept and issues and various aspects of project management.
2. To impart the strategies of positioning in project management and identify the right method of promotional events for an organization to introduce new product, offer etc.
3. To familiarize the students with the budget preparation for project and measuring the performance of project.

### **Semester IV**

**No. of Credits 2**

#### **UNIT - I**

Project management - meaning, definition- features – Purpose of Project management- classification of projects - stages in project cycle – identification, formulation and implementation – Phases of Project management – 7s of Project management.

#### **UNIT - II**

Feasibility study of Projects – Market feasibility, technical feasibility, financial feasibility - different types of appraisal to determine feasibility – feasibility report.

#### **UNIT - III**

Social Cost benefit Analysis - The rationale for Social cost benefit analysis, UNIDO approaches for Social Cost benefit analysis, Methods followed by Financial Institutions.

#### **UNIT - IV**

Estimation of Project cost – Preliminary expenses – cost of acquisition of fixed assets, cost on technical knowhow, acquisition of patents and licenses – documentation charges – preparation of project report

#### **UNIT - V**

Institutional Finance for Projects – National and state level – IDBI, SIDBI, GIC, LIC, UTI, SFC, IFC– functions and schemes

#### **Text and Reference:**

1. Project Management - Vasant Desai, Himalaya Publishing House, Mumbai.
2. Project Management - Goel B.B., Deep & Deep Publications Pvt. Ltd., New Delhi.
3. Project Planning, Analysis - Prasanna Chandra, Tata McGraw-Hill, New Delhi.
4. Project Management and Control -Rao .P .C .K., Sultan Chand & Sons, New Delhi.
5. Project Management: Strategic Financial Planning, Evaluation, and Control - Bhavesh M Patel., Vikas Publishing House, New Delhi.

## **UBAN42 - ESSENTIALS OF MANAGEMENT (ONM)**

### **Objective**

1. To provide a basis of understanding to the students with reference to working of business organization through the process of management.
2. Student will also get the idea about new developments in management.
3. To introduce the basics of management knowledge and enabling the student to correlate it with the practical aspects of its application.
4. To build a base for learning management knowledge and acquiring prerequisite skills.

### **Semester – IV**

**No. of Credits 2**

#### **UNIT – I**

Management: Importance – Definition – Nature and Scope of management process – Role and Functions of a Manager – Levels of Management – Development of Scientific Management and other Schools of thought and approaches.

#### **UNIT – II**

Planning: Nature – Importance – Forms – Types – Steps in planning – Objectives – Policies – Procedures and methods – Nature and Types of Policies.

#### **UNIT- III**

Organizing: Types of Organization – Organization structure – Elements of organization.

#### **UNIT – IV**

Authority – Delegation – Decentralization – Difference between Authority and power – responsibility – Centralization.

#### **UNIT – V**

Co-ordination – Need, Types of co-ordination – Principles – Techniques of co-ordination  
controlling- Meaning and Importance – control process – Techniques of control.

#### **Text & Reference:**

1. Principles of management – L.M. Prasad
2. Principles of Management – DinkarPagare
3. Business Management – C.B. Gupta
4. Business Management – N. Premavathy

## **UBAT51 -MANAGEMENT ACCOUNTING (MAJOR)**

### **Objective:**

1. To familiarize the students with the accounting statement analysis.
2. To help the students acquire knowledge on ratio analysis by using accounting data and other related information for decision making, planning and control
3. To acquaint students with the budgetary preparation and cash flow and fund flow for business planning.
4. To develop the critical and analytical skills of students in analyzing the product, project, divisional and organizational performance by using managerial accounting information.

**Semester – V**

**No of Credits - 4**

### **UNIT - I**

Management Accounting – Definition – Objectives – Nature and Scope – Merits and Limitations – Functions – Management Accounting Vs Financial Accounting Vs Cost Accounting.

### **UNIT – II**

Ratio Analysis – Interpretation, Benefits, Limitations, Classification of ratios – Liquidity, Profitability and Solvency ratios - Construction of Balance sheet (simple problems).

### **UNIT - III**

Fund Flow Statement – Cash Flow Analysis – Uses and Construction – Distinction.

### **UNIT - IV**

Budget and Budgetary Control – Meaning, Objectives - Characteristics and Limitations – Types of Budgets - Preparation of Sales, Production, Raw material Cost, Cash, Master Budgets and Flexible Budgets.

### **UNIT - V**

Marginal Costing – Objectives and Limitations – Cost Volume Profit (CVP) Analysis –Break Even Analysis – Merits and Demerits - Margin of Safety.

### **Text & Reference:**

1. Management Accounting – S.N. MAHESWARI, Sultan Chand & Sons
2. Management Accounting -R.S.N. PILLAI & BHAGAVATHI, Sultan Chand & Sons
3. Accounting for management – Dr. V. R. Palanivelu
4. Management Accounting – N.P.SRINIVASAN

## **UBAT52 -MARKETING MANAGEMENT (MAJOR)**

### **Objective:**

1. To familiarize the student with the concept in marketing and make them to design and implement the best combination of marketing actions to carry out a firm's strategy in its target markets.
2. To develop the skills in market analysis and design customer driven strategies with regard to product, pricing, and promotion
3. To inculcate the students' skills in applying the analytic perspectives, decision tools, and concepts of marketing.
4. To enable to take decisions involving segmentation, targeting and positioning; product offering; pricing; distribution channels and marketing communications.

**Semester – V**

**No of Credits - 4**

### **UNIT – I**

Definition of Marketing: Marketing concepts – Meaning, Objectives – Importance – Distinction between marketing and selling - Types of market – Functions – Marketing management - Marketing Environment: Various factors affecting the marketing function

### **UNIT – II**

**Buyer Behavior:** Meaning of buyer and seller - Buying motives – Buying Process- Explanation of motivation - Market Segmentation - bases - Marketing strategy –Consumer Behavior -Factors influencing consumer behavior

### **UNIT – III**

**The Product**–Nature -Types - consumer goods -Industrial goods - New product development – Product life cycle (PLC) and strategies - Product mix - modification & Elimination - Packaging – Brand Image – Brand Identity- Brand positioning and leveraging the brands – Brand Equity

### **UNIT - IV**

**Pricing:** Pricing – Meaning –Influencing factors – Objectives – Pricing methods – Kinds of price determination – Procedure for price determination - Competitors action to price changes – multi product pricing

### **UNIT - V**

**Place and Promotion:** Definition and Types of Channel – Channel selection and problem – Levels of channels - Personal selling –Process - Advertising – Objectives – Types – Sales promotion – Objectives – Sales promotion methods, publicity and public relations.

**Text & Reference:**

1. Marketing Management - Philip Kotler
2. Marketing Management - Rajan Nair
3. Fundamentals of modern marketing - Cundiff and Still
4. Marketing Management - Nanda Kumar
5. Marketing Management – R. S. N. Pillai and Bhagavathi

**UBAT53 -PRODUCTION MANAGEMENT (MAJOR)**

**Objective:**

1. To make the students to understand the production function, process and plant design, planning functions, Material Planning and Layout and Scheduling.
2. To enable students to choose appropriate statistical techniques for improving processes and write reports to management describing processes and recommending ways to improve them.
3. To familiarize students with the design, planning and control of an organization's processes with the objective of creating and delivering products & services to customers and improving process & supply chain performance.

**Semester – V**

**No of Credits - 4**

**UNIT – I**

Production System: Introduction - Production – Productivity – Production Management– Objectives – Functions - Scope and Significance – Functions- Production System

**UNIT – II**

Production planning and Control – Techniques - Principles - Maintenance - Types - Materials Handling - Importance - Principles - Criteria for selection of material handling equipment's - Breakdown - Preventive - Routine – Maintenance scheduling

**UNIT – III**



Plant location – Introduction need for selecting a suitable location – Plant location problems – Advantages of urban, semi-urban and rural locations – Systems view locations – Factors Influencing plant location – Plant layout: Plant layout problems – Objectives – Principles of plant layout – Factors influencing layout – Types of layout.

#### **UNIT – IV**

Work and method of study – Importance of work study – Work study procedures – Time Study – Introduction to method study – Objectives of Method study – Steps involved – Work Measurement – Objectives – Techniques – Computation of Standard Time – Allowance – Comparison of various Techniques

#### **UNIT – V**

Quality control – Statistical Quality control – Inspection - Objectives and Significance - Types of Inspection - Centralized and Decentralized - Bench marking: Meaning - objectives – advantages

#### **Text & Reference:**

1. Production and Operations Management – K. ASWATHAPPA
2. Production and Operations Management – PANNERSELVAM
3. Production Management – Buffa
4. Production Management – Goel

### **UBAT54 - HUMAN RESOURCE MANAGEMENT (MAJOR)**

#### **Objective**

1. To equip students with knowledge, skill and competencies to manage people in the organization
2. To familiarize the students with the HRM practices, HR planning, Training Activities, Compensation and reward planning, Performance Appraisal system in an organization.
3. To provide an insight into the importance of motivation, counseling to create a stress free environment

#### **Semester V**

**No. of Credits 4**

#### **UNIT - I**

Human Resource - Definition – Characteristics and Objectives – Scope - Functions - Role of HR manager - Functions of Personnel Management – Personnel principles and policies - Managerial and Operative Functions.

## **UNIT - II**

HR Planning –meaning, nature and importance –Steps in HR Planning process– Job Analysis, Job Description and Job Specification - Recruitment and Selection - Factors affecting Recruitments, Sources of Recruitment – Definition and Importance of Selection, Stages involved in Selection Process – Interview and Tests– Types of Interview – Types of Test.

## **UNIT - III**

Placement of Personnel and Induction, Training and Development – Objectives – Training Methods –Promotion- Transfer - Types - Demotions, Separation. Performance Appraisal: Meaning - Importance - Methods –360 degree appraisal - Job evaluation and merit rating system

## **UNIT - IV**

Wage and Salary Administration: Different methods of wage payments – factors principles, Compensation plan, individuals, Group incentives, Bonus, Fringe benefits, Time and Piece rate system –Incentive Schemes - Career Planning & Development – Stages in Career Planning – Internal and External Mobility of Employees

## **UNIT - V**

Employee maintenance and integration: Welfare and Safety measures, Accident prevention, - Meaning and Sources of Employee Grievance – Grievance Handling Systems – Meaning & Process of Collective Bargaining – Indiscipline, Settlement Machinery of Industrial Conflicts – Personnel Records, Reports and Audit.

### **Text & Reference:**

Human Resource Management – C. B. GUPTA – Sultan Chand

Human Resource Management- S.S. Khanka - Himalaya publishing House

Human Resource Management – P.S. SUBBORAO

Human Resource Management – L. NATARAJAN – Margam Publications

Human Resource Management – KATHIRESAN AND RADHA

## **UBAT55 - OPERATIONS RESEARCH**

### **Objective:**

1. To provide to the students a formal quantitative approach to problem solving and to introduce some widely-used mathematical models in solving business operations issues,
2. To provide an insight into basic linear programming, transportation and assignment technique, queuing model and replacement model to students to solve management problems.
3. To provide necessary inputs for optimum utilization of resources by employing operational research techniques

**Semester – V**

**No of Credits - 4**

### **UNIT – I**

Introduction to Operations Research – Meaning, Definition, General methods for solving OR models– Scope – Applications –Characteristics and Phases of OR study – Limitations – Tools, Techniques of OR - Operations Research and Decision Making

### **UNIT – II**

Linear Programming Problem: Mathematical Formulation of L.P.P. - Graphical Method

### **UNIT – III**

Game theory - Concept of Pure and Mixed strategies – Two-person zero sum games - Games with and without saddle point –Rules of dominance - games by Dominance Property – Method of Games with Saddle point

### **UNIT – IV**

Transportation problems – Introduction - Methods for obtaining Initial Basic Feasible solutions – North West Corner Rule - Least Cost Method - Vogel’s Approximation Method - Maximization in transportation problem- Unbalanced transportation problem

### **UNIT – V**

Assignment Problem - Solving assignment Problem – Balanced and Unbalanced assignment problems – Maxima and Minima Method – Hungarian Method.

### **Text & Reference:**

Operations Research – KANTI SWARUP, P.K.GUPTA AND MAN MOHAN, Sultan Chand  
Operations Research – S.KALAVATHY, Vikas Publishing House Private Limited

Quantitative Techniques – C.R.KOTHARI, Vikas Publishing House

Quantitative Techniques for Decision Making – ANAND SHARMA Himalaya Publishing House

Operation Research – S.D. Sharma (Kedarnath Ramanath & COBOL) Chapter 1 to 6 (all sections)

## **UBAE53 - BUSINESS LAW (ELECTIVE)**

### **Objective:**

1. To impart in depth knowledge of the Law of contracts which forms, the foundation of all day to day obligations in the business world.
2. To instill in the students an awareness of legal framework in sale of goods, consumer protection to understand the applications of these laws to practical commercial situations.
3. To acquaint the students with the alternative forms of business organization available in the country as per partnership and new companies act.

### **Semester V**

**No. of Credits 3**

#### **UNIT - I**

Indian contract act 1872: Law of Contract – Definition, Classification – Essentials of a Contract – Types of contract - Agreements - Void - voidable - Offer and Acceptance – Quasi Contract - Performance of Contract – Modes of Discharge of Contract – Remedies for Breach of Contract.

#### **UNIT – II**

Consideration - Legal rules as to Consideration - Contract without consideration - Consent - Coercion - undue influence – misrepresentation - fraud - mistake of law and mistake of fact. Legality of Object - Unlawful and illegal agreements - Effects of illegality - Wagering Agreements.

#### **UNIT - III**

Law of Agency – Mode of creation - Agency by Ratification – Sub-Agent and Substituted Agent-Termination of Agency, Negotiable Instrument Act 1881; Parties to a Negotiable instrument- material alteration

#### **UNIT - IV**

Sale of Goods Act 1930: Definition – Formation of contract of sale –Essentials: Duties of Buyers and Sellers; Sale and agreement to sell – Hire purchase agreement - Sale and bailment.

Conditions and Warranties – Transfer of Property –Performance of Contract of Sale – Rights of an Unpaid Seller.

#### **UNIT - V**

Partnership – Definition - Essentials - Rights, duties and Liabilities of partners -Types of Partnership - Dissolution of partnership, Companies Act 1956; Definition of a Company, Characteristics, Kinds, Memoranda and articles of association, Prospectus.

#### **Text & Reference:**

1. Elements of Mercantile Law - N.D. KAPOOR.
2. A Manual of Mercantile Law - Shukla M.C.
3. Principles of Mercantile Law – B.N. TANDON.
4. Mercantile Law – DAVAR.
5. Business Law – PILLAI & BHAGAVATH

### **UBAS53 - GENERAL APTITUDE & REASONING – I(SBS)**

#### **Objective:**

1. To provide a hands on experience in understanding the quantitative techniques to solve problems self.
2. To help the students learn the techniques of breaking competitive exams so that they can face competitive exams

#### **Semester – V**

**No of Credits - 2**

#### **UNIT – I**

Test of reasoning – analogy – choosing the analogy pair I simple analogy – analogy of words and expression – double, triple analogy – numerical analogy – applied analogy

#### **UNIT – II**

Logical Reasoning (Including mathematical) Blood Relations – Odd man out – Pairs as groups – Letter group – Classification of numbers – Understanding the structure of arguments.

#### **UNIT – III**

Synonyms – Antonyms \_ Verb – Error Correction – Tenses – Sentence Rearrangement – Fill in the Blanks with modals, Articles and Prepositions etc, Reading Comprehension

#### **UNIT – IV**

Series Completion – Finding the missing number – Finding wrong term – Alphabet series – Mixed Series

## **UNIT – V**

Information and Communication Technology (ICT): Meaning, Advantages, Disadvantages – General abbreviations and terminology – Basics of Internet and e-mailing.

### **REFERENCE BOOKS:**

Any book related to this topic

## **UBAT61– TOTAL QUALITY MANAGEMENT (MAJOR)**

### **Objective:**

1. To make them understand the philosophy and core values of Total Quality Management (TQM).
2. To make them understand the voice of the customer and the impact of quality on economic performance and long-term business success of an organization;
3. To educate them about the best practices for the attainment of total quality
4. To help the students understand the relationship between business strategy, business performance and quality management.

## **Semester VI**

**No. of Credits 4**

### **UNIT – I**

Introduction – Need for quality – Evolution of quality – Definition of quality – Dimensions of manufacturing and service quality – Basic concepts of TQM – Definition of TQM – TQM framework – Contributions of Deming, Juran and Grosby – Barriers to TQM

### **UNIT – II**

Leadership – Strategic quality planning, Quality Statements - Customer focus, customer orientation, customer satisfaction, Customer complaints, Customer retention – Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal – Continuous process improvement – PDSA cycle, 5s, Kaizen – Supplier partnership – Partnering, Supplier selection, Supplier Rating

### **UNIT – III**

The seven traditional tools of quality – New management tools – Six Sigma: Concepts, Methodology, Applications to manufacturing, Service sector including IT – Bench marking – Reason to bench mark, Bench marking process- FMEA - Stages, Types.

#### **UNIT – IV**

Quality circles – Quality Function Development (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Cost of Quality – Performance measures

#### **UNIT – V**

Need for ISO 9000 – ISO 9000-2000 Quality System – elements, Documentation, Quality auditing QS 9000 – ISO 14000 – Concepts, Requirements and benefits – Implementation in manufacturing and service sectors including IT

#### **Text & Reference:**

1. The Management and control of Quality - James R Evans and William M. Lindsay, 6<sup>th</sup> Edition, South-western (Thomas Learning), 2005.
2. TQM - Oakland JS, Butterworth- Heinemann Ltd, Oxford, 3<sup>rd</sup> Edition, 2003.
3. TQM - Suganthi L and Anand Samuel, Prentice Hall of India, pvt, ltd., 2006.
4. TQM - Janakiraman B and Gopal RK, Prentice Hall of India, pvt, ltd., 2006
5. Total Quality Management - Dale H Besterfield, Pearson Education Asia, 3ed edition, Indian Reprint, 2006.

### **UBAT62 - MANAGEMENT INFORMATION SYSTEM**

#### **Objective:**

1. To enable the students to gain an understanding about how Information Systems are developed, implemented and assisted in decision making in an organizations.
2. To familiarize the students with the four components of an MIS and understand how it add value to an organization.
3. To design system for an organization and identify privacy, security, and freedom of information issues in a business environment.

#### **Semester VI**

**No of credits – 4**

#### **UNIT I**

Introduction to computers – Operating Systems – Information Systems – Evolution of Information Systems – Business Models – Information System Architecture.

## **UNIT II**

Information Systems – Functional Areas – Marketing, Production, Finance, Personnel Management – Information System Levels – DSS, EIS, ES – Comparison, Managing Global Information System.

## **UNIT III**

Application of Internet – Email – Search Engines – Business decision making using Online.

## **UNIT IV**

Business Application Software – Office Application – Word – Spread Sheet – Power Point and Access.

## **UNIT V**

Business and Management Application Packages – Research Analysis Packages – SPSS etc. – Accounting Packages – Tally etc. – Marketing Packages – Production Packages – HR Packages

### **Text & Reference Books:**

1. Gordon B. Davis – Management Information System: Conceptual Foundation, Structure and Development, Mc Graw Hill.
2. James A O'Brien, Management Information Systems, A Managerial user Perspective.

## **UBAT63 -E-COMMERCE**

### **Objective:**

1. To familiarize the students with the technologies in e-commerce, e-business and its impact in business.
2. To enable the students to identify and implement the right e-commerce model and understand the ethical and legal issues associated with it.
3. To give an insight about electronic payment system and its security

### **Semester VI**

**No of credits – 4**

## **UNIT I**

Introduction: Meaning, nature, concepts, advantages, disadvantages and reasons for transacting online, types of E-Commerce, e-commerce business models (introduction, key elements of a



business model and categorizing major E-commerce business models), forces behind e-commerce.

## **UNIT II**

**Security and Encryption** E-commerce security environment: security threats in the E-commerce environment - technology Solutions, **IT Act 2000 and Cyber Crimes:** IT Act 2000: Definitions, Digital signature, Electronic governance, Attribution, acknowledgement and dispatch of electronic records.

## **UNIT III**

**E-payment methods** - Debit Card, Credit Card, Smart Cards, e-money - digital signatures – procedure- Online Banking - meaning, concepts, importance, electronic fund transfer, automated clearing house, automated ledger posting), risks involved in e-payments.

## **UNIT IV**

**On-line Business Transactions-** Meaning, purpose, advantages and disadvantages of transacting online, E-commerce applications in various industries like banking, insurance, payment of utility bills, online marketing - popularity, benefits, problems and features - Online Services - financial, travel and career, auctions, online portal, online learning, publishing and entertainment - Online shopping - Amazon, Snap deal, Alibaba, flipchart, etc.

## **UNIT V**

**Website designing** - Introduction to HTML - tags and attributes: Text Formatting, Fonts, Hypertext Links, Tables, Images, Lists, Forms, Frames, Cascading Style Sheets.

### **Text & Reference:**

1. Kenneth C. Laudon and Carlo Guercio Traver, E-Commerce, Pearson Education.
2. David Whitely, E-commerce: Strategy, Technology and Applications, McGraw Hill Education
3. Bharat Bhaskar, Electronic Commerce: Framework, Technology and Application, 4th Ed, McGraw Hill Education
4. PT Joseph, E-Commerce: An Indian Perspective, PHI Learning
5. KK Bajaj and Debjani Nag, E-commerce, McGraw Hill Education
6. TN Chhabra, E-Commerce, Dhanpat Rai & Co.
7. TN Chhabra, Hem Chand Jain, and Aruna Jain, An Introduction to HTML, Dhanpat Rai & Co.

## **UBAT64 - FINANCIAL MANAGEMENT (MAJOR)**

### **Objective:**

1. To help the students understand the foundations of finance and financing decisions, Working Capital and Long term sources of finance.
2. To acquaint the students with the theory and techniques of financial management, and developing their abilities in respect of investment and capital budgeting, financial planning, capital structure decisions, dividend policy and working capital management.
3. To develop the analytical skills for interpretation business information and application of financial theory in financing related decisions and situation

### **Semester VI**

**No of credits – 4**

#### **UNIT – I (Theory Only)**

Financial Management - Meaning and Scope - Finance Functions – Profit Maximization and Wealth Maximization – Objectives of Financial Management -Sources of Finance - Short term - Bank sources – Long term

#### **UNIT – II (Theory & Problem)**

Cost of Capital – Concept, Importance – Classification – Calculation of Cost of Debt, Cost of Equity and Cost of Preference Shares - Cost of Retained Earnings –Weighted average cost of capital, Reserves – operating leverage and financial leverage.

#### **UNIT – III (Theory & Problem)**

Capital Structure – Meaning and Scope – Factors influencing capital structure - Approaches: Net Income Approach –Net Operating Income Approach – MM Approach – Traditional Approach – Dividend and dividend policy – meaning, classification – sources available for dividend – dividend policy – general determinants of dividend policy

#### **UNIT – IV (Theory)**

Working Capital Management: concepts – Importance – Determinants of working capital

#### **UNIT – V (Theory & Problem)**

Capital Budgeting– Concept and Importance –objectives – various techniques and methods: Pay Back Method – Discounted Cash Flow Method - NPV Method, Excess Present Value Index, IRR, ARR and ROI

**(Marks: Theory 40% and Problems 60%)**

**Text & Reference:**

1. Elements of Financial Management - S.N. Maheshwari, Sultan Chand & Sons.
2. Financial Management - I.M. Pandey, Vikash Publishing House Pvt. Ltd.
3. Fundamentals of Financial Management - Prasanna Chandra, Tata McGraw Hills.
4. Theory and Problems in Financial Management - M.Y. Khan & P.K. Jain, Tata McGraw Hills.
5. Financial Management - R.K. Sharma, Shashi and K. Gupta, , Kalyani publication.

**UBAT65 -RESEARCH METHODS FOR MANAGEMENT (MAJOR)****Objective:**

1. To educate the students about the basic research methodologies, design and applications.
2. To make them to identify and prepare a research proposal or problems through review of literature.
3. To familiarize students in the area of sampling, data collection and application of statistical tools in business research.
4. To cultivate the skills needed to prepare and present research reports.

**Semester – VI****No of Credits - 4****UNIT -I**

Research - Definition - Importance - Advantages and Limitations – Types: Basic and Applied, exploratory, descriptive and causal - Phases of business research - The research process - problem identification

**UNIT -II**

Research Design - Types of Design - Sampling process and selection - sample types - Sample size and sampling errors

**UNIT -III**

Data Collection - methods - tools - Questionnaire – Interview Schedule - Kinds of Data –Primary data, Secondary data - Attitude measurement of scaling technique - Editing, Coding, Tabulation, Analysis Interpretation of data

**UNIT -IV**

Statistical Data Analysis –Tools and Techniques of data analysis - Hypothesis - its sources - formulation and testing of Hypothesis

#### **UNIT -V**

Interpretation and report writing - Drafting of reports – Contents of a report - steps in writing reports - layout of report, types, and principles of report writing - Graphical representation of results.

#### **Text & Reference:**

1. Research Methodology – C. R. Kothari
2. Marketing Research – Boyd and Westfall
3. Research Methodology – N. Thanulingon, Himalaya Publication, Mumbai
4. Methodology of Research in Social Sciences - O. R Krishnaswami, M. Rangnathan

### **UBAE64 - SERVICES MARKETING (ELECTIVE)**

#### **Objective:**

1. To enable the students to know about the various theories of service marketing.
2. To familiarize the students to gain insights on the issues in operational and administrative aspects of service marketing.
3. To help students to formulate strategies for identifying, organizing and establishing a retail format
4. To inculcate the skills of merchandising, segmentation, pricing and promotion strategies in service marketing.

#### **Semester – VI**

**No of Credits - 3**

#### **UNIT I**

Importance of services sector – Nature and types of services – Difference between services and goods marketing – services marketing triangle.

#### **UNIT II**

Environment for services marketing – macro and micro environments – understanding service customers– models of service consumer behaviour – customer expectations and perception – service quality and GAP model

#### **UNIT III**

Market segmentation and selection – service market segmentation – targeting and positioning

#### **UNIT IV**

Services marketing Mix – Need for expanded marketing mix – planning for services offer – pricing – promotion and distribution of services – management of people – process and physical evidence – matching demand for and supply of services.

#### **UNIT V**

Service marketing applications – Marketing of Financial, Hospitality, Hospital, Tourism and Educational Services – International Marketing of Services and Gats.

#### **Text & Reference:**

1. Services Marketing - Christopher, H. Lovelock, Pearson Education India
2. Services Marketing - Adrian Payne, PHI
3. Services Marketing - Zeithaml, V.A. & M.J. Bitner,
4. Services Marketing - Rao, Pearson Education India
5. Services Marketing - Sinha, P.K. and Sahoo S.C., HPH.
6. Services Marketing- Ravishankar, Lalvani.

### **UBAS64 -GENERAL APTITUDE & REASONING – II**

#### **Objective:**

1. To provide a hands on experience in understanding the quantitative techniques to solve problems self.
2. To help the students learn the techniques of breaking competitive exams so that they can face competitive exams

**Semester – VI**

**No of Credits - 2**

#### **UNIT – I**

Coding and Decoding – Letter Coding – Letters and numbers – Letter, numbers and symbols – Metrics coding – Decoding by analysis – Mixed letter coding

#### **UNIT – II**

Problems based on Age, Percentage, Profit and Loss, Discount, Time, Speed and Distance – Permutation and Combination – Volume and Surface areas – HCF and LCM – Simple and Compound Interest

**UNIT – III**

Logical Reasoning: Understanding the structure of arguments – Deductive and Inductive Reasoning – logical word sequence – Ranking sequence and position

**UNIT – IV**

Reasoning Logical Diagrams: Simple Diagrammatic Relationship – multi diagrammatic Relationship – Venn diagram – Problems based on numbers

**UNIT – V**

Mirror image – Question on mirror image – Completion of a pattern

**REFERENCE BOOKS:**

Any book related to this topic

## **UEVS21 -ENVIRONMENTAL STUDIES**

### **Objectives:**

- 1) To develop knowledge base of students about the demographic and environmental factors affecting Business.
- 2) To make the students aware of environmental problems related to Business and Commerce.
- 3) To inculcate values of Environmental ethics amongst the students.
- 4) To build knowledge about the environment which is helpful to the society.

### **Semester II**

**No. of Credits – 2**

#### **UNIT I**

Environmental Studies: Definition – Multidisciplinary nature – Scope and importance – Need for public awareness. Natural Resources : Forest resources: Use and over- exploitation – Deforestation – Timber extraction – Mining – Dams and their effects on forests and tribal people – Water Resources: Use and over utilization of surface and ground water – Flood – Drought – Conflicts over water – Dams- Benefits and problems – Mineral resources: Use and exploitation – Environmental effects of extracting and using mineral resources – Food resources: World food problems – changes caused by agriculture and overgrazing – Effects of modern agriculture – Fertilizer and pesticides problems – Water logging – Salinity – Energy Resources: Growing energy needs – Renewable and non-renewable energy sources – Use of alternate energy sources – Land Resources: Land as a resource – Land degradation – Man induced landslides – soil erosion- Desertification – Case studies – Role of individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

#### **UNIT II**

Ecosystems: Concept – Structure and function – producers, consumers and decomposers – Energy flow – Ecological system – Food chains, food webs and ecological pyramids – Introduction, characteristics, Types, structure and function of Forest ecosystem – Grassland ecosystem – Desert ecosystem – Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

#### **UNIT III**

Biodiversity and its Conservation: Definition, Genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: Consumptive use – Productive use – Social, Ethical, Aesthetic and Option values – Biodiversity at global,

national and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: Habitat loss – Poaching of wild life, man wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-Situ and Ex-Situ conservation of biodiversity.

#### **UNIT IV**

Environmental Pollution: Definition- Causes, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal pollution and Nuclear hazards – Solid waste management; Causes, effects and control measures of urban and industrial wastes- Disaster management: Floods, earthquakes, cyclone and landslides – Role of individual in prevention of pollution – Case studies.

#### **UNIT V**

Social Issues and the Environment: From unsustainable to sustainable development – Urban problems related to energy – water conservation, rainwater harvesting, watershed management – Resettlement and rehabilitation of people – Its problems and concerns – Environmental ethics; Issues and solutions – Climate change, Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust – Wasteland reclamation – Consumerism and waste products – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environment legislation – Public awareness.

Human population and the Environment: Population growth – variation among nations – Population explosion – Family welfare program – Environment any human health – Human rights – value education – HIV/AIDS – Women and child welfare – Role of Information Technology in environment and human health – Case studies.

Field Work (25 marks)

- Visit to a local area to document environmental assets – River, Forest, grassland, hill, mountain.
- Visit to a local polluted site -Urban, rural, industrial, Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-pond, river, hill slopes etc.,

#### **Text & Reference:**

1. Arul P, (2008) “A Textbook of Environmental Studies” Selvi Publications.
2. Miller T.G. “Environmental Science: Wadsworth Publishing Co.



3. Townsend C, Harper J and Michael Gagon "Essentials of Ecology", Blackwell Science.
4. Trivedi R.K and Goel P.K "Introduction to Air Pollution", Techno-Science Publication.
5. Jadhav, H &Bhosafe, V.M (1995) "Environmental Protection and Laws", Himalaya Publishing house.

அன்னை தெரசா மகளிர் பல்கலைக்கழகம்

கொடைக்கானல்

பல்கலைக்கழக இணைப்புக் கல்லூரி மற்றும் உறுப்புக் கல்லூரிகளில்  
பயிலும் இளங்கலை, இளம் அறிவியல், இளம் வணிகவியல்

மாணவியர்களுக்குரியது

பகுதி - 1

தமிழ்ப் பாடத்திட்டம்



(2018 - 2019 கல்வியாண்டு முதல்)

Academic Committee Meeting Held on 15.05.2018

Mother Teresa Women's University,

Kodaikanal

Part – I – Tamil

UG- B.A/B.Sc/B.Com Courses

(As per TANSCH E Guidelines (W.E.F-2018 – 2019))

முதல் ஆண்டு - முதல் பருவம்						
வ.எண்	தாளின் தலைப்பு	நேரம்	மதிப்பு	அகமதிப்பு	புற மதிப்பீடு	மொத்தம்
1	பகுதி 1- தமிழ் தாள் - 1 -இக்கால இலக்கியம்	6	3	25	75	100
முதல் ஆண்டு - இரண்டாம் பருவம்						
2.	பகுதி - 1 தமிழ் தாள் - 2 இடைக்கால இலக்கியம்	6	3	25	75	100
இரண்டாம் ஆண்டு - மூன்றாம் பருவம்						
3	பகுதி - 1 தமிழ் தாள் - 3 காப்பிய இலக்கியம்	6	3	25	75	100
இரண்டாம் ஆண்டு - நான்காம் பருவம்						
4	பகுதி - 1 தமிழ் தாள் - 4 பழந்தமிழ் இலக்கியம்	6	3	25	75	100

**Kjyhkhz;L - Kjy; gUtk;**

**gFjp – 1 - jkpo;**

**jhs;-1 ,f;fhy ,yf;fpak;**

**myF-1 ftpij (kuGf;ftpij)**

1.1 ftpkzp Njrpftpehafk; gps;is – kUkf;fs; top khd;kpak; -KOtJk;

tpehafh; tzf;fk; - mit mlf;fk;

- FyKiw fpsj;Jg; glyk;
- Nfypg;glyk;
- flyhL glyk;
- ghpfyg;glyk;
- ehfh];jpug;glyk;
- fUlh];jpug;glyk;
- tho;];Jg;glyk;
- NfhL VwpFb Kbj;jg;glyk;
- ahj;jpiug;glyk;
- Fk;gpnahpr;ry; glyk;
- ehQ;rpy; ehl;L Ntshsh;ghf tof;F tiu

1.2 GJf;ftpij - <NuhL jkpod;gd; - “tzf;fk; ts;St!” E}y;

**myF-2 ehty;> ehlfk;**

jPgk; . eh. ghh;];jrhujp- uhzp kq;fk;khs;- Gjpdk;.

JUtd; NfhghyfpU~;zd; - rhFe;jyk; (ftpij ehlfk;)

**myF-3 rpWfij> ciueil**

3.1 xU rpW ,ir – tz;zjhrd; - rhfpj;jpa mfhnjkp ghpR ngw;w rpWfijj; njhFg;G  
E}ypd; Kjy; le;J rpWfijfs; kl;Lk;

3.2 Mz;ghy; - ngz;ghy; - md;ghy; Mde;j tpfld; ntspaPL – Kjy; le;J fl;Liufs; kl;Lk;

#### myF- 4 ,yf;fpa tuyhW

,f;fhy ,yf;fpak; -ftpij> rpWfij> ehty; ehlfk;> ciueil – jkpopyf;fpar; rhd;Nwhh;fSk;  
gq;fspg;Gk;

#### myF -5 nkhopg; gapw;rp

- jkpo;r; nrhw;fs; ,UgJf;F mfuhjp ghh;j;Jj; jkpopy; nghUs; vOJjy;
- vOtha;> gadpiy> nrag;gLnghUs; mikAk; tz;zk; gj;J thf;fpaj; njhlh;fis vOJjy;
- jd;tpid gpwtpid thf;fpaj;njhlh;fs; gj;J vOJjy;.
- nra;tpid nra;ag;ghl;Ltpid thf;fpaj; njhlh;fs; gj;J vOJjy;.
- je;j jiyg;ig xl;b> Neh;\$w;wpy; mikAk;gb fUj;Jr; nrwpTs;s ciuahliy vOJjy;.
- Neh; \$w;wpy; cs;s ciuahliy maw;\$w;Wj; njhluhf khw;wp vOJjy;.

#### ghlE}y;fs;:

1. ftpkzp Njrptpehafk; gps;is> kUkf;fs; top khd;kpak;

[www.kJiukpd;Ehy;njhFg;Gi;jpl;lk;](http://www.kJiukpd;Ehy;njhFg;Gi;jpl;lk;)

2. <NuhL jkpod;gd;> tzf;fk; ts;St

3. eh. ghh;j;j rhujp> uhzp kq;fk;khs;.

4. NfhghyfpU~;zd; - rhFe;jyk;> nrd;id> cyfj; jkpohuha;r;rp epWtd ntspaPL.

5. ghf;aNkhp> jkpo; ,yf;fpa tuyhW epA+nrQ;Rhp Gj;jf ntspaPL, nrd;id.

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**Kjyhkhz;L - ,uz;lhk;; gUtk;**

**gFjp – 1 - jkpo;**

**jhs; 2 ,ilf;fhy ,yf;fpak;**

**myF-1 jpUQhdrk;ge;jh; -Njthuk;**

**1.1 ekr;rpthaj; jpUg;gjpfk;** - fhjyhfpf; frpe;J vd;W njhlq;Fk; ghly; Kjy;  
ee;jpehkk; ekr;rpthah vDk; ghly; tiuAs;s gj;J ghly;fs; (3320-3330)

**1.2. jpUehTf;furh; - Njthuk;** - jpUehiff; fhNuhzk; - ghzj;jhy; kjps;>  
%d;Wk; vhpj;jtd; Kjy; fly; fop ehiff; fhNuhzk;jd; vDk; ghly;  
tiuAs;s gj;J ghly;fs; (6048 - 6057)

**1.3 Re;juh; -Njthuk;** - jpU xw;wpA+h; - ghl;Lk; ghbg; gutpj; jphpthd; Kjy;  
xw;wpA+Uk; muTk; gpiwAk; vDk; ghly; tiuAs;s gj;J ghly;fs; (8147-  
8156)

**1.4 khzpf;fthrfh;** - jpUthrfk; - fz;l gj;J - ,e;jphpa ta kaq;fp Kjy;  
G+jq;fs; le;jhfp vDk; ghly; tiuAs;s gj;J ghly;fs; (475-484)

**myF – 2 itztk;**

**2.1 ek;kho;thh;** - jpUtha;nkhop - Mb Mb mfk; fiue;J ,ir Kjy; Mb  
kfpo;thdpy; mbahh; Fohq;fSld; vDk; ghly; tiuAs;s gdpnuz;L  
ghly;fs; (2818-2829)

**2.2 jpUkq;if Mo;thh;** - nghpa jpUnkhop - ce;jp Nky; ehd;Kfidg;  
gilj;jhd; Kjy; my;yp khjh; mkUk; jpUkhh;td; muq;fj;ij vDk; ghly;  
tiuAs;s gj;J ghly;fs; (1378-1387)

**2.3 jpUkopirg; gpuhd;** - ehd;Kfd; jpUte;jhj - tho;j;Jf tha; Kjy; ePNa  
cyF vy;yhk; vDk; ghly; tiuAs;s gj;J ghly;fs; (2392-2401)

**2.4 Mz;lhs;** - jpUg;ghit-Kjy; - khh;fopj; jpq;fs; Kjy; fw;Wf; fwitf;  
fzq;fs; gy fwe;J vDk; ghly; tiuAs;s gj;J ghly;fs;( 556-566)

**myF-3 rpw;wpyf;fpak;**

**3.1 jp. kPdhl;rpRe;juk; gps;is-** jpUthidf;fh mfpvhyz;l ehafp gps;isj;jkpo; -  
tUifg;gUtk; Kjy; 5 ghly;fs; kl;Lk;

**3.2 ee;jpf;fyk;gfk;** Kjy; 5 ghly;fs; kl;Lk;

**3.3 n[aaq;nfhz;lhh;-** fypq;fj;Jg;guzp - Njtpiag; ghbaJ kl;Lk;

**myF 4 ,yf;fpa tuyhW**

gf;jp ,yf;fpak; - rpw;wpyf;fpak; Fwpj;j ,yf;fpa tuyhW

**myF 5 nkhopg;gapw;rp**

- ,yf;fpa eak; ghuhl;Lk; ,yf;fpaf; fl;Liu vOJjy;
- jd; tuyhw;Wf; fl;Liu vOJjy;
- jd; tptuf; Fwpg;G vOJjy;
- tpz;zg;gk; vOJjy;
- gj;jpiar; RUf;fp vOJjy;
- RUf;fj;ij tphpj;J vOJjy;

\*\*\*\*\*

**,uz;lkhz;L - %d;whk; gUtk;**

**gFjp – 1 - jkpo;**

**jhs; 3 fhg;gpa ,yf;fpak;**

**myF-1 rpyg;gjpfhuk;**

**1.1. kJiuf; fhz;lk; - Ch; fhz; fhij**

**1.2. kzpNkfiy**

22. rpiw nra; fhij

23. rpiw tpL fhij

**myF-2 rPtfrpe;jhkzp**

2.1 ehkfs; ,yk;gfk; - ehl;Ltsk; efh; tsk; kl;Lk; (10)

2.2 fk;guhkhazk; - ghy fhz;lk; 7 jhlif tijg;glyk;

2.3 nghpa Guhzk; - fypa ehadhh; Guhzk; - 17 ghly;fs;

**myF – 3 rPwhg;Guhzk;**

3.1 <r;rq;Fiy tutioj;j glyk;

3.2 Njk;ghtzp – ngWk; kFTf;F ,NaR vdg; NghpL glyk; - Kjy; fhz;lk;

**myF-4 fhg;gpa ,yf;fzk; - lk;ngUq;fhg;gpak; - IQ;rpWfhg;gpak; tiuaiw – jkpopy;**  
fhg;gpaq;fs; Fwpj;j tuyhW

**myF-5 nkhopg; gapw;rp**



- nra;jp mwpf;if vOJjy;
- Neh; fhzy; nra;jy;
- le;J njhlh;fisj; jkpopypUe;J Mq;fpyj;Jf;F nkhop ngah;j;jy;
- le;J njhlh;fis Mq;fpyj;jpy; ,Ue;J jkpOf;F nkhopngah;j;jy;
- tpz;zg;gk; vOJjy;
- gj;J jkpo; Mq;fpy ,izg; gonkhopfis vOJjy;

\*\*\*\*\*

**,uz;lkhkz;L – ehd;fhk; gUtk;**

**gFjp – 1 - jkpo;**

**jhs; 4 goe;jkpo; ,yf;fpak;**

**myF -1 ew;wpiz**

**1.1 FwpQ;rp-** ghly; vz;-134 - ,dpjpd; ,dpJ jiyg;gLk;...vd;W njhlq;Fk; ghly;.

**Ky;iy-** ghly; vz; 139 - cyfpw;F Mzpahfg; gyh;njho .... vd;W  
njhlq;Fk; ghly;.

**kUjk;** - ghly; vz;-200 - fz;zp fl;ba fjph; md;d... vd;W njhlq;Fk; ghly;.

**nea;jy;** - ghly; vz; 187 - nea;jy; \$k;g .. vd;W njhlq;Fk; ghly;.

**ghiy -197 tJ** ghly; - NjhNs njhb nefpo;e;jdNt ... vd;W njhlq;Fk; ghly;.

**1:2 FWe;njhif**

**jytp \$w;W** – ghly; vz; - 220 - gokiof; ftpj;j vd;W njhlq;Fk; xf;\$h;  
khrhj;jpahh; ghly;

**jytd; \$w;W** – ghly; vz; 222 - Jizg;Gizf; nfhspnd vd;W  
njhlq;Fk; rpiwf;Fb Me;ijahh; ghly;

**Njhop \$w;W** - ghly; vz; - 225 - fd;Wjd; gaKiy khe;j vd;W njhlq;Fk;  
fgpyh; ghly;

**fz;NIhh; \$w;W** – ghly; vz; -229 - ,td; ,ts; lk;ghy; gw;wTk;.. vd;W

njhlq;Fk; Nkhjhrdhh; ghly;

**nrtpypj;jha; \$w;W** – ghly; vz; - 242 - fhdq;Nfhopf; fth; Fuy; Nrty;  
..vd;W njhlq;Fk; Fow;wj;jd; ghly;

**myF -2** 1. Ky;iyg;ghl;L KOtJk;

2. GwehD}W – ghly; vz;158-163 tiuAs;s ngUQ;rpj;jpudhh;  
Fkzidg; ghba MW ghly;fs; kl;Lk;.

**myF -3 jpUf;Fws;** - mjpfhuk; 96 – Fbik

mjpfhuk; 97 – khdk; 20 Fws;

**ehybahh;** - mit mwpjy; - ghly; vz; 311 – 320 tiu

nka;Q; Qhdf; Nfhl;b vd;w ghly; Kjy; Gy;ywpT jhk; mwptJ  
,y; vd;W KbAk; ghly; tiu.

**gonkhop** - ‘Fyj;Jr; rpwpahh;’ vd;W njhlq;Fk; 300 tJ ghly; Kjy; eif

NkYk; ifg;gha; tpLk; vd;W KbAk; 304 MtJ ghly; tiu  
cs;s – 5 ghly;fs;

**myF – 4 ,yf;fpa tuyhW** - gjpndd;fPo; fzf;F tiuapyhd goe;jkpo; ,yf;fpa

tuyhW – mfk;> Gwk; gw;wpa ,yf;fpa tifikfs;

**myF - 5 nkhopg;gapw;rp**

- jiyg;Gfisf; Fwpg;gpl;L mg;ghIE}y;fis mDg;gp itf;Fk; gb Gj;jf  
ntspaPl;lhsUf;F fbjk; vOjy;.
- tzpff; fbjk; vOjg; gapw;Wtpj;jy;.
- jiyg;G je;J ,uz;L gf;fr; rpWfij vOjr; nra;jy; jiyg;G je;J  
gjptide;J thpfsy; GJf;ftpij vOjr; nra;jy;.

- xU nra;Aisj; je;J eak; ghuhl;b ,uz;L gf;f ,yf;fpaf; fl;Liu  
vOjr; nrhy;Yjy;.
- VNjDk; xU jkpo;E}iy ,izaj;jpy; Njbf; fz;lwpjy;.

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## SEMESTER I

Code: ULEN11

ENGLISH FOR INFOTAINMENT – I

6 Hours/3 Credits

### Objectives:

1. To teach English with an information and entertainment.
2. To enrich the components of Grammar and Composition.
3. To expose the writings of literary men belonging to various nations.
4. To enable the students speak and write in English fluently on various topics

### UNIT I PROSE

A.P.J.Abdul Kalam	-	Early Days ( From Wings of Fire: An Autobiography)
G.K.Chesterton	-	What I Found In My Pocket
Mary A. Fischer	-	Change of Heart

### UNIT II POETRY

Allen Curnow	-	House and Land
Gabriel Okara	-	You Laughed and Laughed and Laughed
Wordsworth	-	Solitary Reaper

### UNIT III

Parts of Speech  
Sentence Patterns, Framing Sentences, Framing Questions, Tags  
Concord and Formation of Words

### UNIT IV

Auxiliary Verbs  
Comprehension  
Phrasal Verbs

### UNIT V ONE -ACT PLAY

**Bercht** - Informer

### Text Book:

English For Infotainment I – Edited by Dr.S.Kanagaraj and P.Jeyappriya, New Century Book House, Chennai. (In Print)

### Reference:

1. Everyman's English Grammar – A. Rajamanickam, New Century Book House, Chennai
2. English Grammar Practice – Raj N. Bakshi, Orient Black Swan Private Limited, Hyderabad

## SEMESTER II

CodeULEN22

ENGLISH FOR INFOTAINMENT – II

6 Hours / 3 Credits

### Objectives:

1. To teach English with an information and entertainment.
2. To enrich the components of Grammar and Composition.
3. To expose the writings of literary men belonging to various nations.
4. To enable the students speak and write in English fluently on various topics

### UNIT I PROSE

- |                        |   |                                   |
|------------------------|---|-----------------------------------|
| Sir Richard Livingston | - | Essentials of Education           |
| Boman Desai            | - | Between the Masque and the Temple |
| Jerome .K.Jerome       | - | Uncle Podger Hangs a Picture      |

### UNIT II POETRY

- |                   |   |                      |
|-------------------|---|----------------------|
| John Pepper Clark | - | Night Rain           |
| Jean Arasanayagam | - | In the Month of July |
| John Keats        | - | Ode to Autumn        |

### UNIT III

- Tenses
- Reported Speech
- Active Voice and Passive Voice

### UNIT IV

- Re arranging the Jumbled Sentences
- Expansion of Proverbs
- Prepositions

### UNIT V

- Autobiography
- M.K. Gandhi - The Story of My Experiments with Truth

## SEMESTER III

Code: ULTA33

ENGLISH FOR INFOTAINMENT – III 6 Hours / 3 Credits

### Objectives:

1. To teach English with an information and entertainment.
2. To enrich the components of Grammar and Composition.
3. To expose the writings of literary men belonging to various nations.
4. To enable the students speak and write in English fluently on various topics

### UNIT I PROSE

- |                    |   |                          |
|--------------------|---|--------------------------|
| A.P.J. Abdul Kalam | - | Dimensions of Creativity |
| Jawaharlal Nehru   | - | A Birthday Letter        |
| Guy De Maupassant  | - | At the Church Door       |

### UNIT II POETRY

- |                 |   |                                |
|-----------------|---|--------------------------------|
| Alexander Pope  | - | Essay on Man (From Epistle II) |
| Emily Dickenson | - | A Bird Came Down the Walk      |
| Wole Soyinka    | - | To My First White Hairs        |

### UNIT – III

Infinitive, Gerund, Participle  
Conjunctions and Interjections  
Adjectives and Adverbs

### UNIT – IV

Dialogue - Writing and Speaking  
Note-Making, Letter writing, E-mail, Report Writing  
General Essay

### UNIT – V

- |                     |   |                  |
|---------------------|---|------------------|
| Hugh Chestermans    | - | Pie and the Tart |
| Rabindranath Tagore | - | Kabuliwalla      |

## **SEMESTER –IV**

**Code: ULEN44          ENGLISH FOR INFOTAINMENT – IV          6 Hours / 3 Credits**

### **Objectives:**

- 1. To teach English with an information and entertainment.**
- 2. To enrich the components of Grammar and Composition.**
- 3. To expose the writings of literary men belonging to various nations.**
- 4. To enable the students speak and write in English fluently on various topics**

### **UNIT –I          PROSE**

- |             |   |                           |
|-------------|---|---------------------------|
| Jim Corbet  | - | Lalajee                   |
| G.W.Cox     | - | Orpheus and Euridice      |
| Jesse Owens | - | My Greatest Olympic Prize |

### **UNIT – II**

Scene from Shakespeare’s Play (The Trial Scene from the Merchant of Venice)

### **UNIT – III**

Transformation of Sentences

Spotting Errors

### **UNIT – IV**

Conversation Skills

Precise Writing

Writing Minutes, Memos and Agenda

### **UNIT – V          EXTENSIVE READING**

- |                              |   |                                                                                       |
|------------------------------|---|---------------------------------------------------------------------------------------|
| 1. Katherine Mansfield       | - | The Doll’s House and other stories                                                    |
| 2.Chitra Banerjee Divakaruni | - | 1.Clothes, 2. Silver Pavement, Golden Roof,<br>3. Doors. ( From “ Arranged Marriage”) |

## UVAE11 -VALUE EDUCATION (SBS)

### **Objective:**

1. To impart basic knowledge on value system.
2. To inculcate value concepts of family and health.
3. To provide wide knowledge about ethics in life.
4. To build a social stigma among students.

### **Semester I**

**No. of Credits -3**

#### **UNIT I**

Values – Definition- Value Crisis – Need for practicing positive values for good life – value Erosion – its impact on individual, societal, cultural level – way out.

#### **UNIT II**

Family, Material, Human values – Good Health – Individual and Intellectual freedom – Human progress – Production and Distribution – Prosperity and peace – Aesthetic values – Sense of Beauty – Moral and Ethical values – Conscience – Integrity – Fairness.

#### **UNIT III**

Societal values – Cooperative living – Healthy Behavior – Justice – Social Responsibility – Free from Bribery and Corruption – Good Citizen – Good Society – Pursuit of Excellence – Psychological values – Self Esteem and Acceptance – Emotional Intelligence – Spiritual values – Devotion and Self – Fulfillment.

#### **UNIT IV**

Bio-Ethics – Definition – Goals and Objectives – Love of life – Animal abuse and Ethics – Negligence and wrong judgments – Issues in genome and organ transplantation- donors- Drugs – Morality – Social Ethics – Child Labor and Bonded Labor.

#### **UNIT V**

Women and Development – Sex Vs Gender – Women's Rights -Factors affecting development – Violence against women -Right to privacy – Abortion and reproductive rights – Social stigma – Women empowerment – Social, Economic and Political – Government programs and policies.

### **Text & Reference:**

1. Value Education – N. S. Rangunathan
2. Business Ethics and Values – Dr. S. Sankara



**CURRICULUM FRAMEWORK AND SYLLABI FOR  
MASTER OF ARTS IN ENGLISH  
(FOR THE CANDIDATE TO BE ADMITTED FROM THE ACADEMIC YEAR (2018-2019)  
(UNDER CHOICE BASED CREDIT SYSTEM-CBCS)**



**DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES  
MOTHER TERESA WOMEN'S UNIVERSITY  
KODAIKANAL**

## PRELUDE

**DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES:** The Department amalgamates disciplines in dynamic dialogue with each other, ensuring both specific knowledge and a more general ability to think. The Traditional courses will be studied in tandem with cutting edge courses on "Digital Humanities" for a wide exposure to different genres. It emphasizes research on Global Feminist literatures, Eco Studies, Diaspora studies and ELT. This wide range of courses offered in M.A., M.Phil, and Ph.D., will prepare the graduates for a variety of careers in higher education, and at any field that requires an agile mind able to traverse across borders. It imparts efficient Communicative Skills to the students to be competent, through its well-equipped Foreign Language Lab and also offers Certificate Courses in French and German.

## **VISION**

- **Master in the Global Literature**
- **Proficiency in two or three foreign languages**
- **To clear SLET/NET and other competitive Examinations**
- **To assume an engaging, holistic personality as teachers of English**

## **Mission**

- **To aim at a cent percent students' placement**
- **To achieve excellence in teaching and Research**
- **To empower learners to achieve their goal**
- **To etch the creative imagination in students**
- **To train students as proficient orators, speakers and top communicators and creative Writers and Translators**

## **Objective of the Department**

- **Making learning and research a way of life**
- **Achieving total quality in the endeavors to meet local and global expectations**
- **Striking a balance between material and human values**
- **Nurturing a passion for all round excellence**

**MOTHER TERESA WOMEN' UNIVERSITY, KODAIKANAL**  
**Department of English and Foreign Languages**  
**M.A. English (Two Year) Programme**

PROGRAMME OUTCOMES (POs)

On successful completion of M. A. English programme, the students would have

PO 1:

developed mastery of English language skills and forms to be used in explicitly meaningful contexts through literature and criticism

PO 2:

acquired necessarily required linguistic competence to be mastered in various real life situations

PO 3:

appreciated and admired the master minds of literature and analyzed a variety of literary samples to determine the components, organizations, and structure of academic text

PO 4:

molded themselves into full-fledged literary critics with good attitude towards objective criticism and unbiased conclusions

PO 5:

integrated the indispensable human values to become respectful humans and law-abiding citizens

PO 6:

promoted their managerial skills to work independently and in groups so that they could transform themselves into job-ready candidates and achieve their career goals

PO 7:

widened their perspective to face the literary and artistic challenges and incorporate ICT skills to clear competitive examinations like NET, SET, UPSC, TNPSC etc.

## Programme Specific Outcomes

At the end of the programme, the student will be able to

PSO1:	read, understand, analyze, interpret, and extrapolate from the complex texts that are at the heart of the diverse traditions of the English language.
PSO2:	identify, analyze, interpret and describe the critical ideas, values, and themes that appear in literary and cultural texts and understand the way these ideas, values, and themes inform and impact culture and society, both now and in the past.
PSO3:	demonstrate a command of written academic English, including the abilities to a) organize and present material in a cogent fashion, b) formulate and defend original arguments, c) employ effectively the language of their discipline, and d) write under time constraints.
PSO4:	analyze, interpret, and understand the complex interrelationships between authors, texts, and specific social, political, and historical contexts and apply critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres.
PSO5:	write well in a variety of formats, including essays, research papers, reflective writing, and critical reviews of secondary sources and to cogently convey their own interpretations and perspectives, or produce new creative and artistic works themselves

**MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL**  
**NEW SYLLABUS UNDER CBCS PATTERN**  
**DEPARTMENT OF ENGLISH & FOREIGN LANGUAGES**

**PREAMBLE:**

Considering the need for revising and updating the Syllabi from time to time, and as per the UGC/TANSICHE guidelines, as well as the constructive feedback from the various stakeholders of the Department, the Department of English & Foreign Languages has evolved a new syllabus, suitably modified and updated to meet the local, national and global needs. The syllabus also has been framed with the aim of creating competent individuals to sustain themselves in the challenging global context with various skills.

The semester pattern and credit system are retained.

The Program contains 18 Courses, out of which 14 Core Courses with 5 credits and 4 Elective Courses with 4 credits have been designed to cater traditional subject knowledge and cross-cutting issues, while instilling professional and human ethics and values. The project in the final semester enhances student's research acumen and prepares them for Pre-Doctoral Research.

## M.A., ENGLISH - PROGRAMME STRUCTURE

SEM	Course		CR.	HRS / WEEK	INT. MARKS	EXT. MARKS	TOTAL
	SUB. CODE	NAME					
<b>I</b>	PENT11	Core I – British Literature – I	5	6	25	75	100
	PENT12	Core II - British Literature – II	5	6	25	75	100
	PENT13	Core III – Indian Writing in English	5	6	25	75	100
	PENT14	Core IV – Diasporic Fiction	5	6	25	75	100
	PENE11	Elective – I – Creative Writing	5	6	25	75	100
	<b>Total</b>		<b>25</b>	<b>30</b>	<b>--</b>	<b>--</b>	<b>500</b>
<b>II</b>	PENT21	Core V – British Literature – III	5	7	25	75	100
	PENT22	Core VI – British Literature – IV	5	7	25	75	100
	PENT23	Core VII – Shakespeare – V	5	6	25	75	100
	PENT24	Core VIII – Language and Linguistics	5	6	25	75	100
	PENE22	Elective II – Translation Theory and Practice	5	4	25	75	100
	<b>Total</b>		<b>25</b>	<b>30</b>	<b>--</b>	<b>--</b>	<b>500</b>
<b>III</b>	PENT31	Core IX – American Literature	5	6	25	75	100
	PENT32	Core X – World Classics in Translation	5	6	25	75	100
	PENT33	Core XI - Literary Theory and Criticism	5	6	25	75	100
	PENT34	Elective XII – Research Methodology	5	6	25	75	100
	PENE33	Elective III – Writing for the Media	5	6	25	75	100
	<b>Total</b>		<b>25</b>	<b>30</b>	<b>--</b>	<b>--</b>	<b>500</b>
<b>IV</b>	PENT41	Core XIII -- Post Colonial Literature	5	6	25	75	100
	PENT42 14(a)/14(b) Optional	Core XIV (a) – Women’s Writing Core XIV (b) – Subaltern Studies	5	6	25	75	100
	PEND41	Elective V – Presentation Skills and Project	5	18	25	75	100
	<b>Total</b>		<b>15</b>	<b>30</b>	<b>--</b>	<b>--</b>	<b>400</b>
	<b>Grand Total</b>		<b>90</b>	<b>120</b>	<b>--</b>	<b>--</b>	<b>1900</b>



## CREDIT DISTRIBUTION

<b>S.NO</b>	<b>COURSES CATEGORY</b>	<b>CREDITS</b>	<b>PERCENTAGE %</b>
1	Core Theory	70	78
2	Major Based Electives	15	17
3	Project	5	5
<b>TOTAL</b>		<b>90</b>	<b>100</b>

### AVERAGE PERCENTAGE OF THE COURSES HAVING FOCUS ON SKILLS

<b>Courses</b>	<b>Employability</b>	<b>Communicative Skill</b>	<b>Entrepreneur</b>	<b>Knowledge</b>
British Literature – I	Y	Y	Y	Y
British Literature –II	Y	Y	Y	Y
Indian Writing in English	Y	Y	Y	Y
Diasporic Fiction	Y	Y	Y	Y
British Literature – III	Y	Y	Y	Y
<b>British Literature – IV</b>	Y	Y	Y	Y
Shakespeare – V	Y	Y	Y	Y
Language and Linguistics	Y	Y	Y	Y
American Literature	Y	Y	Y	Y
World Classics in Translation	Y	Y	Y	Y
Research Methodology	Y		Y	Y
Literary Theory and Criticism	Y	Y	Y	Y
Post Colonial Literature	Y	Y	Y	Y
a)Women’s Writing (b) – Subaltern Studies		Y	Y	Y
<b>CORE COURSES – TOTAL</b>	<b>13/15</b>	<b>15/15</b>	<b>15/15</b>	<b>15/15</b>
Creative Writing	Y	Y	Y	Y
Translation Theory and Practice	Y	Y	Y	Y
Writing for the Media	Y	Y	Y	Y
<b>ELECTIVE COURSES</b>	<b>3/3</b>	<b>3/3</b>	<b>3/3</b>	<b>3/3</b>

<b>- TOTAL</b>				
Presentation Skills and Project	Y	Y	Y	Y
<b>OTHERS - TOTAL</b>	<b>1/1</b>	<b>1/1</b>	<b>1/1</b>	<b>1/1</b>

<b>Core Courses-Total-19</b>	<b>13</b>	<b>15</b>	<b>15</b>	<b>15</b>
<b>Elective Courses – Total-4</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
<b>Others – Project-1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>

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PSO3:	demonstrate a command of written academic English, including the abilities to a) organize and present material in a cogent fashion, b) formulate and defend original arguments, c) employ effectively the language of their discipline, and d) write under time constraints.
PSO4:	analyze, interpret, understand and appreciate the language, diction, style, the complex interrelationships between authors, texts, and specific social, political, and historical contexts and apply critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres.
PSO5:	write well in a variety of formats, including essays, research papers, reflective writing, and critical reviews of secondary sources and to cogently convey their own interpretations and perspectives, or produce new creative and artistic works themselves

## I M.A ENGLISH

### SEMESTER I

#### Course I :BRITISH LITERATURE I

<b>Course Code &amp; Title</b>	<b>BRITISH LITERATURE I</b>		
<b><u>PENT11</u></b>	<b>Semester-I</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create</b>		
<b>Learning Objectives</b>	The course aims at <ul style="list-style-type: none"><li>➤ Providing a wide spectrum of literary exuberance of the great masters of both the ages of Shakespeare and Milton for the young minds to revel in the luxury of representative literary pieces in each genre and to be informed and inspired.</li><li>➤ Helping the students imbibe the abiding human and moral values through the study of great pieces of literature.</li><li>➤ Developing critical and creative faculties in students.</li></ul>		

#### UNIT I POETRY

Chaucer – Prologue to the Canterbury Tales (The Characters: The Knight, The Prioress, The Cook, The Doctor of Physic & The Wife of Bath)

Spenser - Epithalamion

John Milton – Paradise Lost Book II

#### UNIT II POETRY

John Donne – Ecstasy, The Sun Rising

Robert Herrick – Delight and Disorder

Shakespeare – Phoenix and The Turtle

George Herbert – Altar

Henry Vaughan – Love and Discipline

**UNIT III PROSE**

Francis Bacon – Of Religion

Of Truth

The Bible – Book of Mark

**UNIT IV DRAMA**

Thomas Middleton – The Challenging

John Webster – The Duchess of Malfi

**UNIT V FICTION**

Francis Bacon – New Atlantis

**Books for Reference:**

- Blewitt, David., *Defoe's Art Fiction*. Canada: University of Toronto Press, 1979.
- Boas, Frederick. S. *Christopher Marlowe: A Bibliographical and Critical study*. Oxford; OUP, 1966.
- Boulton, Marjorie. *The Anatomy of the Novel*. London: Routledge and KeganPaul, 1984.
- Boulton, Marjorie. *The Anatomy of Poetry*. New Delhi: Kalyani Publishers, 1979.
- Forster, E. M. *Aspects of the Novel*. London: Edward Arnold, 1927.
- Minto, William. *A manual of English prose Literature*. Atlantic Publishers and Distributors, 1995.
- Peacock, R., *The Art of Drama*. London: 1951
- Phythian, B.A., ed. *Considering Poetry*. London: Hodder and Soughton, 1987.
- Hopkins, Lisa. *Christopher Marlowe –Renaissance Dramatist*. Chennai. Power Book House.

## COURSE OUTCOMES

Upon completion of this course the students will be able to

<b>K1, K2</b>	<b>CO1</b>	know the poetic tactics of the classical writers
<b>K1, K2</b>	<b>CO 2</b>	understand the difference between Old English and Middle English
<b>K2, K4</b>	<b>CO 3</b>	be aware of the salient features of aphoristic style
<b>K2, K6,K3</b>	<b>CO 4</b>	Discover and to apply the creative power behind art and literature
<b>K4, K6</b>	<b>C05</b>	Critically analyze the life and works of great writers and will be able to create literary pieces on their own

### Mapping of Cos with POS & PSOs:

CO/ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

<b>Strongly Correlating (S)</b>	-	<b>3 Marks- 43/60</b>
<b>Moderately Correlating (M)</b>	-	<b>2 marks—17/60</b>
<b>Weakly Correlating (W)</b>	-	<b>1 Mark-</b>
<b>No Correlation (N)</b>	-	<b>0 mark</b>



**PAPER II :BRITISH LITERATURE II**

<b>Course Code &amp; Title</b>	<b>COURSE-II-BRITISH LITERATURE II</b>		
<b>PENT12</b>	<b>Semester-I</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4 Analyze</b> <b>K5 Evaluate</b> <b>K6 Create</b>		
<b>Learning Objectives</b>	<b>The Course aims to</b> <ul style="list-style-type: none"> <li>✚ Make them understand the religious, political, literary, and social problems as reflected in the literature of these periods</li> <li>✚ Help students appreciate the seminal works of prominent writers of these periods</li> <li>✚ Enable students understand the characteristics of the Metaphysical poetry</li> <li>✚ Enhance the students' understanding of the literary conventions followed during these periods</li> <li>✚ Highlight the salient features of Comedy of Manners</li> </ul>		

**UNIT I POETRY**

Blake – Chimney Sweepers

Pope – Rape of the Lock

Dryden – Mac Flecknoe

**UNIT II**

Gray - Elegy Written in the Country Churchyard

Burns - A Red Red Rose

**UNIT III PROSE**

Swift - The Battle of the Books

Addison and Steele – Moll White

Will Wimble

Of Shame and Fear of Poverty

**UNIT IV DRAMA**

Dryden – All for Love  
Congreve - The Way of the World

#### UNIT V FICTION

Henry Fielding – Tom Jones  
Goldsmith – Vicar of Wakefield

#### BOOKS FOR REFERENCE

- Lewin, Gerald, Prose Models, New York: Harcourt Brace Jovanovich inc, 1974
- Minto, William, A Manual of English Prose Literature, Atlantic Publishers And Distributions, 1995
- Coombes, H., Literature and Criticism, New York: Penguin Books Ltd 1980
- Green David., ed. The Winged Word. Delhi: Macmillan India Ltd, 1974
- James, Henry. The Art of Fiction, Madras: Macmillan India Ltd, 1986

#### COURSE OUTCOMES

Upon completion of this course the students will be able to

<b>K1,K2</b>	<b>CO1</b>	understand the sense of rationalism and sensibility of the writers
<b>K1,K2</b>	<b>CO2</b>	recognize and understand the figurative language
<b>K2,K3</b>	<b>CO3</b>	apply the technical nuances of Neo-Classical dramas
<b>K5,K2,K3</b>	<b>CO4</b>	comprehend the artistic style of the writers and to adopt the style in writing
<b>K6, K3</b>	<b>CO5</b>	appreciate the intense zeal of the writers and to stimulate the creativity of the students

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

**Strongly Correlating (S)** - **3 Marks – 38/60**

**Moderately Correlating (M)** - **2 marks- 22/60**

**Weakly Correlating (W)** - **1 Mark- Nil**

**No Correlation (N)** - **0 mark- Nil**

<b>Course Code &amp; Title</b>	<b>Course-III-Indian Writing in English</b>		
<b>PENT13</b>	<b>Semester-I</b>	<b>Credits:5</b>	<b>Hours:5</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<b>The Course aims to</b> <ul style="list-style-type: none"> <li>✚ Enable the students to have an understanding of the historical and political movements in India</li> <li>✚ Enable the students to gain knowledge about Indian cultural ethos and its uniqueness</li> <li>✚ Encourage the students to analyze the cultural traits of Indian English Literature during the colonial and post -colonial periods</li> <li>✚ Motivate the students to compare and contrast the Indian writers' literary acumen with that of the British writers</li> <li>✚ Inspire the students to critically evaluate the merits and demerits of Indian Writing in English</li> </ul>		

## UNIT – I: POETRY

K.N.Daruwalla – Death by Burial

Sri Aurobindo – The Pilgrims of the Night

Nissim Ezekiel – The Patriot

JayantaMahapatra – The Lost Children of America

Gieve Patel – On killing a tree

Amrita Pritam – Bread of dreams

Toru Datt – Lakshman

Sarojini Naidu – Indian Gipsy

Tajore- Geetanjali

#### **UNIT-II: PROSE**

A.P.J. Abdul Kalam – Patriotism beyond politics and religion

Swami Vivekanada – Work and its Secret

Nehru - Discovery of India (II-Chapters)

#### **UNIT-III: DRAMA**

Vijay Tendulkar – GhashiramKotwal

Mahesh Dattani – Final Solutions

#### **UNIT-IV: FICTION**

Rama Mehta - Inside the Haveli

Amitav Gosh – Circle of Reason

#### **UNIT-V: SHORT STORY**

K.A.Abbas- Sparrows

Kushwantsingh- Mr. Kanjooas and The Great Miracle

## BOOKS FOR REFERENCE:

1. Iyengar . R. Srinivasa. “Indian Writing in English”. New Delhi: Sterling Publishers Private Limited, 1983.
2. Naik, M. K, ed . “Aspects o f Indian Writing i n English”. New Delhi: Macmillan India Limited, 1982.
3. Dwivedi, A. N. “Aspects o f Indian Writing in English”. New Delhi: Amar Prakashan, 2002.
4. Das, Nigamanda. ed. Contemporary Indian Writing in English: Trends; Concepts; Techniques.

## COURSE OUTCOME

At the end of the course, the students will be able to:

<b>K1, K2</b>	<b>CO1</b>	Understand the social, and political controversies in India during the colonial and post- colonial periods
<b>K1, K2</b>	<b>CO2</b>	Acquire knowledge about Indian cultural ethos and its uniqueness
<b>K5, K4</b>	<b>CO3</b>	Evaluate the unique characteristics of Indian writing in English
<b>K5, K1</b>	<b>CO4</b>	Appreciate the spirit of the Indian writers to preserve the noble values of Indian society
<b>K6, K3</b>	<b>CO5</b>	Acquire literary acumen for facing the SET/ NET/TET and other competitive examinations with confidence

## Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
sCO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks—44/60

Moderately Correlating (M) - 2 marks—16/60

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

<b>Course Code &amp; Title</b>	<b>Course IV-Diasporic Fiction</b>		
<b>PENT14</b>	<b>Semester-I</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<b>By introducing the course, it is intended to:</b> <ul style="list-style-type: none"> <li>✚ Introduce the learners to the literatures of the Commonwealth nations which deal with different aspects of life and its problems</li> <li>✚ Introduce the learners to the characteristics of Diaspora Studies</li> <li>✚ Familiarize the learners with representative authors and dimensions of diasporic experience</li> <li>✚ Highlight the significant works produced by contemporary diaspora writers.</li> <li>✚ Enable the learners to approach the texts from cross-cultural perspectives</li> </ul>		

### Unit I

Vikram Seth — Golden Gate

### Unit II

Salman Rushdie – Midnight's Children

### Unit III

Chitra Banerjee Divakaruni—Palace of Illusions

### Unit IV

Rohinton Mistry - Family Matters

Jhumpa Lahiri – The Lowland

### Unit V

Manju Kapur - Difficult Daughters

Bharathi Mukherjee - Wife

## COURSE OUTCOMES

Upon completion of this course the students will be able to

<b>K1, K2</b>	<b>CO1</b>	introduce the emerging body of literature
<b>K2, K1</b>	<b>CO2</b>	intimate the process of cross cultural studies and comparative literary studies
<b>K4, K5, K2</b>	<b>CO3</b>	display an understanding of both literal and metaphorical meaning of literary texts
<b>K5 K4</b>	<b>CO4</b>	negotiate the complexities and ambiguities
<b>K5, K4</b>	<b>CO5</b>	incorporate the literary products with different cultural and geographical specificity

### Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	M	S	S	S	S	S	S	M	S
CO2	S	S	S	M	S	S	S	S	S	S	M	S
CO3	S	S	S	M	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S






**Strongly Correlating (S)** - **3 Marks—53/60**

**Moderately Correlating (M)** - **2 marks-7/60**

**Weakly Correlating (W)** - **1 Mark**

**No Correlation (N)** - **0 mark**

### Course- V: CREATIVE WRITING

<b>Course</b>	<b>Course V-Creative Writing</b>		
<b>Code &amp; Title</b>			
<b>PENE11</b>	<b>Semester-I</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<b>By introducing the course, it is intended,</b> <ul style="list-style-type: none"> <li> To enable the students to imbibe the creative techniques of the major genres of English literature</li> <li> To enable students to acquire the skills of writing for the press &amp; mass media</li> <li> To enhance students employability by the application of their creative talents to trigger the students to write poems, short stories and reports.</li> <li> Enable the students to acquire the skills of writing in English for literary and other purposes and enhance the students master the art of writing in English to fulfill their academic and professional goals</li> <li> Make the students understand the strategies involved in developing effective and coherent paragraphs and get acquainted with the conventions of academic writing in English</li> </ul>		

**UNIT I:**

Writing Short Story (Narrative, descriptive), Writing Poetry (Simile, metaphor, Personification, Rhyme scheme)

**UNIT II:**

Script for Announcement Preparing Notice/Agenda

**UNIT III:**

Writing Advertisement Writing Reviews (Books /Films) Writing News for TV /Radio

**UNIT IV:**

Writing Memos

Report writing (function /accident / incident) Feature Articles



## UNIT V:

Essay- Writing (2 hours)based on Exposition, Description, Narration& Argumentation

### REFERENCE BOOKS:

- Rog Off, Leonard and Ballenger, Grad y “Office Guide to Business Letters, memo s & Reports” New York; Macmillan 1994.
- Developing communication skills -2nd Edition, Krishna Mohan, MeeraBanerji, Macmillan)
- Martin Maloney and Paul Max Rubenstein: Writing for the Media. Practice – hall in c. engel wood cliffs n.j
- Effective English Communication for You, Emerald Publishers, 2002.
- **Course Outcomes:**  
At the end of the course, the students will be able to:

<b>K5,K6</b>	<b>CO1</b>	Construct a variety of flawless sentences in English using appropriate grammatical structures
<b>K2,K5,K6</b>	<b>CO2</b>	Earn their skills in Technical Writing to be a reporter, Content Writer
<b>K6, K4, K5</b>	<b>CO3</b>	Draft effective research proposals/reports
<b>K3,K4,K5</b>	<b>CO4</b>	Exploit the resources of English language for professional enrichment
<b>K1,K5,K6</b>	<b>CO5</b>	Master the mechanics of writing and to be a writer/a teacher

### Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	M	M	S	S	S	M	M	M
CO2	S	S	M	M	M	S	M	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	M	S	S

Strongly Correlating (S) - 3 Marks—47/60

Moderately Correlating (M) - 2 marks-13/60

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

<b>Course Code &amp; Title</b>	<b>Course-VI-British Literature-III ( Semester –II)</b>		
<b>PENT21</b>	<b>Semester-II</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	By introducing the course, it is intended to: <ul style="list-style-type: none"> <li>+ Introduce the students to the writers of the Pre-Romantic and Romantic Ages</li> <li>+ Get the students learn the different genres of the periods</li> <li>+ Enable the students to get acquainted with the unique characteristics of the literature of the Pre-Romantic and the Romantic Ages</li> <li>+ Make the students comprehend the spirit of Romanticism</li> <li>+ Inspire the students to appreciate the literary works of the periods</li> </ul>		

### **UNIT I POETRY**

Wordsworth	-Daffodils
Coleridge	- Dejection: An Ode
Keats	-Ode to Autumn
Shelley	-To the Skylark

### **UNIT II POETRY**

Tennyson	-The Lady of Shallot
Arnold	-Rugby Chapel
Robert Browning	-Porphyria's Lover

### **UNIT III PROSE**

Charles Lamb	-Dream Children
	-In Praise of Chimney Sweepers
R.L. Stevenson	-Walking Tours
Carlyle	-Hero as a Poet

## **UNIT IV     DRAMA**

Oscar Wilde                    - Lady Windermere's Fan

## **UNIT V**

Hardy                            -Far from the Madding Crowd

Dickens                         -Tale of Two Cities

### **BOOKS FOR REFERENCE:**

1. Green, David. "The Winged Word – An Anthology of Poems for Degree Course", Chennai: Macmillan Publishers India Limited, 1974.
2. Thomas, C.T. "Twentieth Century Verse – An Anglo American Anthology", Chennai: Macmillan Publishers India Ltd, 1979.

### **COURSE OUTCOMES**

Upon completion of this course the students will be able to

<b>K1, K2</b>	<b>CO1</b>	know the revolutionary ideologies of the romantic writers
<b>K4,K2</b>	<b>CO2</b>	identify the lyrical qualities in romantic poetry
<b>K3,K6</b>	<b>CO3</b>	discover the creative power behind art and literature and to imitate and to recreate
<b>K3, K5</b>	<b>CO4</b>	appreciate the style of the essayists
<b>K5,K6</b>	<b>CO5</b>	relish the aesthetic beauty, wonder in the realm of nature and reflect in Writing

<b>Code &amp; Title</b>	<b>Course-VII--British Literature -IV</b>		
<b><u>PENT22</u></b>	<b>Semester-II</b>	<b>Credits:5</b>	<b>Hours:5</b>

**Mapping of Cos with POS & PSOs:**

<b>CO/ PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>

**Strongly Correlating (S)** - **3 Marks—51/60**

**Moderately Correlating (M)** - **2 marks---9/60**

**Weakly Correlating (W)** - **1 Mark--- Nil**

**No Correlation (N)** - **0 mark---Nil**

<b>Cognitive Level</b>	<b>K1: Recall</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>
<b>Learning Objectives</b>	<p>By introducing the course, it is intended to:</p> <ul style="list-style-type: none"> <li>✚ Enable the students to get acquainted with the major characteristics of the Victorian society in England</li> <li>✚ Enable the students to understand the conflicts of the Age which shows a kind of “struggle on the darkling plain”</li> <li>✚ Make the students master the literary inputs of the period</li> <li>✚ Inspire the students to critically evaluate the literature of the period</li> <li>✚ Analyze and interpret the works of the period using contemporary literary approaches</li> </ul>

**UNIT I Poetry**

- T.S Eliot - The Journey of the Magi  
W.B. Yeats - The Second Coming  
Ted Hughes - The Hawk in the Rain  
Philip Larkin - Wants

**UNIT II Poetry**

- W.H. Auden - The Unknown Citizen  
G.M. Hopkins - Pied Beauty  
Lawrence Binyon - For the Fallen  
Dylan Thomas - Do Not Go Gentle into That Goodnight

**UNIT III Prose**

- E.M. Forster - Selection From E.M. Forster's Essays  
(Notes on English Character / Does Culture Matter)  
Bertrand Russell - Marriage and Morals  
George Orwell - Shooting an Elephant

**UNIT IV Drama**

- T.S. Eliot -- Murder in the Cathedral  
Herald Pinter -- The Betrayal

**UNIT V Novel**

- Joseph Conrad -- Heart of Darkness  
Kazuo Ishiguro -- The Remains of the Day

<b>Code &amp; Title</b>	<b>Course-VIII- Shakespeare-V</b>
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### BOOKS FOR REFERENCE:

1. K. AyyappaPaniker, K. Ed. "A Pride of Poets". New Delhi: Oxford University Press, 1979.
2. Eliot T.S. "The Sacred Wood", Essays on poetry and Criticism". New Delhi: B.I. Publications, 1936.
3. Roberts, Michael. The Faber Book of Modern Verse.Faber and Faber, 1936.
4. Ward A.C. "Twentieth Century English Literature". New Delhi: Oxford University Press, 1960-61.
5. Jeffares A.N.A. "Commentary on the Collected Poets of W.B.Yeats". Methun, 1964.
6. Welland, D.S.R., Wilfred Owen "A Critical Study". London: Chatto and Windus, 1960.

### COURSE OUTCOMES

Upon completion of this course the students will be able to

<b>K4, K1</b>	<b>CO1</b>	know the religious and philosophical insight through dramatic monologues
<b>K3,K2</b>	<b>CO2</b>	understand the writers' vision for the betterment of mankind
<b>K2,K4</b>	<b>CO3</b>	ponder the values and ideas propagated by the Victorian writers
<b>K1,K5</b>	<b>CO4</b>	explore the several social problems in Victorian England
<b>K4,K6</b>	<b>CO5</b>	analyze the life of the Victorians to apply human values and ethics in real life

### Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	M	S	S	S	S	S	M	S
CO2	S	S	S	S	M	S	S	S	S	S	M	S
CO3	S	S	S	S	M	S	S	S	S	S	M	S
CO4	S	S	S	S	M	S	S	S	S	S	M	S
CO5	S	S	S	S	M	S	S	S	S	S	M	S

**Strongly Correlating (S) --- 3 Marks-- 50/60**

**Moderately Correlating(M) -- 2 Marks - 10/60**

<b><u>PENT24</u></b>	<b>Semester-II</b>	<b>Credits:5</b>	<b>Hours:5</b>
<b>Cognitive Level</b>	<b>K1: Recall</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Evaluate</b> <b>K5: Analyze</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	By introducing the course, it is intended to: <ul style="list-style-type: none"> <li>✚ Enable the students to appreciate the genius of Shakespeare that has made him a classic of eternal value</li> <li>✚ Enable them to know the historical and present day value of Shakespeare, the poet- dramatist</li> <li>✚ Make the students understand the aesthetics of Shakespeare</li> <li>✚ Get them understand the social, historical, and cultural content of Shakespearean works</li> <li>✚ Enable the students analyze the strengths and weaknesses of the characters</li> <li>✚ Enable the students appreciate Shakespeare's skill of characterization, plot construction, use of humour and wit, and song and music</li> </ul>		

### **UNIT I - Tragedy**

Hamlet

### **Unit II - Romantic Comedy**

As You Like It

### **Unit III – Historical Play**

Henry IV Part-I

### **Unit IV - Roman Play**

Antony and Cleopatra

### **Unit V – General Shakespeare**

- Shakespeare's Theatre and Audience
- History Plays
- Shakespearean Tragedy
- Romantic Comedy
- Songs and Music
- Fools in Shakespeare
- Shakespearean Criticism down the Ages



## BOOKS FOR REFERENCE:

1. Bradley, A.C. "Shakespearean Tragedy". London: Oxford University Press, 2006.
2. Harrison, G.B. "Introducing Shakespeare". Kolkata: Penguin Books, 1968.
3. Knight, Wilson, "The Imperial Theme". New York: NY Publishers, 1980.

## COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

<b>K1,K2,K4</b>	<b>CO1</b>	understand the magnitude of the Shakespearean world
<b>K3,K4,K5</b>	<b>CO2</b>	introspect the complexities of Shakespeare's plays
<b>K2,K4,K3</b>	<b>CO3</b>	attain a comprehensive knowledge of the plays of Shakespeare
<b>K1,K2,K3,K4</b>	<b>CO4</b>	analyze the stylistic features of Shakespeare
<b>K4,K5, K6</b>	<b>CO5</b>	relish the sublimity of Shakespearean language and express through creative writing

## Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
<b>CO1</b>	S	S	S	S	S	S	S	S	S	S	S	M
<b>CO2</b>	S	S	S	S	M	S	S	S	S	M	S	M
<b>CO3</b>	S	S	S	S	M	S	S	S	S	S	M	M
<b>CO4</b>	S	S	S	S	M	S	S	S	S	M	M	S
<b>CO5</b>	S	S	S	S	S	S	S	S	S	S	M	S

<b>Strongly Correlating (S)</b>	-	<b>3 Marks- 49/60</b>
<b>Moderately Correlating (M)</b>	-	<b>2 marks—11/60</b>
<b>Weakly Correlating (W)</b>	-	<b>1 Mark</b>
<b>No Correlation (N)</b>	-	<b>0 mark</b>

<b>Course Code &amp; Title</b>	<b>Course-IX- Language and Linguistics</b>		
<b>PENT31</b>	<b>Semester-III</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Recall</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<ul style="list-style-type: none"> <li>✚ By introducing the course, it is intended to:</li> <li>✚ Enable the student recognize the need for learning correct (RP) pronunciation</li> <li>✚ Make the student familiar with the different stages of speech production</li> <li>✚ Help the student know the criteria for the description of English vowels and consonants</li> <li>✚ Familiarize the student with the use supra-segmental features</li> <li>✚ Analyze the Growth and development of English and Its structural, grammatical and functional aspects</li> </ul>		

## LANGUAGE AND LINGUISTICS

### **Unit I :The History of English Language**

The Descent of the English Language.

The Old English Period : The Middle English Period; The Renaissance & After;

The Growth of Vocabulary, Change of Meaning,

The Evolution of Standard English.

### **Unit II Phonology**

Transcription , The Syllable, Received Pronunciation and the need for a model, Accent, Rhythm and Intonation, Assimilation, Elision, Liaison and Juncture.

### **Unit III Levels of Linguistic Analysis**

Morphology, Semantics and Pragmatics, Discourse Analysis.

**Unit IV Sociolinguistics** Language varieties, language, society and culture  
Computational Linguistics Language and Machine

## Unit V - Language and Linguistics

### Phonetic Transcription

#### Reference:

1. Wallwork, J. F. *Language and Linguistics: An Introduction to the Study of Language*. London: Heinemann Educational, 1969. Print.
2. Lyons, John. *Language and Linguistics: An Introduction*. Cambridge: Cambridge UP, 1981. Print.
3. Trask, R. L., and Peter Stockwell. *Language and Linguistics: The Key Concepts*. Abingdon: Routledge, 2007. Print.
4. Yule, George., *The Study of Language* 3d Edition, Cambridge University Press, 2012. Print.

### COURSE OUTCOMES

Upon completion of this course the students will be able to

<b>K5,K1,K2</b>	<b>CO1</b>	know the concepts of linguistics
<b>K2,K1,K3</b>	<b>CO2</b>	familiarize with the basic symbols of the International Phonetic Alphabet and to familiarize with pronunciation
<b>K6,K4</b>	<b>CO3</b>	enhance intrinsic values of language usage
<b>K3,K4</b>	<b>CO4</b>	analyze the various aspects of articulation effects
<b>K1,K2,K3,K6</b>	<b>CO5</b>	practice the intricacies of various structures of modern English and to practice transcription

### Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	M	S	S	S	S	M	S	S
CO2	S	S	S	M	M	S	M	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks - 52/60

Moderately Correlating (M) - 2 marks- 8/60

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

<b>Course Code &amp; Title</b>	<b>PAPER X : TRANSLATION THEORY AND PRACTICE</b>		
<b>PENE22</b>	<b>Semester-III</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	By introducing the course, it is intended to: <ul style="list-style-type: none"> <li>✚ Introduce the students to the different theories of translation</li> <li>✚ Enable the students to understand the significance of translation studies in general</li> <li>✚ Encourage the students to acknowledge the importance of translation in a multilingual country like India</li> <li>✚ Familiarize them with the theories of translation and the current practices</li> <li>✚ Inspire the students to critically evaluate and appreciate the translated genres.</li> </ul>		

#### **UNIT I:**

- Definition
- Theories of Translation (Nida, Susan Bassnett & Catford.)
- History of Translation.

#### **UNIT II:**

Kinds of Translation.

Roman Jakobson

Dryden

Catford

Literal Translation.

#### **UNIT III:**

1. Three Methods of Translation.
2. Translation Procedures.
  - Transference  Transposition  Transcreation  Transliteration.
3. Equivalence  Susan Bassnett  Eugene Nida
4. Problems in Translation.  Prose  Poetry  Drama.

#### UNIT IV:

- Bible Translation □ Machine translation □ Science Translation □ Kavimani's  
a:ciya joti: A Review □ A.K.Ramanujan Translation: A Review.

#### UNIT V:

Literary and Non Literary Passage Translation (about 100 words)

#### BOOKS FOR REFERENCE:

Bassnett, Susan, Translation studies. 3rd ed. London: Taylor and Francis Group, 2002.

Catford, 'A Linguistic Theory of Translation', Oxford University Press, 1965

Nida, Eugene. A and Charles Taber R. 'The Theory and Practice of Translation' Leiden:  
E. J. Brill, 1974.

#### COURSE OUTCOMES

Upon completion of this course the students will be able to

<b>K2, K1</b>	<b>CO1</b>	understand the history of translation
<b>K3, K4</b>	<b>CO2</b>	develop the transactional skills
<b>K4, K2</b>	<b>CO3</b>	refine their standard in translation
<b>K5, K4</b>	<b>CO4</b>	appreciate the intercultural concepts
<b>K6, K5</b>	<b>CO5</b>	apply the intrinsic skills of translation

#### Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

<b>Strongly Correlating (S)</b>	-	<b>3 Marks - 57/60</b>
<b>Moderately Correlating (M)</b>	-	<b>2 marks - 3/60</b>
<b>Weakly Correlating (W)</b>	-	<b>1 Mark</b>
<b>No Correlation (N)</b>	-	<b>0 mark</b>

<b>Course Code &amp; Title</b>	<b>PAPER XI : AMERICAN LITERATURE</b>		
<b>PENT31</b>	<b>Semester-II</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Recall</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	By introducing the course, it is intended to: <ul style="list-style-type: none"> <li>✚ Critically analyze American literary texts in the light of several movements in literature.</li> <li>✚ Understand the changing faces of texts with developments in culture.</li> <li>✚ Understand the progression of ideas across genres and times.</li> <li>✚ Get a clear idea of the literary space of America</li> <li>✚ Be sensitized towards cross cutting issues</li> </ul>		

### PAPER XI : AMERICAN LITERATURE

#### UNIT-I: POETRY

Edgar Allen Poe – Lenore, The Raven

E.E.Cummings – I Carry your heart with me

Robinson Jeffers – End of the World

Distant Rainfall

Langston Huges – The Dream Deferred

Edgar Arlington Robinson – Reuben Bright

#### UNIT-II: POETRY

Emily Dickinson – The Daisy follows soft the sun

Walt Whitman – In Midnight Sleep

Robert Frost – Stopping by the woods

Emerson – Hamatreya

### **UNIT-III: PROSE**

Maya Angelo - I Know Why the Caged Bird Sings

Martin Luther King - I have a dream

Stephen Jay Gould – Caring Group and Selfish Genes

### **UNIT-IV: DRAMA**

Lorraine Hansberry - Raisin in the Sun

Tennessee Williams – A Street Car Named Desire

### **UNIT-V: FICTION**

Malamud - The Assistant

Alice Walker - Colour Purple

### **Reference:**

*American Literature*. Volume 2, Ed. William E.Cair.Newyork: Penguin Academics 2004

### **Course Outcome**

Upon completion of this course the students will be able to

<b>K6,K2, K4</b>	<b>CO1</b>	learn the literary works & culture of the Americans
<b>K2, K5</b>	<b>CO2</b>	understand the literary activities of the writers of American descent
<b>K6,K5</b>	<b>CO3</b>	gain a perception of literary trends set by the American writers
<b>K3,K2,K5</b>	<b>CO4</b>	understand the character, flavor and ethos of the American literature
<b>K5,K6</b>	<b>CO5</b>	Appreciate the positive approaches of the American writers towards equality and emancipation and enable them to practice and to be an instructor.

**Mapping of Cos with POS & PSOs**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	M	S	M
CO3	S	S	S	M	S	S	M	S	S	S	M	S
CO4	S	S	S	S	S	M	S	S	M	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S	S	S

**Strongly Correlating (S)** - **3 Marks – 49/60**

**Moderately Correlating (M)** - **2 marks – 11/60**

**Weakly Correlating (W)** - **1 Mark**

**No Correlation (N)** - **0 mark**



<b>Course Code &amp; Title</b>	<b>COURSE XII : WORLD CLASSICS IN TRANSLATION</b>		
<b><u>PENT32</u></b>	<b>Semester-III</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<ul style="list-style-type: none"> <li>➤ Analyse literary texts in English or English translation in terms of their main stylistic and thematic features.</li> <li>➤ Discuss the literary, historical, social and cultural backgrounds of these texts.</li> <li>➤ Identify some of the main theoretical and methodological issues involved in reading World Literature.</li> <li>➤ Communicate findings clearly and engagingly.</li> <li>➤ Provide students employment opportunities through translation work</li> </ul>		

## **COURSEXII :WORLD CLASSICS IN TRANSLATION**

### **UNIT-I: POETRY**

Rabindranath Tagore – Upagupta

Salma – Green Angel

### **UNIT-II: PROSE**

The Book of Mathew – Good News Bible (Chapter1-8)

Anatole France – Our Lady’s Juggler

### **UNIT-III: DRAMA**

Anton Chekov – Uncle Vanya

### **UNIT-IV: SHORT STORIES**

Shalom Aleicham – The Lottery Ticket

Lafcadio Hearn - Living God

Guy De Maupassant – Simoen’s Papa

### **UNIT-V: FICTION**

Vaasanthi – Prison / Gomathi Narayan – A Home in the Sky

Lakshmi Holmstrom – An hour past midnight

**BOOKS FOR REFERENCE:-**

1. Reading Literature – Stories, plays, and poems ed. Joseph Satin.
2. Prison by Vaasanthi translated by Gita Subramanian
3. Good News Bible-Today’s English version
4. Current English for Language Skills- M.L. Tickoo A.E. Subramanian

**Course Outcome**

Upon completion of this course the students will be able to

<b>K2,K1,K5</b>	<b>CO1</b>	Acquire perception of the classical texts amidst the whole gamut of world literatures.
<b>K3,K4</b>	<b>CO2</b>	Discover the richness of the cultures and their writings
<b>K4,K4,K5</b>	<b>CO3</b>	Possess the capacity to identify, expound on and compare literary genres and periods.
<b>K5,K1,K2</b>	<b>CO4</b>	Relish the essence of knowing the works of people from other cultures and background.
<b>K6,K3,K4</b>	<b>CO5</b>	Exposed to analyze and demonstrate the knowledge of the major literary movements of the period and to apply in translation oriented works.

**Mapping of Cos with POS & PSOs:**

<b>CO/ PO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PS O1</b>	<b>PS O2</b>	<b>PS O3</b>	<b>PS O4</b>	<b>PS O5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>

**Strongly Correlating (S)** - **3 Marks-52/60**

**Moderately Correlating (M)** - **2 marks- 8/60**

**Weakly Correlating (W)** - **1 Mark**

**No Correlation (N)** - **0 mark**

<b>Course Code &amp; Title</b>	<b>COURSE XIII : LITERARY THEORY AND CRITICISM</b>		
<b>PENT33</b>	<b>Semester-III</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Recall</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<b>The Course aims to</b> ➤ Have an overview of major critical tools available to understand a text contextually		

	<ul style="list-style-type: none"> <li>➤ Attain the skill of attempting a close reading of the text and to analyze and interpret facts</li> <li>➤ Show an appreciation of the relevance and value of theoretical models in literary study</li> <li>➤ Demonstrate an understanding of important theoretical methodologies by summarizing key concepts or arguments.</li> <li>➤ Apply these concepts or arguments successfully in a close reading of a literary text.</li> </ul>
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## **COURSE XIII :LITERARY THEORY AND CRITICISM**

### **Unit I**

Aristotle : Philip Sidney : “An Apology for Poetry”  
 John Dryden : “Essay of Dramatic Poesie”

### **Unit II**

S.T. Coleridge : *Biographia Literaria* Chapter XIV  
 P.B. Shelley : “A Defence of Poetry”

### **Unit III**

Mathew Arnold : “The Function of Criticism at the Present Time”  
 T.S.Eliot : “The Function of Criticism”

### **UNIT-IV**

Theories: Post Modernism  
 Deconstruction

### **UNIT-V**

Feminism  
 Post-Colonial

### **Recommended Reading:**

- Abrams, M.H. *The Mirror and the Lamp*.
- Blamires, Harry. *A History of Literary Criticism*.
- Brooks, Cleanth and W.K.Wimsatt. *A Short History of Literary Criticism*.
- Hazlitt, William. “On Shakespeare and Milton”.
- Horace. *ArsPoetica*.
- Plato. *The Republic* Book X.
- Richards, I.A. “The Two Uses of Language”, “The Four Kinds of Meaning”.
- Wellek, René. *A History of Literary Criticism* (6 volumes).
- Wordsworth, William. “Preface” to *Lyrical Ballads*.

### **Course Outcome**

<b>K6,K1,K2</b>	<b>CO1</b>	The course intends to provide a critical understanding of the developments in literary criticism from the beginning to the end of 19th century
<b>K2,K1,K3</b>	<b>CO2</b>	Moreover some selected texts/critics are prescribed for detailed study whose contribution to this area constitutes a significant benchmark in each era.
<b>K6,K1,K2,K4</b>	<b>CO3</b>	It also provides a conceptual framework for developing an understanding of the function and practice of traditional modes of literary criticism
<b>K3,K4,K5,K6</b>	<b>CO4</b>	Learn the history of literary criticism and various literary theories. Apply critical and technical theory and vocabulary to describe and analyze, and formulate an argument about literary and other texts.
<b>K5,K4,K5,K6</b>	<b>CO5</b>	Think about the non-fixity of meaning of literacy texts. Develop a skill in applying various literary theories in interpreting a specific text.

**Mapping of Cos with POS & PSOs:**





<b>CO/ PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PSO 1</b>	<b>PSO 2</b>	<b>PSO 3</b>	<b>PSO 4</b>	<b>PSO 5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>

**Strongly Correlating (S)** - **3 Marks-45/60**

**Moderately Correlating (M)** - **2 marks-15/60**

**Weakly Correlating (W)** - **1 Mark**

**No Correlation (N)** - **0 mark**

<b>Course Code &amp; Title</b>	<b>COURSE XIV : WRITING FOR THE MEDIA</b>		
<b><u>ENE33</u></b>	<b>Semester-III</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<p><b>The Course aims to</b></p> <ul style="list-style-type: none"> <li> Create and edit well-designed and technically sound e-news pages using industry standard software.</li> <li> Create and maintain all aspects of a daily, Internet-based, multimedia publication.</li> <li> Participate as an effective member of a team.</li> <li> Manage and lead a team of journalism professionals</li> </ul> <p style="padding-left: 40px;">Instill acumen in the field of journalism and media</p> <p>Develop portfolio that demonstrates creative and professional skills and abilities in journalism.</p> <p>Comply with and promote adherence to relevant Canadian legislation, standards, and the principles and practices of journalism</p>		

## **COURSE XIV : WRITING FOR THE MEDIA**

### **UNIT I: Report Writing**

Function/Celebration Accident Incident

### **UNIT II: 1. Editorial Column**

2. Letter to the Editor

3. Types of Interviews

### **UNIT III: Writing Feature Stories Writing Documentaries**

### **UNIT IV: News for TV News for the Radio Advertisements Reviews**

a. Books b. Films

### **UNIT V: 1. writing for Web sites**

2. Writing for e-zines

### **BOOKS FOR REFERENCE:**

1. S. P. Phadbe- "Modern Journalism – Tools and Techniques" - ABD Publishers 2007  
Y.K. D' Souza -Encyclopedia of Advanced Journalism – Orient Longman, 2revised edition.

### **Course Outcome**

On successful completion of the course, the students will be able to

<b>K2,K3,K4</b>	<b>CO1</b>	Demonstrate their ability to observe events, gather information, write news reports and news releases and report on events
<b>K3,K2,K5</b>	<b>CO2</b>	Gain first-hand experience in the designing the News Letters.
<b>K4,K2,K3</b>	<b>CO3</b>	Understand the difference between communication and media theories and would have gained expertise to handle this area in their profession
<b>K5,K4,K6</b>	<b>CO4</b>	grasp the complex relationship between communication/media theories and a diverse set of individual, social, and professional practices
<b>K6,K2,K3</b>	<b>CO5</b>	Know the processes and practice of writing for the media and to have placement in Media

<b>Course Code &amp; Title</b>	<b>COURSE XV : RESEARCH METHODOLOGY</b>		
<b><u>PENT34</u></b>	<b>Semester-III</b>	<b>Credits:5</b>	<b>Hours:5</b>
<b>Cognitive Level</b>	<b>K1: Recall</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		

**Mapping of Cos with POS & PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

- Strongly Correlating (S)** - **3 Marks- 60/60**
- Moderately Correlating (M)** - **2 marks**
- Weakly Correlating (W)** - **1 Mark**
- No Correlation (N)** - **0 mark**



<b>Learning Objectives</b>	<p><b>The course aims to</b></p> <ul style="list-style-type: none"> <li>• explain key research concepts and issues</li> <li>• read, comprehend, and explain research articles in their academic discipline</li> </ul> <p>understand a general definition of research design.</p> <p>know why educational research is undertaken, and the audiences that profit from research studies.</p> <p style="padding-left: 40px;">identify the overall process of designing a research study from its inception to its report.</p> <ul style="list-style-type: none"> <li>• be familiar with ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.</li> </ul>
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## **COURSE XV :RESEARCH METHODOLOGY**

### **UNIT –I**

Research: Meaning, Principles of research, Kinds of research

Formulation of Research Problems

Mechanics of Writing : Spelling, Punctuation, Italics, Name of Persons and Numbers

### **UNIT-II**

Choosing a topic

Designing a Research project or thesis

Preparation of Bibliography

### **UNIT-III**

Format of Research Paper: Margins, Heading and Title, Page numbers, Tables and Illustrations, Corrections and Insertions, Electronic submission

Tone, Emphasis, Unity, Coherence, Sentence and Paragraph

### **UNIT-IV**

Documentation: List of Works cited, Citing periodical and Non Periodical print publication, Citing Web Publication, Citing additional common source

Data Collection

Primary and Secondary Sources

Use of Quotations

### **UNIT-V**

Foot note

Parenthetical Documentation

First Draft and Final Draft

Proof reading

Abbreviations – Symbols and abbreviations used in proof reading and correction

## BOOKS FOR REFERENCE:

Gibaldi, Joseph, MLA Handbook for Writers of Research Papers. 8<sup>th</sup>ed. New York: MLA Publications, 2004.

### Course Outcome

On successful completion of the course, the students will be able to acquire knowledge about

<b>K1,K2,K3</b>	<b>CO1</b>	Comprehend Literary Research against other types of researches and will have learnt to identify and describe the Research Question
<b>K2,K4,K5</b>	<b>CO2</b>	Imbibe the rhetoric styles, language appropriate for research and the knowledge on the mechanics and methodology of writing a literary project
<b>K3,K4,K5</b>	<b>CO3</b>	Acquire training in selecting and defining the appropriate research problem and parameters.
<b>K2,K4,K5,K6</b>	<b>CO4</b>	Understand how to organize ideas and format a dissertation.
<b>K6,K5,K4</b>	<b>CO5</b>	develop data analytics skills and meaningful interpretation to the data sets so as to solve the Research problem

### Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>M</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>

**Strongly Correlating (S)** - **3 Marks- -49/60**

**Moderately Correlating(M)** - **2Marks - 11/6**

<b>Course Code&amp; Title</b>	<b>COURSE XVI : POST COLONIAL LITERATURE</b>		
<b>PENT41</b>	<b>Semester-IV</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<b>The Course aims to</b> Possess a coherent knowledge and a critical understanding of postcolonial literature and its key historical, cultural and theoretical developments To understand about the importance of listening Be able to compare, discuss and explain interconnections and functions of postcolonial literature and its contexts, including comparative and interdisciplinary issues <ul style="list-style-type: none"> <li>➤ Be able to critically evaluate arguments and assumptions about postcolonial literature, texts, and modes of interpretation.</li> <li>➤ Be able to communicate arguments effectively and show a degree of independent thinking in so doing</li> </ul>		

#### **SEMESTER IV**

### **COURSE XVI : POST COLONIAL LITERATURE**

#### **UNIT-I: POETRY**

KishwarNaheed- I am not that woman  
 Vincent Buckley – Parents  
 David Ruadiri – A Negro Labourer in Liverpool  
 EdwindThambo – The Exile

#### **UNIT-II : POETRY**

TaufiquaRafat – The Medal  
 John Pepper Clark – The Casualities  
 W.W.E. Ross – The Snake Try Up  
 A.D. Hope – The Death of the Burial

#### **UNIT-III: PROSE**

Jean Rhyts – Smile Please  
 John Pilger - A Secret Country  
 Chinua Achebe - The Novelist as a Teacher

#### UNIT-IV: DRAMA

Wole Soyinka - A Dance of the Forests

George Ryga – Grass and Wild strawberries

#### UNIT-V: FICTION

Alice Munro – Too Much Happiness

Bapsi Sidwa – Water

#### BOOKS FOR REFERENCE:

1. An Anthology of Commonwealth Poetry ed. By. C.D. Narasimhaiah
2. Post Colonial Situation in the novels of V.S. Naipaul- ChampaRao Mohan
3. Critical studies on Commonwealth Literature-R.A.Singh 2003.
4. Current perspectives in Indian English Literature Gauri Shankar Jha, Atlantic publishers (p) Ltd, New Delhi 2006.

#### COURSE OUTCOME:

On successful completion of the course, the students will be

<b>K1, K2,</b>	<b>CO1</b>	Familiarized with some of the seminal works on colonialism
<b>K2,K3</b>	<b>CO2</b>	Acquainted with the key concepts of postcolonial literary theory through the study of postcolonial texts
<b>K2,K3</b>	<b>CO3</b>	Introduced to aspects of subjectivity, race, class and feminism as they inhere in the postcolonial space
<b>K2, K3</b>	<b>CO4</b>	Known how a literary text, explicitly or allegorically; represents various aspects of colonial oppression
<b>K3,K4,K5</b>	<b>CO5</b>	Learnt how a text reveals about the politics and/or psychology of anti-colonialist resistance and trace the history of post-colonial movements in India and its textual representations and trained them to teach and to be sensitized towards cross cutting issues.

#### Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	M	M	S	M	S	S
CO2	M	S	S	S	S	S	M	S	M	M	S	M
CO3	S	S	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	S	S	M	S	M
CO5	S	S	S	S	S	S	M	S	S	M	S	S

Strongly Correlating (S) - 3 Marks- 47/60

Moderately Correlating (M) - 2 marks --13/60

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

<b>Course Code &amp; Title</b>	<b>COURSE XVII : WOMEN'S WRITING</b>		
<b><u>PENT42</u></b>	<b>Semester-IV</b>	<b>Credits:5</b>	<b>Hours:6</b>
<b>Cognitive Level</b>	<b>K1: Knowledge</b> <b>K2: Understand</b> <b>K3: Apply</b> <b>K4: Analyze</b> <b>K5: Evaluate</b> <b>K6: Create</b>		
<b>Learning Objectives</b>	<b>The Course aims to</b> <ul style="list-style-type: none"> <li>○ Understand Gender and Women's Studies as an academic field</li> </ul>		

	<p>of study</p> <ul style="list-style-type: none"> <li>○ Be familiar with its major concepts, history, assumptions, and theories/theorists, and recognize its epistemological and methodological diversity and character.</li> <li>○ Analyze the ways in which societal institutions and power structures impact the material realities of women's lives.</li> <li>○ Evaluate information derived from various women's writing.</li> <li>○ Interpret information from a variety of sources including print and electronic media, film, video, and other information technologies and Cater to the needs of women in Society proactively.</li> </ul>
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### **COURSEXVII :WOMEN'S WRITING**

#### **UNIT I: Poetry**

Kamala Das - Next to Indira Gandhi

Judith Wright - Woman to Man

Maya Angelou - Still I Rise

Sylvia Plath – Mushrooms

#### **UNIT II: Poetry**

Jean Arasanajagan- In the month of July

Hilda Doolittle- Pear tree

Razia Khan – My Daughter's Boy Friend

Elinor Wylie – The Eagle and the mole

#### **UNIT III: Prose**

Alice Walker - In search of our Mothers' Gardens.(An extract from the prose collection with the same title).

Virginia Woolf - A Room of one's own (Chapter 1& 2)

Helen Keller – Three days to see

Maya Angelou – I know why the caged bird sings

#### **UNIT IV: Drama**

Rita Dove - The Darker Face of the Earth

Wendy Wasserstein– Uncommon women and others

#### **UNIT V: Fiction**

Lawrence – Stone Angel

Toni Morrison –Sula

## BOOKS FOR REFERENCE:

Nilufer E. Bharuche Vilas Sarang : Indian English Fiction. Macmillan publications 1980-90.

M.S. Nagarajan, N. Eakambaram, A. Natarajan Essays in criticism on Indian Literature in English.S.Chand&CO,1991.

AmarnathPrasad : Indian writing in English, past and present.Sarup&Sons.NewDelhi,2004.

M.R. Verma, K.A. Agarwal : Reflections on Indian English Literature.Atlantic,2002.

## COURSE OUTCOME

On successful completion of the course, the students will be able to acquire practical knowledge about

<b>K1,K2</b>	<b>CO1</b>	Learn how and on what grounds women's writings can be considered as a separate genre.
<b>K1,K2</b>	<b>CO2</b>	Read and understand canonical texts written by Women writers across different ages.
<b>K3,K4</b>	<b>CO3</b>	Differentiate between sex and gender and how the latter is a social construction.
<b>K4,K5</b>	<b>CO4</b>	Be aware about the issues and concerns of the women writers of the developed, developing and under-developed countries
<b>K3,K6</b>	<b>CO5</b>	Demonstrate awareness of cultural and intercultural concerns relating to women's writing

**Mapping of Cos with POS & PSOs:**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	M	S	S	S	S	S

**Strongly Correlating (S) - 3 Marks -56/60**

**Moderately Correlating (M) - 2 marks -4/60**

**Weakly Correlating (W) - 1 Mark**

**No Correlation (N) - 0 mark**

Prepared by : Dr. A. MuthuMeenaLosini

Verified by: Dr. R. Vijaya



### Employability/Entrepreneurship/ Skill Development

<b>Name of the Course</b>	<b>Course Code</b>	<b>Name of the Programme</b>	<b>Activities with direct bearing on Employability/ Entrepreneurship/ Skill development</b>
Indian Writing in English	PENT13	M.A. English	work as a teacher/ Writer- Employability, Skill
British Literature-I	PENT11	M.A.English	work as a teacher/ Writer- Employability, Skill
British Literature-II	PENT12	M.A. English	work as a teacher/Writer- Employability, Skill
British Literature-III	PENT21	M.A. English	work as a teacher/Writer- Employability, Skill
British Literature-IV	PENT22	M.A.English	work as a teacher/Writer- Employability, Skill
Diasporic Fiction	PENT14	M.A.English	work as a teacher/Writer- Employability, Skill
Creative Writing	PENE11	M.A.English	Creative Writer- Skill Development, Employability, entrepreneur
Language and Linguistics	PENT24	M.A.English	Skill Development and Employability
Translation Theory and Practice	PENE22	M.A.English	Translator -Entrepreneur, Employability, Skill Development
World Classics in Translation	PENT32	M.A.English	Skill Development and Employability
Literary Theory and Criticism	PENT33	M.A.English	Skill Development
Research Methodology	PENT34	M.A.English	Skill Development and Research Writing
Writing for the Media	PENE33	M.A.English	Editor, Journalist and a Review writer, Critical Thinking- Employability

**MOTHER TERESA WOMEN'S UNIVERSITY**  
**SYLLABUS, REGULATION AND SCHEME OF EVALUATION**

**(From 2018-19 onwards)**

**M.COM (CHOICE BASED CREDIT SYSTEM)**

**(Full-time)**



**MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL-624102**

## **COURSE NAME: M.COM (Choice Based Credit System)**

### **1. Objectives of the course:**

The course is intended for students who have completed the first degree programme at university level, to get specialized knowledge in the areas of commerce and accountancy. The subjects of study are suitably designed to provide core knowledge in commerce and various specialized accounting systems and also to develop skill in application of computers in business.

### **2. Eligibility:**

A candidate who has passed any one of the following degree courses of this university or any other university accepted by the syndicate as equivalent there subject to such conditions as may be prescribed therefore, will be eligible for admission to the M.Com course.

B.Com., B.Com. (CA), B.Com. (e-Commerce), B.Com. (Corporate Secretaryship), BCS, B.A. (Corporate Secretaryship), B.B.A., (Bachelor of Business Administration), B.B.M. (Bachelor of Business Management), B.B.M., (Bachelor of Bank Management) B.Com. (Cooperation) and B.A., (Cooperation).

### **3. Duration:**

M.Com, course shall extend through a period of 4 consecutive semesters and duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

### **4. Medium of instruction:**

English

### **5. Evaluation:**

Evaluation of the candidates shall be through internal and external assessment. The ratio of formative and summative assessment should be 25:75 for Core and elective papers.

**The Break-up for internal assessment shall be as follows**

<b>Internal (Theory)</b>	<b>- 25</b>
Test	- 15 Marks
Assignment /Technical Quiz	- 5 Marks
Attendance	- 5
<b>Total</b>	<b>- 25</b>
External Theory	- 75

**Question paper in External examination for core and elective papers carrying 75 marks will be in the format below: (3 hours)**

S.No	Part	Type	Marks
1	A	<b>10*1 Marks=10</b> Multiple Choice Questions, 2 Questions from each Unit	<b>10</b>
2	B	<b>5*4=20</b> (From each Unit either or Choice)	<b>20</b>
3	C	<b>3*15=45</b> (Open Choice) (Any three Question out of 5, one Question from each Unit)	<b>45</b>
			<b>75</b>

**The Internal Assessment for Practical: 25**

**The External Assessment for Practical: 75**

## **6. Project Report**

A student should select a topic for the project work in the third semester end itself and submit the project report at the end of the fourth semester. The project report shall not exceed 75 typed pages.

**Evaluation:**

There is a viva for project work. The Guide and an External Examiner shall evaluate and conduct the viva. The project work carries 100 marks (Internal: 60 Marks, Viva: 40 Marks)

**7. Passing Minimum:**

A candidate who obtains not less than 50% marks (38/75) in each paper in the summative examination separately and 50% marks in the aggregate of both summative examination and the formative evaluation shall be declared to have passed. The minimum pass mark for internal evaluation is 50% (13/25) in each paper.

Minimum credits required to pass - 90.

**8. Classification of Successful candidate:**

A candidate who secures not less than 50% of the aggregate marks in all parts of the final examination is placed in the second class.

A candidate who secures not less than 60% of the aggregate marks in all parts of the final examinations shall be declared to have passed the examination and placed in first class.

A candidate who have passed in first class and who obtains not less than 75% of the marks in any paper (provided it is cleared in the first attempt) shall be declared to have passed with a Distinction in that paper.

**9. Any Other Information:**

Apart from the above regulation, common regulations other than those mentioned above will also be applicable to this course.

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL- 624102

DEPARTMENT OF COMMERCE

Papers offered in each semester/ Scheme of Examination

M.Com

Paper No.	Paper Code	Course Title	Hours	Credits	Continuous Internal Assessment (CIA)	End Semester Exam (ESE)	Total
<b>Semester I</b>							
1	PCOT11	Marketing Management	6	5	25	75	100
2	PCOT12	International Trade and Practice	6	5	25	75	100
3	PCOT13	Advanced Financial Management	6	5	25	75	100
4	PCOP11	Computerized Accounting with Tally (Practical)	6	5	40	60	100
5	PCOE11	Managerial Economics	6	5	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>500</b>
<b>Semester II</b>							
6	PCOT21	Modern Banking and Insurance	6	5	25	75	100
7	PCOT22	Advanced Cost Accounting	6	5	25	75	100
8	PCOT23	Business Research Methods	6	5	25	75	100
9	PCOT24	Quantitative Techniques for Business	6	5	25	75	100
10	PCOE22	1.Business Environment 2.Organisational Behaviour	6	5	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>500</b>
<b>Semester III</b>							
11	PCOT31	Indirect Taxation	6	5	25	75	100
12	PCOT32	Financial Markets and Services	6	5	25	75	100
13	PCOT33	Advanced Corporate Accounting	6	5	25	75	100
14	PCOT34	Management	6	5	25	75	100

		Accounting					
15	PCOE33	1.Logistics Management 2. Human Resource Management	6	5	25	75	100
		<b>Total</b>	<b>30</b>	<b>25</b>			<b>500</b>
<b>Semester IV</b>							
16	PCOT41	Income Tax and Tax Planning	6	5	25	75	100
17	PCOT42	Strategic Management	6	5	25	75	100
18	PCOD41	Project	18	5	25	75	100
		<b>Total</b>	<b>30</b>	<b>15</b>			<b>300</b>
<b>Total</b>			<b>120</b>	<b>90</b>			<b>1800</b>

**PEOS:**

**PEO-1:** Become well versed and competent in the core concepts of the Programme.

**PEO-2:** Be recognized for quantitative, qualitative, cognitive and analytical skills to identify, analyze, design and create business opportunities in a dynamic environment on the Global map.

**PEO-3:** Become successful entrepreneurs and finance professionals in the field of Banking, Insurance, Manufacturing, Transport, Telecom, Service, Hospitality, IT and to pursue career in teaching and for advanced studies.

**PEO-4:** Contribute to the creation, transmission and application of knowledge in the field of Commerce and other related fields adapting to a rapidly changing environment through lifelong learning.

**PEO-5:** Become with professional integrity and humanitarian values to fulfill the societal needs at regional, state, national and global levels

**POS:**

**PO 1:** Acquire in-depth knowledge of Commerce discipline, including wider and global perspectives, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge. **(Academic result &**

### **International / global reach)**

**PO 2:** Analyze complex business problems critically; apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context. **(Research and Innovation)**

**PO 3:** Think laterally and originally, conceptualize and solve Business problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise at the national and international levels. **(International / global reach)**

**PO 4:** Extract information pertinent to unfamiliar industry issues through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct survey, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, submit a report about the study in commerce. **(Practical managerial analytical skills & Industry interaction)**

**PO 5:** Demonstrate ability to understand commerce in multifunctional areas like Banking and Finance, Auditing and taxation, Marketing & Entrepreneurship. Also they will be able to demonstrate ability to understand and derive meaningful inferences about organizational performance. **(Functional Specialization)**

### **PSOS:**

**PSO 1:** Display knowledge and understanding of group dynamics, recognise opportunities and contribute positively to collaborative-multidisciplinary management research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, themselves as well as others. **(Team Work)**

**PSO 2:** Demonstrate knowledge and understanding of commerce principles and apply the same to one's own work, as a member and leader in a team, manage projects in the work environment efficiently in respective disciplines and multidisciplinary environments after considering the economical and financial factors. **(Industry interaction)**

**PSO3:** Communicate with society at large, regarding complex managerial activities confidently and effectively, such as, being able to comprehend and write effective reports and design



**PSO4:** Documentation by adhering to appropriate standards, make effective presentations, and give and receive clear instructions. Also they will demonstrate an ability to communicate effectively, both in writing and orally (**Speaking / Writing skills**).

**PSO5:** Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously. (**Continuing education awareness**)

**PSO6:** Display commitment towards professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society. (**Values, ethics, professional integrity and contribution to society**)

**PSO 7:** Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback. (**Independent and Reflective Learning**)

**PSO 8:** Identify a timely opportunity and using business innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large. (**Successful career, immediate employment & entrepreneurship**)

**Semester I – Core 1**  
**PCOT11– Marketing Management**

**Credit –5**

**Hours: 6**

**Objectives:**

- To understand the trends in, Marketing Management at local, national and international level.
- To know the elements of Marketing Management
- To know the types of Marketing
- The student will understand the overview of Marketing Management

**Unit I**

Introduction to Marketing Management – nature and scope – Concepts of marketing – Functions and problems of marketing management – Traditional marketing – Modern Marketing – Responsibilities of marketing manager – Role of marketing management in Indian economy.

**Unit II**

Buyer behavior – Consumer behavior vs. business buying behavior – Factors affecting consumer behavior – Consumer research – Importance – Consumer research process – Consumer research design – Steps in consumer research.

**Unit III**

Promotion – Tools of promotion – Communication process – Characteristics of promotion- Merits – Demerits – Designing a promotion campaign – Promotion – mix – Determinants – Promotion tools – Advertising – Sales promotion – Public relations.

**Unit IV**

Marketing organization and control – Emerging trends and issues in marketing – Rural marketing – Social marketing – On – line marketing – Green marketing – network marketing.

**Unit V**

Customer satisfaction – Difference between consumer and customer – Consumerism – Rights of consumers – Customer expectation – Changing perceptions of customer – Benchmarking – Total quality management.

**Books for Reference:**

1. Modern Marketing – Principles and Practices – R.S.N. Pillai and Bagavathi.
2. Marketing Management – Global Perspective, Indian Context – V.S. Ramasamy and s. Namakumari.
3. International Marketing Management – An Indian perspective – R.L. Varshney and B. Bhattacharya.

**Note: Question paper shall cover 100% Theory.**

**Course outcome:**

1. States fundamental marketing management concepts, theories and principles in areas of marketing policy, of market and consumer behaviour; of product, marketing issues, customer expectation (k1)
2. Translate strategies for developing new products and services that are consistent with evolving market needs. (k2)
3. Evaluate the viability of marketing a product or service in an international market or markets. (k6)
4. The ability to take decisions and plan, develop, execute and control marketing strategies (k5)
5. plan and conduct an investigation into an organisation's marketing strategy, and communicate findings in an appropriate format.(k6)

**Mapping- PEOS AND POS, PSO**

Semester I	Code <b>PCOT11</b>					Marketing Management								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	P O1	P O2	P O3	P O4	P O5	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PS O8		
CO-1	4	4	3	4	3	4	5	3	3	4	4	3	4	48/13=3.69	
CO-2	4	4	3	4	3	4	4	4	3	4	4	3	3	47/13=3.61	
CO-3	3	4	3	3	4	3	3	3	3	4	3	3	4	43/13=3.31	
CO-4	4	4	3	4	3	4	4	3	3	4	4	4	4	48/13=3.69	
CO-5	4	4	3	5	4	4	4	4	4	3	4	4	3	50/13=3.85	

$$18.15/5=3.63$$

Note: 3.63 Moderate relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.63	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

-----  
Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

## Semester I – Core 1I

### PCOT12- INTERNATIONAL TRADE AND PRACTICES

Credit –5

Hours: 6

#### Objective

- To understand the global trends in business, marketing and trade and to make aware of regulations of foreign trade practices in the era of globalization.
- To get awareness about International Business Environment.
- To know the foreign exchange and Foreign institutions.
- The student will get knowledge on Global level Business.

#### Unit-I

International Business: Meaning, Nature, Objectives – Strategic decisions in International Business – Special Problems in International business – Reasons for firms for going international – Drivers and Restrainers of Globalization – Types of International Business activities – BOP: Components – Disequilibrium – Correction of Disequilibrium.

#### Unit-II

International Business environment: Meaning – Significance – Political Environment – Economic Environment – Cultural Environment – Technological Environment.

#### Unit-III

International marketing – Introduction – Meaning – Definition – International Marketing Vs Domestic marketing - Problems – International marketing environment - Market Entry Strategies – Information requirements for international marketing – Sources of information – International marketing channels

#### Unit-IV

International trade – Trade strategies – Types of Trade barriers – GATT – WTO – GATS – TRIMs – TRIPs – IPRs – Patents – Foreign Exchange Market – Exchange rate determination – Exchange rate system – Foreign exchange risk – Euro Currency market – IMF – World Bank.

#### Unit-V

India's Trade Performance: Determinants of Exports and Imports - Major Exports and Imports - Direction of Trade - Trade in Services - Major Problems of India's Export Sector

Foreign exchange market: Meaning, Nature and Functions – Determination of exchange rates – Exchange Rate system – FEMA.

#### Text Book:

1. Francis Cherunilam - International Business – PHI Learning Pvt. Ltd., New Delhi, 2013.

**Reference Books:**

1. Francis Cherunilam - International Trade and Export Management – PHI Learning Pvt. Ltd., New Delhi.
2. Varshney and Bhattachariya - International Marketing Management
3. Subba Rao, P - International Business - Himalaya Publishing House, New Delhi, 2014
4. Vershney, R.L. Bhattacharya, B. - International Marketing Management - Sultan Chand & Sons, New Delhi, 2012.
5. B.S.Rathor, B.M.Jani, J.S.Rathor - International Marketing- Himalaya Publishing, Mumbai, 2001

**NOTE:** Question paper shall cover 100% theory.

**Course outcome:**

1. Describe and interpret core functional areas of International Trade and Practices and the assumptions and structure of standard models of international trade theory and policy (k6)
2. Conduct an environmental scan to evaluate the impact of world issues on an organization's international business opportunities. Apply the current business phenomenon and to evaluate the global business environment in terms of economic, social and legal aspects (k5)
3. Identify major recent developments in the world trading system, and be able to critically analyse key issues raised both by the current round of WTO negotiations and by the spread of regional trading arrangements. (k4)
4. Conduct, evaluate and present market research to support an organization's international business decision-making. Create evidence-based solutions to business problems or opportunities. (k6)
5. Demonstrate and interpret how institutions and policy affect international trade. (k3)

### Mapping- PEOS AND POS, PSO

Semester i	Code <b>PCOT12</b>					<b>INTERNATIONAL TRADE AND PRACTICES</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	3	3	3	4	3	3	3	3	4	3	3	3	3	41/13=3.15	
CO-2	3	3	3	3	3	3	3	4	3	4	3	3	3	41/13=3.15	
CO-3	3	3	3	3	4	3	3	3	3	4	4	3	3	42/13=3.23	
CO-4	4	3	3	4	3	3	3	3	3	3	3	4	3	42/13=3.23	
CO-5	3	3	3	3	3	3	3	3	3	4	3	3	3	40/13=3.07	

15.83/5=3.166

Note: 3.166 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.166	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

-----  
Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester I – Core III**  
**PCOT13– Advanced Financial Management**

**Credit –5**

**Hours: 6**

**Objective**

- To gain knowledge on the fundamental concepts on financial management.
- To know the valuation of securities
- To understand the theories of capital structure and working capital management
- The student will be able to understand an overview of financial management

**Unit-I**

Financial Management: Meaning, Scope, Objectives, Functions, Relationship with other areas of Management – Functions of Financial Manager – Sources of Finance – Short term and long term finance – Financial decisions – Concepts of valuation: Time value of money – Compounding and Discounting – Risk and Return trade off.

**Unit-II**

Valuation of Securities: Valuation of Asset – Bond Valuation – Valuation of Preference shares, Equity valuation. Dividend Policy: Meaning, Objectives, Forms of Dividend, Different dividend theories – Factors determining Dividend Policy.

**Unit-III**

Capital Structure: Patterns of capital structure – Factors affecting Capital Structure – Optimum Capital Structure - Theories of Capital Structure. Leverages: Meaning, Types – Financial, Operating and Combined.

**Unit-IV**

Cost of Capital: Meaning, Significance, Concepts, Cost of Debt, Equity, Preference and Retained Earnings – Weighted Average Cost of Capital. Capital Budgeting: Concept - Evaluation Techniques: Payback, Accounting Rate of Return, NPV, IRR, Profitability Index, and Comparison of DCF Techniques.

**Unit-V**

Working Capital: Concept, Need, Types, Factors affecting Working Capital – Estimation of Working Capital – Components of Working Capital – Management of Working Capital Components – Cash, Inventories, Accounts Receivable and Accounts Payable – Working Capital Financing: Trade Credit, Bank finance & Commercial Papers.

**Text Book:**

1. S.N.Maheswari – Financial Management Principles and Practice – Sultan Chand & Sons, New Delhi.



**Reference Books:**

1. I.M.Pandey. Financial Management, Vikas Publishing House Pvt Ltd, New Delhi.
2. James C. Van Horne, John M.Wachowicz., Jr, “Fundamentals of Financial Management”, PHI Pvt. Ltd, New Delhi, 2005.
3. Prasanna Chandra, “Financial Management Theory and Practice”, Tata McGraw – Hill Publishing Company Ltd, New Delhi, 2002
4. Preeti Singh, “Fundamentals of Financial Management”, Ane Books Pvt. Ltd, Bangalore.
5. P.V. Kulkarni & B.G. Sathyaprasad, Financial Management –Himalaya Pulishing House, Mumbai.

**NOTE:** Question paper shall cover 40% theory and 60% problems.

**Course outcome:**

1. Explains the role of financial management in business firms and the essentials of corporate finance. They are able to relate the concept and mechanics of the time value of money, capital budgeting techniques, and the theory of capital structure to assess a firm’s leverage and the cost of capital. (k1, k6 )
2. Critically evaluate the financial objectives of various types of organizations’ and the requirements of stakeholders (k6)
3. Explain alternative sources of finance and investment opportunities and their suitability in particular circumstances (k2)
4. Analyse the complexities associated with management of cost of funds in the capital Structure (k4)
5. Assess the factors affecting investment decisions and opportunities presented to an organisation. Select and apply techniques in managing working capital, analyse a company’s performance and make appropriate recommendations. (k6)

### Mapping- PEOS AND POS, PSO

Semester i	Code <b>PCOT13</b>					<b>Advanced Financial Management</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO 1	PO 2	PO 3	PO 4	PO 5	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PS O8		
CO-1	4	4	4	4	4	4	4	3	4	4	4	3	4	50/13=3.85	
CO-2	4	4	4	4	3	4	3	4	3	4	5	4	4	50/13=3.85	
CO-3	4	4	4	3	4	3	4	4	4	3	4	4	4	49/13=3.77	
CO-4	3	3	3	3	3	3	3	4	4	3	3	3	3	41/13=3.15	
CO-5	3	3	3	3	3	3	3	4	3	3	3	3	3	40/13=3.08	

17.70/5=3.54

Note: 3.54 moderate relation

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.54	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester I – Core 1V**  
**PCOP11- Computerized Accounting with Tally**

**Credit –5**

**Hours: 6**

**Objective**

- To provide basic knowledge of computerized accounting to deserving students under self – learning mode.
- To know the preparation of budget and vouchers
- To prepare the final accounts and fund flow statement
- The student will get employment after learning the paper

**Unit - I**

Introduction – Role of computer in Accounting – Extended enterprise features – Accounting and Inventory control features – sales and purchase order processing. To start tally – menus and options – Accounting with Tally – Pre defined groups of accounts – Golden rules of accounts – Double entry systems – ledger creation.

**Unit - II**

Groups: Accounts Information – Primary groups of capital nature – revenue nature – To create groups using single mode – Multiple mode – Types of Budget – type of vouchers – Restart numbering – Foreign Exchange Transactions – stock Group Creation– Inventory information – Single stock group creation – Multiple stock group creation – create stock category using single mode – Multiple mode – Configuration settings for inventory – costing method – FIFO – LIFO – create stock items in multiple mode – Trading Business.

**Unit - III**

Gateway of Tally – Voucher entry – Type of Voucher – Inventory allocations – Purchase and Sales order vouchers entry – Invoice entry – Optional and Regular Vouchers – Balance Sheet – Profit and Loss Account .

**Unit – IV**

Trial Balance – Accounting Books and Statements – Inventory Reports and Statements – Cash Flow / Funds Flow Statement – Gateway of Tally – Multi Accounting Printing – Types of Printing - Configuration Options.

**Unit - V**

Reconciliation of Bank Accounts and other Miscellaneous option – Stock Summary Ratio Analysis – Import and Export of Data – Backup and Restore of data – loading a company – creating a group company – Reconciliation of Bank accounts – Security control - Types of Security.

**Text Book:**

1. Implementing Tally – A.K. Nadhani, BPB Publications

**Reference Books:**

- Tally 9, Dr.Mamrata Agrawal, DreamTech Press, New Delhi, 2010
- Computerized Accounting under Tally, Deva publications. Implementing Tally, K.K.Nandhani, BPB publication.
- Namrata Agrawal “Tally 9” Published by Dreamtech, year – 2008.
- Tally Software Package – manual.
- K.K. Nidhani, Implementing Tally.

**NOTE:** 100% practical

**Course outcome:**

1. Identify the key components of Tally (Students are familiarized with the statutory features of Tally like VAT, CST, TCS, TDS, FBT, and Goods and Service Tax. Students are also familiarized with the Point of Sale and Payroll features of Tally.) (K1)
2. Process and record the business transactions and manage the accounts information (K3)
3. Calculate the amount of tax that needs to be paid at the end of a particular accounting period (K3)
4. Student will do by their own create company, enter accounting voucher entries including advance voucher entries, do reconcile bank statement, do accrual adjustments, and also print financial statements, etc. in Tally ERP.9 software (k5)
5. To be employed as Tally data entry operator as an accountant and as a Chief Financial Officer (CFO) in companies. (k3)

### Mapping- PEOS AND POS, PSO

Semester i	Code <b>PCOP11</b>					<b>Computerized Accounting with Tally</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO 1	PO 2	PO 3	PO 4	PO 5	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PS O8		
CO-1	4	4	4	4	4	4	4	4	4	4	4	4	4	52/13=4	
CO-2	4	4	3	3	4	4	4	4	4	4	3	4	4	49/13=3.77	
CO-3	4	4	4	4	4	4	3	3	4	4	3	4	5	50/13=3.85	
CO-4	5	5	5	5	5	5	5	5	5	5	5	5	5	65/13=5	
CO-5	4	4	4	4	4	4	4	4	4	3	4	4	4	51/13=3.92	

20.54/5=4.108

Note: 4.108 high relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	-	4.108	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester I – Elective-I**  
**PCOE11 – Managerial Economics**

**Credit –5**

**Hours: 6**

**Objective**

- To develop managerial perspective to economic principle as an aid for decision making under given environmental constraints.
- To understand the concepts of demand analysis and cost of production analysis
- To know the types of competition, pricing decisions and profit management
- The student will understand the concepts of managerial economics

**Unit - I**

Managerial Economics: Nature and Scope, In relation with other disciplines - Role and Responsibilities of Managerial Economist - Goals of Corporate Enterprises: Maximization of profit – Value of enterprises.

**Unit - II**

Demand analysis: Demand determinations - Demand distinctions – Types of Elasticity of demand – Demand forecasting: For industrial goods – Consumer goods – Factors determining demand forecasting – Methods of demand forecasting.

**Unit - III**

Cost and production analysis: Cost concepts, Classifications and Determinants – Cost and output relationship – Short run and Long run – Cost functions – Economics scale of production – Cost control – Cost reduction - Production functions – Break-even analysis.

**Unit - IV**

Pricing and output decisions indifferent market situations: Perfect competition – Monopoly and Monopoly – Monopolistic competition – Oligopoly and Oligopoly – Pricing policies – Pricing methods – Pricing forecasting.

**Unit - V**

Profit management: Nature, Measurement – Profit policies – Profit planning and forecasting - Business cycles and Business policies – Economic forecasting – Input Output analysis - National income.

**Text Book:**

1. R.L. Varsheny , C.L.Maheshwari, “Managerial Economics”, Sultan Chand & Sons, New Delhi, 2002

**Reference Books:**

1. Cauvery, SudhaNayak and Others - Managerial Economics - S. Chand and Sons, New Delhi.
2. Dwivedi D.N. - Managerial Economics - Vikas Publishing House P. Ltd, New Delhi.
3. Gupta G.S. – Managerial Economics – Tata McGraw Hill, New Delhi.
4. Mehta P.L. – Managerial Economics – Sultan Chand and Sons, New Delhi.
5. Mithani D.M. – Managerial Economics – Himalaya Publishing House, Mumbai.

**Note:** Question paper shall cover 100% theory

**Course outcome:**

1. Recognize applications of managerial economics.(k1)
2. Explains the relationships between short-run and long-run costs.(k2)
3. Explains uniform pricing and how it relates to price discrimination and total revenue.(k2, k4)
4. Recognize is a role of the government to play in managerial economies (k1)
5. Integrate the concept of price and output decisions of firms under various market structure.(k6)

**Mapping- PEOS AND POS, PSO**

Semester I	Code PCOE11					Managerial Economics								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOs)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	3	5	4	4	4	3	3	3	4	3	3	3	3	45/13=3.46	
CO-2	3	3	3	3	3	3	3	3	3	3	2	3	3	38/13=2.92	
CO-3	3	3	3	3	3	3	3	3	3	3	2	1	2	35/13=2.69	
CO-4	4	4	4	3	3	3	3	3	4	3	4	4	3	45/13=3.46	
CO-5	3	3	3	3	3	3	3	3	3	3	3	3	3	39/13=3.00	

15.53/5=3.106

Note:15.53/5= 3.106 moderate relation

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.106	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS



**Semester – II- Core-V**  
**PCOT21–MODERN BANKING AND INSURANCE**

**Credit –5**

**Hours: 6**

**Objective**

- To enable the students to obtain knowledge on the important areas that help in Banking and its services
- To know the types of banking, e-banking and its services
- To understand the basic concept of insurance
- The student will be able to operate online banking and to know the banking and operations

**Unit - I**

Banking Services – Traditional Vs Modern – Mobile banking – Facilities in mobile banking — Internet Banking – Tele banking – Home banking – Corporate banking- Electronic Fund Transfer (EFT) – Evolution – Steps in EFT – Need and advantages of EFT – NEFT – Advantages – Electronic Clearing Services (ECS) – Advantages of ECS – Disadvantages – RTGS – Features – Security features of RTGS – Advantages – Disadvantages.

**Unit - II**

E-Banking – Facets of E-banking– E-banking transactions – Electronic delivery channels – Truncated cheque and electronic cheque – Models for E-banking – M - Cheque product – Electronic cheque - Advantage and constraints in E-banking – Security measures.

**Unit - III**

ATM – Features – Mechanism – Functions- Importance – Procedure for cash withdrawal – Debit cards – Concept – Mechanism – Dangers – Credit cards – Origin and history – Features – Classification – Validity and renewal — Credit card frauds - Benefits of credit card – Drawbacks – Indian Scenario – Future outlook.

**Unit - IV**

General Insurance in India – Basic Principles of Insurance: Utmost good faith, Insurable Interest- Indemnity, Misrepresentation, Subrogation, Proximate cause -Role of Insurance Companies as financial intermediaries- Insurance schemes – Assessing risk- product pricing - promotion measures - claim valuation methods-Intermediaries in insurance business – agency.

## **Unit - V**

Scope of general insurance covering theft, fire, vehicles, products, transport, travel, building and understanding the underlying conditions thereof- claims for compensation and procedure there of -Regulatory authorities and their functions.

### **Reference books:**

1. Modern Banking theory and practices : Shelagh Hefferman, John wiley and sons
2. Fundamentals of modern banking : N.C.Majumdar, New central Book Agency
3. Modern banking in India : D.P.Gupta and R.K.Gupta, Asian Books
4. Banking and insurance law and practice : Indian Institute of Banking and Finance, Taxmann Publication Private Limited.

**Note:** Question Paper shall cover 100% Theory.

### **Course outcome:**

1. Able to describe fundamental concepts behind modern banking technologies. (k1)
2. Explains how internet can help in growth of the business.(k2)
3. Express the importance of security, privacy and ethical issues as they relate to E-Commerce.
4. Explain the nature and principles of insurance and the regulatory framework of it in India (k2)
5. Describe the features of General Insurance (k1)

### Mapping- PEOS AND POS, PSO

Semester II	Code <b>PCOT21</b>					<b>MODERN BANKING AND INSURANCE</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	5	5	5	5	4	5	4	4	4	4	4	4	5	58/13=4.46	
CO-2	4	4	5	5	4	4	5	4	4	5	4	4	4	56/13=4.30	
CO-3	4	4	4	4	4	5	4	4	4	5	4	4	4	54/13=4.15	
CO-4	5	5	4	4	4	4	4	4	4	4	4	3	4	53/13=4.07	
CO-5	3	4	3	4	3	4	4	4	4	4	4	4	4	49/13=3.76	

20.74/5=4.148

Note: 4.148 – highly related

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	-	4.148	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester – II- Core-VI**  
**PCOT22– ADVANCED COST ACCOUNTING**

**Credit –5**

**Hours: 6**

**Objective**

- To enable the students to obtain knowledge on the important areas that help in decision making.
- To understand the basic concepts of cost accounting
- To know the elements of costing and types of costing
- The student will get an idea to prepare cost sheet and various types of costing.

**UNIT – I**

Cost Accounting – Meaning and Definition – Importance –Cost concept – Differences between Financial Accounting and Cost Accounting – Installation of an Ideal Costing System – Elements of cost – Classification of cost - Preparation of Cost Sheet including Tender.

**UNIT – II**

Material cost control – Fixation of various stock levels – Economic Order Quantity – Purchase procedure – Issue of materials – Pricing of material issues – Inventory control and verification.

**UNIT – III**

Labour cost control – Time keeping – Wage payment and Incentive schemes – Idle Time and Overtime – Labour turnover.

**UNIT – IV**

Overheads – Meaning, Classification according to functions and variability – Apportionment and Reapportionment of Overheads – Absorption of Overheads – Machine hour rate – Reconciliation of cost and financial Profits.

**UNIT – V**

Job Costing – Contract Costing – Process Costing – Losses and Gains – Inter Process Transfer Pricing – Equivalent production – Joint and By Products Costing.

**REFERENCES:**

1. Cost Accounting : Jain & Narang –, Mc Graw Hill, Noida, U.P.
2. Practical Costing : Arora.M.N — Himalaya Publishing, Mumbai.
3. Cost Accounting : Maheshwari S.N. -- Sultan Chand & Sons, New Delhi.
4. Advanced Cost Accounting : Senthilkumar & Maruthamuthu, Vikas Publishing House, New Delhi (Revised Edition)
5. Cost Accounting : Murthy 7 Gurusamy, Vijay Nicole Publication, Chennai.

**Note:** Question Paper shall cover 20% Theory and 80% Problems.

**Course outcome:**

1. Able to : Recognize the basic concepts and processes used to determine product costs, able to interpret cost accounting statements, (K1)
2. Analyze and evaluate information for cost ascertainment, planning, control and decision making, and (K4,K5)
3. Prepare Cost Sheet, Tender and Quotations. Various aspects of material cost control and Analyze inventory control methods (K3)
4. Calculate Labour, Contract , Process Costing (K3)
5. Interpret the cost accounting records (k5)

**Mapping- PEOS AND POS, PSOA**

Semester II	Code <b>PCOT22</b>					<b>ADVANCED COST ACCOUTING</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	4	4	4	4	4	4	4	5	5	4	4	4	4	54/13=4.15	
CO-2	4	5	4	5	4	4	4	5	4	4	4	4	4	55/13=4.23	
CO-3	4	4	4	4	4	5	4	4	4	4	4	4	4	53/13=4.07	
CO-4	5	4	4	4	5	4	4	4	4	4	4	4	4	54/13=4.15	
CO-5	4	5	5	5	4	4	4	4	4	4	4	4	4	55/13=4.23	

20.83/5=4.166

Note: 4.166 high relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	-	4.166	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of CO

**Semester – II- Core-VII**  
**PCOT23- BUSINESS RESEARCH METHODS**

**Credit – 5**

**Hours: 6**

**Objectives:**

- To enable students to know the concept and process of research and the methods of presenting research report.
- To understand the concepts of various steps and techniques and procedures in Research.
- To enable the student to gain the knowledge of analysis and interpretation.
- The student will get an idea to prepare project report.

**Unit - I**

Research: Introduction – Characteristics – Objectives – Scope – Importance – Qualities of good researcher – Types of research – Research Process – Identification, Selection and Formulation of research problems.

**Unit - II**

Formulation of hypothesis – Research design – Types – Sampling: Methods and Techniques, Steps – Sample size – Sampling error – Advantages and limitations of sampling.

**Unit - III**

Data collection methods: Techniques of data collection – Primary data – Interview Schedule, Questionnaire and Observation – Pretest – Pilot study – Secondary data sources.

**Unit - IV**

Data processing: Editing – Coding - Classification and Tabulation – Attitude measurement – Scaling technique: L.L.Thurstone, Rensis Likert, Emory S. Bogardus - Social distance - Rating and Ranking scales – Data analysis: Statistical tolls used in research – Measure of Central tendency – Standard Deviation – Correlation – regression models – Methods of least square – Multiple regressions. Test of significance – ‘T’ Test and ‘F’ test – ANOVA – Chi-Square test

**Unit - V**

Report writing and presentation: Types of report – Contents – Format of report – Steps in drafting report - Presentation of report – Foot note – References – Bibliography - Research Ethics - Plagiarism.

**Text Book**

1. C.R.Kothari, “Research Methodology”, New Age International Publishers.

**Reference Books:**

1. Devendra Thakur.2000. Research Methodology in Social Science. Deep & Deep Publications. New Delhi.
2. Krishnasami, O.R. and Ranganathan, M. 2014. Methodology of Research in Social Science, 2<sup>nd</sup> Edn. Himalaya Publishing House, Mumbai.

3. Michael. V.P. Research Methodology in Management, Kitib Mohan Publications, Alahabad
4. Ravilochanan, P. 2007. 2<sup>nd</sup> Edn. Research Methodology. Margham Publications, Chennai.
5. Saravanavel, P. 2008. Research Methodology. 1<sup>st</sup> Edn. Kitab Mahal, Allahabad.

**Note:** Question paper shall cover 80% Theory and 20% Problem.

**Course outcome:**

1. To identify empirical and analytical problems affecting the research process and ways to overcome them. (k1)
2. To identify a business problem/ need, translate it into a research question, and design an appropriate way to answer it. (k1, k2)
3. Design an experiment as a research method, develop skills in choosing suitable case studies, sampling, measurement, Designing questionnaire, conducting interviews and surveys, leading focus groups. (k6)
4. To formulate testable hypotheses and choose the most appropriate tools for testing them.(k6)
5. Interpret research findings and their implications in a clear and well organized way, both orally and in writing.(k5)

### Mapping- PEOS AND POS, PSO

Semester II	Code <b>PCOT23</b>					<b>BUSINESS RESEARCH METHODS</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	4	4	4	5	4	4	4	4	4	4	4	4	3	52/13=4	
CO-2	4	4	4	4	5	4	4	4	4	4	4	4	4	53/13=4.07	
CO-3	4	4	4	4	4	4	4	4	4	4	4	4	3	51/13=3.92	
CO-4	4	4	4	4	3	4	4	4	3	3	4	4	4	49/13=3.77	
CO-5	4	4	4	4	4	4	4	4	4	4	4	4	4	52/13=4	

19.76/5=3.952

Note: 3.952 moderate relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.952	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS



**Semester – II- Core-VIII**  
**PCOT24- QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS**

**Credit –5**

**Hours: 6**

**Objective:**

- To make the students to understand the various concepts in Quantitative techniques,
- To enable the students how various techniques of statistics used in business for taking decisions.
- To provide practical knowledge on quantitative techniques.
- The students will gain sound theory as well as practical knowledge in quantitative techniques.

**UNIT I:**

Meaning of Quantitative Techniques – Role of Quantitative Techniques – Advantages and Limitations of Quantitative Techniques – Correlation Analysis – Simple – Partial and Multiple –Regression Analysis – Time Series.

**UNIT II:**

Probability – Problems applying Additional and Multiplication Theorem – Mathematical Expectations – Theoretical Distributions – Binomial – Poisson – Normal Distribution.

**UNIT III:**

Significance Tests in Small Samples ( t test) – Testing the significance of the mean of a random sample – Testing difference between means of two samples (Independent and Dependent Samples) – Chi-square test- Analysis of Variance (One way and two way classification).

**UNIT IV:**

Linear Programming – Graphical Method – Simplex Method – Transportation Problems – Initial Basic Feasible Solution - Modi Method – Assignment Problems.

**UNIT V:**

Interpolation and Extrapolation – Methods of Interpolation – Binomial Expansion Method – Newton’s Method – Lagrange’s Method – Parabolic Curve Method – Extrapolation – Vital Statistics – Life Tables

**Reference Books:**

- 1 Quantitative Technique – C.R. Kothari
2. Statistical Methods – S.C. Gupta
3. Statistical Methods – S.P. Gupta
4. Advanced Statistics – D.L. Enclave

**Note:** Question paper will cover 80 % Problem 20 % Theory

**Course outcome:**

1. Identify the source of a quantifiable problem, recognise the issues involved and produce an appropriate action plan (k1)
2. Extrapolate from data interpret the important trends in order to forecast as accurately as possible (k5)
3. Employ appropriate mathematical and statistical tools to solve problems (k3)
4. Calculate and interpret numerous statistical values and report the findings to the business manager (k3, k5)
5. Demonstrate an ability to apply statistical methods and carry out a simple sample survey, analyse the results and present the findings to the class. (k3, k4)

### Mapping- PEOS AND POS, PSO

Semester II	Code PCOT24					QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	4	4	4	5	5	4	4	5	5	4	4	4	4	56/13=4.31	
CO-2	4	4	4	4	4	4	4	4	4	3	4	4	4	51/13=3.92	
CO-3	4	4	4	4	5	4	4	4	4	4	4	4	5	54/13=4.15	
CO-4	4	4	4	4	4	4	4	4	5	4	4	4	5	54/13=4.15	
CO-5	4	4	4	4	4	5	4	4	5	4	4	4	5	55/13=4.23	

20/76=4.152

Note: 4.152 highly moderate

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	-	4.152	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**SEMESTER- II- Elective-II**  
**PCOE22– BUSINESS ENVIRONMENT**

**Credit – 5**

**Hours: 6**

**Objectives**

- As the environment in which an executive in taking business decisions are keep changing from time to time the Managers are expected to know about that he/she guess the situation and takes the wise Managerial decisions.
- To enable students to know the concept of Business Environment.
- To enable the student to understand the importance and significance of Business Environment.
- The student will gain whole information about business environment at National and International level.

**UNIT I**

Theoretical Framework of 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.

**UNIT II**

Economic Environment of Business: Significance and elements of economic environment; Economic systems and business environment; Economic planning in India; Government policies – industrial policy, fiscal policy, monetary policy, EXIM policy; Public Sector and economic development; Development banks and their relevance to Indian business; Economic reforms, liberalisation and structural adjustment programmes.

**UNIT III**

Political and Legal Environment of Business: Critical elements of political environment; Government and business; Changing dimensions of legal environment in India, Competition Act, FEMA and licensing policy;

**UNIT IV**

Socio-Cultural Environment: Critical elements of socio-cultural environment; social institutions and systems; Social values and attitudes; Social groups; Middle class; Dualism in Indian society and problems of uneven income distribution; Emerging rural sector in India; Indian business system; Social responsibility of business; consumerism in India, Consumer Protection Act..

## **UNIT V**

International and Technological Environment: Multinational corporations; Foreign collaborations and Indian business; Non – resident Indians and corporate sector; International economic institutions – WTO, World Bank; IMF and their importance to India; Foreign trade policies; Impact of Rupee devaluation; Technological environment in India; Policy on research and development; Patent laws; Technology transfer.

### **Text Books**

1. Francis Cherunila: Business Environment Himalaya Publishing House, Bombay..
2. Raj Agrawal and Parag Diwan, Business Environment: Excel Books, New Delhi

### **Reference Books:**

1. Adhikary , M: Economic Environment of Business, Sultan Chand & Sons, New Delhi.
2. Ahluwalia. I.J: Industrial Growth in India, Oxford University Press, Delhi.
3. Alagh, Yoginder K: Indian Development Planning and Policy, Vikas Publication, New Delhi
4. Aswathappa,K.Legal Environment of Business, Himalaya Publication, New Delhi.
5. Chakravarty, S: Development Planning, Oxford University Press, Delhi.
6. Ghosh, Biswanath: Economic Environment of Business, Vikas Publication New Delhi Govt of India : Survey, Various issues.
7. Ramaswamy, V.S. and Nama Kumari: Strategic Planning for Corporate Success, Macmillian, New Delhi.
8. Sengupta, N.K: Government and Business in India, Vikas Publication, New Delhi.

**Note:** Question paper will cover 100% Theory.

### **Course outcome:**

1. Identify and evaluate the various elements of Business environment and complexities of business environment and their impact on the business. (k1, k6)
2. Analyze the relationships between Government and Business and understand the political, economic, legal and social policies of the country. (k4)
3. Analyze current economic conditions in developing emerging markets, and evaluate present and future opportunities.(k4)
4. demonstrate the Industrial functioning and strategies to overcome challenges in competitive markets.(k3)
5. Analyse the principle and the different foreign exchange rate regimes' impact on businesses and Integrate the concept and opening economies of developing countries like India through RTB and multilateral route (WTO). (k4,k6)

**SEMESTER- II- Elective-II**  
**PCOE22 - ORGANIZATIONAL BEHAVIOUR**

**Credit – 5**

**Hours: 6**

**Objectives**

1. To enable the students to understand an organization and its behavior.
2. To enable the students to know the needs and ways of human beings at work.
3. To enable the students to understand the importance of organizational behavior and conflict and relationship management.
4. The students will gain the knowledge to survive in the changing organizational environment.

**Unit I**

Organizational Behaviour (O.B) - Definition – Key elements – Nature and scope – Need for studying Organizational Behaviour – Disciplines contributing to organizational behavior - Organizational behavior process - Applying O.B. knowledge to Management Practices. Hawthorne experiments – O.B. Models.

**Unit II**

Individual perspective – Foundation of individual behavior – Personality – Concept – Types- Determinants - Theories – Perception - Perceptual process - Factors affecting perception – Perception and its applications in organizational behavior – Learning – Determinants- Principles – Theories - Learning and behavior.

**Unit III**

Meaning and origin of group dynamics – Concept of group – Types of groups – Formal and Informal groups – Theories of group formation – Group behavior – Group decision making.

**Unit IV**

Concept of conflict – Conflict process – Inter-group conflict- Intra – Individual conflict – interpersonal conflict – Organisational conflicts – Conflict management – Negotiation – Resolution techniques. Organisational culture – Types – Functions of culture – Creating and sustaining and changing a culture – Learning and measuring culture – Communicating culture.

**Unit V**

Goal of organizational change – Nature and factors in organizational change – Approaches to organizational change – Perspectives on change – Planned changes for development – Process of

planned change – Response to change – Resistance to change – Overcoming resistance to change – Role of change agents.

### **Text Book**

1. Prasad, L.M. 2014. Organisational Behaviour. 5<sup>th</sup> Revised Edn. Sultan Chand and Sons, New Delhi.

### **Reference Books**

1. Aswathapa, K. 2008. Organisational Behaviour - Text and Cases. 12<sup>th</sup> Edn. Himalaya Publishing House, New Delhi.
2. Chandran, Jit.S. 2008. Organisational Behaviour. 3<sup>rd</sup> Edn. Vikas Publishing House Pvt Ltd., New Delhi.
3. Gvegory Moorheed and Ricky W. Grifftin, 2005. Organisational Behaviour. 7<sup>th</sup> Edn. Jai Co Publishing House, Mumbai.
4. Khanka, S.S. 2004. Organisational Behaviour. 4<sup>th</sup> Edn. S.Chand & Co. Ltd., New Delhi.
5. Mishra, M.N. 2005. Organisational Behaviour. 1<sup>st</sup> Edn. Vikas Publishing House Pvt Ltd., New Delhi.

**Note:** Question paper shall cover 100% Theory.

### **Course outcome:**

1. Explain the concept of organizational behaviour and classifies the behaviour of people in the organization. (k1, k2)
- 2: Demonstrate the applicability of analyzing the complexities associated with management of individual behaviour in the organization. (k3)
- 3: Analyze the complexities associated with management of the group behavior in the organization. (k4)
4. Describe why conflict resolution, crucial conversations and other communication is necessary to study in organizations (k1)
5. Discuss change management as it functions in organizational behaviour, various ways of change has succeeded and failed in contemporary issues in organizations (k2)

### Mapping- PEOS AND POS, PSO

Semester II	Code PCOE22					ORGANIZATIONAL BEHAVIOUR								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO 1	PO 2	PO 3	PO 4	PO 5	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PS O8		
CO-1	3	4	3	4	4	4	5	4	4	4	4	4	5	52/13=4	
CO-2	4	4	4	3	4	4	4	5	4	5	4	4	4	53/13=4.07	
CO-3	4	4	3	4	4	4	4	4	5	5	4	4	5	54/13=4.15	
CO-4	3	4	4	4	4	4	4	4	4	5	3	4	5	52/13=4	
CO-5	4	4	3	4	4	4	4	5	5	4	4	4	4	53/13=4.07	

$$=20.29/5=4.058$$

Note: 4.058 high relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	-	4.058	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS



**Semester – III- Core IX**  
**PCOT31– Indirect Taxation**

**Credit – 5**

**Hours: 6**

**Objective**

- To make the students gain knowledge on indirect taxes and legal provisions
- To enable the students to understand the applications of indirect taxes and its importance.
- To make the students to understand about Goods and Services Tax.
- The student will gain the knowledge about all types of indirect taxes which are levied by government.

**Unit- I**

Indirect Taxes - Introduction - Features - Objectives of Taxation- Types of taxes- Direct and Indirect taxes - Indirect Tax structure - Merits and Demerits of Indirect Taxes - Recent Developments in Indirect Tax structure - Goods and Services Tax Act 2016 - Introduction – Features – Benefits of Goods and Service Tax.

**Unit II**

Goods and Service Tax - Important Definitions - Taxable persons – Time of supply of goods and services – Administrative set up – Classes of officers under Central and State Goods and Services Tax Act - Appointment of officers – Powers of officers – Levy and Collection of GST – Powers to grant exemption from GST.

**Unit III**

Registration – Procedure for registration under Schedule III – Special provisions relating to casual taxable person and non-resident taxable person – Amendment of registration – Cancellation of registration – Revocation of cancellation of registration.

**Unit IV**

Assessment of GST- Self-assessment – Provisional assessment – Scrutiny of returns – Assessment of non-filers of returns – Assessment of unregistered persons – Assessment in certain special cases – Tax Invoice – Credit and Debit Notes – Payment of Tax – Tax Deducted at Source - Collection of Tax at source.

**Unit V**

Customs Act 1962 – Important Definitions – Basics – Importance of Customs Duty – Constitutional authority for levy of Customs Duty – Types of Customs Duty – Prohibition of Importation and Exportation of goods – Valuation of goods for Customs Duty – Transaction Value – Assessable Value – Computation of Assessable Value and Customs Duty. (Including Problems)

**Text Books**

1. Background Material for Goods and Service Tax. July, 2016. National Academy Of Customs Excise and Narcotics.
2. Mehrotra and Goyal. 2015. Indirect Taxes, 13<sup>th</sup> Edn. Sahitya Bhavan Publications, Agra.

**Reference Books and Web Sites**

1. Radhakrishnan, P. 2011. Indirect Taxation, 3<sup>rd</sup> Edn. Kalyani Publishers, New Delhi.
2. Balachandran, V. 2016. Indirect Taxation, 17<sup>th</sup> Edn. Sultan Chand & Sons, New Delhi.
3. [www.cbec.gov.in](http://www.cbec.gov.in)
4. [www.gst.gov.in](http://www.gst.gov.in).

**Note:** Question Paper shall cover 100% Theory

**Course outcome:**

1. Explain the provisions of levy and collection of GST (k1)
2. Analyse and evaluate the effect of an indirect tax on consumers, producers and the government. (k4,k6)
3. Summarize various types of Assessment under GST Act (k2)
4. Able to compute valuation of goods under Customs Duty (k3)
5. Plan for Future Business / Implementation Challenges and Compliances & Assessment Procedures (k6)

### Mapping- PEOS AND POS, PSO

Semester i	Code <b>PCOT31</b>					<b>Indirect Taxation</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	5	4	4	4	4	4	4	4	4	4	4	4	3	52/13=4	
CO-2	3	4	4	4	4	4	4	4	3	4	4	4	4	50/13=3.84	
CO-3	4	3	3	4	4	4	3	4	4	4	3	4	3	47/13=3.61	
CO-4	4	4	4	4	4	3	4	4	4	3	4	4	4	50/13=3.84	
CO-5	4	4	4	4	4	4	4	4	3	3	4	4	3	49/13=3.77	

19.06/5=3.812

Note: 3.812 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.812	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester – III- Core X**  
**PCOT32- Financial Markets and Services**

**Credit – 5**

**Hours: 6**

**Objective**

- To enable the students to understand the concepts of Indian financial system.
- To provide knowledge on stock market and an on-line Trading of Shares.
- To familiarize the various functions of financial Markets.
- The students will gain thorough knowledge about financial markets and financial services.

**Unit - I**

Indian Financial System: Structure, Functions, Financial System and Economic Development – Financial Market: Meaning, Classification – Financial Services: Meaning, Significance, Features, Challenges in financial service sectors – Financial Products and Services – Emerging Scenario.

**Unit - II**

Money Market – Call Money Market – Treasury Bills Market – Discount Market – Govt. Securities Market – Market for Commercial Paper and Certificates of Deposits.

**Unit – III**

Stock Market – Stock Exchange – Organization and Functions – Listing of Securities – Trading in Stock Exchanges – On-line Trading of Shares – E-Shares – New Issues Market – Types of New Issues – Problems of New Issue Market.

**Unit – IV**

Merchant Banking – Meaning, Functions, Services – Guidelines of RBI and SEBI. Mutual Funds – Meaning, Types, Importance, Guidelines of RBI and SEBI. Venture Capital – Meaning, Features, Importance, Guidelines.

**Unit - V**

Factoring - Meaning, Importance – Factoring in India –Factoring Vs. Discounting – Forfeiting – Meaning, Advantages and Limitations, Factoring Vs Forfeiting – Securitization of Debts – Securitization Vs Factoring, Depository System – Meaning, Functions – Advantages and Disadvantages, Depository Participants in India.

**Reference Books:**

1. E. Gordan and K. Natarajan -Emerging Scenario of Financial Services
2. M.Y. Khan -Indian Financial Theory and Practice
3. S. Gurusamy - Financial Markets and Institutions
4. P. N.Varsheney - Indian Financial System
5. Chawla A. S. - Indian Banking toward 21<sup>St</sup> century

**Note:** Question paper shall cover 100 % Theory.

**Course outcome:**

1. List the role and function of the financial system with reference to the macro economy. (k1)
2. Demonstrate an awareness of the current structure and regulation of the Indian financial services sector. (k3)
3. Evaluate and create strategies to promote financial products and services. (k5)
4. Summaries the various speculators and describe the speculative activities (k2)
5. Students can describe the different components of a financial system and their role and the trading mechanism in the stock market (k6)

**Mapping- PEOS AND POS, PSO**

Semester III	Code PCOT32					Financial Markets and Services								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	5	5	4	4	5	5	4	4	4	4	3	4	4	55/13=4.23	
CO-2	4	4	4	4	4	4	4	4	3	4	3	4	4	50/13=3.84	
CO-3	3	3	3	3	4	3	3	3	4	3	4	3	4	43/13=3.31	
CO-4	4	3	3	4	4	4	4	4	3	3	4	4	4	48/13=3.69	
CO-5	3	3	3	3	3	4	3	3	3	3	3	3	4	41/13=3.15	

18.22/5=3.64

Note: 3.64 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.64	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester – III- Core XI**  
**PCOT33– Advanced Corporate Accounting**

**Credit – 5**

**Hours: 6**

**Objective**

- To impart knowledge on corporate accounting methods
- To enable the students to understand the procedures of accounting.
- To enable them to develop skills in the preparation of accounting statements and their analysis.
- The students will gain the knowledge about Accounting standards and companies' ac

**Unit - I**

Holding Companies (except inter-company holdings and chain holding).

**Unit - II**

Banking Company Accounts – Schedules and Preparation of Balance Sheet.

**Unit - III**

Insurance Company Accounts – Life and Non-life - Schedules and Preparation of Final Accounts.

**Unit - IV**

Double Account System – Nature – Features – Receipts and Expenditure on Capital Accounts – General Balance Sheet – Revenue Account – Net Revenue Account - Accounts of Electricity Companies and Railways - Replacement and Renewals.

**Unit - V**

Accounting Standards – Indian and International Accounting Standards – Accounting Standards 1,3,6,10,14,21 and 29 - Application – Scope – Formulation – Advantages – Disadvantages – Challenges - Inflation Accounting (Theory only).

**Text Book:**

1. Reddy, T.S. and Murthy, A. 2015. Corporate Accounting. Revised Edn. Margham Publications, Chennai.

**Reference Books:**

1. Arulanandam, M.A. and Raman, K.S. 2009. Advanced Accounting. 6<sup>th</sup> Edn. Himalaya Publishing House, Mumbai.
2. Gupta R.L. and Radhaswamy 2009. Advanced Accountancy. 13<sup>th</sup> Revised Edn. Sultan Chand & Sons, New Delhi.
3. Jain, S.P. and Narang, K.L. 2014. Advanced Accountancy. 20<sup>th</sup> Edn. Kalyani Publishers, Ludhiana
4. Pillai, R.S.N. and Bagavathi. 2012. Advanced Accountancy. 5<sup>th</sup> Edn. Chand, S. & Co Ltd., New Delhi.
5. Rajasekaran, V. and Lalitha, R. 2011. Advanced Accounts. 1<sup>st</sup> Edn. Pearson. New Delhi.

**Note:** Question Paper shall cover 80% Problems & 20% Theory

**Course outcome:**

1. Demonstrate conceptual knowledge of corporate accounting (k1)
2. Perform the skill of recording financial transactions and preparation of reports in accordance with Indian and International Standards (k3)
3. Prepare final accounts of Holding, banking and Insurance companies. (k3)
4. Perform computerized accounting using Tally package. (k3)
5. Explain comprehensive understanding of the advanced issues in corporate accounting (k6)

**Mapping- PEOS AND POS, PSO**

Semester III	Code <b>PCOT33</b>					<b>Advanced Corporate Accounting</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	4	4	4	4	3	4	4	4	4	4	3	3	4	49/13=3.77	
CO-2	4	3	4	3	3	4	4	4	4	3	4	4	5	49/13=3.77	
CO-3	4	4	4	4	4	3	3	4	4	3	4	3	4	48/13=3.69	
CO-4	3	4	4	3	4	3	3	3	3	4	3	4	4	45/13=3.46	
CO-5	4	3	3	3	3	3	4	3	3	3	3	3	3	41/13=3.15	

17.84/5=3.568

Note: 3.568 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.568	-	--
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS



**Semester – III- Core XII**  
**PCOT34-Management Accounting**

**Credit – 5**

**Hours: 6**

**Objectives**

To enable the students to

1. Develop an insight of principles and techniques of Management Accounting.
2. Familiarize the utilization of accounting information for planning, and decision-making
3. Effective control of business ventures.
4. The students will get the knowledge to prepare financial statements, other analysis and evaluations themselves.

**Unit I**

Management Accounting: Nature - Scope - Management accounting Vs Financial accounting. Management reporting system – Designing and installation – Types of reports.

**Unit II**

Analysis of financial statement – Concept of funds – Importance – Preparation of Fund Flow Statement and Cash Flow Statement – Comparison of Fund Flow and Cash Flow Statement.

**Unit III**

Standard Costing – Importance – Limitations- Material, Labour, Overhead, Sales and Profit.

**Unit IV**

Cost-Volume Profit analysis – Techniques – Break Even Analysis – Profit-Volume (P/V) analysis – Role and Limitations of CVP analysis.

**Unit V**

Nature of Capital Budgeting – Importance of Capital Budgeting – Difficulties – Rationale – Evaluation techniques – Average rate of return – Pay back method – Discounted cash flow techniques – Net present value method - Internal rate of return method.

**Text Book**

Pillai, R.S.N. and Bagavathi.2008.Management Accounting. 2<sup>nd</sup> Revised Edn. S.Chand & Co Ltd., New Delhi.

**Reference Books**

1. Gupta, S.P.200. Management Accounting. Sahitya Bhavan Publications. Agra.
2. Khan M.Y. and Jain, P.K. 2007.Management Accounting. 4<sup>th</sup> Edn. Tata McGraw Hill Publishing Co. Ltd., NewDelhi.

3. Maheswari, S.N. 2009. Management Accounting & Financial Control. Sultan Chand & Sons, Delhi.
4. Sharma, R.K. and Sashi, K. Gupta. 2007. Management Accounting. 15<sup>th</sup> Revised Edn. Kalyani Publishers, Ludhiana.
5. Vinayakam, N. and Sinha, I.B. 2005. Management Accounting – Tools & Techniques – Kalyani Publishers, Ludhiana.

**Note:** Question paper shall cover 20% of theory and 80% of Problems

**Course outcome:**

1. Differentiate between cost accounting, financial accounting and management accounting (K4)
2. Identify Important Information Found On Key Financial Statements And Analyze The Relationships Between Key Financial Statements (K1)
3. Perform Cost-Volume-Profit Analysis (K3)
4. Perform Standard Costing Variation Analysis Through Standard Costs (K3)
5. Prepare In The Analytical Statement For Decision Making, Using Relevant Cost Benefit Analysis Technique (K3, K6)

**Mapping- PEOS AND POS, PSO**

Semester III	Code <b>PCOT34</b>					<b>Management Accounting</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	4	3	4	4	4	3	3	4	4	4	4	4	4	49/13=3.77	
CO-2	4	4	4	3	4	4	4	3	4	4	4	4	4	50/13=3.84	
CO-3	5	4	4	4	5	5	4	4	4	4	4	5	5	57/13=4.38	
CO-4	4	4	4	4	4	3	4	4	3	3	3	4	4	48/13=3.69	
CO-5	4	3	4	4	4	3	4	4	3	4	4	3	4	48/13=3.69	

19.37/5=3.874

Note: 3.874 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.874	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

$$\frac{\text{-----}}{\text{Total No of POS\& PSOS}}$$

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester – III- Elective III**  
**PCOE33-LOGISTICS MANAGEMENT**

**Credit – 5**

**Hours: 6**

**Objectives**

- Develop an understanding of the role of logistics in a market-oriented society
- Examine the major functions of logistics
- Provide an opportunity for comprehensive analysis and discussion of key contemporary issues and problems in logistics management
- Examine the details of planning and control processes in logistics management

**UNIT-I**

Logistics management and Supply Chain management - Definition, Evolution, Importance. The concepts of logistics. Logistics relationships. Functional applications – HR, Marketing, Operations, Finance, IT. Logistics Organization - Logistics in different industries.

**UNIT - II**

Logistics Activities: – functions, objectives, solution. Customer Service, Warehousing and Material Storage, Material Handling, order processing, information handling and procurement Transportation and Packaging. Third party and fourth party logistics - Reverse Logistics - Global Logistics

**Unit - III**

Fundamentals of Supply Chain and Importance, Development of SCM concepts and Definitions Supply chain strategy, Strategic Supply Chain Management and Key components. Drivers of Supply Chain Performance – key decision areas – External Drivers of Change.

**Unit - IV**

Modeling logistics systems - Simulation of logistic systems - Dimensions of Logistics & SCM – The Macro perspective and the macro dimension – Logistic system analysis strategy, Logistical Operations Integration, Customer service – Supply Chain Relationships

**Unit - V**

Framework and Role of Supply Chain in e-business and b2b practices. Value of information in logistics & SCM - E-logistics, E-Supply Chains - International and global issues in logistics - Role of government in international logistics and Principal characteristics of logistics in various countries and regions

## REFERENCES

1. Bowersox, Logistical Management, Mc-Graw Hill, 2000
2. Sahay B S, Supply Chain Management for Global Competitiveness, Macmillan India Ltd., New Delhi.
3. Reguram G, Rangaraj N, Logistics and Supply Chain Management Cases and Concepts, Macmillan India Ltd., New Delhi, 1999.
4. Coyle, Bradi&Longby, The Management of Business Logistics, 3rd Ed., West Publishing Co.

**Note:** Question paper shall cover 100% Theory.

### Course outcome:

1. Analyze how logistical decisions (e.g., facilities, inventory, and transportation) impact the performance of the firm. (K4)
2. Analyze the strengths and weaknesses of various transportation modes and perform cost analysis and evaluate the logistics cost calculation methods. (K4)
3. Develop the strategies that can be taken to find the best paths to route vehicles to deliver and collect goods at multiple stops. (K6)
4. Develop the strategies that can be taken to manage inventories, including deciding the timing and quantity for replenishments. (K6)
5. Compile basic characteristics and costs of warehousing and materials handling activities.(K5)

### Mapping- PEOS AND POS, PSO

Semester III	Code PCOE33					LOGISTICS MANAGEMENT								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	5	4	4	4	5	4	4	4	4	4	4	4	5	55/13=4.23	
CO-2	4	3	4	4	4	4	4	3	4	4	4	4	4	50/13=3.84	
CO-3	5	4	4	4	4	4	4	4	4	3	4	4	5	53/13=4.08	
CO-4	4	3	4	4	4	3	4	4	3	4	4	3	4	48/13=3.69	
CO-5	4	4	3	3	5	4	4	3	4	3	3	4	4	48/13=3.69	

19.53/5=3.906

Note: 3.906 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.906	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester – III- Elective III**  
**PCOE33- Human Resources Management**

**Credit – 5**

**Hours: 6**

**Objective**

- To provide a sound understanding on the concepts of Human Resource Management.
- To enable the student to understand the principles of Human Resource Management and its applications in the business and industry.
- To make understand the students about the importance of Human Resource Management.
- The students will gain the knowledge of every aspect in Human Resource Management.

**Unit - I**

Human Resource Management: Meaning, Nature, Scope, Objectives – Importance – Functions – Distinction between HRM and Personnel Management – Personnel policies, programmes and procedures – Personnel Manager, Qualities and status.

**Unit - II**

Man Power Planning – Characteristics: Need, Process - Job Analysis - Job Description- Job Specification - Job Design- Job Evaluation Methods – Merits and Demerits - Job Enrichment-Job Enlargement –Re-Engineering - Recruitment – Sources - Selection- Selection Procedure, - Interviews – Placement – Induction.

**Unit - III**

Training –Meaning, Need - Selection of Trainees- Methods of Training – Evaluation of Training - Management Development Programmes – Methods - Promotion – Types, Merits- Demotions; Carrier Planning - Transfers

**Unit - IV**

Performance Appraisal – Purpose- Factors Affecting Performance Appraisal – Criteria for Performance Appraisal – Performance Appraisal Techniques – Limitation of Appraisal Methods. Quality of Work Life – Issues in Quality of Work Life- Measuring QWL – Workers Participation in Management.

**Unit - V**

Grievance – Meaning, Causes of Grievance- Grievance Redressal Procedure – Collective Bargaining – Meaning – levels – methods – pre -requisites – Benefits.

**Text Book:**

1. Pravin Durai, Human Resource Management, 2nd Edition, Pearson Education, New Delhi.

**Reference Books:**

1. Ashwathappa, Human Resource Management, McGraw Hill Education (India) Pvt. Limited, New Delhi.

2. David A. De Cenzo & Stephen P. Robbins, Personnel/Human Resource Management, Third edition, PHI/Pearson.
3. L.M. Prasad, Human Resources Management, Jain Book Agency, New Delhi.
4. S.S. Khanka, Human Resource Management, S.Chand & Sons, New Delhi.
5. VSP Roa, Human Resource Management : Text and cases, First edition, Excel Books, New Delhi

**NOTE:** Question paper shall cover 100% theory

### Course outcome

1. Effectively manage and plan key human resource functions within an organizations (K5)
2. Examine current issues, trends, practices, and processes in HRM and Contribute to employee performance management and organizational effectiveness (K4)
3. Ability to handle employee grievance issues and evaluate the new trends in HRM (K6)
4. Describe appropriate implementation , monitoring and assessment procedures of training and list training and development need for the 21<sup>st</sup> century (K6)
5. State the importance of Human Resource management in planning and staffing organisational man power requirements (K2)

### Mapping- PEOS AND POS, PSO

Semester III	Code PCOE33					Human Resources Management								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOs)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	4	4	4	4	5	3	4	4	4	4	4	3	5	52/13=4	
CO-2	4	4	3	4	4	4	3	4	4	4	4	4	4	50/13=3.84	
CO-3	3	4	4	4	5	5	5	4	4	3	4	4	4	53/13=4.08	
CO-4	4	3	4	4	4	4	3	4	4	4	4	3	4	49/13=3.77	
CO-5	4	4	4	4	4	3	4	4	4	4	4	3	4	50/13=3.84	



19.53/5=3.91

Note: 3.91 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.91	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester –IV - Core XIII**  
**PCOT41– INCOME TAX & TAX PLANNING**

**Credit – 5**

**Hours: 6**

**Objective**

- To provide understanding on Income Tax including Rules pertaining various aspects.
- To make understand the students about the procedures followed by the income tax authorities in concern with income tax.
- To enable the students to know the procedure of file Income Tax returns.
- The students will gain the knowledge on procedures of income tax, payment of tax, and tax planning.

**Unit – I**

Income Tax Authorities – Appointment and control – Powers of the Central Board of Direct Taxes – Assessing officer. Deduction of Tax at source – Meaning – Provisions related to TDS from salaries, Income from other sources – Computation of Tax payable and Tax deductible at source.

**Unit - II**

Advance payment of Tax – Meaning – Liability for payment of advance tax – condition – Computation of Advance tax. Assessment procedure - Permanent Account Number – Assessment – Forms used for filing the return of income – Voluntary Return of income, Compulsory return, steps for e-filing of Income tax return.

**Unit - III**

Recovery and Refund of Tax – Meaning – Modes of Recovery – Refund of Tax. Appeals and Revision – Procedure in appeal – Revision by the Principal Commissioner or Commissioner.

**Unit - IV**

Penalties – Penalties imposable – General principles – Items of penalties – Power of principal Commissioner or Commissioner to waive penalty.

**Unit - V**

Tax planning for individuals – Tax Evasion – Tax planning – Objectives – Characteristics – Importance – Tax planning under Salaries, House property, Profits and Gains of Business or Profession, Capital gains, Income from other sources and Clubbing of income.

**Text Book:**

1. Reddy, T.S. and Hari Prasad Reddy, Y. Income Tax Theory. 11<sup>th</sup> Edn. Margham Publishers, Chennai. - Current year.

**Reference Books:**

1. Gaur, V.P. and Narang, D.B. Income tax Law and Practice. 45<sup>th</sup> Edn., Kalyani Publishers, New Delhi. - Current year.

2. Murthy, A. Income tax Law and Practice. 5th Edn. Vijay Nicole Imprints Private Limited, Chennai. – Current year.
3. Mehrotra, H.C. and Goyal, S.P. Income Tax Law & Accounts. 58th Edn. Sahitya Bhawan Publications, Agra. Current year.
4. Saha, R.G., Usha Devi, N. Income Tax (Direct Tax). 4th Revised Edn. Himalaya Publishing House, New Delhi.
5. Vinod, K. and Singania. Students Guide to Income Tax. University Edn. Taxmann Publications, New Delhi. - Current year.

**Note:** Question paper shall cover 30% Theory and 70% Problem.

**Course outcome:**

1. Students will know different types of incomes and their taxability, apply various deductions to reduce the taxable income (K3)
2. Define the procedure of direct tax assessment. (K1)
3. Able to file IT return for individual persons. (K3)
4. Appraise the penalties levied in the assessment of income. (K3)
5. Give a framework for tax panning measures for different heads of income (K2)

**Mapping- PEOS AND POS, PSO**

Semester IV	Code <b>PCOT41</b>					<b>INCOME TAX &amp; TAX PLANNING</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO 1	PO 2	PO 3	PO 4	PO 5	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PS O8		
CO-1	4	4	4	4	5	4	4	4	4	3	4	4	5	53/13=4.07	
CO-2	4	4	4	4	4	4	3	4	3	4	3	4	4	49/13=3.77	
CO-3	4	4	4	3	4	4	3	4	4	3	4	4	4	49/13=3.77	
CO-4	4	3	4	4	4	4	4	4	4	4	3	4	4	50/13=3.85	
CO-5	4	4	4	3	5	3	4	4	4	4	4	4	5	52/13=4	

19.46/5=3.89

Note: 3.89 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.89	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

$$\frac{\text{-----}}{\text{Total No of POS\& PSOS}}$$

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester –IV - Core XIV**  
**PCOT42-STRATEGIC MANAGEMENT**

**Credit – 5**

**Hours: 6**

**Objective**

- To make the students well aware about the concepts of strategic management.
- To help the students to understand the analysis and formulation of management strategies.
- To enable the students to know the procedures for implementation and evaluation of management strategies.
- The student will get the knowledge to identify the strengths and weakness of the firm.

**UNIT – I**

Strategic Management – Definition – Scope – Benefits – Risks – Approaches – Models – Strategic change – Strategic Leadership and Decision making.

**UNIT –II**

Situation Analysis – SWOT Analysis - Environmental Scanning and Industry analysis – Forecasting – Internal Scanning - Mission – objectives – Stakeholder Theory – Cyert and March’s Behavioural Theory – Objectives of Non-Profit Organizations – Social Responsibility and Business Ethics.

**UNIT – III**

Strategy Formulation – Business Strategy – Corporate Strategy – Divertional Strategy – Portfolio Analysis – BCG Growth /Share matrix – Strategic choice – Development of policies – Strategic Alliances.

**UNIT – IV**

Strategy Implementation – Organization for action – Staffing – Leading – MBO –Total Quality Management – Functional Strategies – Growth Strategies – Diversification, Acquisition and Joint Venture – Recovery – Recession and Diversstment Strategies – Management Buyout.

**UNIT – V**

Strategic Control and Evaluation – Establishing Strategic control – premise control – Implementation control – Strategic Surveillance – Special Alert Control – Evaluation Techniques – Managing change – Strategic issues in Managing Technology and Innovation – Strategic Effectiveness.

**BOOKS FOR REFERENCE :**

1. Strategic Management – Strategy Formulation and Implementation – John A.Pearce II, Richard B.Robinson Jr.(A.I.T.B.S. Publishers – J-5,6, Krishnan Nagar, Delhi – 110 051).

2. Strategic Management – Awareness and change – John L.Thompson (Cheapman & Hall 32 Second Main Road CIT East, Chennai – 35).
3. Strategic Management-J.David Hunger and Thomas L.Wheelen (Addision – Wesley Longman) (Available at Higginbotham’s Ltd., Chennai).
4. Strategic Management – Gregory G.Dess and Alex Miller.
5. Strategic Management – An Integrated Approach – W.L.Charles and John Gareth,
6. Strategic Management – Concepts and Application – C.Certo and J.Paul Peter.
7. Strategic Management – John H.Barnett and William D., Atlantic Publishers and Distributors, New Delhi.
8. International & Strategic Management – R.N.Srivastava.
9. Strategic Planning for Corporate Success – V.S.Ramaswamy and S.Nanakumari.

**Note:** Question Paper shall cover 100% Theory.

**Course outcome:**

1. Able to describe major theories, background work, concepts and research output in the field of strategic management. (K1)
2. Develop and prepare organizational strategies that will be effective for the current business environment (K6)
3. Able to solve practical business problems in the field of strategic management, (K3)
4. Able to make their own conclusions and place them in appropriate professional framework, (K5)
5. Use critical analysis and synthesis in solving complex multidisciplinary issues in the field of strategic management. (K3)

### Mapping- PEOS AND POS, PSO

Semester IV	Code <b>PCOT42</b>					<b>STRATEGIC MANAGEMENT</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8		
CO-1	4	3	4	3	4	4	4	3	3	3	3	3	4	45/13=3.46	
CO-2	4	4	4	3	4	4	3	4	3	3	4	4	4	48/13=3.69	
CO-3	4	4	4	4	4	4	3	4	4	3	3	4	4	49/13=3.77	
CO-4	4	4	4	4	3	4	4	4	4	4	4	4	4	51/13=3.92	
CO-5	4	3	4	3	4	4	4	4	4	4	3	4	4	49/13=3.77	

18.61/5=3.722

Note: 3.722 Moderate Relations

Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	3.722	-	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

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Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**Semester –IV - Core XV  
PCOD41-PROJECT**

**Credit – 5**

**Hours: 18**

**Course outcome:**

1. Demonstrate a sound technical knowledge of their selected project topic.(K3)
2. Identify problem, formulate and find solution.
3. Design professional solutions to complex problems utilising a systems approach.(K6)
4. Conduct project (K5)
5. Communicate at large in written an oral forms. (K5)

**Mapping- PEOS AND POS, PSO**

Semester i	Code <b>PCOD41</b>					<b>PROJECT</b>								Hours	Credits
Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS	
	P O 1	P O 2	P O 3	P O 4	P O 5	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PS O8		
CO-1	4	4	4	4	4	4	4	4	4	4	4	4	4	52/13=4	
CO-2	4	4	3	3	4	4	4	4	4	4	3	4	4	49/13=3.77	
CO-3	4	4	4	4	4	4	3	3	4	4	3	4	5	50/13=3.85	
CO-4	5	5	5	5	5	5	5	5	5	5	5	5	5	65/13=5	
CO-5	4	4	4	4	4	4	4	4	4	3	4	4	4	51/13=3.92	

20.54/5=4.108

Note: 4.108 high relations



Mapping	1-20%	21-40%	41-60%	61-80%	81-100%
Scale	1	2	3	4	5
Relation	-	-	-	4.108	-
Quality	Very Poor	Poor	Moderate	High	Very High

Mean Scores of COS= Total Values

-----  
 Total No of POS& PSOS

Mean Overall Score for COS= Total of Mean Scores /Total No of COS

**MOTHER TERESA WOMEN'S UNIVERSITY  
KODAIKANAL**

**DEPARTMENT OF MATHEMATICS**

**M.Sc. MATHEMATICS PROGRAMME**



**SYLLABI  
WITH EFFECT FROM THE ACADEMIC YEAR  
2018 – 2019 Onwards  
(CHOICE BASED CREDIT SYSTEM)**

## **PROGRAM EDUCATIONAL OBJECTIVES**

The M. Sc Mathematics curriculum is dedicated to preparing students for productive careers after 3-5 years of graduation.

- 1. Apply their knowledge in modern industry or teaching, or secure acceptance in highquality graduate programs in mathematics.**
- 2. Development in their chosen profession and/or progress toward an advanced degree**
- 3. The trust and respect of others as effective and ethical team members.**
- 4. Graduates will become effective collaborators and innovators, leading or participating in efforts to address social, technical and business challenges.**
- 5. Promote the culture of interdisciplinary research among all disciplines and applied mathematics.**

## **PROGRAMME OUTCOMES**

**PO1: Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.**

**PO2: Equip the student with skills to analyze problems, formulate an hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.**

**PO3: Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields**

**PO4: Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.**

**PO5: Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.**

## **PROGRAMME SPECIFIC OUTCOMES**

**PSO1: Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.**

**PSO2: Prepare and motivate students for research studies in mathematics and related elds.**

**PSO3: Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees at reputed academic institutions.**

**PSO4: Nurture problem solving skills, thinking, creativity through assignments, project work.**

**PSO5: Assist students in preparing (personal guidance, books) for competitive exams e.g. NET, GATE, etc.**

**ALLOCATION OF PAPERS AND CREDITS (SEMESTER- WISE) FOR PG  
PROGRAMMES AS PER THE TANSCHER RULES  
MATHEMATICS  
PG Course Structure under Choice Based Credit System (CBCS)**

S.No.	Subject Code	Subject Title	Hours	Credits	Int.	Ext	Total
<b>First Semester</b>							
1	PMTT11	Linear Algebra	6	5	25	75	100
2	PMTT12	Real Analysis I	6	5	25	75	100
3	PMTT13	Differential Equations	6	5	25	75	100
4	PMTT14	Graph Theory	6	5	25	75	100
5	PMTE11	Major Elective	6	5	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>500</b>
<b>Second Semester</b>							
1	PMTT21	Algebra	6	5	25	75	100
2	PMTT22	Real Analysis II	6	5	25	75	100
3	PMTT23	Topology	6	5	25	75	100
4	PMTT24	Optimization Techniques	6	5	25	75	100
5	PMTE22	Major Elective	6	5	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>500</b>
<b>Third Semester</b>							
1	PMTT31	Complex Analysis	6	5	25	75	100
2	PMTT32	Measure Theory	6	5	25	75	100
3	PMTT33	Classical Dynamics	6	5	25	75	100
4	PMTT34	Calculus of variations and Integral Equations	6	5	25	75	100
5	PMTE33	Major Elective	6	5	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>500</b>
<b>Fourth Semester</b>							
1	PMTT41	Functional Analysis	6	5	25	75	100
2	PMTT42	Differential Geometry	6	5	25	75	100
3	PMTP43	Project	18	5	25	75	100
<b>TOTAL</b>			<b>30</b>	<b>15</b>			<b>300</b>
<b>Grand Total</b>					<b>90</b>		<b>1800</b>

### List of Elective Courses

S.No	Major Elective Courses
1.	Algebraic Number Theory
2.	Automata Theory
3.	Probability Theory and Statistics
4.	MatLab and LaTeX
5.	Fuzzy sets and their Applications
6.	Neural Network
7.	Stochastic Processes
8.	Fluid Dynamics
9.	Non linear Differential Equations
10.	Financial Mathematics
11.	Control Theory
12.	Fractal Analysis
13.	Tensor Analysis and special theory of relativity
14.	Mathematical Biology

**Reference/Text Books contain the following details:**

- I. Name of the Author
- II. Title of the Book
- III. Name of the Publisher
- IV. Year

**SCHEME OF EXAMINATION**

<b>Internal (Theory)</b>	<b>- 25</b>
Test	- 15
Attendance	- 5
Assignment/Technical Quiz	- 5
Total	- 25
<b>External (Theory)</b>	<b>- 75</b>

**QUESTION PATTERN**

1.	10*1 Marks (Objective type / Multiple choice 2 Question from each unit)	10
2.	5*4 Marks (from each unit either or choice)	20
3.	3*15 Marks (Open choice Any Three Questions out of 5, one question from each unit )	45
<b>Total</b>		<b>75</b>

**The Internal Assessment for Practical : 25**

**The External Assessment for Practical : 75**

## Semester I

Course Code	Course Name	Category	L	T	P	Credit
PMTT11	LINEAR ALGEBRA	Core	86	4	-	5

### Objectives:

- To provide sound foundation in linear Algebra , as well as understanding of the principles underlying in linear Algebra and deep knowledge about various algebraic structures
- To prepare students to understand principles, concepts necessary to formulate and give a depth knowledge about elementary matrix operations.
- To prepare the students for further courses in higher mathematics and related disciplines and solve linear equation

### Course Outcomes:

Upon successful completion of this course students will be able to:

**CO1:** Determine relationship between coefficient matrix invertibility and solutions to a system of linear equations and the inverse matrices.

**CO2:** Find a basis for the row space, column space and null space of a matrix and find the rank and nullity of a matrix.

**CO3:** Students completing this course will be able to find the matrix representation of a linear transformation given bases of the relevant vector spaces.

**CO4:** Use computational techniques and algebraic skills essential for the study of systems of linear equations, matrix algebra, vector spaces, eigenvalues and eigenvectors, orthogonality and diagonalization. (Computational and Algebraic Skills).

**CO5:** Work collaboratively with peers and instructors to acquire mathematical understanding and to formulate and solve problems and present solutions.

CO Number	CO Statement	Knowledge Level
CO1	<b>Demonstrate competence with the basic ideas of linear Algebra including the concepts of vector spaces, inner product spaces, modules and linear transformations</b>	<b>K2</b>
CO2	<b>Become familiar with the theorems and the characteristics of linear spaces and linear transformations</b>	<b>K3</b>
CO3	<b>Apply properties and theorems about linear spaces to specific mathematical structures that satisfy the linear space</b>	

	<b>axioms</b>	<b>K4</b>
<b>CO4</b>	<b>Compose clear and accurate proofs using the concepts of linear Algebra</b>	<b>K5</b>
<b>CO5</b>	<b>Appreciate the significance of vector spaces and linear transformations</b>	<b>K6</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>

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



**Unit I: Vector Spaces:** Introduction – Vector spaces – Subspaces – Linear combinations and systems of linear equations – Linear dependence and linear independence – Bases and dimensions – Maximal linearly independent subsets.

**Unit II: Linear Transformations and Matrices:** Linear transformations, Null spaces, and Ranges – The matrix representation of a linear transformations – Composition of linear transformations and matrix multiplication – Invertibility and Isomorphisms – The change of coordinate matrix – Dual spaces – Homogeneous linear differential equations with constant coefficients.

**Unit III: Elementary Matrix Operations and Systems of Linear Equations:** Elementary matrix operations and Elementary matrices – The rank of matrix and matrix inverse – Systems of linear equations theoretical aspects – Systems of linear equations – computational aspects.

**Unit IV: Determinants:** Determinants of order 2- Determinants of order n – Properties of determinants - Summary – Important facts about determinants – A characterization of the determinant.

**Unit V: Diagonalization:** Eigen values and Eigen vectors – Diagonalizability – Matrix limits and Markov chains – Invariant subspaces and the Cayley Hamilton theorem.

### Text Book

1 Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence, **Linear Algebra**, Pearson New International Edition, fourth edition, 2014

Chapter 1 : (Sec 1.1- Sec 1.7).

Chapter 2 : (Sec 2.1- Sec 2.7).

Chapter 3 : (Sec 3.1 - Sec 3.4).

Chapter 4 : (Sec 4.1- Sec 4.5).

Chapter 5 : (Sec 5.1- Sec 5.4).

### Reference books:

1. John. B. Fraleigh, A First Course in Abstract Algebra, 7th Edition, Addison-Wesley, New Delhi, 2003.
2. S. Kumerason, "Linear Algebra" Prentice Hall of India Pvt Ltd New Delhi, 2000.
3. D.S. Malik, J.N. Mordeson and M.K. Sen, Fundamental of Abstract Algebra, McGraw Hill (International Edition), New York. 1997.
4. Kenneth Hoffman and Ray Kunze, Linear Algebra, 2nd edition, Prentice Hall, Inc., New Jersey, 2010.

### Pedagogy

Chalk and talk, Group Discussion, PPT, Seminar, Quiz, As and video lecture

## Semester I

Course Code	Course Name	Category	L	T	P	Credit
PMTT12	REAL ANALYSIS- I	Core	86	4	-	5

### Objectives:

- To convey concepts of real valued functions in detail.
- To provide the deep knowledge about sequences and series.
- To make a clear difference between differentiability and continuity.
- To know some basic theorems.

**Note:** The Question paper may contain problems to a maximum of 20%

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1:** Students will be able to demonstrate competence with elementary properties of sets by proving identities involving union and intersection and Cartesian Products of sets.

**CO2:** Students will be able to demonstrate competence with elementary properties of functions by proving results involving composite functions and inverse functions.

**CO3:** Students will be able to demonstrate competence with the algebraic and order properties of real numbers.

**CO4:** Students will be able to demonstrate competence with properties of real numbers by finding supremum and infimum of sets and using the completeness property of real numbers.

**CO5:** Students will be able to demonstrate ability to use Taylor Theorem, the Mean value Theorem, and use L'Hôpital's Rule to compute limits of functions.

CO Number	CO Statement	Knowledge Level
CO1	Describe fundamental properties of the real numbers that lead to the formal development of real analysis	K2
CO2	The extended real number system in the complex field and Euclidean spaces developing the theory underpinning real analysis	K3
CO3	Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration	K4
CO4	Construct various mathematical proofs of basic results in Continuity and connectedness	K5
CO5	Appreciate how abstract ideas and various methods in The derivative of a real function can be applied to important practical problems. Exhibits rigorous mathematical proofs in derivatives of Higher order	K6

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	S	S	M	S	M
CO4	S	M	S	S	M
CO5	S	S	M	S	S

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

**PMTT12**

**REAL ANALYSIS- I**

**6 Hours/5 Credits**

**Unit I: The Real and Complex Number Systems:** Introduction, Ordered sets – Fields - The real field - The extended real number system - The complex field - Euclidean spaces.

**Unit II: Basic Topology:** Finite - Countable and Uncountable sets - Metric spaces - Compact sets - Perfect sets - Connected sets.

**Unit III: Numerical Sequences and Series:** Convergent sequences –Subsequences - Cauchy sequences - Upper and lower limits - Some special sequences – Series - The number e - The root and ratio tests - Fourier series - Summation by parts - Absolute convergence - Addition and multiplication of series - Rearrangements.

**Unit IV: Continuity:** Limits of functions - Continuous functions - Continuity and compactness - Continuity and connectedness - Monotonic functions - Infinite limits and limits at infinity.

**Unit V: Differentiation:** The derivative of a real function - Mean value theorems - The continuity of derivatives - L'Hospital' rule - Derivatives of Higher order - Taylor's theorem - Differentiation of vector valued functions.

**Text Book:**

Walter Rudin, **Principles of Mathematical Analysis**, 3rd Edition, McGraw – Hill International Book Company, Singapore, (1982). Units 1-5: Chapters: 1 – 5 (Including Appendix of chapter 1).

**Reference Books:**

1. Tom Apostol, *Mathematical Analysis*, Addison Wesley Publishing Company, London-1971.
2. R. G. Bartle & D.R. Sherbert, *Introduction to Real Analysis*, John Wiley & Sons, New York, 1982.
3. Kenneth A. Ross, *Elementary Analysis: The theory of Calculus*, Springer, New York, 2004.
4. K. R. Stromberg, *An Introduction to Classical Real Analysis*, Wadsworth, 1981.
5. G.F.Simmons, *Introduction to Topology and Modern Analysis*, McGraw – Hill, New Delhi, 2004.

\*\*\*\*\*

**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

### **Semester I**

<b>Course Code</b>	<b>Course Name</b>	<b>Category</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credit</b>
<b>PMTT13</b>	<b>DIFFERENTIAL EQUATIONS</b>	<b>Core</b>	<b>86</b>	<b>4</b>	<b>-</b>	<b>5</b>

#### **Objectives:**

- **Differential equations arise for many problems in oscillations of mechanical and electrical systems**
- **It plays a very important role in all modern scientific and engineering studies.**
- **To give an in-depth knowledge of differential equations and their applications.**
- **Solve the higher order differential equations in different types with initial and boundary conditions**
- **Use the method of separation of variables to reduce some partial differential equations to ordinary differential equations of 2<sup>nd</sup> order.**
- **To make the students to solve the practical problems used differential equations.**

**Course Outcomes: Upon the successful completion of the course, students will be able to**

CO1: Recognize differential equations that can be solved by each of the three methods – direct integration, separation of variables and integrating factor method – and use the appropriate method to solve them

CO2: Use an initial condition to find a particular solution of a differential equation, given a general solution

CO3: Check a solution of a differential equation in explicit or implicit form, by substituting it into the differential equation

CO4: Understand the terms ‘exponential growth/decay’, ‘proportionate growth rate’ and ‘doubling/halving time’ when applied to population models, and the terms ‘exponential decay’, ‘decay constant’ and ‘half-life’ when applied to radioactivity

CO Number	CO Statement	Knowledge Level
CO1	Solve a variety of first order differential equations selecting from a variety of techniques	K2
CO2	Solve a variety of second order differential equations, selecting from several techniques	K2
CO3	Give series solutions (and approximations) for second order linear differential equations, both at ordinary points and at regular singular point	K3
CO4	Investigate boundary values problems and point out its significance	K5

### Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	S	S
CO3	S	S	M	S	S
CO4	S	S	S	M	S

**PMTT13**

**DIFFERENTIAL EQUATIONS**

**6 Hours /5 Credits**

**Unit I:** The general solution of the homogeneous equation– the use of one known solution to find another – The method of variation of parameters – Power Series solutions. A review of power series– Series solutions of first order equations – Second order linear equations; Ordinary points.

**Unit II:** Regular Singular Points – Gauss’s hypergeometric equation – The Point at infinity - Legendre Polynomials – Bessel functions – Properties of Legendre Polynomials and Bessel functions.

**Unit III:** Linear Systems of First Order Equations – Homogeneous Equations with Constant Coefficients – The Existence and Uniqueness of Solutions of Initial Value Problem for First Order Ordinary Differential Equations – The Method of Solutions of Successive Approximations and Picard’s Theorem.

**Unit IV:** Oscillation Theory and Boundary value problems – Qualitative Properties of Solutions – Sturm Comparison Theorems – Eigen values, Eigen functions and the Vibrating String.

**Unit V:** Second Order P.D.E.: Genesis of Second Order P.D.E. – Classification of Second Order P.D.E. One-Dimensional Wave Equation – Vibrations of an Infinite String – Vibrations of a Semi-infinite String –Vibrations of a String of Finite Length (Method of separation of variables).

**Text Books:**

1.G.F. Simmons, **Differential Equations with Applications and Historical Notes**, TMH, New Delhi, 1984.

Unit I Chapter 3: Sections 15, 16, 19 and Chapter 5: Sections 25 to 27

Unit II Chapter 5: Sections 28 to 31 and Chapter 6: Sections 32 to 35

Unit III Chapter 7: Sections 37, 28 and Chapter 11: Sections 55, 56

Unit IV Chapter 4: Sections 22 to 24

2.T.Amarnath, **An Elementary Course in Partial Differential Equations**, Narosa Publishing Company, 1997.

Unit V : Chapter 2: Sections 2.1 to 2.3.5, except 2.3.4 In book 2

**Reference Books:**

1. W.T. Reid, Ordinary Differential Equations, John Wiley & Sons, New York, 1971.
2. E.A. Coddington, An Introduction to Ordinary Differential Equation, Prentice Hall of India, New Delhi, 2007.
3. D.Somasundaram, Ordinary Differential Equations, Narosa Publ., House, Chennai - 2002.
4. I.C. Evans, Partial Differential Equations, Graduate Studies in Mathematics, Vol. 19 AMS, 1998.
5. I.N. Snedden, Elements of Partial Differential Equations, McGraw Hill, 1985.

**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

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### Semester I

Course Code	Course Name	Category	L	T	P	Credit
PMTT14	GRAPH THEORY	Core	86	4	-	5

**Objectives:**

- To impart the different types of graphs.
- To give a depth knowledge about matching and colourings.
- To make the students to identify the varieties of graphs.
- To study related theorems.
- To present students the Basic concepts of graph theory. □ To enable the students to find the practical applications to the real world problems etc.

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**Course Outcomes:**

**CO1:** State all of the technical definitions covered in the course (such as a graph, tree, planar graph, colouring, digraph, generating function, linear extension, and other terms).

**CO2:** State all of the relevant theorems covered in the course.

**CO3:** Formulate graph theoretic models to solve real world problems (e.g., scheduling problems).

**CO4:** Analyze combinatorial objects satisfying certain properties and answer questions related to existence (proving the existence or non-existence of such objects), construction (describing how to create such objects in the case they exist), enumeration (computing the number of such objects), and optimization (determining which objects satisfy a certain extremal property).

CO Number	CO Statement	Knowledge Level
CO1	Understanding of some network and colouring in Graph ns	K2
CO2	Apply the understanding and used to model the atomic variable	K3
CO3	Apply the concepts of connectivity, Blocks and Hamilton cycles in the real life.	K4
CO4	Demonstrate the concept and familiar with the concepts of colouring develop the reader to apply in day today life .	K5

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	M	S	S
CO3	S	S	S	S	M
CO4	M	S	M	S	S

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

**PMTT14**

**GRAPH THEORY**

**6Hours / 5 Credits**

**Unit I:** Graphs, Subgraphs and Trees: Graphs and simple 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.

**Unit II:** Connectivity, Euler Tours and Hamilton Cycles: Connectivity – Blocks – Euler tours – Hamilton cycles – The Chinese postman problem – The travelling salesman problem.

**Unit III:** Matchings and Edge Colourings: Matchings - matchings and coverings in bipartite graphs – Perfect matchings – Edge chromatic number - Vizing’s theorem.

**Unit IV:** Independent Set, Cliques and Vertex Colourings: Independent sets – Ramsey’s theorem – Turan’s theorem – Chromatic number – Brooks theorem – Hajos theorem Chromatic polynomials – Girth and chromatic number.

**Unit V:** Planar Graphs And Directed Graphs : Plane and planar graphs – Dual graphs – Euler’s formula – Bridges - Kuratowski’s theorem – The five colour theorem and the four colour

conjecture – Non Hamiltonian planar graphs – Directed graphs – Directed paths – Directed cycles.

**Text Book:**

J. A. Bondy and U. S. R. Murty, **Graph theory with applications**, The MacMillan Press Ltd., 1976.

Unit I : (chapter 1 : 1.1 – 1.7 and chapter 2 : 2.1 – 2.4).

Unit II : (chapter 3 : 3.1 – 3.2 and chapter 4 : 4.1 – 4.4).

Unit III: (chapter 5 : 5.1 – 5.3 and chapter 6 : 6.1 – 6.2).

Unit IV: (chapter 7 : 7.1 – 7.3 and chapter 8 : 8.1 – 8.5).

Unit V : (chapter 9 : 9.1 – 9.7 and chapter 10 : 10.1 – 10.3).

**Reference Books:**

1. F.Harary, “Graph Theory”, Addition Wesley, 1969
2. R. Johnson baugh, “Discrete Mathematics”, 1989
3. Narsingh Deo, Graph Theory with applications to Engineering and Computer Science, PHI learning Pvt Ltd, New Delhi, 2013
4. L.R. Foulds, “Graph Theory Applications”, Narosa publishing House, 1993.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

**Semester II**

Course Code	Course Name	Category	L	T	P	Credit
PMTT21	ALGEBRA	Core	86	4	-	5

**Objectives:**

- **To Provide deep knowledge about various algebraic Structures.**
- **Specific outcome learning: The learner will be able to recognize some advances of the theory of groups.**
- **Use Sylow’s Theorems in the study of finite groups.**
- **Formulate some special types of rings and their properties.**
- **Recognize the interplay between fields and vector spaces. Apply the algebraic methods for solving Problems.**

**Course Outcomes: Upon the successful completion of the course, students will be able to**



**CO1:** Students will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, order of a finite group and order of an element.

**CO2:** Students will be introduced to and have knowledge of many mathematical concepts studied in abstract mathematics such as permutation groups, factor groups and Abelian groups.

**CO3:** Students will actively participate in the transition of important concepts such as homomorphisms & isomorphisms from discrete mathematics to advanced abstract mathematics.

**CO4:** Students will gain experience and confidence in proving theorems. A blended teaching method will be used requiring the students to prove theorems give the student the experience, knowledge, and confidence to move forward in the study of mathematics.

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate competence with the basic ideas of algebra including the concepts of direct products, finitely generated abelian groups, Fields , extension fields , Galois theory and finite fields	K2
CO2	Demonstrate knowledge of the structures of fields ,extension fields and finite fields	K3
CO3	Apply the knowledge in solving problems in polynomials over the rational field	K4
CO4	Present clear and logical mathematical arguments and Solvability by radicals	K5

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	M	S	M	S
CO4	S	S	S	S	S

S- Strong; M-Medium; L-Low

Semester II

**Unit I:** A Counting principle - Normal subgroups and quotient groups - Homomorphism-Automorphism- Cayley's theorem - Permutation groups.

**Unit II:** Another counting principle - Sylow's theorem's - Direct product - Finite abelian groups.

**Unit III:** Euclidean rings - A Particular Euclidean ring - Polynomial rings - polynomials over the rational field - polynomial rings over commutative rings.

**Unit IV:** Extension fields - Roots of polynomials - More about roots - Finite fields.

**Unit V:** The elements of Galois theory – Solvability by radicals - Galois group over the rational.

**Text book:**

N. Herstein, **Topics in Algebra**, 2nd edition, John Wiley & Sons, Singapore, 2006.

Unit 1 Chapter 2: Sections 2.5, 2.6, 2.7, 2.8, 2.9, 2.10

Unit 2 Chapter 2: Sections 2.11, 2.12, 2.13, 2.14

Unit 3 Chapter 3: Sections 3.7, 3.8, 3.9, 3.10, 3.11

Unit 4 Chapter 5: Sections 5.1, 5.3, 5.5 & Chapter 7: Section 7.1

Unit 5 Chapter 5: Sections 5.6, 5.7, 5.8.

**Reference Books:**

1. John. B. Fraleigh, A First Course in Abstract Algebra, 7th Edition, Addison-Wesley, New Delhi, 2003.

2. P. B. Bhattacharya, S. K. Jain & S. R. Nagpaul, Basic Abstract Algebra, Cambridge University Press, USA, 1986.

3. Charles Lanski, Concepts in Abstract Algebra, American Mathematical Society, USA, 2010.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

## Semester II

Course Code	Course Name	Category	L	T	P	Credit
PMTT22	REAL ANALYSIS-II	Core	86	4	-	5

### Objectives:

- To introduce the concept of integration of real-valued functions.
- To give a deep knowledge about the real valued function.
- To know about linear transformation.
- To solve the problems of differentiation of integrals.

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1:** Investigate the ideas of continuity and inverse images of open and closed sets, functions continuous on compact sets

**CO2:** Differentiate the concepts of connectedness and implement them on various sets.

**CO3:** Examine the derivatives of functions and apply few theorems based on it.

**CO4:** Investigate properties of monotonic functions.

**CO5:** Learn the properties of Riemann- Stieltjes integral.

CO Number	CO Statement	Knowledge Level
CO1	Describe fundamental properties of the real numbers that lead to the formal development of real analysis	K2
CO2	Comprehend rigorous arguments developing the theory underpinning real analysis in the Stone-Weierstrass theorem	K3
CO3	Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration	K4
CO4	Construct various mathematical proofs of basic results in implicit function theorem	K5
CO5	Appreciate how abstract ideas and various methods in mathematical analysis can be applied to important practical problems. Exhibits rigorous mathematical proofs in real analysis like inverse function theorem and the implicit function theorem	K6

### Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S

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

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

**PMTT22**

**REAL ANALYSIS-II**

**6 Hours/5 Credits**

**Unit I: The Riemann-Stieltjes integral:** Definition and existence of the integral - Properties of the integral - Integration and differentiation - Integration of vector valued functions - Rectifiable curves.

**Unit II: Sequences and series of functions:** Discussion of Main problem - Uniform Convergence - Uniform convergence and continuity - Uniform convergence and Integration - Uniform convergence and differentiation - Equicontinuous families of functions - The Stone-Weierstrass theorem.

**Unit III: Some special functions:** Power series - The exponential and Logarithmic functions - The trigonometric functions - The algebraic completeness of the complex field - Fourier Series - The Gamma functions.

**Unit IV: Functions of several variables:** Linear transformations – Differentiation - The contraction principle - The inverse function theorem.

**Unit V: The implicit function theorem** - The rank theorem – Determinants - Derivatives of higher order - Differentiation of integrals.

**Text book:**

Walter Rudin, **Principles of Mathematical Analysis**, 3rd Edition, McGraw – Hill International Book Company, Singapore, 1982.

Unit 1: Chapter 6,      Unit 2: Chapter 7,  
Unit 3: Chapter 8,      Unit 4, 5: Chapter 9.

**References Books:**

1. Tom M. Apostol, *Mathematical Analysis*, Narosa Publishing House, New Delhi, India, 1997.
2. G. F. Simmons, *Introduction to Topology and Modern Analysis*, 3rd Ed., McGraw-Hill, New Delhi, 2004.
3. S. C. Malik, *Mathematical Analysis*, Willey Eastern Ltd., New Delhi, 1985.
4. N. L. Carothers, *Real Analysis*, Cambridge University Press, UK, 2000.

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pedagogy :

Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture

## Semester II

Course Code	Course Name	Category	L	T	P	Credit
PMTT23	TOPOLOGY	Core	86	4	-	5

**Objectives:**

- Students will learn the fundamental concepts of point-set topology
- Introduce students to the concepts of open and closed sets abstractly, not necessarily only on the real line approach
- Provide the awareness of tools to students to carrying out advanced research work in pure mathematics Course

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1:** Know how the topology on a space is determined by the collection of open sets, by the collection of closed sets, or by a basis of neighbourhoods at each point, and you know what it means for a function to be continuous.

**CO2:** Know the definition and basic properties of connected spaces, path connected spaces, compact spaces, and locally compact spaces.

**CO3:** Know what it means for a metric space to be complete, and you can characterize compact metric spaces.

**CO4:** Familiar with the Urysohn lemma and the Tietze extension theorem, and you can characterize metrizable spaces.

**CO5:** Familiar with the construction of the fundamental group of a topological space and applications to covering spaces and homotopy theory.

CO Number	CO Statement	Knowledge Level
CO1	Define and illustrate the concept of topological spaces and continuous functions, concept of product topology and quotient topology	K2
CO2	Identify the concepts of distance between two sets, connectedness, denseness, compactness and separation axioms.	K3
CO3	Analyze the concepts to read and write theorem proofs in topology	K4
CO4	Ability to determine that a given point in a topological space is either a limit point of not for a given subset of a	K5

	<b>topological space.</b>	
<b>CO5</b>	<b>Apply theorem proofs to do variety of examples and counter examples in topology</b>	<b>K5</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>M</b>
<b>CO4</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>

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

**PMTT23**

**TOPOLOGY**

**6 Hours/5 Credits**

**Unit I: Topological Spaces and Continuous Functions:** Topological spaces- Basis for a Topology- The order Topology- The Product Topology on  $X \times Y$ - The subspace Topology – Closed sets and Limit points- Continuous Functions- The product Topology.

**Unit II: Metric Topology:** The Metric Topology- The Metric Topology (continued) Connectedness and Compactness: Connected Spaces- Connected Subspaces of the Real line- Components and Local Connectedness.

**Unit III: Compactness:** Compact Spaces- Compact subspaces of the Real Line- Limit Point Compactness- Local Compactness.

**Unit IV: Countability and Separation Axioms:** - The Separation Axioms- Normal Spaces- The Urysohn Lemma- The Urysohn Metrization Theorem.

**Unit V: Extension Theorem:** - The Tietze Extension Theorem- The Tychonoff Theorems- The Stone-Cech Compactification- Metrization Theorems: Local finiteness- The Nagata-Smirnov Metrization Theorem

**Text Book:**

James. R. Munkres, **Topology: A first course**, 2<sup>nd</sup> Edition, Prentice Hall of India Pvt Ltd, New Delhi. 2013

Unit I: Chapter 2- Section: 12- Section 19

Unit II: Chapter 2- Section: 20, 21 and Chapter 3-Section: 23- Section: 25

Unit III: Chapter 3- Section: 26- Section 29

Unit IV: Chapter 4- Section: 30- Section 34

Unit V: Chapter 5- Section: 37, 38- Chapter 6: Section 39, 40

### Reference Books:

1. G.F. Simmons “Introduction to Topology and modern Analysis”, Tata McGraw Hill edition. B. Mendelson, Introduction to Topology, CBS Publishers, Delhi, 1985.
2. Size- Tsen Hu, Introduction to General Topology, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1966.
3. S. Lipschutz, General Topology, Schaum’s Series, McGraw-Hill New Delhi, 1965.
4. K. D. Joshi, Introduction to General Topology, New Age International Pvt. Ltd, 1983.
5. J. L. Kelly, General Topology, Springer-Verlag, New York, 1975

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

### Semester II

Course Code	Course Name	Category	L	T	P	Credit
PMTT24	OPTMIZATION TECHNIQUES	Core	86	4	-	5

### Objectives:

- Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively;
- Provides a quantitative technique or a scientific approach for making better decisions for operations under the control.
- Use integer programming programming problem to solve system of linear equations.
- .To provide the depth knowledge about inventory control theory and make students to solve the inventory problems.

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1: The students will be able to analyze the real life systems with limited constraints**

**CO2: Identify the mathematical nature of a given optimization problem**

**CO3: Analyze a range of classes of optimization problems**

**CO4: Identify solution methods for the optimization problems studied**

**CO5: The students will be able to depict the systems in a mathematical model form.**

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	<b>Recognize the importance and value of Operations Research and mathematical modeling in solving practical problems in industry</b>	<b>K2</b>
<b>CO2</b>	<b>Know how to use variables for formulating complex mathematical models in management science, industrial engineering and Transportation science and in real life.</b>	<b>K3</b>
<b>CO3</b>	<b>Analyze a managerial decision problem and application of Dynamic Programming: Capital Budgeting Problem</b>	<b>K4</b>
<b>CO4</b>	<b>To design, improve and operate complex systems in the best possible way through empirical Queueing Models</b>	<b>K5</b>
<b>CO5</b>	<b>Appreciate the significance of Lagrangean Method – Kuhn-Tucker Method</b>	<b>K6</b>

### Mapping with Programme Outcomes

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>

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

**PMTT24**

**OPTMIZATION TECHNIQUES**

**6 Hours/5 Credits**

**Unit I: Integer Programming:** Introduction – Integer Programming Formulations – The Cutting – Plane Algorithm – Branch-and-Bound Technique – Zero-One Implicit Enumeration Algorithm.



**Unit II: Inventory Control:** Introduction – Models of Inventory – Operation of Inventory System – Quantity Discount – Implementation of Purchase Inventory Model.

**Unit III: Dynamic Programming:** Introduction – Application of Dynamic Programming: Capital Budgeting Problem – Reliability Improvement Problem – Stage-coach Problem – Cargo Leading Problem – Minimizing Total Tardiness in Single Machine Scheduling Problem – Optimal Subdividing Problem – Solution of Linear Programming Problem through Dynamic Programming.

**Unit IV: Queueing Theory:** Introduction – Terminologies of Queueing System – Empirical Queueing Models – Simulation.

**Unit V: Non Linear Programming:** Introduction – Lagrangean Method – Kuhn-Tucker Method – Quadratic Programming – Separable Programming – Chance-Constrained Programming or Stochastic Programming.

**Text Books:**

R. Panneerselvam, **Operations Research**, 2nd Edition, PHI Learning Private Limited, Delhi, 2015.

Unit - I- Chapter 6- Sections 6.1-6.5

Unit - II- Chapter 7- Sections 7.1-7.5

Unit - III- Chapter 8- Sections 8.1-8.2

Unit - IV- Chapter 9- Sections 9.1-9.4

Unit - V- Chapter 17- Sections 17.1-17.6

**Reference Books:**

1. S. Kalavathy, Operations Research, fourth edition, Vikas Publishing House Pvt. Ltd.
2. G. Srinivasan, Operations Research principles and applications, Second Edition, PHI Learning Private Limited, New Delhi-110001, 2012.
3. Kanti Swarup, P.K. Gupta, Man Mohan, Operations Research, Sultan Chand & Sons, Educational Publishers, New Delhi.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

**Semester III**

Course Code	Course Name	Category	L	T	P	Credit
PMTT31	COMPLEX ANALYSIS	Core	86	4	-	5

**Objectives:**

- To impart various concepts about the sequence and series, analytic functions in the complex plane.
- Provide deep knowledge about mapping and transformation. and the learner will gain knowledge of power series of analytic function

- learner will be proficient in applications of Cauchy's theorem
- .To present students the elements and importance of the Complex analysis.
- .To define and recognize the basic properties of the complex numbers.

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1: Explain and apply Cauchy's integral formula and some of its consequences**

**CO2: explain the convergence of power series and develop analytical capabilities in Taylor or Laurent series in a given domain**

**CO3: Define the fundamental concepts of complex numbers and its properties, Exponential, logarithmic, trigonometric and hyperbolic complex functions .**

**CO4: Describe Holomorphic and harmonic complex functions and list different examples.**

**CO5: State Complex integral on a path – Cauchy theorem and Cauchy integral formula name zeros and singularities of a Complex function and the Residue theorem .**

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	<b>Describe fundamental properties of the complex numbers that lead to the development of complex analysis</b>	<b>K2</b>
<b>CO2</b>	<b>Evaluate line integrals, curve integrals, singularities and determine the values of integrals using residues. ns</b>	<b>K3</b>
<b>CO3</b>	<b>Apply and understand about limits and to know how they are used in series and problems</b>	<b>K4</b>
<b>CO4</b>	<b>Analyze functions of complex variable in terms of continuity, differentiability and analyticity. Apply Cauchy-Riemann equations and harmonic functions to solve problem</b>	<b>K5</b>
<b>CO5</b>	<b>Comprehend rigorous arguments developing the theory underpinning complex analysis</b>	<b>K6</b>

## Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	S	S	M	S	M
CO4	S	M	S	S	S
CO5	S	S	M	S	S

S- Strong; M-Medium; L-Low

PMTT31

COMPLEX ANALYSIS

6 Hours / 5 Credits

**Unit I:** Functions, Limit, and continuity: Sequence and series functions – limits and continuity-projection – sequence and series of function.

**Unit II:** Analytic functions and power series: Differentiability and Cauchy-Riemann equations – Harmonic functions- power series as and Analytic functions – Exponential and Trigonometric functions – Logarithmic functions – Inverse functions.

**Unit III:** Complex Integration: Plane – properties –Cauchy-Goursat Theorem – connectivity – Winding number –Homotopy version of Cauchy’s theorem – Cauchy integral formula-Morera’s theorem.

**Unit IV:** Mapping and Transformation: Existence of Harmonic Conjugate –Taylor’s Theorem –Zeros of Analytic functions- Laurent series –Principle of conformal mapping- Möbius map-fixed point and Möbius map.

**Unit V:** Maximum principle, Schwarz’ Lemma – Liouville’s Theorem: Maximum Modulus principle – Hadamard’s Three circles/lines theorem – Schwarz’ Lemma and its consequence-Liouville’s Theorem- Doubly periodic entire functions – fundamental theorem of Algebra – Zeros of certain Polynomials.

### **Text book:**

S.Ponnusamy, Foundations of Complex Analysis, 2<sup>nd</sup> Edition, Narosa Publishing House Ltd, Chennai, 2005.

Unit I - Chapter 1: 1.6 and Chapter 2: 2.1 – 2.4

Unit II – Chapter 3: 3.1 – 3.6

Unit III - Chapter 4: 4.1 – 4.8

Unit IV- Chapter 4: 4.9 –4.12 and Chapter 5: 5.1-5.3

Unit V – Chapter 6: 6.1 – 6.7

### **Reference Books:**

1. John B. Conway “Function of one Complex Variable” 2<sup>nd</sup> Edition, Springer International Students Edition.
2. Karunakaran, Complex Analysis, Narosa Publishing House, New Delhi, 2002.
3. R.V. Churchill & J. W. Brown, Complex Variables & Applications, Mc.Graw Hill, 1990.

4. John. B. Conway, Functions of One Complex Variable, Narosa Pub. House, 2002.
5. Lars V. Ahlfors, Complex Analysis, Third Ed. McGraw-Hill Book Company, Tokyo, 1979.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

### Semester III

Course Code	Course Name	Category	L	T	P	Credit
PMTT32	MEASURE THEORY	Core	86	4	-	5

**Objectives:**

- To introduce concepts of outer measures and integration on  $\mathbb{R}$  and to develop the concept of analysis in abstract situations.
- Provide the relationship between Riemann and Lebesgue integral
- Learner will be derive integration and derivatives by using Radon-Nikodym Theorem and Fubini's Theorem
- To introduce the concepts of measure and integral with respect to a measure, to show their basic properties, and to provide a basis for further studies in Analysis, Probability, and Dynamical Systems.
- To gain understanding of the abstract measure theory and definition and main properties of the integral.
- To construct Lebesgue's measure on the real line and in  $n$ -dimensional Euclidean space. To explain the basic advanced directions of the theory.

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1:** Master in an abstract context, the fundamental theorems of integration learned during the previous courses of analysis for the case of the Euclidean spaces, harmonizing the latter with the example of the outer Lebesgue measure.

**CO2:** Build a measure starting from a countable additive set function defined on a semi-algebra of subsets or starting from a sequence of suitably chosen measures.

**CO3:** Integrate a measurable function with respect to a measure

O Number	CO Statement	Knowledge Level
CO1	Describes the basics axioms for the real numbers, natural and rational numbers as subset. Demonstrate the basic concepts underlying the definition of the general Lebesgue integral	K2

<b>CO2</b>	<b>Derives the concepts of Borel sets, measurable functions, differentiation of monotone functions</b>	<b>K3</b>
<b>CO3</b>	<b>Analyse about the Signed Measure and the Hahn Decomposition, integral of a non-negative function, functions of bounded variation</b>	<b>K4</b>

### Mapping with Programme Outcomes

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>

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

### **Semester III**

**PMTT32**

**MEASURE THEORY**

**6Hours/5 Credits**

**Unit I:** Lebesgue Measure: Lebesgue Outer Measure - Measurable Sets – Regularity – Measurable Functions - Borel and Lebesgue Measurability.

**Unit II:** Borel and Lebesgue Measure: Integration of Non-Negative Functions – General Integral. Integration of series – Riemann and Lebesgue Integral.

**Unit III:** R-S Integral: Abstract Measures space – Measures and Outer Measures- Extension of a Measure – Uniqueness of Extension - Completion of a Measure – Measure Spaces – Integration with respect to a Measure –  $L^p$  Spaces – Completeness.

**Unit IV:** Signed Measure: Signed Measure and the Hahn Decomposition – the Jordan Decomposition – Radon-Nikodym Theorem.

**Unit V:** Measurability in a Product Space – The Product Measure and Fubini’s Theorem.

#### **Text Book**

G.De Barra, **Measure Theory and Integration**, 1<sup>st</sup> ed, New age international (p) Limited, 2003

Unit – I: Chapter II: Sections 2.1 to 2.5

Unit – II: Chapter III: Sections 3.1 to 3.4

Unit – III: Chapter V: Sections 5.1 to 5.6

Unit – IV: Chapter VII: Sections 7.1 and 7.2, Chapter VIII: Sections 8.1 and 8.2

Unit – V: Chapter X: Sections 10.1 and 10.2

#### **Reference Books:**

1. P.R. Halmos, “Measure Theory”, D.VanNostrand Company, Inc. Princeton, N.J., 1950
2. H.L.Royden “Real Analysis”, Prentice Hall of India 2001 edition.

3. I.K. Rana, An Introduction to Measure and Integration, Narosa Publishing House, NewDelhi, 1999
4. D.L. Cohn, Measure Theory, Birkhauser, Switzerland, 1980,

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pedagogy :

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

### Semester III

Course Code	Course Name	Category	L	T	P	Credit
PMTT33	CLASSICAL DYNAMICS	Core	86	4	-	5

**Objectives:**

- **1.To develop familiarity with the physical concepts and facility with the mathematical methods of classical dynamics**
- **To represent the equations of motion for complicated mechanical systems using the Lagrangian and Hamiltonian formulation of classical dynamics**

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**Course Outcomes:**

**CO1:** Be able to solve the Lagrange's equations for simple configurations using various methods.

**CO2:** Understand the concept of Hamilton Jacobi Theory.

**CO3:** Be able to understand the concept canonical Transformations

**CO4:** **To develop skills in formulating and solving physics problems**

**CO5:** **Able to get idea of dynamical systems are of relatively recent origin, the concept of motion in phase- space and its geometrical depiction is simple.**

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the knowledge of core principles in dynamics	K2
CO2	Interpret complex and difficult problems of classical dynamics in a systematic way	K3
CO3	Apply the variation principle for real physical situations	K4

<b>CO4</b>	<b>Identify the existing symmetries and the corresponding integrals of motion and analyze the qualitative nature of dynamics</b>	<b>K5</b>
<b>CO5</b>	<b>Explore problem solving skills (approach, estimation, computation, and analysis) of classical mechanics in various contexts such as mechanical engineering, astrophysics, and biophysics</b>	<b>K6</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>

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

**PMTT33**

**CLASSICAL DYNAMICS**

**6 Hours/5 Credits**

**Unit I: Introductory concepts:** The mechanical system - Generalised Coordinates - constraints - virtual work - Energy and momentum.

**Unit II: Lagrange's equation:** Derivation and examples - Integrals of the Motion

**Unit III: Hamilton's equations:** Hamilton's principle - Hamilton's equations - Other variational principles - phase space.

**Unit IV: Hamilton - Jacobi Theory:** Hamilton's Principal Function – The Hamilton - Jacobi equation - Separability.

**Unit V: Canonical Transformations:** Differential forms and Generating functions – Special Transformations – Lagrange and Poisson Brackets.

**Text Book:**

Donald T. Greenwood, **Classical Dynamics**, PHI Pvt. Ltd., New Delhi, 1985.

Unit I - Chapter: 1.1-1.5

- Unit II - Chapter: 2.1-2.4
- Unit III - Chapter: 3.1,3.2 and 3.4 (3.3 Omitted)
- Unit IV - Chapter: 4.1-4.4
- Unit V - Chapter: 5.1-5.3

**Reference Books:**

- 1.H. Goldstein, Classical Mechanics, (2<sup>nd</sup> Edition), Narosa Publishing House, New Delhi, 1998.
- 2.John L Synge and Byron A Griffith, Principles of Mechanics, McGraw-Hill, New York, 1959.
- 3.Narayan Chandra Rana &Promod Sharad Chandra Joag, Classical Mechanics, Tata McGraw Hill, 1991.



**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

**Semester III**

Course Code	Course Name	Category	L	T	P	Credit
PMTT34	CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS	Core	86	4	-	5

**Objectives:**

- **To introduce the concept of calculus of variations and integral equations and their applications for fixed boundaries.**
- **To give a knowledge about a calculations variation and make students to solve the problems.**
- **To study linear integral problems and methods of successive approximations.**
- **Learner will be able solve problems based on these topics.**

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1:** Determine asymptotes for rational expressions (we will not go into these graphs in much detail)

**CO2:** Apply the techniques from the previous section to graph a fourth degree polynomial or higher

**CO3:** On successful completion of the course students will be able to recognize difference between Volterra and Fredholm Integral Equations, First kind and Second kind, homogeneous and inhomogeneous etc.

**CO4:** They apply different methods to solve Integral Equations.



CO Number	CO Statement	Knowledge Level
CO1	Demonstrate competence with the basic ideas of The Method of Variations in Problems with fixed Boundaries	K2
CO2	Become familiar with functional dependent on the functions of several independent variables	K3
CO3	Apply Euler's finite difference method ,The Ritz method and Kantorovich's method in Variational Problems	K4
CO4	Compose clear and accurate proofs using the concepts of reduction to a system of Algebraic equations	K5

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S

S- Strong; M-Medium; L-Low

**Semester III**

**PMTT34      CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS      6Hours/5 Credits**

**.Unit-I:      The Method      of      Variations      in      Problems      with  
fixed Boundaries**

Variation and its properties - Euler's equation - Functionals of the form  $\int F(x,y_1,y_2,\dots y_n,y_1',y_2',\dots y_n')dx$ , Functionals dependent on higher order derivatives - Functionals dependent on the functions of several independent variables - Variational problems in parametric form - Some applications.

**Unit-II: Sufficient Conditions for an Extremum**

Field of extremals - The function  $E(x,y,p,y')$  - Transforming the Euler equations to the canonical form.

**Unit-III: Direct Methods in Variational Problems**

Direct methods - Euler's finite difference method - The Ritz method - Kantorovich's method.

**Integral Equations:**

**Unit IV: Linear Integral Equations** - Definition, Regularity conditions – special kind of kernels – eigen values and eigen functions – convolution Integral – the inner and scalar product of two functions – Notation – reduction to a system of Algebraic equations – examples – Fredholm alternative - examples – an approximate method.

**Unit V: Method of successive approximations:** Iterative scheme – examples – Volterra Integral equation – examples – some results about the resolvent kernel. Classical Fredholm Theory: the method of solution of Fredholm – Fredholm’s first theorem – second theorem – third theorem.

**Text Books:**

1. L. Elsgolts, **Differential equations and the calculus of variations**, MIR publishers, Moscow 1970.

- Unit – I Chapter 6
- Unit – II Chapter 8
- Unit – III Chapter 10

2.Ram.P.Kanwal, **Linear Integral Equations Theory and Practice**, Academic Press 1971.

- [1] Unit – IV Chapters 1 and 2
- Unit – V Chapters 3 and 4

**Reference Books:**

- 1.S.J. Михлин, **Linear Integral Equations** (translated from Russian), Hindustan Book Agency, 1960.
- 2.I.N. Snedden, **Mixed Boundary Value Problems in Potential Theory**, North Holland, 1966.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

**Semester IV**

Course Code	Course Name	Category	L	T	P	Credit
PMTT41	FUNCTIONAL ANALYSIS	Core	86	4	-	5

**Objectives:**

- To introduce three structure theorems of Function as Hahn – Banach theorem, open mapping theorem and uniform boundedness principle from Hilbert space..
- To study the finite dimensional spectrum theory.

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**Course Outcomes:**

**CO1:** To learn to recognize the fundamental properties of normed spaces and of the transformations between them.

**CO2:** To be acquainted with the statement of the Hahn-Banach theorem and its corollaries. To understand the notions of dot product and Hilbert space.

**CO3:** To apply the spectral theorem to the resolution of integral equations and Sturm-Liouville problems.

**CO4:** The learner will gain knowledge normed linear space, Banach spaces, Hahn-Banach theorem(open and closed) and (general and structure) banach algebra.

CO Number	CO Statement	Knowledge Level
CO1	Describe properties of normed linear spaces and construct examples of such spaces	K2
CO2	Apply basic theoretical techniques to analyze linear functionals and operators on Banach and Hilbert spaces.	K3
CO3	Apply Finite-Dimensional Spectral Theory survey of the situation	K4
CO4	Apply theorems to do problems	K5

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S

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

**PMTT41**

**FUNCTIONAL ANALYSIS**

**6Hours/5 Credits**

**Unit I: Banach spaces:** The definitions and some examples-Continuous linear transformations-The Hahn-Banach Theorem- The Natural imbedding of  $N$  in  $N^{**}$ - The Open mapping theorem-The Conjugate of an Operator.

**Unit II: Hilbert Spaces:** The Definitions and some simple properties-Orthogonal Complements-Orthonormal sets-The Conjugate Space  $H^*$  - The Adjoint of an operator-Self-adjoint operators-Normal and Unitary operators.

**Unit III: Finite-Dimensional Spectral Theory:** Matrices – Determinants and the spectrum of an operator – The spectral theorem – A survey of the situation

**Unit IV: General Preliminaries on Banach Algebras:** The Definition and some examples-Regular and singular elements-Topological divisors of zero-The Spectrum-The formula for the spectrum radius-The radical and semi-simplicity.

**Unit V:The Structure of Commutative Banach Algebras :** The Gelfand mapping – Applications of the formula  $r(x) = \lim \|x^n\|^{1/n}$  - Involutions in Banach Algebras – The Gelfand-Neumark theorem.

**Text Book:**

G.F.Simmons “Introduction to Topology and Modern Analysis” ,Tata McGraw Hill Edn, 2004.

Unit I: Chapter 9      Unit II: Chapter 10

Unit III: Chapter 11      Unit IV: Chapter 12      Unit V:Chapter 13

**Reference Books:**

1. M. Thamban Nair, “Functional Analysis” Eastern Economy edition, Prentice Hall of India Pvt Ltd, New Delhi 2002.
2. B.V. Limaye, “Functional Analysis” Wiley Eastern New Delhi 1981.
3. Walter Rudin, Functional Analysis, TMH Edition, 1974.
4. B.V. Limaye, Functional Analysis, Wiley Eastern Limited, Bombay, Second Print,1985.
5. K.Yosida, Functional Analysis, Springer-Verlag, 1974.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

## Semester IV

Course Code	Course Name	Category	L	T	P	Credit
PMTT42	DIFFERENTIAL GEOMETRY	Core	86	4	-	5

### Objectives:

- To introduce space curves, surfaces and its properties.
- The learner will acquire knowledge in problem solving in curves and surfaces in geometrical approach.
- To make the students to solve the problems based on these topics and to study Representation of a surface, geodesic equations and geodesic curvatures

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1:** After completing this course, students should be able to: Determine and calculate curvature of curves in different coordinate systems.

**CO2:** Treat geodesic curves and parallel translation Calculate and analysis curvature of surfaces in different settings.

**CO3:** Know the concept of tensor and recognize tensors that are used in mechanics, image processing and theory of relativity.

**CO4:** Apply geometry of curves and surfaces to computer aided graphics.

CO Number	CO Statement	Knowledge Level
CO1	Make clear and concise arguments involving basic notions and constructions of 2-dimensional Riemannian geometry, curves and torsion	K2
CO2	Identification of important types of curves in surfaces, including principal curves, asymptotic curves and geodesics using fundamental existence theorem for space curves	K3
CO3	Enumerate some standard examples in geometry, such as surfaces of constant Gaussian curvature, compact and non - compact surfaces, and surfaces of revolution	K4
CO4	Analyze Gaussian and mean curvatures using variety of methods including patch computations .Differential equations of geodesics using normal property	K5

### Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S

CO3	S	S	S	S	S
CO4	S	S	M	S	S

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

**PMTT42**

**DIFFERENTIAL GEOMETRY**

**6 Hours/5 Credits**

**Unit I:** Theory of space curves: Unique parametric representation of a space curve- Arc length - tangent and osculating plane - principal normal and binormal - curvature and torsion - contact between curves and surfaces - osculating circle and osculating sphere - locus of centres of spherical curvature.

**Unit II:** Tangent surfaces - Involutives and evolutes- Bertrand curves - Spherical indicatrix - Intrinsic equations of space curves - Fundamental existence theorem for space curves - Helices.

**Unit III:** The first fundamental form and local intrinsic properties of a surface: Definition of a surface - Nature of points on a surface - Representation of a surface - Curves on surfaces - Tangent plane and surface normal - The general surfaces of revolution – Helicoids - Metric on a surface - The first fundamental form - Direction coefficients on a surface.

**Unit IV:** Families of curves - Orthogonal trajectories - Double family of curves – Isometric correspondence - Intrinsic properties - Geodesics on a surface: Geodesics and their differential equations - Canonical geodesic equations - Geodesics on surface of revolution - Normal property of geodesics - Differential equations of geodesics using normal property.

**Unit V:** Existence theorems - Geodesic parallels - Geodesic polar coordinates – Geodesic curvature - Gauss-Bonnet theorem-Gaussian curvature.

**Text Book:**

D. Somasundaram, Differential Geometry: A first course, Narosa Publishing House, New Delhi, India, 2005.

Unit I: Sections 1.3-1.7, 1.10-1.12

Unit II: Sections 1.13-1.18

Unit III: Sections 2.2-2.10

Unit IV: Sections 2.11-2.15, 3.2-3.6

Unit V: Sections 3.7-3.12

**Reference Books:**

1. T.J. Willmore, An Introduction to Differential Geometry, Oxford University Press, New Delhi, 2006.

2. J. N. Sharma & A. R. Vasistha, Differential Geometry, KedarNath Ram Nath, Meerut, 1998.

3. Dirk J. Struik: “Lectures on Classical Differential Geometry” (second edition), Addison Wesley Publishing Company.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

<b>PMTP43</b>	<b>Semester IV</b> <b>Project- Mathematical Model</b>	<b>18 Hours/5 credits</b>
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### **RULES AND REGULATION OF THE PROJECT**

1. The Project Area/title must be any one of the following
  - (i) Pure Mathematics
  - (ii) Applied Mathematics
  - (iii) Mathematical Application in Real Time Activities.
2. Student allotment Method will be decided by the Department Faculties(In October 2<sup>nd</sup> week)
3. They are Four Project Common Meet(In Front of All Faculty) Power point presentation
  - (i). First Meet – November last week. Work done - Topic and Area will be decided (5 marks)
  - (ii). Second Meet – January 1<sup>st</sup> week. Work done-25% work ( 5 marks)
  - (iii). Third Meet –February 1<sup>st</sup> week, Work done -50% work(5 marks)
  - (iv). Fourth Meet – March 1<sup>st</sup> week, work done -90% work(5 marks)
4. Project Record Submission – Third week of March

Internal: 25 marks

External: 75 marks

Course Code	Course Name	Category	L	T	P	Credit
Elective Papers 1	ALGEBRAIC NUMBER THEORY	Elective	86	4	-	5

**Objectives:**

- To expose the students to the charm, niceties and nuances in the world of numbers.
- To highlight some of the Applications of the Theory of Numbers.
- The Learner will gain deep knowledge to solve the problems on algebraic number theory.
- The Learner will be know the various type of equations

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1:** Demonstrate knowledge and understanding of topics including, but not limited to divisibility, prime numbers, congruence, quadratic reciprocity, Diophantine equations.

**CO2:** Learn methods and techniques used in number theory.

**CO3:** Write programs/functions to compute number theoretic functions.

**CO4:** Use mathematical induction and other types of proof writing techniques.

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate factual knowledge including the mathematical notation and terminology of number theory	K2
CO2	Construct mathematical proofs of statements and find counterexamples to false statements in Number Theory.	K3
CO3	Apply theoretical knowledge to problems of computer security	



		<b>K4</b>
<b>CO4</b>	<b>Analyze the logic and methods behind the major proofs in number theory.</b>	<b>K5</b>

### Mapping with Programme Outcomes

COs/Pos	PO1	PO2	PO3	PO4	PO5
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>

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

### **Elective Papers 1**

**6 Hours/5 Credits**

### **ALGEBRAIC NUMBER THEORY**

**Unit I:** Introduction – Divisibility – Primes – The Binomial Theorem – Congruences – Euler’s totient - Fermat’s, Euler’s and Wilson’s Theorems – Solutions of congruences – The Chinese Remainder theorem.

**Unit II:** Techniques of numerical calculations – Public key cryptography – Prime power Moduli – Primitive roots and Power Residues – Congruences of degree two.

**Unit III:** Number theory from an Algebraic Viewpoint – Groups, rings and fields – Quadratic Residues- The Legendre symbol  $(a/r)$  where  $r$  is an odd prime – Quadratic Reciprocity – The Jacobi Symbol  $(P/q)$  where  $q$  is an odd positive integer.

**Unit IV:** Binary Quadratic Forms – Equivalence and Reduction of Binary Quadratic Forms – Sums of three squares – Positive Definite Binary Quadratic forms – Greatest integer Function – Arithmetic Functions – The Mobius Inversion Formula – Recurrence Functions – Combinatorial number theory .

**Unit V:** Diophantine Equations – The equation  $ax+by=c$  – Simultaneous Linear Diophantine Equations – Pythagorean Triangles – Assorted examples.

#### **Text Book**

Ivan Niven, Herbert S, Zuckerman and Hugh L, Montgomery, **An Introduction to the Theory of Numbers**, 5<sup>th</sup> edn., John Wiley & Sons Inc, 2004.

Unit I Chapter 1 and Chapter 2 : Sections 2.1 to 2.3

Unit II	Chapter 2 : Sections 2.4 to 2.9
Unit III	Chapter 2 : Sections 2.10, 2.11 and Chapter 3: Sections 3.1 to 3.3
Unit IV	Chapter 3 : Sections 3.4 to 3.7 and Chapter 4
Unit V	Chapter 5: Sections 5.1 to 5.4.

**Reference Books:**

1. Elementary Number Theory, David M. Burton W.M.C. Brown Publishers, Dubuque, Iowa, 1989.
2. Number Theory, George Andrews, Courier Dover Publications, 1994.
3. Fundamentals of Number Theory, William J. Leveque Addison-Wesley Publishing Company, Phillipines, 1977.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective Papers 2	AUTOMATA THEORY	Elective	86	4	-	5

**Objectives:**

- To make the students to understand the nuances of Automata and Grammar.
  - To explain various types of automata and grammar.
  - Introduce the fundamental concepts of formal languages, grammars and automata theory.
  - Identify different formal language classes and their relationships
  - To make them to understand the applications of these techniques in computer science.
- Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1:** Acquire a fundamental understanding of the core concepts in automata theory and formal languages.

**CO2:** An ability to design grammars and automata (recognizers) for different language classes.

**CO3:** An ability to identify formal language classes and prove language membership properties.

**CO4:** An ability to prove and disprove theorems establishing key properties of formal languages and automata.

**CO5:** To solve the sums based on automata and grammar.

CO Number	CO Statement	Knowledge Level
CO1	Understand basic concepts in Lattices , formal language and automata theory	K2
CO2	Demonstrate abstract models of computing, including deterministic (DFA), non-deterministic (NFA), Push Down Automata(PDA	K3
CO3	Apply theoretical knowledge relate practical problems to languages and automata	K4
CO4	Analyze the logic and methods behind grammars and recognizers for different formal languages	K5
CO5	Formalize the structure of a given formal language using regular expressions and context free grammars and implementation of a lexical analyzer.	K5

### Mapping with Programme Outcomes

COs/Pos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S
CO5	S	S	S	S	M

S- Strong; M-Medium; L-Low

Elective Papers 2

**AUTOMATA THEORY**

**6 Hours /Credits : 5**

**Unit I: Finite Automata and Regular expressions** Definitions and examples - Deterministic and Nondeterministic finite Automata - Finite Automata with -moves.

**Unit II: Context free grammar** Regular expressions and their relationship with automation - Grammar - Ambiguous and unambiguous grammars - Derivation trees – Chomsky Normal form.

**Unit III: Pushdown Automaton** Pushdown Automaton - Definition and examples - Relation with Context free languages.

**Unit IV: Finite Automata and lexical analysis** Role of a lexical analyzer - Minimizing the number of states of a DFA - Implementation of a lexical analyzer.

**Unit V: Basic parsing techniques** Parsers - Bottom up Parsers - Shift reduce - operator precedence - Top down Parsers - Recursive descent - Predictive parsers.

**Text Books:**

1. John E. Hopcroft and Jeffrey D. Ullman, **Introduction to Automata theory, Languages and Computations**, Narosa Publishing House, Chennai, 2000.

Unit I: Chapter 2: Sections 2.1-2.4

Unit II: Chapter 2, Section 2.5, Chapter 4, Sections 4.1-4.3, 4.5,4.6

Unit III: Chapter 5: Section 5.2, 5.3

2. A.V. Aho and Jeffrey D. Ullman, **Principles of Compiler Design**, Narosa Publishing House, Chennai, 2002.

Unit IV: Chapter 3: Section 3.1-3.8

Unit V: Chapter 5: Section 5.1-5.5

**References Books:**

1. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Second Edition, Prentice Hall, 1997.

2. A.V. Aho, Monica S. Lam, R. Sethi, J.D. Ullman, Compilers: Principles, Techniques and Tools, Second Edition, Addison-Wesley, 2007.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 3	PROBABILITY THEORY AND STATISTICS	Elective	86	4	-	5

**Objective**

- To learn the advanced theory of possibility and distributions and Estimations.
- To understand the concepts of probability and its properties.
- The learner identifying situations where one-way ANOVA and Latin square

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1: Able to understand the concepts of various parameter estimation methods, like method of moments, maximum likelihood estimation and confidence intervals**

**CO2: Able to apply the appropriate Chi-Squared test for independence and goodness of fit**

**CO3: Students will frame problems using multiple mathematical and statistical representations of relevant structures and relationships and solve using standard techniques.**

**CO4: The learner to know constructing the probability distribution of a random variable based on the real-world situation and compute mean and variance and many distributions**

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	<b>Demonstrate the basic concepts of statistics, probability and random variables</b>	<b>K2</b>
<b>CO2</b>	<b>Apply the concepts in finding the moments of the distributions.</b>	<b>K3</b>
<b>CO3</b>	<b>Identify the type of the distribution and estimation</b>	<b>K4</b>
<b>CO4</b>	<b>Understand the basics of sampling distribution theory</b>	<b>K5</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>

## **Elective paper 3 PROBABILITY THEORY AND STATISTICS 6 Hours/ 5 Credits**

**Unit I: Theory of Probability:** Axiomatic approach to axioms of Probability, Conditional probability – Multiplicative law of Probability -Total probability and Baye's theorem – Independent events. Discrete random variable - continuous random variables – Properties of distribution function-Function of random variable- Two dimension random variable - Marginal Probability Distributions – Conditional Probability Distributions- independent random variables.

**Unit II: Moment Generating Function:** Expectation – Moments -Moment Generating Function and properties - Characteristic Functions: Probability Generating Function- Correlation – Regression –Multiple and Partial Correlation.

**Unit III: Distributions:** Geometric Distribution -The Normal Distribution - Uniform Distribution – Exponential Distribution – Gamma Distributions - Beta Distributions- Sampling distribution - Chi Square, t, F Distribution – Students t Distribution – F-Distribution.

**Unit IV: Estimation:** Concepts of Point and Interval Estimator –Efficiency - Consistent Estimator –Sufficient Estimator – Properties of Estimator –invariance property of consistent estimator – method of Maximum Likelihood Estimators-Minimum chi square Estimator.

**Unit V: Classifications:** One way and two way classification -ANOVA- design of Experiments: Experimental Units –basic principles in the design of Experiments- Completely block designs - Completely Randomized Design -Randomized Block design – Latin square designs- analysis of Latin square designs- merits and demerits of Completely Randomized Design - merits and demerits of Random Block design and Latin square design –Factorial Experiments.

### **Text Books:**

P.R.Vital , **Mathematical Statistics**, Margham publications, Edition 2012.

Unit I- Chapter 1: 1.4 – 1.48 and Chapter 2 : 2.1 – 2.33

Unit II- Chapter 3: 3.1 – 3.18, Chapter 5, Chapter 6, Chapter 8, Chapter 9 and Chapter 11

Unit III- Chapter 15, Chapter 16, Chapter 17, Chapter 18, Chapter 19,Chapter 20, and Chapter 22 Unit IV- Chapter 23 Unit V -Chapter 26 and Chapter 28.

### **Reference Books:**

1.Robert V. Hogg & Allen T. Craig, Introduction to Mathematical Statistics, 5th Edition, Pearson Education, Singapore, 2002.

2.Irwin Miller &Marylees Miller, John E. Freund's Mathematical Statistics, 6th Edition, Pearson Education, New Delhi, 2002.

3. John E. Freund, Mathematical Statistics, 5 th edition, Prentice Hall India, 1994.

4.S.M. Ross, Introduction to Probability Models, Academic Press, India, 2000.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 4	MATLAB & LATEX	Elective	86	4	-	5

**Objective:**

- To impart the programming concepts of Matlab and Laxtex.
- Specific outcome of learning the learner will be able to use Matlab for interactive computations Able to draw 2D and 3D graphs.
- Understand richness of Latex rather than using algebraic Number theory M.S. Word for documentation
- Able to applying programming techniques to solve the programs at advanced level.

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1:** Able to use Matlab for interactive computations.

**CO2:** Familiar with memory and file management in Matlab.

**CO3:** Able to generate plots and export this for use in reports and presentations.

**CO4:** Cooperating and working with others using subversion

**CO5:** Debugging and optimising their programs

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of types of mat lab mathematical operators,Relational, binary and logical operators	K2
CO2	Apply the concepts in expanding and reducing size-reshaping ,shifting and sorting matrices .	K3
CO3	Identify different types of LaTeX and LaTeX file	K4
CO4	Understand the basics of document layout and organization	K5
CO5	Emphasis on estimating a document class and fine tuning text .	K6

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
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<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>

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

### **Elective paper 4 MATLAB & LATEX**

**6 Hours/5 Credits**

**Unit I Introduction-** Starting –Closing matlab -Types of matlab windows - Data types - Assignment statements. System commands and mathematical operators: Saving and loading files - Workspace - Mathematical operators -Relational, binary and logical operators.

**Unit II: Handling of arrays:** Creating- Accessing arrays - Mathematical operations on arrays: Addition, multiplication of single and multiple arrays -Relational and logical operations on arrays - Operations on sets. Handling of matrices: Creating - Accessing- Length-size- Maximum -Minimum - Mean - Expanding and reducing size- Reshaping - Shifting -Sorting matrices -Mathematical operations on matrices.

**Unit III: LaTeX:** Introduction - Components - messages - commands -Advantages- Text formatting - different types of LaTeX- LaTeX file- Commands name and arguments – environments – declarations lengths special characters – Fragile commands.

**Unit IV: Document layout and organization:** Document class – page style parts of the documents –Table of contents – fine tuning text – word division.

**Unit V: Displayed Text:** Changing font – centering and indenting – lists- generalized list – declarations – tabulator stops – boxes – tables – printing literal – footnotes and marginal notes.

#### **Text Books:**

1. Y. Kirani Singh & B. B. Chaudhuri, **MATLAB Programming**, Prentice-Hall of India Pvt. Ltd, New Delhi, 2008.( Unit I , Unit II)
2. H.Kopka, and P.W.Daly, **Guide to LaTeX**, 3<sup>rd</sup> edition, Addison Wesley, London, 1999(Unit III- Chapter 1&2, Unit IV- Chapter 3, Unit V-Chapter 4)

#### **Reference Books:**

- 1.Desmond. J.Higham & Nicholas J.Higham, **MATLAB Guide** , 2<sup>nd</sup> edition SIAM , 2005.
- 2.H.Kopka & P.W.Daly, **A Guideline to LaTeX** ,Third edition , Addison- Wesley, London , 1999



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pedagogy :

Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 5	FUZZY SETS AND THEIR APPLICATIONS	Elective	86	4	-	5

**Objectives:**

- To introduce the concept of fuzzy theory and study its application in real problems
- To study the uncertainty environment through the fuzzy sets that incorporates imprecision and subjectivity into the model formulation and solution process.
- To understand the fuzzy relations and fuzzy arithmetic.
- To explain the concept of operations on fuzzy sets.

**Course Outcomes:** At the end of the course, students should:

**CO1:** Be able to distinguish between the crisp set and fuzzy set concepts through the learned

**CO2:** Differences between the crisp set characteristic function and the fuzzy set membership function.

**CO3:** Be able to draw a parallelism between crisp set operations and fuzzy set operations through the use of characteristic and membership functions respectively.

**CO4:** Become aware of the use of fuzzy inference systems in the design of intelligent

CO	CO Statement	Knowledge
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Number		Level
CO1	Demonstrate the basic concepts of fuzzy sets and membership functions , Know various AI search algorithms	K2
CO2	Ability to find examples for crisp equivalence relation.	K3
CO3	Applying the concept in Fuzzy Morphisms.	K4
CO4	Understand the basics of sampling distribution theory	K5

### Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S

S- Strong; M-Medium; L-Low

### **Elective paper 5 FUZZY SETS AND THEIR APPLICATIONS Hours/5Credits**

**Unit I: From Classical Sets To Fuzzy Sets, Fuzzy Sets Verses Crisp Sets** Fuzzy sets: Basic types – Fuzzy sets: Basic Concepts –Additional Properties of  $\alpha$  – cuts-Extension Principle for fuzzy sets .

**Unit II: Operations On Fuzzy Sets** Types of operations– Fuzzy complements- Fuzzy Intersections: t-Norms – Fuzzy Unions: t-Conorms - Combinations of Operations.

**Unit III: Fuzzy Arithmetic** Fuzzy numbers - Linguistic variables -Arithmetic operations on intervals –Arithmetic operations on Fuzzy numbers.

**Unit IV: Fuzzy Relations** Binary Fuzzy Relations – Binary Relations on a Single Set – Fuzzy Equivalence Relations – Fuzzy Compatibility Relations –Fuzzy Ordering Relations – Fuzzy Morphisms.

**Unit V: Fuzzy Decision Making** Individual decision making – Multiperson Decision Making- Ranking methods – Fuzzy Linear programming.

**Text Books:**

George J. Klir and Bo Yuan, Fuzzy sets and Fuzzy Logic Theory and Applications, Prentice Hall of India, (2005).

Unit I Chapter 1 Sections 1.3, 1.4, Chapter :2 Sections 2.1 and 2.3

Unit II Chapter 3 Sections 3.1, 3.2, 3.3, 3.4, 3.5.

Unit III Chapter 4 Sections 4.1,4.2, 4.3, 4.4.

Unit IV Chapter 5 Sections 5.3 ,5.4, 5.5, 5.6, 5.7, 5.8.

Unit V Chapter 15 Sections 15.2,15.3, 15.6, 15.7

**Reference Books:**

1. H.J. Zimmermann, Fuzzy Set Theory and its Applications, Allied Publishers Limited (1991).
2. M. Ganesh, Introduction to Fuzzy sets and Fuzzy logic, Prentice Hall of India, New Delhi (2006).

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 6	NEURAL NETWORKS	Elective	86	4	-	5

**Objectives:**

- To introduce the main fundamental principles and techniques of neural network systems and investigate the principal neural network models and applications.
- To provide the deep knowledge on Dynamic Neural units.
- To study the concepts of Continuous-time dynamic neural networks.

**Specific outcome of learning:** The learner will acquire in – depth knowledge of Neural Network-Applications of neural network Nonlinear models and dynamics behavior of DNN Hopfield dynamic neural network Conditions for equilibrium points in DNN

**Course Outcomes:**Students will be able to:

**CO1:** Understand the differences between networks for supervised and unsupervised learning.

**CO2:** Design single and multi-layer feed-forward neural networks.

**CO3:** Develop and train radial-basis function networks.

**CO4:** Program linear and nonlinear models for data mining.**CO5:** Analyze the performance of neural networks

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts neural networks- Functioning of artificial neural network-Neuron modelling.	K2
CO2	Apply the concepts in finding Models and circuits of isolated DNUs	K3
CO3	Identify the type Dynamic temporal behaviour of DNN	K4
CO4	Understand the basics Hopfield dynamic neural network (DNN) and its implementation	K5

### Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S

S- Strong; M-Medium; L-Low

## Elective paper 6 NEURAL NETWORKS

6 Hours/5 Credits

**Unit I:** Architectures: Introduction to Neural Network-Applications of neural network-Biological neural networks-Artificial neural networks-Functioning of artificial neural network-Neuron modelling.

**Unit II:** Dynamic Neural Units (DNUs): Nonlinear models and dynamics-Models of dynamic neural units-Models and circuits of isolated DNUs-Neuron with excitatory and inhibitory dynamics.

**Unit III:** Neuron with multiple nonlinear feedback-Dynamic temporal behaviour of DNN-Nonlinear analysis for DNUs.

**Unit IV:** Continuous-time dynamic neural networks: Dynamic neural network structures: An introduction-Hopfield dynamic neural network (DNN) and its implementation-Hopfield dynamic neural networks (DNNs) as Gradient-like systems.

**Unit V:** Modifications of Hopfield dynamic neural networks-Other DNN models-Conditions for equilibrium points in DNN.

**Text Books:**

- 1.A. Anto Spiritus Kingsly, **Neural network and fuzzy logic control**, Anuradha publications, Chennai, 2009.
- 2.Madan M. Gupta, Liang Jin & Noriyasu Homma, **Static and Dynamic neural networks**, A John Wiley and sons, INC., Publication, 2003.

Unit 1: Chapters: 1.1—1.6.2 –Text book 1

Unit 2: Chapters: 8.1—8.3—Text book 2

Unit 3: Chapters: 8.4—8.6—Text book 2

Unit 4: Chapters: 9.1—9.3—Text book 2

Unit 5: Chapters: 9.4—9.6—Text book 2

**Reference Books:**

- 1.Jacek M. Zurada, Introduction to Artificial Neural Systems, Jaico Publishing House, Chennai, 2006.
2. Kevin L. Priddy & Paul E. Keller, Artificial Neural Networks, PHI Learning Private Limited, New Delhi, 2009.
3. Elaine Rich & Kevin Knight, Artificial Intelligence, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2005.
4. S. Rajasekaran & G. A. Vijayalakshmi Pai, Neural Networks, Fuzzy Logic and Genetic Algorithms synthesis and applications, PHI Learning Private Limited, New Delhi, 2008.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective Paper 7	STOCHASTIC PROCESS	Elective	86	4	-	5

**Objectives:**

- To give a depth knowledge about Markov chain and Process.
- To understanding the stochastic models for much real life probabilistic situations and expected results.
- To learn the well known models like birth – death and queueing to reorient the knowledge of stochastic analysis.
- The learner understands in depth knowledge about ergoding, renewal theory and its application in discrete and continuous process.

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1: The student has basic knowledge about stochastic processes in the time domain.**

**CO2:** The student has acquired more detailed knowledge about Markov processes with a discrete state space, including Markov chains, Poisson processes and birth and death processes.

**CO3:** The student also knows about queuing systems and Brownian motion, in addition to mastering the fundamental principles of simulation of stochastic processes and the construction of Markov chain Monte Carlo (MCMC) algorithms.

**CO4:** The student is able to formulate simple stochastic process models in the time domain and provide qualitative and quantitative analyses of such models.

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of Stochastic process, Markov chains	K2
CO2	Apply the concepts in Birth and Death Distribution Process	K3
CO3	Identify the type of the Differential Equations for A Wiener Process -Kolmogorov Equation	K4
CO4	Understand the basics of sampling distribution theory	K5

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S

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

**Unit I:** Basic Definitions: Stochastic Processes: An Introduction - Markov Chains : Definition and Examples - Higher Transition Probabilities - Generalization of Independent Bernoulli Trials : Sequence of Chain – Dependent Trails - Classification of States and Chains – Determination of Higher Transition Probabilities - Stability of A Markov System – Graph Theoretic Approach.

**Unit II:** Sequence of Chains: Poisson Process -Poisson Process and Related Distributions – Generalizations of Poisson Process - Birth and Death Process

**Unit III:** Classification of States: Introduction -Brownian Motion – Wiener Process – Differential Equations for A Wiener Process -Kolmogorov Equation – First Passage Time Distribution for wiener Process – Ornstein-Uhlenbeck Process.

**Unit IV:** Birth and Death Distribution Process: Renewal Process - Renewal Processes in Continuous Time – Renewal Equation - Stopping Time : Wald’s Equation - Renewal Theorems

**Unit V:** Renewal Theorems: Delayed and Equilibrium Renewal Process –Residual and Excess Lifetimes.

**Text Books:**

J.Medhi “Stochastic process”, Second edition- New Age International Publishers.

Unit I : Chapter 1: 1.5; Chapter 2: 2.1 to 2.7

Unit II : Chapter 3 : 3.1 to 3.4

Unit III: Chapter 4: 4.1 to 4.6

Unit IV: Chapter 6: 6.1 to 6.5

Unit V: Chapter 6: 6.6 to 6.11

**Reference Books:**

1.Samuel Karlin and Howard M. Taylor, “A First Course in stochastic process”, second edition, academic Press. 1975

2.Samuel Karlin and Howard M. Taylor, “A Second course in stochastic process”, Academic Press, 1981.

3.Narayan Bhat, U, “Elements of Applied Stochastic Processes”, Second Edition John Wiley & Sons, New York.

4.Feller, “An Introduction to Probability theory and its applications”, Volume 1. Third edition, John Wiley & Sons, New York.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 8	FLUID DYNAMICS	Elective	86	4	-	5

**Objectives:**

- It is a subject of almost all fields of engineering, astrophysics, biomedicine, and metrology. Basic concepts of fluid dynamics are dealt with in this paper.
- To understand the concepts of irrotational motion, *two dimensional motion and real fluids*.
- To provide clear knowledge about fluid dynamics and apply this concepts on real time problems.
- To study the concepts of the laminar boundary layer.

**Course Outcomes:**

**CO1:** Solve hydrostatic problems.

**CO2:** Describe the motion of fluids.

**CO3:** Identify derivation of basic equations of fluid mechanics and apply

**CO4:** Make dimensional analysis and similitude

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental knowledge of fluids and its properties	K2
CO2	Describe the concepts and equations of fluid dynamics.	K3
CO3	Apply thermodynamic control volume concepts in fluid dynamics for applications that include momentum, mass and energy balances	K4
CO4	Analyze the approximate solutions of the Navier-Stokes equation	K5

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	M

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



## Elective paper 8 FLUID DYNAMICS 6 Hours/ 5 Credits

**Unit I:** Eulerian method: Flow along a stream tube- General equation of motion: Introduction – the equation of motion of an inviscid fluid – Irrotational motion – Boundary condition – uniqueness – Euler momentum theorem.

**Unit II:** Two Dimensional Motion: Introduction –two dimensional functions – basic singularities- conformal transformation – The Aerofoil .

**Unit III:** Irrotational Motion in three dimensions : Introduction – Laplace’s equation .

**Unit IV:** Dynamics of real fluids: Introduction – the equations of Motion for Viscous flow- Some exact solutions of the Navier – Stokes equation – very slow motion.

**Unit V:** The Laminar boundary Layer in incompressible flow: Introduction –The boundary layer equations – Analytic Solutions of the boundary layer equations.

### Text Book:

N.Curle and H.J. Davies, Modern Fluid Dynamics, Volume 1, Incompressible Flow, D.VanNostrand Company Ltd, London, 1968.

Unit I: Chapter 1: 1.2.1 and Chapter 2: 2.1 to 2.6

Unit II: Chapter 3: 3.1 to 3.3 , 3.6 , 3.7

Unit III: Chapter 4: 4.1 – 4.2

Unit IV: Chapter 5:5.1 – 5.4

Unit V: Chapter 6: 6.1 , 6.2 (6.2.1, 6.2.3, 6.2.4, 6.2.5) and 6.3

### Reference Books:

1. F.Chorlton, “Text book of Fluid Dynamics” , CBS Publishers and distributors, New Delhi-32,1998.
2. M.D.Raisinghawia, “ Fluid Dynamics”,S.Chand and Company Ltd, New Delhi - 55, 1995.
3. S.W. Yuan, Foundations of Fluid Mechanics, by Prentice – Hall of India, New Delhi, 1988.
4. G.K.Batchelor, An Introduction to Fluid Dynamics, Cambridge University Press, 2000.
5. R.K. Bansal, An Introduction to Fluid Dynamics, Firewall Media, 2005
6. D.E. Rutherford, Fluid Dynamics, Oliver and Boyd, 1959.

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### pedagogy :

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
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<b>Elective paper 9</b>	<b>NON LINEAR DIFFERENTIAL EQUATIONS</b>	<b>Elective</b>	<b>86</b>	<b>4</b>	<b>-</b>	<b>5</b>
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**Objectives:**

- To study Non-linear Differential equation and its properties.
- To study oscillation and stability properties of the solutions.
- To provide clear knowledge about perturbation methods.
- To understand the concepts of linear systems and stability.

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1:** After completed course, the students are expected to be able to.

**CO2:** Give account for existence and uniqueness of the solutions of ordinary differential equations solutions.

**CO3:** Make use of the phase plane to analyse two-dimensional systems with emphasis on equilibrium, existence of limit cycles and linearisation.

**CO4:** Summarise theorems that related to the existence of periodical solutions, and apply them to simple systems.

**CO5:** Explain important terms in asymptotic theory, such as, order symbols, asymptotic sequences and asymptotic series, and give account for truncation and convergence of asymptotic series.

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	<b>Demonstrate the basic concepts linear approximation at equilibrium points</b>	<b>K2</b>
<b>CO2</b>	<b>Apply the concepts amplitude Perturbation for the pendulum equation</b>	<b>K3</b>
<b>CO3</b>	<b>Identify the application of Floquet Theory</b>	<b>K4</b>
<b>CO4</b>	<b>Understand the basics Stability and Poincare stability</b>	<b>K5</b>
<b>CO5</b>	<b>Emphasis on estimating the Perturbation Method and Fourier series.</b>	<b>K6</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>

<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>

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

### **Elective paper 9 NON LINEAR DIFFERENTIAL EQUATIONS 6 Hours/5 Credits**

**Unit I** First order systems in two variables and linearization: The general phase plane-some population models – Linear approximation at equilibrium points – Linear systems in matrix form.

**Unit II** Averaging Methods: An energy balance method for limit cycles – Amplitude and frequency estimates – slowly varying amplitudes – nearly periodic solutions - periodic solutions: harmony balance – Equivalent linear equation by harmonic balance – Accuracy of a period estimate.

**Unit III** Perturbation Methods: Outline of the direct method – Forced Oscillations far from resonance - Forced Oscillations near resonance with Weak excitation – Amplitude equation for undamped pendulum – Amplitude Perturbation for the pendulum equation – Lindstedt’s Method – Forced oscillation of a self – excited equation – The Perturbation Method and Fourier series.

**Unit IV** Linear Systems: Time Varying Systems – Constant coefficient System – Periodic Coefficients – Floquet Theory – Wronskian.

**Unit V** Stability: Poincare stability – solutions, paths and norms – Liapunov stability Stability of linear systems – Comparison theorem for the zero solutions of nearly – linear systems.

#### **Text Book**

Nonlinear Ordinary Differential Equations , D.W.Jordan, & P.Smith, Clarendon Press, Oxford, 1977.

## References

1. Differential Equations by G.F.Simmons, Tata McGraw Hill, NewDelhi (1979).
2. Ordinary Differential Equations and Stability Theory By D.A.Sanchez, Freeman (1968).
3. Notes on Nonlinear Systems by J.K.Aggarwal, Van Nostrand, 1972.

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pedagogy :

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 10	FINANCIAL MATHEMATICS	Elective	86	4	-	5

### Objectives:

- To study financial mathematics through various models.
- To study the various aspects of financial mathematics.
- To provide the deep knowledge on Brownian motion and stochastic calculus.
- Use financial mathematics to solve the real time problems.

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**Course Outcomes:**

**CO1:** On successful completion of this course students will be able to:

**CO2:** Demonstrate understanding of basic concepts in linear algebra, relating to linear equations, matrices, and optimization.

**CO3:** Demonstrate understanding of concepts relating to functions and annuities.

**CO4:** Employ methods related to these concepts in a variety of financial applications.

**CO5:** Apply logical thinking to problem solving in context.

CO Number	CO Statement	Knowledge Level
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CO1	Demonstrate the basic concepts of Single period models and Neutral Probability Measure	K2
CO2	Apply the concepts binomial trees and discrete parameter martingales	K3
CO3	Identify the type Stochastic Integration	K4
CO4	Understand the basics of martingales in Continuous time	K5
CO5	Emphasis on estimating block-scholes model	K6

### Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	M
CO5	S	S	M	S	M

S- Strong; M-Medium; L-Low

### Elective paper 10 FINANCIAL MATHEMATICS

6Hours/ 5 Credits

**Unit I Single period models:** definitions from finance - pricing a forward - one-step Binary Model - a ternary Model - Characterization of no arbitrage - Risk-Neutral Probability Measure.

**Unit II Binomial trees and discrete parameter martingales:** Multi-period Binary model - American Options - Discrete parameter martingales and Markov processes - Martingale Theorems - Binomial Representation Theorem - Overturn to Continuous models.

**Unit III Brownian motion:** Definition of the process - Levy's Construction of Brownian Motion - The Reflection Principle and Scaling - Martingales in Continuous time.

**Unit IV Stochastic calculus:** Non-differentiability of Stock prices - Stochastic Integration - Ito's formula - Integration by parts and Stochastic Fubini Theorem - Girsanov Theorem - Brownian Martingale Representation Theorem – Geometric Brownian Motion - The Feynman - Kac Representation.

**Unit V Block-scholes model:** Basic Block-Scholes Model - Block-Scholes price and hedge for European Options - Foreign Exchange - Dividends - Bonds - Market price of risk.

### Text Book

Alison Etheridge, **A Course in Financial Calculus**, Cambridge University Press, Cambridge, 2002.

### References

1. Martin Boxtor and Andrew Rennie, **Financial Calculus: An Introduction to Derivatives Pricing**, Cambridge University Press, Cambridge, 1996.

2. Damien Lambertson and Bernard Lapeyre, (Translated by Nicolas Rabeau and Farancois Mantion), Introduction to Stochastic Calculus Applied to Finance, Chapman and Hall, 1996.
3. Marek Musiela and Marek Rutkowski, Martingale Methods in Financial Modeling, Springer Verlag, New York, 1988.
4. Robert J.Elliott and P.Ekkehard Kopp, Mathematics of Financial Markets, Springer Verlag, New York, 2001 (3rd Printing)

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 11	CONTROL THEORY	Elective	86	4	-	5

Objectives:

- To introduce basic theories and methodologies required for analyzing and designing advanced control systems.
- Specific outcome of learning: The learner will acquire skills to solve observability problems of linear and nonlinear systems.
- Proficient in solving linear and nonlinear control system Proficient in stability analysis of linear and nonlinear systems Proficient in stabilization of control systems Proficient in optimal control problems. To able to solve problems on control theory

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1: Be able to understand Reconstruction Kernal, streaming Function**

**CO2: Able to analyze the stability of linear systems**

**CO3: Problem solving skillsare developed in linear time invariant systems**

CO Number	CO Statement	Knowledge Level

<b>CO1</b>	<b>Describe the basic concepts and properties of differential equations, fundamental concepts of control system</b>	<b>K2</b>
<b>CO2</b>	<b>Understand about concept of observable and controllable system.</b>	<b>K3</b>
<b>CO3</b>	<b>Ability to analyze and design a new control system.</b>	<b>K4</b>

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>

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

### **Elective paper 11**

### **CONTROL THEORY**

**6 Hours/5 Credits**

**Unit I:** Observability: Linear systems – Observability Grammian – Constant coefficient systems – Reconstruction kernel – Nonlinear Systems

**Unit II:** Controllability: Linear systems – Controllability Grammian – Adjoint systems  
Constant coefficient systems – Steering function – Nonlinear systems

**Unit III:** Stability: Stability – Uniform stability – Asymptotic stability of linear Systems -  
Linear time varying systems – Perturbed linear systems – Nonlinear systems

**Unit IV:** Stabilizability: Stabilization via linear feedback control – Bass method –  
Controllable subspace –Stabilization with restricted feedback

**Unit V:** Optimal Control: Linear time varying systems with quadratic performance criteria  
– Matrix Riccati equation – Linear time invariant systems – Nonlinear Systems

#### **Text Book:**

K. Balachandran & J. P. Dauer, Elements of Control Theory, Narosa, New Delhi, 1999.

#### **References Books:**

- 1.Linear Differential Equations and Control by R.Conti, Academic Press, London, 1976.
- 2.Functional Analysis and Modern Applied Mathematics by R.F.Curtain and A.J.Pritchard,

Academic Press, New York, 1977.

3. Controllability of Dynamical Systems by J. Klamka, Kluwer Academic Publisher, Dordrecht, 1991

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 12	FRACTAL ANALYSIS	Elective	86	4	-	5

**Objectives:**

- To introduce the basic mathematical techniques of fractal geometry for diverse applications.
- .To understand the concepts of the space of fractals and fractal dimensions
- To provide the clear knowledge about fractals and measures.

**Course Outcomes:** Upon the successful completion of the course, students will be able to

**CO1: Understand the contraction mappings on the space of Fractals**

**CO2: Able to analyze fractal dimensions**

**CO3: Understand The Structured Walk Technique and the Divider Dimension**

**CO4: The learner will able to understand the basic concepts of fractals and measure recognize the space of fractals and fractal dimension**

**CO5: find the Hausdorff, box-counting and other dimensions understand the self – similar sets properties of fractals recognize the concepts fractal interpolation.**

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts fractals and measures. Fractal Interpolation Functions and Graphs of Functions	K2
CO2	Apply the Experimental Determination of the Fractal Dimension.	K3



<b>CO3</b>	<b>Identify the Self-Similar Sets, Similarity Dimensions and Divider Dimensions</b>	<b>K4</b>
<b>CO4</b>	<b>Understand the basics the Sierpinski Gasket and Carpet</b>	<b>K5</b>
<b>CO5</b>	<b>Emphasis Collage Theorem for IFS</b>	<b>K6</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>
<b>CO5</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>

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

**Elective paper 12      FRACTAL ANALYSIS      6Hours/5 Credits**

**Unit I:** Fractals and Measures: Introduction to Fractals – History of Fractals –Fractal Examples: The Triadic Cantor Set -The Sierpinski Gasket- A space of Strings-The Koch Curve -Heighway’s Dragon -Measures and Mass Distributions: Examples of Measures - Notes on Probability Theory -Topological Dimension.

**Unit II:** The Space of Fractals and Fractal Dimension : The Contraction Mapping Theorem-The HausdorffMetric – The Metric Space  $(H(X), h)$ : The Place Where Fractals Live – Iterated Functions Systems – Contraction Mappings on the Space of Fractals – Fractal Dimension – The Box-Counting Theorem – The Theoretical Determination of the Fractal Dimension – The Experimental Determination of the Fractal Dimension.

**Unit III:** Hausdorff, Box-Counting and Other Dimensions : Hausdorff Measure – Hausdorff Dimension – Calculation of Hausdorff Dimension-Simple Examples – Equivalent Definition of Hausdorff Dimension – Finer Definitions of Dimension – Box-Counting Dimensions – Properties and Problems of Box-Counting Dimension – Modified Box-Counting Dimensions – Packing Measures and Dimensions – Some Other Definitions of Dimension – Techniques for

Calculating Dimensions: Basic Methods – Subsets of Finite Measure – Potential Theoretic Methods – Fourier Transform Methods.

**Unit IV:** Self-Similar Sets, Similarity Dimensions and Divider Dimensions: Ratio Lists – Iterated Function Schemes – Dimension of Self -Similar Sets – Some Variations – Self-affine Sets – Applications to Encoding Images – Determination of Similarity Dimensions: The Cantor Set – The Koch Curve – The Quadratic Koch Curve – The Koch Island – The Sierpinski Gasket and Carpet – The Menger Sponge – The Structured Walk Technique and the Divider Dimension.

**Unit V:** Fractal Interpolation Functions and Graphs of Functions : Interpolation Functions- Fractal Interpolation Functions – The Fractal Dimension of Fractal Interpolation Functions – Collage Theorem for IFS – Dimensions of Graphs – The Weierstrass Function- Self-affine Curves – Autocorrelation of Fractal Functions.

**Text Books:**

1. Kenneth J. Falconer, **Fractal Geometry: Mathematical Foundations and Applications**, John Wiley and Sons, 2003.
2. Michael F. Barnsley, **Fractals Everywhere**, Academic Press Professional, 1988.

**Reference Books:**

1. G. A. Edgar, Measure, Topology and Fractal Geometry, Springer – New York, 2008.
2. Kenneth J. Falconer, The Geometry of Fractals Sets, Cambridge University Press, Cambridge, 1985.
3. Paul S. Addison, Fractals and Chaos: An Illustrated Course, Overseas Press, 2005.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 13	TENSOR ANALYSIS AND SPECIAL THEORY OF RELATIVITY	Elective	86	4	-	5

**Objectives:**

- To introduce the notion of Tensor and study its properties.
- To study the theory of relativity.
- To understand the concepts of invariance, metric tensor and Einstein tensor.
- To study specific theory of relativity and relativistic dynamics.

**Course Outcomes: Upon the successful completion of the course, students will be able to**

**CO1:** Use tensor notation in relativity theory.

**CO2:** Apply the concepts of length contraction and time dilation as well as use Lorentz transformations.

**CO3:** Solve simple kinematical problems.

**CO4:** Analyze Maxwell's equations and use their relativistic invariance

CO Number	CO Statement	Knowledge Level
CO1	Understand concept of tensor variables and difference from scalar or vector variables.	K2
CO2	Derive base vectors, metric tensors and strain tensors in an arbitrary coordinate system..	K3
CO3	Investigate the Christoffel symbols which provide a concrete representation of the connection of (pseudo-)Riemannian geometry in terms of coordinates on the manifold	K4
CO4	Apply Riemannan-Christoffel tensor to problems of differential geometry, electrodynamics and relativity	K5

**Mapping with Programme Outcomes**

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	S	S	M	S	S

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

**Elective paper 13 TENSOR ANALYSIS AND SPECIAL THEORY OF RELATIVITY  
6 Hours/ 5 Credits**

**Unit I:**Invariance - Transformations of coordinates and its properties - Transformation by invariance - Transformation by covariance and contra variance - Covariance and contra variance - Tensor and Tensor character of their laws - Algebras of tensors - Quotient tensors - Symmetric and skew symmetric tensors – Relative tensors.

**Unit II:** Metric Tensor - The fundamental and associated tensors - Christoffel's symbols - Transformations of Christoffel's symbols- Covariant Differentiation of Tensors - Formulas for covariant Differentiation- Ricci Theorem - Riemann -Christoffel Tensor and their properties.

**Unit III:** Einstein Tensor- Riemannian and Euclidean Spaces (Existence Theorem)-The e-systems and the generalized Kronecker deltas - Application of the e-systems.

**Unit IV:** Special Theory of Relativity: Galilean Transformation - Maxwell's equations - The ether Theory – The Principle of Relativity Relativistic Kinematics : Lorentz Transformation equations - Events and simultaneity - Example Einstein Train - Time dilation - Longitudinal Contraction -Invariant Interval - Proper time and Proper distance – World line - Example - twin paradox - addition of velocities - Relativistic Doppler effect.

**Unit V:**Relativistic Dynamics : Momentum – energy – Momentum-energy four vector – Force – Conservation of Energy – Mass and energy – Example – inelastic collision – Principle of equivalence – Lagrangian and Hamiltonian formulations .

Accelerated Systems : Rocket with constant acceleration – example – Rocket with constant thrust

**Text Books:**

1. I.S. Sokolnikoff, **Tensor Analysis**, John Wiley and Sons, New York, 1964
2. D. Greenwood, **Classical Dynamics**, Prentice Hall of India, New Delhi, 1985

- Unit I Chapter 2 : Sections 18 to 28 of [1]  
 Unit II Chapter 2 : Sections 29 to 37 of [1]  
 Unit III Chapter 2 : Section 38 to 41 of [1]  
 Unit IV Chapter 7 : Sections 7.1 and 7.2 of [2]  
 Unit V Chapter 7 : Sections 7.3 and 7.4 of [2]

**Reference Books:**

- 1.J.L. Synge and A.Schild, Tensor Calculus, Toronto, 1949.
- 2.A.S. Eddington, The Mathematical Theory of Relativity, Cambridge University Press, 1930.
- 3.P.G. Bergman, An Introduction to Theory of Relativity, New york, 1942.
- C.E. Weatherburn, Riemannian Geometry and Tensor Calculus, Cambridge, 1938.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

Course Code	Course Name	Category	L	T	P	Credit
Elective paper 14	MATHEMATICAL BIOLOGY	Elective	86	4	-	5

**Objectives:**

- *To introduce the concept of Mathematical biology and study its applications.*
- *To study some basic concepts of mathematical biology.*
- *To provide a deep knowledge about models.*
- **To understand the concepts of Biochemical kinetics.**

**Course Outcomes:**The student should be able to

**CO1: Formulate and solve mathematical models of evolution in terms of optimisation and game theory problems;**

**CO2: Use techniques from stochastic processes to describe population genetics;**

**CO3: Use techniques from partial differential equations to describe spread of genes, disease and other biological material;**

**CO4: Explain how these techniques are applied in scientific studies and applied in ecology and epidemiology.**

<b>CO Number</b>	<b>CO Statement</b>	<b>Knowledge Level</b>
<b>CO1</b>	<b>Understand concept of Single Species Population Dynamics Continuous time models</b>	<b>K2</b>
<b>CO2</b>	<b>Identify infectious Diseases Simple epidemic and SIS diseases..</b>	<b>K3</b>
<b>CO3</b>	<b>Investigate the Christoffel symbols which provide a concrete representation of the connection of (pseudo-)Riemannian geometry in terms of coordinates on the manifold</b>	<b>K4</b>
<b>CO4</b>	<b>Apply Biochemical Kinetics Simple models for polymer growth dynamics</b>	<b>K5</b>

**Mapping with Programme Outcomes**

<b>COs/POs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>CO1</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO2</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>
<b>CO3</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>	<b>S</b>
<b>CO4</b>	<b>S</b>	<b>S</b>	<b>M</b>	<b>S</b>	<b>S</b>

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

**Elective paper 14 MATHEMATICAL BIOLOGY 6 Hours/5Credits**

**Unit I:** Single Species Population Dynamics Continuous time models – Growth models, Logistic model – Evolutionary Aspects – Delay models.

**Unit II:** Two Species Population Dynamics The Lotka-Volterra Prey-Predator equations – Modelling the predator functional response Competition – Ecosystems modelling.

**Unit III:** Infectious Diseases Simple epidemic and SIS diseases – SIR Epidemics – SIR Endemics.

**Unit IV:** Biochemical Kinetics Transitions between states at the molecular and populations level – Law of mass action – Enzyme kinetics.

**Unit V:** Biochemical Kinetics Simple models for polymer growth dynamics.

**Text Books:**

1. N. Britton, **Essential Mathematical Biology**, Springer Science & Business Media, 2012.

Unit I- Chapter 1: 1.3-1.5, 1.7.

Unit II- Chapter 2: 2.3-2.

Unit III- Chapter 3: 3.1-3.4

2. A. Segel and L. Edelstein-Keshet, **A Primer in Mathematical Models in Biology**, SIAM, Vol. 129, 2013.

Unit IV- Chapter 2: 2.1-2.4

Unit V- Chapter 2: 2.5

**Reference Books:**

1. J.D. Murray, “Mathematical Biology I: An Introduction”, Springer-Verlag, New York, 2002.

2. A. D. Bazykin, “Nonlinear dynamics of interacting populations”, World Scientific, 1998.

3. J.N. Kapur, “Mathematical Models in Biology and Medicine”, Affiliated East-West, New Delhi, 1985.

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**pedagogy :**

**Chalk & talk, PPT, Group discussion, Seminar, Quiz, assignment and video Lecture**

### Employability/Entrepreneurship/ Skill Development

Name of the Course	Course Code	Name of the Programme	Activities with direct bearing on Employability/ Entrepreneurship/ Skill development
Differential Equations	PMTT13	M.Sc Mathematics	Employability Skill
Graph Theory	PMTT14	M.Sc Mathematics	Employability Skill
Topology	PMTT23	M.Sc Mathematics	Employability Skill
Optimization Techniques	PMTT24	M.Sc Mathematics	Employability Skill/ Entrepreneurship
Automata Theory	PMTE11/22/33( Elective)	M.Sc Mathematics	Employability Skill/Soft Skill
Financial Mathematics	PMTE11/22/33( Elective)	M.Sc Mathematics	Employability Skill/ Entrepreneurship
MatLab and LaTeX	PMTE11/22/33( Elective)	M.Sc Mathematics	Entrepreneurship/ Employability/ Skill
Measure Theory	PMTT32	M.Sc Mathematics	Employability/Entrepreneur
Classical Dynamics	PMTT33	M.Sc Mathematics	Employability
Calculus of Variations and Integral Equations	PMTT34	M.Sc. Mathematics	Employability
Probability Theory and Statics	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability/ Entrepreneur
Fuzzy Sets and their Applications	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability/ Entrepreneur
Stochastic Processes	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability/ Entrepreneur
Non linear Differential Equations	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability/ Entrepreneur
Financial Mathematics	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability
Mathematical Biology	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability
Algebraic Number Theory	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability
Neural Network	PMTE11/22/33( Elective)	M.Sc. Mathematics	Soft Skill
Control Theory	PMTE11/22/33( Elective)	M.Sc. Mathematics	Employability/ Entrepreneur/ Skill



**MOTHER TERESA WOMEN'S UNIVERSITY**

**KODAIKANAL – 624 102**

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**M.Sc.( COMPUTER SCIENCE)**  
**(EFFECTIVE FROM JUNE 2018-2019 ONWARDS)**



# MASTER OF SCIENCE

## M.SC. Computer Science

UNDER CBCS (with effect from 2018-2019)

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### **About the Programme M.Sc- Computer Science**

M.Sc. in Computer Science is a two-year Post-graduate programme with the objective to develop human resources with core competence in various thrust areas of Computer Science. The programme includes software engineering, system development, mathematical foundations, data analytics, software development, applied communications, network architecture and database design. The coursework of the programme focus on preparing students for major techno companies or on entrepreneurship.

Students are provided with opportunities to develop and hone core competency in the field of Computer science and encourage them to make a mark in the much sought after IT industry. Guest lectures, case studies and presentations are organized from time to time to give an insight into the latest development in the industry.

### **OBJECTIVES:**

- To develop girl students with core competence in various thrust areas of Computer Science
- To prepare students for innovation on data analytics, software development or on entrepreneurship
- To prepare the students on Software development and networking systems

### **PROGRAMME OUTCOMES (POs)**

On successful completion of this programme the students will be able to:

1. Get core competence in various subjects of Computer Science.
2. Recognize the organizational need and to engage themselves in continuing professional development.
3. Apply knowledge of computing and mathematics appropriate to the discipline.
4. Design, implement, and evaluate a computational system to meet the desired needs within realistic constraints.

5. Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computational systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
6. Function effectively on teams to accomplish shared computing design, evaluation, or implementation goals.
7. Recognize the need for and ability to engage in continuing professional development.
8. Use appropriate techniques, skills, and tools necessary for computing practice.
9. Identify, formulate, develop solutions to computational challenges. Understand professional, ethical, legal, security, and social issues and responsibilities for the computing profession.
10. Apply design and development principles in the construction of software systems of varying complexity.

### **PROGRAMME SPECIFIC OUTCOMES**

PS01 : Able to handle any kind of software development

PS02 :Able to maintain the software network to handle the technological challenges.

PS04: Able to develop strong analytical skills, critical thinking and experimental skills.

PS05 : Able to solving on Computational problems, system networking knowledge, use of technology with innovative ideas

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# MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL – 624 102

DEPARTMENT OF COMPUTER SCIENCE

M.SC. COMPUTER SCIENCE

ALLOCATION OF PAPERS AND CREDITS FOR PG PROGRAMME

2018 – 2019 ONWARDS

S.NO.	SUBJECT CODE	SUBJECT NAME	HOURS	CREDITS	INT	EXT	TOT
<b>First Semester</b>							
01.	PCST11	Advanced Java Programming	6	5	25	75	100
02.	PCST12	Data Structures and Algorithms	6	5	25	75	100
03.	PCST13	Mathematical Foundations of Computer Science	6	5	25	75	100
04.	PCSP11	Advanced Java Lab	6	5	25	75	100
05.	PCSE11	Elective – I	6	5	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>500</b>
<b>Second Semester</b>							
01.	PCST21	Advanced Operating System	6	5	25	75	100
02.	PCST22	Relational Database Management System	6	5	25	75	100
03.	PCST23	Computer Networks	6	5	25	75	100
04.	PCSP22	RDBM Lab	6	5	25	75	100
05.	PCSE22	Elective – II	6	5	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>500</b>
<b>Third Semester</b>							
01.	PCST31	Compiler Design	6	5	25	75	100
02.	PCST32	Software Engineering	6	5	25	75	100
03.	PCST33	Web Programming	6	5	25	75	100
04.	PCSP33	Web Programming Lab	6	5	25	75	100
05.	PCSE33	Elective – III	6	5	25	75	100
<b>Total</b>			<b>30</b>	<b>25</b>			<b>500</b>

<b>Fourth Semester</b>							
01.	PCST41	Digital Image Processing	6	5	25	75	100
02.	PCST42	Mobile Computing	6	5	25	75	100
03.	PCSP44	Project	-	5	25	75	100
<b>Total</b>			<b>12</b>	<b>15</b>			<b>300</b>
<b>Grand Total</b>				<b>90</b>			<b>1800</b>

<b>ELECTIVES</b>		
<b><u>SEMESTER I</u></b>	<b><u>SEMESTER II</u></b>	<b><u>SEMESTER III</u></b>
1. Computer Graphics 2. Soft Computing	1. Data Warehousing and Data Mining 2. Cryptography and Network Security	1. Software Project Management 2. Big Data Analytics

### **SCHEME OF EXAMINATION**

<b>Internal (Theory)</b>	-	<b>25</b>
<b>Test</b>	-	<b>15</b>
<b>Attendance</b>	-	<b>5</b>
<b>Assignment / Technical Quiz</b>	-	<b>5</b>
<b>Total</b>	-	<b>25</b>
<b>External (Theory)</b>	-	<b>75</b>

## QUESTION PATTERN

<b>1.</b>	<b>PART A</b>	<b>10*1 Marks=10</b> (Objective Type/Multiple Choice) 2 Question from each Unit	<b>10</b>
<b>2.</b>	<b>PART B</b>	<b>5*4 Marks =20</b> (From each Unit Either or Choice)	<b>20</b>
<b>3.</b>	<b>PART C</b>	<b>3*15 Marks =45</b> (Open Choice) (Any three Question out of 5,onequestion from each unit)	<b>45</b>
		<b>Total</b>	<b>75</b>

**The Internal assessment for Practical : 25**

**The External assessment for Practical : 75**

PCST11	ADVANCED JAVA PROGRAMMING		
	Semester I	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply K6-Create		
<b>Objectives</b>	1. To remind the object oriented paradigm in Java programming 2. To understand the importance of Interfaces and exception handling concept 3. Compare and contrast the Net and Applet Java packages 4. To develop Java application using Servlet		

### **Unit – I OVERVIEW OF JAVA, INHERITANCE AND METHODS**

Introduction- Object-Oriented Programming- Lexical Issues- Data types- Variables and Arrays – Operators – Control Statements – Objects-Classes - Inheritance – Methods – Method Overriding – Using Final with Inheritance - The Creation of Java- Java Byte code - The Java Buzzwords – Garbage Collection

### **Unit – II USER DEFINED PACKAGES, THREAD PROGRAMMING AND STRING**

Packages – Importing Packages – Interfaces – Exception Handling – Multithreaded Programming-The String Constructors –String Handling – Character Extraction – Comparison – Modifying a String - String Buffer.

### **Unit – III JAVA PACKAGES: I/O, NET PACKAGE**

I/O Package: The Java I/O Classes and Interfaces – File – Byte Streams – The Character Streams – Serialization- Net Package: The Networking Classes and Interfaces – InetAddress – Datagrams –TCP/IP Server Sockets.

### **Unit – IV JAVA PACKAGES: AWT, APPLET**

AWT Package: AWT Classes – Window Fundamentals – Working with Graphics– Working with Color – Working with Fonts – Applet Package: Applet Basics – Applet Architecture – Reading and Writing in Console – Print Writer class

### **Unit – V SOFTWARE DEVELOPMENT USING JAVA**

Remote Method Invocation – JDBC – Servlets – Life Cycle of a Servlet – The Servlet API – Servlet and Http Package.

#### **Text Book(s):**

1. Herbert Schildt”The Complete Reference JAVA”, 7th Edition-,Tata McGraw Hill, 2007.

**Reference(s):**

1. Herbert Schildt, "The Complete Reference", 8th Edition-, Tata McGraw Hill, 2011.
2. Kogent, "Java 6 Programming Black Book" Edition 2011, Kogent Learning Solutions.
3. Steven Holzner, "Java2(JDK 5 Edition) Programming" 2007 edition

**Course Outcomes:**

After successful completion of this course, the students shall be able to

CO1: Design and Create Java Applications using OOPs concept **K6**

CO2: Utilise the features of exception handling, threads & util package in Java. **K3**

CO3: Simplify the communication between client & server using database connectivity. **K2**

CO4: Build Java applications that include GUIs and event driven programming **K3**

**Mapping of Cos with Pos and PSOs :**

<b>CO/ PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	S	S	S	S	M	M	S	M	M	S
<b>CO2</b>	M	S	S	S	M	S	S	S	M	S
<b>CO3</b>	S	S	M	M	M	S	M	S	S	M
<b>CO4</b>	M	S	M	S	S	M	S	M	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCST12	DATA STRUCTURES AND ALGORITHMS		
	Semester I	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To recognize the space and time complexities for specific program/algorithm</li> <li>2. To understand the linear and non-linear data structure and its operations</li> <li>3. To know the importance of hashing techniques in space complexity</li> <li>4. To learn the binary tree and graph representation concept</li> </ol>		

## UNIT I INTRODUCTION TO ANALYSIS OF ALGORITHMS

Introduction to algorithms - Algorithm Analysis framework - Performance of algorithms: Space and Time Complexity - Asymptotic Notations: Big-Oh, Big-Omega and Big-Theta - Best, Worst and Average case analysis of algorithms. Mathematical analysis of Non recursive Algorithms - Sequential Search. Mathematical analysis of Recursive Algorithms - Recurrence relation - Binary search.

## UNIT II LINEAR DATA STRUCTURES

Abstract Data Types (ADT) - List ADT - Array-based implementation - Linked list implementation - doubly-linked lists - Applications of Lists - Polynomial Operations. Stack ADT - Array based and linked List based implementation - Postfix expression evaluation. Queue ADT - Circular queue and linked List based implementation - Applications of Queues.

## UNIT III BINARY TREES AND PRIORITY QUEUES

Trees - Binary trees - Binary tree representation and traversals - Threaded binary trees - Expression Trees - Binary Search Tree - Applications of trees. Balanced trees: AVL trees. Priority queue - Binary heap - Heap operations - Applications of heap.

## UNIT IV SETS AND HASHING

### IV

Disjoint Set ADT - Dynamic equivalence problem - Set operations - Representation - Implementation of union - Find operations - Smart union algorithms - Path compression - Applications of set. Hashing - Closed hashing: Separate chaining - Open addressing: Linear and quadratic probing - rehashing - Extendible hashing.

## UNIT V GRAPHS



Graph - Definitions - Representations - Topological sort - Breadth first traversal - Depth first traversal - Connected components - Shortest path algorithms: Single source shortest path - Minimum spanning tree - Prim's and Kruskal's algorithms.

**Text Book(s):**

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C++", Pearson Education, Fourth Edition, 2013.
2. AnanyLevitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2013.

**Reference Book(s):**

1. Ellis Horowitz and SartajSahni, "Fundamentals of Data Structures", Galgotia Book Sorce, Gurgaon, 2007.
2. Jean-Paul Tremblay and Paul G. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw-Hill, New Delhi, Second Edition, 1991.
3. Alfred V. Aho, John E. Hopcroft and Jeffry D. Ullman, "Data Structures and Algorithms", Pearson Education, New Delhi, 2006
4. Thomas H Cormen, Charles E Leiserson, Ronald L Rivest and Clifford Stein, "Introduction to Algorithms", Prentice Hall of India, New Delhi, Second Edition, 2007

**Outcomes**

After successful completion of this course, the students shall be able to

- CO1:** Analyse the space and time complexities for an algorithm **K2**  
**CO2:** Identify and use appropriate data structure to solve problems **K3**  
**CO3:** Use Hashing Techniques to solve real time Problems **K3**  
**CO4:** Implement and Handle various searching and sorting algorithms **K3, K4**

**Mapping of Cos with Pos and PSOs :**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	M	S	S	S	M	M	M	S	M	M
<b>CO2</b>	M	S	M	S	M	S	S	M	M	S
<b>CO3</b>	M	S	S	S	S	M	S	M	S	S
<b>CO4</b>	M	S	S	S	S	M	S	M	S	S

**S – Strongly Correlating**

**M- Moderately Correlating**

<b>PCST13</b>	<b>MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE</b>		
	<b>Semester I</b>	<b>Credits: 5</b>	<b>Hours: 6</b>
<b>Cognitive Level</b>	K2-Understand K3-Apply K6-Create		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To understand the concept of Logic and WFF</li> <li>2. To identify and solve the Set theory and its relation</li> <li>3. To solve the mathematical problems using algebraic structures</li> <li>4. To familiarize with graph representation and its applications</li> </ol>		

### **UNIT – I MATHEMATICAL LOGIC & PREDICATES**

Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms. **Predicates:** Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

### **UNIT – II SET THEORY**

Properties of binary Relations, equivalence, compatibility and partial ordering relations, Hasse diagram. Functions: Inverse Function Composition of functions, recursive Functions, Lattice and its Properties, Pigeon hole principles and its application.

### **UNIT – III ALGEBRAIC STRUCTURES & COMBINATORICS**

Algebraic structures: Algebraic systems Examples and general properties, Semi groups and monoids, groups sub groups' homomorphism, Isomorphism. Elementary **Combinatorics:** Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion – Exclusion.

### **UNIT – VI RECURRENCE RELATIONS**

Generating Functions, Function of Sequences Calculating Coefficient of generating function, Recurrence relations, solving recurrence relation by substitution and Generating Functions. Characteristics roots solution of in homogeneous Recurrence Relation.

### **UNIT – V GRAPH THEORY AND APPLICATIONS**

Representation of Graph, DFS, BFS, Spanning Trees, and planar Graphs. Applications of Graph: Graph Theory and Applications, Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers

**Text Book(s):**

1. Mathematical Foundation of computer science(Discrete Structures)- Dr.D.S.C, PRISM, 3/e, 2010.
2. Mathematical Foundation of computer science-Dr.J.Rajendra Prasad, T.Rama Rao, A.MadanaMohana Rao, 1/e, 2011.
3. Discrete mathematics structure with application to computer science, Tremblay. JP &Manohar P., Mc-Graw-Hill, 2/e, 2004.

**Reference Book(s):**

1. Discrete Mathematics, Norman Biggs, Oxford. 10/e, 2010.
2. Discrete Mathematics for Computer Scientists and Mathematicians. Joe L. Mott, Abraham Kandel, and Theodore P. Baker, Prentice Hall, 2/e, 2002.
3. Elements of Discrete Mathematics, C. L. Liu, McGraw-Hill, 3/e, 2008.
4. Discrete and Combinatorial Mathematics – An Applied Introduction – Ralph. P. Grimaldi, Pearson Education , 5/e ,2003.
5. Discrete mathematics and its applications, Kenneth H. Rosen, McGraw-Hill, 7/e, 2012.

**Course Outcomes:**

After successful completion of this course, the students can be able to

- CO1:** Construct simple mathematical proofs and possess the ability to verify them. **K6**  
**CO2:** Utilise Algebraic Structures and Recurrence Function **K3**  
**CO3:** Know various graphs and its algorithms in computer programs. **K2**  
**CO4:** Describe computer programs in a formal mathematical manner **K2**

**Mapping of Cos with Pos and PSOs :**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	M	S	S	M	M	M	M	M	M	S
<b>CO2</b>	S	M	S	M	S	M	S	M	S	M
<b>CO3</b>	M	M	S	S	M	M	S	M	S	M
<b>CO4</b>	M	S	M	S	M	S	S	M	S	S

6. S – Strongly Correlating

M- Moderately Correlating

PCSP11	ADVANCED JAVA LAB		
	Semester I	Credits: 5	Hours: 6
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To develop programs using the fundamental concepts in Java</li> <li>2. To implement GUI applications to handle events and to store the data in the database</li> <li>3. To Test and debug Java programs for errors and exceptions</li> <li>4. To create user defined packages</li> </ol>		

### LIST OF EXPERIMENTS

1. Simple Java program with JavaDoc comments
2. Programs using packages and classes, JAR file creation
3. Programs using inheritance and its types
4. Programs using Interface and exception handling
5. Implementation of Multithreading
6. Program to demonstrate the use of Collection Classes
7. Database Connectivity using JDBC
8. Implementation of Applets
9. Event driven windows based application in Java
10. Program in AWT and Events Handling.
11. Network Programming using RMI.
12. Implementation using Java Servlet

PCST21	ADVANCED OPERATING SYSTEM		
	Semester II	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To learn the concepts of operating systems.</li> <li>2. To learn about the various issues in operating systems.</li> <li>3. To appreciate the emerging trends in operating systems</li> <li>4. To familiarize with the important mechanisms in operating systems.</li> </ol>		

### **UNIT – IOPERATING SYSTEMS OVERVIEW**

Introduction to operating systems – Computer system organization, architecture – Operating system structure, operations – Process, memory, storage management – Protection and security – Distributed systems – Computing Environments – Open-source operating systems – OS services – User operating-system interface – System calls – Types – System programs – OS structure – OS generation – System Boot – Process concept, scheduling – Operations on processes – Cooperating processes – Inter-process communication – Examples – Multithreading models – Thread Libraries – Threading issues – OS examples.

### **UNIT – IIPROCESS MANAGEMENT**

Basic concepts – Scheduling criteria – Scheduling algorithms – Thread scheduling – Multiple-processor scheduling – Operating system examples – Algorithm Evaluation – The critical-section problem – Peterson’s solution – Synchronization hardware – Semaphores – Classic problems of synchronization – Critical regions – Monitors – Synchronization examples – Deadlocks – System model – Deadlock characterization – Methods for handling deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock detection – Recovery from deadlock.

### **UNIT–IIISTORAGE MANAGEMENT**

Memory Management – Swapping – Contiguous memory allocation – Paging – Segmentation – Example: The Intel Pentium - Virtual Memory: Background – Demand paging – Copy on write – Page replacement – Allocation of frames – Thrashing.

### **UNIT –IVI/O SYSTEMS**

File concept – Access methods – Directory structure – File-system mounting – Protection – Directory implementation – Allocation methods – Free-space management – Disk scheduling – Disk management – Swap-space management – Protection.

## UNIT –V CASE STUDY

The Linux System – History – Design Principles – Kernel Modules – Process Management – Scheduling – Memory management – File systems – Input and Output – Inter-process Communication – Network Structure – Security – Windows 7 – History – Design Principles – System Components – Terminal Services and Fast User – File system – Networking.

### Text Book(s):

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, —Operating System Concepts Essentials, John Wiley & Sons Inc., 2010.

### Reference Book(s):

1. Andrew S. Tanenbaum, —Modern Operating Systems, Second Edition, Addison Wesley, 2001.
2. D M Dhamdhare, —Operating Systems: A Concept-based Approach, Second Edition, Tata McGraw-Hill Education, 2007.
3. Charles Crowley, —Operating Systems: A Design-Oriented Approach, Tata McGraw Hill Education, 1996.
4. William Stallings, —Operating Systems: Internals and Design Principles, Seventh Edition, Prentice Hall, 2011.

**Course Outcome:** Students will be able to gain:

CO1: Knowledge about advanced concepts in OS

**K4**

CO2: Able to rectify the designing concepts of OS

**K4**

CO3: Ability to develop OS for distributed systems

**K3**

CO4: Understand the Mutual exclusion, Deadlock detection and file sharing in Distributed operating system

**K2**

### Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	M	S	M	S	M	M	S	S	M	M
CO2	M	S	M	M	S	M	M	S	S	M
CO3	S	M	S	S	M	S	S	M	S	S
CO4	M	S	S	M	S	M	M	S	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCST22	RELATIONAL DATABASE MANAGEMENT SYSTEM		
	Semester II	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K3-Apply K4-Analyze K6-Create		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To understand the overview of Data Base systems &amp; Data Models.</li> <li>2. To modify and maintain the database structure.</li> <li>3. To Understand the needs of database processing and learn techniques for controlling the Consequences of concurrent data access.</li> <li>4. The Students can able to handle the Database.</li> </ol>		

### **Unit I: Introduction**

Database Systems vs. File Systems- View of Data-Data Models-Database Languages-Transaction Manage

ment-Database System Structure-History of Database Systems-Database System Applications-Entity Relational Model.

### **Unit II: Relational Databases**

SQL-Basic Structure-Set Operations-Complex Queries-Joined Queries-DDL-Embedded SQL-Dynamic SQL-Other SQL Functions-Query by Example-Normalization.

### **Unit III:**

Relational Database Design-Indexing & Hashing-Static Hashing-Dynamic Hashing-Multiple Key Access-Integrity And Security.

### **Unit IV: Query Evaluation and Optimization**

Query Processing-Selection Operation-Sorting-Join Operation-Evaluation of Expressions-Query Optimization.

### **Unit V: Transaction Management**

Transaction Management-Concurrency Control-Protocols-Deadlock Handling-Recovery Systems-Recovery with Concurrent Transactions-Shadow Paging-Buffer Management-Case Studies-Oracle-Microsoft SQL Server

## TEXT BOOK

1. Abraham Silberschatz, Henry F.Korth and S.Sudharssan, “Database System Concepts”, 4<sup>th</sup> Edition, Tata McGraw Hill, 2002

## REFERENCE BOOKS

2. Raghu Ramakrishnan & Johannesgerhrke, “Database Management Systems”, McGraw Hill International edition, 2000
3. Introduction to RDBMS-C.J.Date

## Course Outcomes

After successful completion of the course, Student shall be able to:

CO1:Create E/R models from application descriptions.

**K6**

CO2:Improve the database design by normalization.

**K4**

CO3: Students can create database structure

**K3**

CO4: Create databases in an RDBMS and enforce data integrity constraints and queries using SQL

**K3, K4**

## Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	M	S	S	M	S	S	S	M	M	S
CO2	M	S	M	M	S	M	S	S	M	S
CO3	M	M	S	S	M	S	S	M	S	M
CO4	S	M	M	S	M	S	M	M	S	S

**S – Strongly Correlating**

**M- Moderately Correlating**



PCST23	COMPUTER NETWORKS		
	Semester II	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To study layered architecture of computer networks and protocols.</li> <li>2. To learn the various mediums used in the physical layer.</li> <li>3. To study the functionalities of data link layer.</li> <li>4. The students can familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.</li> </ol>		

### **UNIT – I INTRODUCTION, PHYSICAL LAYER**

Overview: Data Communication - Network Types - Internet History - TCP/IP Protocol Suite - The OSI Model - Digital Signals - Data rate limits - Performance - Line Coding - Block Coding - Transmission Media: Guided Media - Unguided Media – Switching.

### **UNIT – II DATA LINK LAYER**

Link Layer Addressing - ARP - Error Detection and Correction - Data Link Control Services - Data Link Layer Protocols - HDLC - PPP - Media Access Control - Ethernet - Wireless LANs: IEEE 802.11, Bluetooth -Connecting Devices.

### **UNIT – III NETWORK LAYER**

Network layer Services - Packet switching - Performance - IPV4 addresses - Forwarding of packets - Internet Protocol - ICMPV4 - Mobile IP - Routing algorithms - Routing Protocols - IPV6 addressing - IPV6 protocol -Transition from IPV4 to IPV6

### **UNIT – IV TRANSPORT LAYER**

Transport Layer Services - Protocols - UDP - TCP: Transition Diagram, Flow Control, Error Control, Congestion Control - SCTP - QoS: Flow Control to improve QoS - Integrated Services - Differentiated Services - Client Server Programming.

### **UNIT – V APPLICATION LAYER AND SECURITY**

World Wide Web and HTTP - FTP - Electronic Mail - Telnet - Secure Shell - Domain Name System - Cryptographic Algorithms - Authentication Protocols - Message Integrity Protocols - Public Key Distribution(X.509) - Network Layer Security - Transport Layer Security - Application Layer Security - Firewalls.

**Text Book(s):**

1. Behrouz A. Foruzan, “Data communication and Networking”, Tata McGraw-Hill, Fifth Edition, 2013
2. Larry L. Peterson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Morgan Kauffmann Publishers Inc., Third Edition, 2003.

**Reference Book(s):**

1. James F. Kuross, Keith W. Ross, “Computer Networking, A Top-Down Approach Featuring the Internet”, Addison Wesley, Third Edition, 2004.
2. Pete Loshin, “IPv6: Theory, Protocol and Practice”, ELSEVIER, Morgan Kauffmann Publishers Inc., Second edition, 2004
3. William Stallings, “Data and Computer Communication”, Pearson Education, Sixth Edition, 2000.
4. Andrew S. Tannenbaum, “Computer Networks”, Pearson Education, Fourth Edition, 2003
5. D.E. Comer, “Internetworking with TCP/IP Vol- III”, (BSD Sockets Version), Pearson Education, Second Edition, 2003.
6. W. Richard Stevens, “UNIX Network Programming Vol-I”, Pearson Education, Second Edition, 1998.

**Course Outcomes**

After successful completion of the course, Student shall be able to:

CO1: Have a good understanding of the OSI Reference Model **K2**

CO2: Students can understand TCP/IP Model and in particular have a good knowledge of Layers. **K2**

CO3: Identify the different types of network devices and their functions within a network **K4**

CO4: Students will Analysis the requirements for a given organizational structure. **K4**

**Mapping of Cos with Pos and PSOs :**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	M	M	S	M	S
CO2	M	S	M	S	S	S	S	S	M	M
CO3	S	S	S	M	S	M	S	S	M	S
CO4	S	S	M	S	S	M	S	M	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCSP22	RDBMS LAB		
	Semester II	Credits: 5	Hours: 6
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To practice to implement to create a database</li> <li>2. To know how to handle records in a table.</li> <li>3. To practice database management.</li> <li>4. The Student can gain the in-depth knowledge in handling the database.</li> </ol>		

### 1. Creating Database

Creating a Database

Creating a Table

Specifying Relational Data Types

Specifying Constraints

Creating Indexes

### 2. Table and Record Handling

INSERT statement

Using SELECT and INSERT together

DELETE- UPDATE- TRUNCATE statements

DROP- ALTER statements

### 3. Retrieving Data from a Database

The SELECT statement

Using the WHERE clause

Using Logical Operators in the WHERE clause

Using IN- BETWEEN- LIKE - ORDER BY- GROUP BY and HAVING

*Clause*

Using Aggregate Functions

Combining Tables Using JOINS

Subqueries

## **4.Database Management**

Creating Views

Creating Column Aliases

Creating Database Users

Using GRANT and REVOKE

<b>PCST31</b>	<b>COMPILER DESIGN</b>		
	<b>Semester III</b>	<b>Credits: 5</b>	<b>Hours: 6</b>
<b>Cognitive Level</b>	K2-Understand K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To Understand the working of compiler</li> <li>2. To learn the various parsing techniques and different levels of translation</li> <li>3. To learn how to obtain specific object code from source language</li> <li>4. To optimize the code and schedule for optimal performance.</li> </ol>		

### **UNIT – I FRONT END OF COMPILERS**

The Structure of Compiler – Lexical Analysis: Role of Lexical Analyzer, Specification and Recognition of Tokens, Syntax Analysis: Top Down Parsing, Bottom up Parsing, LR Parsers: SLR, CLR, and LALR.

### **UNIT – II INTERMEDIATE CODE GENERATION**

Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Syntax Directed Translation Schemes, Intermediate Languages: Syntax Tree, Three Address Code, Postfix Code, Declarations, Translation of Expressions, Type Checking, Back Patching.

### **UNIT – III RUNTIME AND OBJECT CODE GENERATION**

Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management - Issues in Code Generation - Design of Code Generator - Register Allocation and Assignment – Instruction Selection by Tree Rewriting – Optimal Code Generation for Expressions – Dynamic Programming Code Generation.

### **UNIT – IV CODE OPTIMIZATION**

Basic Blocks and Flow Graphs – Optimization of Basic Blocks – Principal Sources of Optimizations – Data Flow Analysis – Constant Propagation – Partial Redundancy Elimination – Peephole Optimizations.

### **UNIT – V SCHEDULING AND OPTIMIZING FOR PARALLELISM**

Code Scheduling Constraints – Basic Block Scheduling – Global Code Scheduling - Basic Concepts in Parallelization – Parallelizing Matrix Multiplication – Iteration Spaces – Affine Array Indexes.

#### **Text Book(s):**

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, —Compilers: Principles,

Techniques and Tools, Second Edition, Pearson Education, 2009.

### Reference Book(s):

1. Randy Allen, Ken Kennedy, —Optimizing Compilers for Modern Architectures: A Dependence-based Approach, Morgan Kaufmann Publishers, 2002.
2. Steven S. Muchnick, —Advanced Compiler Design and Implementation, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.
3. Keith D Cooper and Linda Torczon, —Engineering a Compiler, Morgan Kaufmann Publishers Elsevier Science, 2004.
4. V. Raghavan, —Principles of Compiler Design, Tata McGraw Hill Education Publishers, 2010.
5. Allen I. Holub, —Compiler Design in C, Prentice-Hall Software Series, 1993.

### Course Outcomes

1. Understand the working process of the compiler. **K2**
2. Learn the various parsing techniques and different levels of translation. **K4**
3. Have a good understanding of specific object code from source language. **K2**
4. Learn to optimize the code and schedule for optimal performance. **K4**

### Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	M	S	S	M	M
CO2	M	S	M	S	S	M	S	S	M	M
CO3	M	M	S	S	M	S	S	M	S	S
CO4	S	S	S	M	S	M	S	S	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCST32	SOFTWARE ENGINEERING		
	Semester III	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K1-Recall K2-Understand K4-Analyze K5-Evaluatate K6-Create		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To be aware of generic models to structure the software development process.</li> <li>2. To understand fundamental concepts of requirements engineering and requirements</li> <li>3. To understand different notion of complexity at both the module and system level.</li> <li>4. To work as an individual and as part of a multidisciplinary team to develop and deliver quality software.</li> </ol>		

### **UNIT – I SOFTWARE PROCESS MODELS**

The Evolving Role of Software – Software – The changing Nature of Software – Legacy software — A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment –Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – The Unified Process.

### **UNIT – II REQUIREMENT ENGINEERING**

Software Engineering Practice – Communication Practice – Planning Practice - Modeling Practice– Construction Practice –Deployment. Requirements Engineering - Requirements Engineering Tasks – Initiating the Requirements Engineering Process - Eliciting Requirements – Developing Use Cases – Building the Analysis Models –Elements of the Analysis Model – Analysis Pattern – Negotiating Requirements – Validating Requirements.

### **UNIT – III ANALYSIS MODELLING**

Requirements Analysis – Analysis Modeling Approaches – Data Modeling Concepts – Object Oriented Analysis – Scenario Based Modeling – Flow Oriented Modeling – Class Based Modeling – Creating a Behaviour Model.

### **UNIT – IV DESIGN AND TESTING**

Design Engineering – Design Process -Design Quality - Design Model - User Interface Design – Testing Strategies - Testing Tactics - Strategies Issues for Conventional and Object Oriented Software - Validation Testing – System Testing – Art of Debugging – Project Management

## UNIT –V QUALITY AND MAINTENANCE

Software Evolution - Verification and Validation -Critical Systems Validation – Metrics for Process, Project and Product-Quality Management - Process Improvement – Risk Management - Configuration Management – Software Cost Estimation

### Text Book(s):

1. Roger S. Pressman, —Software Engineering: A Practitioner’s Approach, McGraw Hill International edition, Seventh edition, 2009.
2. Ian Sommerville, —Software Engineering, Ninth Edition, Pearson Education, 2008.

### Reference Book(s):

1. Stephan Schach, —Software Engineering, Tata McGraw Hill, 2007
2. Pfleeger and Lawrence —Software Engineering: Theory and Practice, Pearson Education, Second edition, 2001

## Course Outcomes

After successful completion of the course, Student shall be able to:

1. Understands the process to be followed in the software development life cycle **K2**
2. Understand fundamental concepts of requirements engineering. **K1**
3. Find the practical solutions to the problems. **K4**
4. Student can work as an individual and as part of a multidisciplinary team to develop and deliver quality software **K5,K6**

### Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	M	S	S	M	S	M	S	M	M	M
CO2	M	M	S	M	S	S	S	S	S	M
CO3	S	S	M	S	S	M	S	M	S	S
CO4	S	S	M	M	S	M	S	S	S	S

**S – Strongly Correlating**

**M- Moderately Correlating**



PCST33	WEB PROGRAMMING		
	Semester III	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply K4-Analyze K6-Create		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To learn to design web pages using HTML5</li> <li>2. To gain knowledge on creating interactive web pages using JavaScript, jQuery</li> <li>3. To know to use Cascading Style Sheets (CSS) and DOM.</li> <li>4. To learn to develop server side scripting using PHP</li> </ol>		

### UNIT – I BASICS INTERNET PROTOCOLS, HTML5

Basic Internet Protocols - The World Wide Web - HTTP messages - Web servers and clients - Introduction to HTML5 - Editing HTML5 - W3C HTML validation service - Headings - Linking - Images - Special characters and horizontal rules - Lists - Tables - Forms - Internal linking - Meta elements - New HTML5 Form input types - Input and datalist elements and auto complete attribute - Page structure elements - Introduction to Canvas - Canvas Coordinate System - Rectangles - Drawing Arcs and Circles - Shadows

### UNIT – II JAVASCRIPT, JQUERY

Introduction to JavaScript - Syntax - Variables and data types - JavaScript Control Statements - Operators - Literals - Functions - Objects - Arrays - Built in objects - Event handling - Fundamentals of JQuery - JQuery selectors - JQuery methods to access HTML attributes - Traversing - Manipulators - Events - Effects

### UNIT – III CSS3, DOM

Types of CSS - Conflicting style sheets - Positioning Elements - Element Dimension - Box model and Text Flow - Media types - Media Queries - Drop-Down Menus - Text shadows - Rounded corners - Color - Box Shadows - Introduction to the Document Object Model - DOM History and Levels - Intrinsic Event Handling - Modifying Element Style - The Document Tree - Properties of window - DOM Collections - Using Timer and Dynamic Styles to Create Animated Effects - JavaScript Event Handling - Reviewing the load, mousemove, mouseover, mouseout events - Form processing with focus, blur, submit, reset - Event Bubbling - More Events

### UNIT – IV XML AND PHP

XML documents and vocabularies - XML versions and declarations - XML namespace - Representing data types : DTD, XML schema - XSLT - XPath - XQuery - Introduction to PHP - Converting Between Data Types - Arithmetic Operators - Initializing and Manipulating Arrays - String Comparisons - String Processing with Regular Expressions - Form Processing and Business Logic - Reading from a Database - Using Cookie - Dynamic Content.

## UNIT – V AJAX AND WEB SERVICES

Ajax - Enabled rich internet applications with XML and JSON - Web Services Introduction - WCF Services Basics - SOAP - REST - JSON - Publishing and Consuming SOAP-Based Web Services, REST-Based XML Web Services, REST-Based JSON Web Services

### Text Book(s):

1. P.J.Deitel, H.M.Deitel, "Internet and World Wide Web - How to program", Pearson Education Publishers, Fifth Edition, 2009.
2. Jeffrey C. Jackson, "Web Technologies - A Computer Science Perspective", Pearson Education, 2007.

### Reference Book(s):

1. Robert. W. Sebesta, "Programming the World Wide Web", Pearson Education, Fourth Edition, 2007.
2. Kogent Learning Solutions Inc., "Html5 Black Book: Covers CSS3, JavaScript, XKL, XHTML, AJAX, PHP and jQuery", Dreamtech Press, 2011.
3. Joe Fawcett, Danny Ayers, Liam R. E. Quin, "Beginning XML", John Wiley & Sons Publisher, Fifth Edition, 2012
4. Bates, "Developing Web Applications", Wiley, 2006.

### Course Outcome

1. Students will learn to design web pages using HTML. **K6**
2. Able to gain knowledge on creating interactive web pages using JavaScript, Query. **K2,K4**
3. Able to write a program and to use Cascading Style Sheets (CSS) and DOM. **K3**
4. Able to develop server side scripting using PHP **K3**

### Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	M	S	S	S	S	S	S	M	S	S
CO2	M	S	S	M	S	M	M	S	M	S
CO3	M	S	S	M	S	M	M	S	M	S
CO4	S	S	S	M	S	M	M	S	M	S

S – Strongly Correlating

M- Moderately Correlating

PCSP33	WEB PROGRAMMING LAB		
	Semester III	Credits: 5	Hours: 6
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To develop the most important technologies that are being used today by web developers</li> <li>2. To build a wide variety of web applications.</li> <li>3. To develop Java based web programming.</li> <li>4. To practice web applications using proven developer tools and message formats.</li> </ol>		

### LIST OF EXPERIMENTS

1. Using InetAddress class, Socket Programming in Java
2. RMI
3. Client side scripting using
  - XHTML
  - Javascript – DOM
  - CSS
4. XML DTD, Parsers, XSLT, XPATH, SAX
5. Programming with AJAX, JQuery, JSON
6. Server Side programming (implement these modules using any of the server side scripting languages like PHP, Servlets, JSP etc.,
  - Gathering form data , Querying the database ,Response generation ,Session management , MySQL/JDBC/Oracle
7. Case Study – Sample Application development
8. Ruby-on-Rails setup and programming
9. Django, Jena – Integrating Databases and applications
10. JAX – RPC
11. WSDL
12. SOAP

PCST41	DIGITAL IMAGE PROCESSING		
	Semester IV	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To learn about the basic concepts of digital image processing and various image transforms.</li> <li>2. To understand the image enhancement techniques</li> <li>3. To expose the student to a broad range of image processing techniques and their applications.</li> <li>4. The Student can gain the Knowledge about the use of current technologies those are specific to image processing systems.</li> </ol>		

### **UNIT – I FUNDAMENTALS OF IMAGE PROCESSING**

Introduction - Steps in image processing systems - Image acquisition - Sampling and Quantization - Pixel relationships - Color fundamentals and models - File Formats, Image operations: Arithmetic, Geometric and Morphological - Introduction to MATLAB - Image operations using MATLAB.

### **UNIT – II IMAGE ENHANCEMENT**

Spatial Domain - Gray level transformations - Histogram processing - Spatial filtering - Smoothing and sharpening - Frequency domain: Filtering in frequency domain - DFT, FFT, DCT - Smoothing and sharpening filters - Homomorphic filtering - Image enhancement using MATLAB.

### **UNIT – III IMAGE RESTORATION AND SEGMENTATION**

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 operators - Edge linking and boundary Detection - Thresholding - Region based segmentation - Morphological Watersheds - Motion segmentation.

### **UNIT – IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS**

Multi Resolution analysis: Image pyramids - Multi resolution expansion - Wavelet transforms - Image compression: Fundamentals - Models - Elements of information theory - Error free compression - Lossy compression - JPEG standard, JPEG 2000, SPIHT, MPEG Standards. Image compression and enhancement using Wavelet transforms.

### **UNIT – V IMAGE REPRESENTATION AND RECOGNITION**

Boundary representation - Chain Code - Polygonal approximation, signature, boundary segments - Boundary description - Shape number - Fourier Descriptor, moments- Regional Descriptors - Topological feature, Texture - Patterns and Pattern classes - Recognition based on matching. Image Classification, retrieval. Image fusion - Digital compositing - Video motion analysis.

**Text Book(s):**

1. Rafael C.Gonzalez and Richard E.Woods, “Digital Image Processing”, Pearson Education, Third Edition, 2009.
2. Anil K.Jain, “Fundamentals of Digital Image Processing”, PHI, 2011.

**Reference Book(s):**

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image Processing, Analysis and Machine Vision”, Thompson Learning, Second Edition, 2007.
2. Willliam K Pratt, “Digital Image Processing”, John Willey, 2002.
3. Malay K. Pakhira, “Digital Image Processing and Pattern Recognition”, PHI Learning Pvt. Ltd., First Edition, 2011.
4. Sanjit K. Mitra and Giovanni L. Sicuranza, “Non Linear Image Processing”, Elsevier, 2007.
5. S.Sridhar, “Digital Image Processing”, Oxford University Press, 2011.

**Course Outcomes**

After completion of the course, Student shall be able to

- CO1. Understand how digital images are represented and manipulated in computer **K2**
- CO2. Develop a broad range of image processing techniques and their applications. **K3**
- CO3: Understand the different types of image transformations and image features. **K4**
- CO4: Understand the advancements in Computer Vision of Images. **K4**

**Mapping of Cos with Pos and PSOs :**

<b>CO/ PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	M	S	S	S	M	M	S	M	M	M
<b>CO2</b>	S	S	S	M	S	S	S	S	M	S
<b>CO3</b>	M	M	S	S	S	M	S	M	S	M
<b>CO4</b>	S	S	M	M	S	S	M	M	S	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCST42	MOBILE COMPUTING		
	Semester IV	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To clearly understanding the mobile communications environment</li> <li>2. To get clear idea about Satellite Systems.</li> <li>3. To Interface a mobile computing system to hardware and networks.</li> <li>4. The Student can develop their knowledge in mobile computing system and how to interact with servers and database systems.</li> </ol>		

### UNIT – I INTRODUCTION

Introduction: Applications - A Simplified Reference Model. Wireless Transmission: Frequencies for radio transmission – Signals – Antennas - Signal Propagation – Multiplexing – Modulation – Spread Spectrum - Cellular System.

### UNIT – II MEDIUM ACCESS CONTROL

Medium Access Control: Motivation for a Specialized MAC- Hidden and exposed terminals – Near and far terminals – SDMA – FDMA – TDMA - Fixed TDM – Classical Aloha – Slotted Aloha – Carrier Sense Multiple Access – Demand assigned Multiple Access – PRMA Packet Reservation Multiple Access – Reservation TDMA – Multiple Access with Collision Avoidance – Polling – Inhibit Sense Multiple Access. CDMA - Spread Aloha multiple access. Comparison of S/T/F/CDMA.

### UNIT – III TELECOMMUNICATION SYSTEMS

Telecommunication Systems: GSM - Mobile Services – System Architecture – Radio Interface – Protocols - Localization and Calling – Handover – Security. UMTS and IMT 2000: UMTS releases and standardization - UMTS System Architecture - UMTS Radio Interface –UTRAN - UMTS Handover.

### UNIT – IV SATELLITE SYSTEM

Satellite System: History – Applications – Basics - Routing– Localization – Handover. Wireless LAN: IEEE 802.11- System Architecture – Protocol Architecture - Physical Layer – Medium Access Control Layer. Bluetooth: User scenarios – Architecture – Radio Layer – Baseband Layer – Link Manager Protocol.

### UNIT – V MOBILE NETWORK LAYER

Mobile Network Layer: Mobile IP - Goals, Assumption, and Requirements – Entities and Terminology – IP Packet delivery – Agent discovery – Registration. Dynamic Host Configuration Protocol - Mobile Transport Layer: Traditional TCP - Congestion Control – Slow Start – Fast Retransmit.

**Text Book(s):**

1. Jochen Schiller, “Mobile Communications”, 2nd Edition, eighth impression, Pearson Education, 2011.

**Reference Book(s):**

1. William Stallings, “Wireless Communication and Networks”, 2nd Edition, Pearson Education, 2005.
2. Theodore Rappaport, “Wireless Communications: Principles and Practice”, Prentice Hall Communications, 1996.

**Course Outcomes:**

After successful completion of the course, Student shall be able to:

CO1. Understand the characteristics and limitations of mobile hardware devices including their user-interface modalities **K2**

CO2. Design and develop context-aware solutions for mobile devices. **K3**

CO3. have clear idea about Satellite Systems **K2**

CO4. develop their knowledge in mobile computing system and how to interact with servers and database systems. **K3**

**Mapping of Cos with Pos and PSOs :**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	S	M	S	M	M	M
CO2	S	S	S	M	S	M	S	S	M	M
CO3	S	M	S	M	S	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCSE11	Elective I - COMPUTER GRAPHICS		
	Semester I	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply K6-Create		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To Know and discuss hardware system architecture for computer graphics.</li> <li>2. To understand the current 3D graphics API .</li> <li>3. To explore the future trends in computer graphics and APIs.</li> <li>4. To familiar with key algorithms for modeling and rendering graphical data</li> </ol>		

### UNIT I

Overview of Graphics System – output primitives: points and lines – line drawing algorithm – circle generating algorithm – ellipse generating algorithm – filled area primitives – character generation.

### UNIT II

Two Dimensional transformation: basic transformation – Matrix representation – composite transformation and other transformation – window-to-viewport transformation, viewing – clipping – interactive input methods.

### UNIT III

Three dimensional transformation: 3 D concepts – 3 D representation: polygon surfaces, curved line and surfaces, quadric surfaces – spline representation – cubic spline interpolation – Bezier curves – B Spline Curves and surfaces and Beta spline – fractal-geometric methods.

### UNIT IV

Three dimensional geometric and modeling transformation – 3 D viewing – Visible surface detection methods – illumination models and surface-rendering methods.

### UNIT V

Color Models and color applications: properties of light – standard primaries and the chromaticity diagram – all color models – conversion between HSV and RGB Models - Color



selection – Design and animation sequences – general computer animation functions – computer animation languages – Key frame system – Motion specification.

## REFERENCE BOOK

1. Donald Hearn and M.Pauline Baker – Computer Graphics, Pearson Education, Second Edition.

## Course Outcomes

After successful completion of the course, Student shall be able to:

1. Explain Graphic primitives and the working of I/O devices **K2**
2. Apply geometric transformations in objects **K3**
3. Implement Graphic modeling process **K3**
4. Create interactive graphics applications in C++ using graphics application programming interfaces. **K6**

### Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	M	M	S	S	M	M	S	M	M	S
<b>CO2</b>	S	S	M	M	S	M	S	S	S	M
<b>CO3</b>	M	M	S	M	S	S	M	S	S	M
<b>CO4</b>	S	S	M	M	S	M	M	S	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCSE11	Elective I - SOFT COMPUTING		
	Semester I	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To give students knowledge of soft computing theories fundamentals,</li> <li>2. To learn the fundamentals of non-traditional technologies and approaches to solving hard real-world problems.</li> <li>3. To learn and apply artificial neural networks, fuzzy sets and fuzzy logic, and genetic algorithms in problem solving and use of heuristics based on human experience.</li> <li>4. The Student can Familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations</li> </ol>		

#### **UNIT – I NEURAL NETWORKS - I**

(Introduction and Architecture) Neuron, Nerve Structure and Synapse, Artificial Neuron and its Model, Activation Functions, Neural Network Architecture: Single Layer and Multilayer Feed Forward Networks, Recurrent Networks. Various Learning Techniques; Perception and Convergence Rule, Auto-Associative and Hetro-Associative Memory.

#### **UNIT – II NEURAL NETWORKS - II**

(Back Propagation Networks) Architecture: Perceptron Model, Solution, Single Layer Artificial Neural Network, Multilayer Perception Model; Back Propagation Learning Methods, Effect of Learning Rule Co-Efficient ;Back Propagation Algorithm, Factors Affecting Back Propagation Training, Applications.

#### **UNIT – III FUZZY LOGIC - I**

(Introduction) Basic Concepts of Fuzzy Logic, Fuzzy Sets and Crisp Sets, Fuzzy Set Theory and Operations, Properties of Fuzzy Sets, Fuzzy and Crisp Relations, Fuzzy to Crisp Conversion.

#### **UNIT – IV FUZZY LOGIC – II**

(Fuzzy Membership, Rules) Membership Functions, Interference in Fuzzy Logic, Fuzzy If-Then Rules, Fuzzy Implications and Fuzzy Algorithms, Fuzzifications and Defuzzificataions, Fuzzy Controller, Industrial Applications

#### **UNIT – V GENETIC ALGORITHM**

Basic Concepts, Working Principle, Procedures of GA, Flow Chart of GA, Genetic Representations, (Encoding) Initialization and Selection, Genetic Operators, Mutation, Generational Cycle, Applications.

### **Text Book(s):**

1. S. Rajasekaran and G.A. VijayalakshmiPai, —Neural Networks, Fuzzy Logic and Genetic Algorithm: Synthesis and Applications, Prentice Hall of India, 2003.
2. N.P.Padhy, Artificial Intelligence and Intelligent Systems, Oxford University Press, 2005.
3. J.S.R. Jang, C.T. Sun and E. Mizutani, —Neuro-Fuzzy and Soft Computing, Pearson Education, 2004.

### **Reference Book(s):**

1. SimanHaykin, —Neural Networks, Prentice Hall of India, 1999
2. Timothy J. Ross, —Fuzzy Logic with Engineering Applications, Third Edition, Wiley India, 2010
3. S.Y.Kung, —Digital Neural Network, Prentice Hall International, 1993.
4. Aliev.R.A and Aliev,R.R, — Soft Computing and its Application, World Scientific Publishing Company, 2001.
5. Wulfram Gerstner and WennerKristler, —Spiking Neural Networks, Cambridge University Press.
6. Bart Kosko, —Neural Networks and Fuzzy Systems: Dynamical Systems Application to Machine Intelligence, Prentice Hall, 1992.

### **Course Outcomes**

After successful completion of the course, Student shall be able to:

1. Understand the knowledge of soft computing theories fundamentals, **K2**
2. Discuss the fundamentals of non-traditional technologies and approaches to solving hard real-world problems. **K2**
3. Apply artificial neural networks, fuzzy sets and fuzzy logic, and genetic algorithms in problem solving and use of heuristics based on human experience. **K3**
4. Implement random search procedures in self-learning situations **K3**

**Mapping of Cos with Pos and PSOs :**

<b>CO/ PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	S	S	S	M	M	M	S	M	M	M
<b>CO2</b>	M	S	S	M	S	M	S	M	M	M
<b>CO3</b>	S	S	S	M	S	M	S	S	S	M
<b>CO4</b>	S	M	S	M	S	S	M	S	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

<b>PCSE22</b>	<b>Elective II - DATA WAREHOUSING AND DATA MINING</b>		
	<b>Semester II</b>	<b>Credits: 5</b>	<b>Hours: 6</b>
<b>Cognitive Level</b>	K3-Apply K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To make the students to understand data mining principles and techniques</li> <li>2. To discover the knowledge imbibed in the high dimensional system.</li> <li>3. To study algorithms for finding the hidden interesting patterns in data.</li> <li>4. Familiar with the developing areas – Web mining, Text mining and Big Data Mining Tools of Data mining.</li> </ol>		

### **UNIT – I INTRODUCTION TO DATAWAREHOUSING**

Evolution of Decision Support Systems- Data Warehousing Components –Building a Data Warehouse, Data Warehouse and DBMS, Data Marts, Metadata, Multidimensional Data Model, OLAP vs. OLTP, OLAP Operations, Data Cubes, Schemas for Multidimensional Database: Stars, Snowflakes and Fact Constellations.

### **UNIT – II DATAWAREHOUSE PROCESS AND ARCHITECTURE**

Types of OLAP Servers, 3 –Tier Data Warehouse Architecture, Distributed and Virtual Data Warehouses. Data Warehouse Implementation, Tuning and Testing of Data Warehouse. Data Staging (ETL) Design and Development, Data Warehouse Visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview - Data Warehousing and Business Intelligence Trends - Business Applications - Tools – SAS.

### **UNIT – III INTRODUCTION TO DATA MINING**

Data Mining - KDD versus Data Mining, Stages of the Data Mining Process- Task Primitives, Data Mining Techniques - Data Mining Knowledge Representation – Data Mining Query Languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing – Data Cleaning, Data Transformation, Feature Selection, Dimensionality Reduction, Discretization and Generating Concept Hierarchies - Mining Frequent Patterns Association- Correlation.

### **UNIT – IV CLASSIFICATION AND CLUSTERING**

Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Clustering techniques – Partitioning Methods - k-means- Hierarchical

Methods - Distance-based Agglomerative and Divisible Clustering, Density-Based Methods – Expectation Maximization - Grid Based Methods – Model-Based Clustering Methods – Constraint – Based Cluster Analysis – Outlier Analysis.

## **UNIT – V TRENDS IN DATAMINING AND BIG DATA MINING**

Introduction to Big Data-Case Studies on Big Data Mining Tools: Apache Hadoop, Apache Mahout and R - Mining Complex Data Objects, Spatial Databases, Temporal Databases, Multimedia Databases, Time Series and Sequence Data; Text Mining – Web Mining- Application and Trends in Data Mining.

### **Text Book(s):**

- 1 Jiawei Han and MichelineKamber, —Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers, Third Edition, 2011.
- 2 Paul Zikopoulos, Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, —Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming, McGraw-Hill Osborne Media, First Edition, 2011.

### **Reference Book(s):**

- 1 Mehmed Kantardzic, —Datamining Concepts, Models, Methods, and Algorithms, Wiley Interscience, 2003.
- 2 Alex Berson and Stephen J. Smith, —Data Warehousing, Data Mining and OLAP, Tata McGraw Hill Edition, Tenth Reprint 2007.
- 3 G. K. Gupta, —Introduction to Data Mining with Case Studies, Easter Economy Edition, Prentice Hall of India, 2006.
- 4 Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, —An Introduction to Statistical Learning: with Applications in R, Springer, 2014.

### **Course Outcomes**

After successful completion of this course, the students shall be able to

CO1: Identify the characteristics of data warehousing. **K4**

CO2: Identify the association rules for mining applications. **K4**

CO3: Design appropriate classification/clustering techniques for data mining problems

**K3**

CO4: Select appropriate tools for various data mining applications.

**K4**

**Mapping of Cos with Pos and PSOs :**

<b>CO/ PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>CO1</b>	M	M	S	S	M	S	S	M	M	M
<b>CO2</b>	M	S	S	S	M	S	S	S	M	M
<b>CO3</b>	S	S	M	M	S	M	S	M	S	S
<b>CO4</b>	S	S	M	M	S	M	S	S	S	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCSE22	Elective II - CRYPTOGRAPHY AND NETWORK SECURITY		
	Semester II	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K2-Understand K3-Apply K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To understand security design principles</li> <li>2. To learn secure programming techniques</li> <li>3. To Understand the security requirements in operating systems and databases</li> <li>4. The Student can familiar with security applications in wireless environment.</li> </ol>		

### UNIT – IINTRODUCTION& NUMBER THEORY

Services, Mechanisms and attacks-the OSI security architecture-Network security model-Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography).FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem-Testing for primality -The Chinese remainder theorem- Discrete logarithms.

### UNIT – IIBLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange-Elliptic curve arithmetic-Elliptic curve cryptography.

### UNIT – IIHASH FUNCTIONS AND DIGITAL SIGNATURES

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – El Gamal – Schnorr.

### UNIT – IVSECURITY PRACTICE & SYSTEM SECURITY

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

### UNIT V E-MAIL, IP & WEB SECURITY

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-



S/MIME. IPSecurity: Overview of IPsec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSLAttacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

**Text Book(s):**

1. William Stallings, Cryptography and Network Security, 6 th Edition, Pearson Education, March 2013.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, “Network Security”, Prentice Hall of India, 2002.

**Reference Book(s):**

1. Behrouz A. Ferouzan, “Cryptography & Network Security”, Tata Mc Graw Hill, 2007.
2. Man Young Rhee, “Internet Security: Cryptographic Principles”, “Algorithms and Protocols”, Wiley Publications, 2003.
3. Charles Pfleeger, “Security in Computing”, 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, “Internet Security Protocols”, Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, “Network Security, Second Edition, Private Communication in Public World”, PHI 2002.
6. Bruce Schneier and Neils Ferguson, “Practical Cryptography”, First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson “Cryptography – Theory and practice”, First Edition, CRC Press, 1995.

**Course Outcomes**

After completion of the Course, students shall be able to

- CO1: Learn and operate secure programming techniques **K2**
- CO2: Understand the design issues in Network Security **K2**
- CO3: Identify security threats, security services and mechanisms to counter them. **K4**
- CO4: Be familiar with security applications in wireless environment **K3**

**Mapping of Cos with Pos and PSOs :**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M	S	M	S	S	M	M
CO2	M	S	S	M	S	M	M	S	M	S
CO3	S	M	S	S	S	M	S	S	M	S
CO4	S	S	M	M	S	S	M	S	M	S

S – Strongly Correlating

M- Moderately Correlating

<b>PCSE33</b>	<b>Elective III - SOFTWARE PROJECT MANAGEMENT</b>		
	<b>Semester III</b>	<b>Credits: 5</b>	<b>Hours: 6</b>
<b>Cognitive Level</b>	K2-Understand K4-Analyze		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To estimate the cost associated with a project</li> <li>2. To plan and monitor projects for the risk management</li> <li>3. To explore the process of monitoring and controlling</li> <li>4. The Student can gain the in depth knowledge about software development standards and to know how to manage people and organization of teams.</li> </ol>		

### **UNIT – I INTRODUCTION**

Project Definition – Contract Management – Activities covered by Software Project Management – Overview of Project Planning – Stepwise Project Planning - Project evaluation - Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation

### **UNIT – II ACTIVITY PLANNING**

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature Of Risk – Types Of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control

### **UNIT – III MONITORING AND CONTROL**

Creating Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types of Contract – Stages in Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance

### **UNIT – IV MANAGING PEOPLE AND ORGANIZING TEAMS**

Understanding Behavior – Organizational Behavior – Selecting The Right Person For The Job – Instruction in the Best Methods – Motivation – The Oldham Hackman Job Characteristics Model – Working In Groups – Becoming A Team – Decision Making – Leadership – Organizational Structures – Stress – Health And Safety – Case Studies

## UNIT – V DEVELOPMENT AND MANAGEMENT STANDARDS

Microsoft solution Framework - PMBOK Guide - NASA practices - PRINCE 2 - Capability Maturity Model - Integration - open source tools for managing projects: Project information flow - basic infrastructure - collaborative document writing

### Text Book(s):

1. Bob Hughes, Mike Cotterell, “Software Project Management”, Fifth Edition, Tata McGraw Hill, 2011
2. Adolfo Villafiorita, “Introduction to Software Project Management”, CRC Press 2014

### Reference Book(s):

1. Ramesh, Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
2. Royce, “Software Project Management”, Pearson Education, 1999
3. Jalote, “Software Project Management in Practice”, Pearson Education, 2002

## Course Outcomes

After completion of the Course, Students shall be able to

1. Learn how to estimate the cost associated with a project **K2**
2. Plan and monitor projects for the risk management **K4**
3. Learn the process of monitoring and controlling **K2**
4. Gain the in-depth knowledge about software development standards and to know how to manage people and organization of teams with their own. **K4**

### Mapping of Cos with Pos and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	M	S	S	M	S	S	M	S	S	M
CO2	S	S	M	M	S	M	M	S	S	M
CO3	M	M	S	S	M	M	S	M	S	M
CO4	S	S	S	M	S	S	S	S	M	S

**S – Strongly Correlating**

**M- Moderately Correlating**

PCSE33	Elective III - BIG DATA ANALYTICS		
	Semester III	Credits: 5	Hours: 6
<b>Cognitive Level</b>	K1-Recall K2-Understand K3-Apply		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To know the fundamental concepts of big data and analytics.</li> <li>2. To explore tools and practices for working with big data</li> <li>3. To know about the research that requires the integration of large amounts of data.</li> <li>4. The Student can gain the In depth knowledge in stream computing and about the research that requires the integration</li> </ol>		

### UNIT – I INTRODUCTION TO BIG DATA

Introduction – understanding Big data-capturing bigdata-Volume-velocity-variety-veracity-Benefiting Big Data –Management of bigdata- organazing big data- Technology challenges

### UNIT – II BIGDATA SOURCES AND ARCHITECTURE

Big data sources-people to people communication-m2m- big data applications- Examining big data types- structured data – unstructured data- semi structured data-integrating data type into big data environment-Big data Architecture.

### UNIT – II HADOOP

Big Data – Apache Hadoop & Hadoop EcoSystem – Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce - Data Serialization- Hadoop Architecture, Hadoop Storage. Hadoop MapReduce paradigm, Map and Reduce tasks, Job, Task trackers:- HDFS- Hive Architecture and Installation, Comparison with Traditional Database, HiveQL - Querying Data - Sorting and Aggregating, Map Reduce Scripts, Joins &Subqueries, HBase

### UNIT – IV ANALYTICS AND BIG DATA

Basic analytics-Advanced analytics-operationalzed analytics-Monetizing analytics-modifying business intelligence products to handle big data- big data analytics solution-understanding text analytics-tools for big data.

### UNIT – V DATA VISUALIZATION & R

Introduction-excellence in visualization- types of chart-Business Intelligence: Tools-skills- applications – Health care- Education-retail – E- Governance – Working eith R- Import a data set in R- plotting a histogram-Big data mining

#### Text Book(s):

1. Anil Maheshwari, Data Analytics Made Accessible: 2017 edition Kindle Edition

- Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman “ Big Data for Dummies  
“ wiley India Pvt.Ltd.New Delhi, 2014

**Reference Book(s):**

- Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, “Professional Hadoop Solutions”,  
Wiley, ISBN: 9788126551071, 2015.
- Chris Eaton, Dirk deroos et al., “Understanding Big data ”, McGraw Hill, 2012.
- Tom White, “HADOOP: The definitive Guide”, O Reilly 2012. 6 IT2015 SRM(E&T)
- Tom Plunkett, Brian Macdonald et al, “Oracle Big Data Handbook”, Oracle Press, 2014.
- JyLiebowitz, “Big Data and Business analytics”, CRC press, 2013.
- VigneshPrajapati, “Big Data Analytics with R and Hadoop”, Packet Publishing 2013.

**Course Outcomes**

After completion of the Course, students shall be able to

- Know the fundamental concepts of big data and analytics. **K1**
- Utilise the tools and practices for working with big data **K3**
- Understand about the research that requires the integration of large amounts of data. **K2**
- Gain the In depth knowledge in stream computing **K2**

**Mapping of Cos with Pos and PSOs :**

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
<b>CO1</b>	M	M	S	S	M	S	S	M	M	S
<b>CO2</b>	M	S	S	M	S	M	S	S	M	S
<b>CO3</b>	S	S	M	M	S	M	S	S	S	M
<b>CO4</b>	S	S	S	M	S	M	M	S	S	S

**S – Strongly Correlating**

**M- Moderately Correlating**

Courses having focus on employability/ entrepreneurship/ skill development

<b>Name of the Course</b>	<b>Course Code</b>	<b>Name of the Programme</b>	<b>Activities with direct bearing on Employability/ Entrepreneurship/ Skill development</b>
Advanced Java Programming	PCST11	M.Sc. Computer Science	Programmer
Data Structures and Algorithms	PCST12	M.Sc. Computer Science	Problem Solving Skills in Programming
Relational Database Management System	PCST22	M.Sc. Computer Science	Database Administrator
Computer Networks	PCST23	M.Sc. Computer Science	Network Engineer
Web Programming	PCST33	M.Sc. Computer Science	Web Programmer
Software Engineering	PCST32	M.Sc. Computer Science	Software Project Manager
Mobile Computing	PCST42	M.Sc. Computer Science	Mobile Application Developer
Big Data Analytics	PCSE33	M.Sc. Computer Science	Data Scientist
Cryptography & Network Security	PCSE22	M.Sc. Computer Science	Network Engineer and Data Scientist
Software Engineering	PCAC32	MCA	Software Project Manager
Mobile Computing	PCAE33	MCA	Mobile Application Developer
Software Project Management	PCAE55	MCA	Software Project Manager
C Programming Lab	PCAP11	MCA	Programmer
Microprocessor Lab	PCAP12	MCA	Embedded System Developer
C++ Lab	PCAP21	MCA	Programmer

Multimedia Lab	PCAP22	MCA	Multimedia Application Developer
JAVA Programming Lab	PCAP31	MCA	Web Application Developer
Object Oriented Programming Lab	PCAP32	MCA	Programmer
Relational Database Management System	PCAP41	MCA	Database Administrator
RDBMS Lab	PCAP41	MCA	Database Administrator
Python Programming	PCAP42	MCA	Programmer and Data Analyst
Python Lab	PCAP42	MCA	Programmer, Data Analyst
Project (Internship)	PCAP61	MCA	Application Developer
C Programming, and Data Structures	PCAT11	MCA	Programmer
System Software	PCAT12	MCA	Software Developer
C++ Programming	PCAT21	MCA	Programmer
Operating System	PCAT22	MCA	System Software Developer
Multimedia and Applications	PCAT23	MCA	Multimedia Application Developer
Java Programming	PCAT31	MCA	Programmer
Computer Networks	PCAT42	MCA	Network Engineer
Computer Graphics	PCAT43	MCA	Multimedia Application Developer
Web Programming	PCAT51	MCA	Web Programmer
Principles of Compiler Design	PCAT52	MCA	System Software Developer
Digital Image Processing	PCAT53	MCA	Image Analyst
Project (Internship)	PCAP61	MCA	Software Developer