ISLAMIAH COLLEGE

(AUTONOMOUS)

VANIYAMBADI – 635 752

(AIDED & SELF FINANCE)

SYLLABI BOOK - XI

12TH ACADEMIC COUNCIL MEETING

(For the UG Candidates Admitted from 2018-2019)

16Th NOVEMBER 2019

DEPARTMENT OF ENGLISH
COURSE OUTCOMES
FOR SEMESTERS V &VI

ENGLISH PHONETICS **U8EN5001**	1. Knowledge and awareness of English Phonetics
	2. Apply-technical terms for describing and English pronunciation.
	3. Read and produce phonemic transcriptions and transcription of intonation patterns.
	4. Acquire pronunciation skills
	5. Have experitise in English Language teaching
AMERICAN LITERATURE-II **U8EN5002**	1. Identify the key eatures of prose
	2. Identify the key features of poetry
	3. Describe the major ciritical approaches to literary interpretation.
	4. Understand the cultural developments of colonial America
	5. To understand the major conventions , tropes and themes
AMERICAN LITERARY HISTORY **U8EN5003**	1. Demonstrate a broad knowledge of manor and minor authors.
	2. Hone the skills students in analysis, interpretation and research
	3. Write literature majors with clarity,creativity and persuasiveness
	4. An awareness of the significance of literarure and literary form.
	5. Literature's values as a creative endeavor.
INTODUCTION TO LITERARY CRITICISM **U8EN5004**	1. An appreciation of the relevance and value of theoretical models in literary study
	2. An understanding of important theoretical methodologies
	3. Successful in a close reading of a literary text.
	4. Literary interpretation of character, voice,narrative and genre
	5. Hoistorical and cultural materialist approaches to literary text.
20TH CENTURY LITERARURE-I **U8EN5005**	1. Knowing key ideas and texts and intellectual shifts in reading the culture, language and literature.
	2. Ideals with ideas and concepts of 20th century criticism
	3. Ideas associated with movemnts like

	structuralism, post structuralism and feminism.
	4. Deals with changing notions of the relationship between humans and nature
	5. Recurrence in later social, historical, cultural and literary contexts.
AFRICAN- AMERICAN LITERATURE U8EN5006	1. Unique literary voice of African American writers
	2. Understanding the role spirit, spirituality and the oral tradition.
	3. Evaluating key African American writers of literature
	4. Applying the African centered approach to studying literature.
	5. Understanding the impact of racism, sexism and economic exclution of African American literatrue.
ENGLISH FOR COMPETITIVE EXAMINATIONS-I U8ENSB51	1. Read and comprehend English in the context of acquisition of soft skills
	2. Application on the soft skills and express in writing their views.
	3. Skill of making grammatically correct sentences.
	4. Importance for the received pronunciation
	5. Handle the day affairs well with their knowledge of language skills.
JOURNALISM AND MASS COMMUNICATION U8EN6001	1. Make effective oral presentations on a variety of topics in public settings
	2. Apply basic and advanced human communication theories and models to academic and professional situations.
	3. Make effective business and professional presentations to internal and external audiences.
	4. Students write a variety of mass media products.
	5. Create and design emerging blogs, digital audio, social media..etc
20TH CENTURY LITERARURE-II U8EN6002	1. Knowing key ideas and texts and intellectual shifts in reading the culture, language and literature.
	2. Ideals with ideas and concepts of 20th century criticism
	3. Ideas associated with movemnts like structuralism, post structuralism and feminism.

	4. Deals with changing notions of the relationship between humans and nature
COMMON WEALTH LITERATURE U8EN6003	1. Recurrence in later social, historical, cultural and literary contexts.
	2. Identify the georaphy of commonwealth literature
	3. State the functions of commonwealth literature
	4. Mention major characteristics of Commomwealth literature/issues common to the wtiters
	5. Major themes and literary trends in commonwealth literature
	6. Discuss the problem of language in creative writing in the Commonwealth literature
GENDER STUDIES U8EN6004	1. Utilize key concepts, terminology and theoretical frameworks central to the interdisciplinary field of Gender Studies
	2. Identify in various spheres of human edeavor.
	3. Openess of learning about people,cultureand society
	4. Analyze forces shaping individuals experiences as well as social structure.
	5. Understanding the strands of feminist thought and envision themselves as participants in a multidisciplinary dialogue.
CREATIVE WRITING U8EN6005	1. Analyze and effective use of the conventions of the English language
	2. Examine the texts function across a range of genres, context and cultures.
	3. Represent cultures and encounters between cultures
	4. Analyzing the writing, reading and research.
	5. Provide a new leadership
SOFT SKILLS U8EN6006	1. Managing diasspointment and dealing with conflict
	2. Conneting and work with others to achieve a set task
	3. Utilising the diverse skills of the group to achieve the set objective, awareness of risk.

	4. Briefing help and support when necessary
	5. Developing self-motivation, raised aspiration and belif in one's abilities.
ENGLISH FOR COMPETITIVE EXAMINATIONS-II U8ENSB61	1. Read and comprehend English in the context of acquisition of soft skills
	2. Application on the soft skills and express in writing their views.
	3. Skill of making grammatically correct sentences.
	4. Importance for the received pronunciation
	5. Handle the day affairs well with their knowledge of language skills.

SEMESTER V

Course Code	Course Title	L	T	C
U8EN5001	ENGLISH PHONETICS	5	1	5

Instructional Objectives

1. ***To develop knowledge in any field of Media.***
2. ***To develop expertise in the field of teaching.***
3. ***To understand how sounds are produced and they are transmitted.***
4. ***To enhance principle of speech sounds required in speech therapy.***
5. ***To identify different branches of historical development of Linguistics History***

Unit-I	Elements of English Language	12 Hours

1. Definitions

(i) Phonology (ii) Morphology (iii) Syntax(iv) Meaning

2. Social, psychological and applied perspectives
3. Organs of Speech and their role

Unit-II	Sounds of English Language	12 Hours

1. Consonants – Vowels – Diphthongs.
2. Classification of Consonants – according to place of articulations – manner of articulation
3. Classification of Vowels
4. Classification of Diphthongs – closing diphthongs – centering diphthongs

Unit-III	Syllable	12 Hours

1. Stress – word stress (Primary & Secondary) – Sentence stress.
2. Accent and rhythm in connected speech

Unit-IV	Tone	12 Hours

1. Strong and weak form
2. Tone group (Breath group)
3. Intonation

Unit-V	Phonemic Transcription	12 Hours

1. Individual Words –
2. Sentences

Books for Study:

1. English Phonology: An Introduction. Heinz J. Giegerich (Pub: Cambridge)
2. Elements of General Linguistics, Dr. Sharad Rajimwale (Pub: Rama Brothers)
3. Elements of Linguistics and Phonetics, Dr. Amresh Sharma (Pub: Ritu Publication, Jaipur)
4. A text book of English Phonetics for Indian students, T. Balasubramanian (Pub:Macmillan)
5. English Phonetics, Walter Ripman

Books for Reference:

1. English Phonetics and phonology: A Practical Course. Peter Roach(Pub: Cambridge University Press)
2. The Study of Language: George Yule. (Pub: Cambridge University Press)
3. Practical Phonetics and Phonology.Bererley Collins and Inger M.Mees(Pub: Rout Ledge)

4. An outline of English Phonetics. Daniel Jones(Pub: Cambridge University Press)
5. An Intoduction to English Phonetics and Linguistics, Vikrant &Sehgal

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8EN5002	AMERICAN LITERATURE-II	5	1	5

Instructional Objectives

1. ***To understand nation's unique culture.***
2. ***To know different periods and thoughts.***
3. ***To understand how literature created national identity.***
4. ***To relate different works to each other.***
5. ***To understand political and social ideas.***

Unit-I	Poetry	12 Hours

1. Emily Dickinson- A Bird Came Down the Walk
2. Robert Frost - Stopping by the Woods on a Snowy Evening
3. R.W. Emerson- Brahma
4. W. Whitman - O Captain, my Captain

Unit-II	Short Story	12 Hours

1. The Gift of the Magi-O. Henry
2. An Angel in Disguise-T.S. Arthur

Unit-III	Prose	12 Hours

1. R.W. Emerson- The American Scholar
2. H.D. Thoreau- What I Lived For

Unit-IV	Fiction	12 Hours

1. E. Hemingway- A Farewell to Arms

Unit-V	Drama	12 Hours

2. Eugene O'Neil- The Emperor Jones

Books for Study:

1. The Poems of Emily Dickinson: Reading Edition, edited by R.W. Franklin (Harvard University Press, 1999)
2. https://www.poetryfoundation.org/poems/45868/brahma-56d225936127b
3. http://la.utexas.edu/users/hcleaver/330T/350kPEEEmersonAmerSchTable.pdf
4. https://archive.org/stream/americanscholar00inpark/americanscholar00inpark_djvu.txt
5. https://archive.org/stream/emperorjones00onei/emperorjones00onei_djvu.txt

Books for Reference:

1. American Literature of the Nineteenth Century –An anthology, Eurasia Publishing House-

New Delhi'
2. American Literature 1890-1965, an Anthology, Eurasia Publishing House, New Delhi.
3. https://www.poetryfoundation.org/poems/56593/a-bird-came-down-the-walk-35
4. https://www.bachelorandmaster.com/britishandamericanpoetry/brahma.html
5. http://digitalemerson.wsulibs.wsu.edu/exhibits/show/text

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8EN5003	**AMERICAN LITERARY HISTORY**	**5**	**1**	**5**

Instructional Objectives

1. ***To introduce the learners to the early American History.***
2. ***To know different periods and thoughts.***
3. ***To acquaint the learners with the colonial impact on the American Literary History***
4. ***To understand how literature created national identity.***
5. ***To understand political and social ideas.***

Unit-I	Unique American Style	12 Hours

1. Washington Irving, Edgar Alan Poe, Melville

Unit-II	Realism	12 Hours
1. Mark Twain (1835-1910) , Henry James (1843-1916)		
Unit-III	**Novel**	**12 Hours**
1. One of the earliest American Novels –a struggle to find a unique American voice - William Hillbrown's*The Power of Sympathy* (1789)		
Unit-IV	**Nineteenth Century Poetry**	**12 Hours**
1. Walt Whitman, Emily Dickinson		
Unit-V	**Colonial Literature**	**12 Hours**
Captain John Smith; Political Writing – Samuel Adams, Benjamin Franklin and Thomas Paine		

Books for Study:

1. https://www.biography.com/writer/washington-irving
2. https://www.biography.com/writer/edgar-allan-poe
3. https://www.britannica.com/biography/Mark-Twain
4. http://www.supersummary.com/the-power-of-sympathy/summary/
5. The Oxford Companion to American Literature-James D. Hart

Books for Reference:

1) American Literature of the Nineteenth Century –An anthology, Eurasia Publishing House- New Delhi'
2) American Literature 1890-1965, an Anthology, Eurasia Publishing House, New Delhi.
3) https://www.biography.com/writer/emily-dickinson
4) Studies in Classical American Literature, Lawerence H.D.
5) Modern American Literature, Rajeswar Mittapalli.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8EN5004	**INTRODUCTION TO LITERARY CRITICISM**	**5**	**1**	**5**

Instructional Objectives

1. ***To introduce the learners to the literary aspects.***
2. ***To acquaint the learners with the Classical background.***
3. ***To familiarize learners with dramatic traditions.***
4. ***To increase students understanding in a way to interpret the literary work.***
5. ***To help students how to analyze and judge the work of literature.***

Unit-I	Classical Criticism	12 Hours
1. The Classical background- A brief introduction to Plato, Aristotle, Longinus, and Horace		

2. Aristotle's views on poetry and tragedy – key concept like mimesis, catharsis, Hamartia and anagnorises.

Unit-II	Medieval And Renaissance Criticism	12 Hours

1. Sir Philip Sydney: Apology for Poetry (superiority of poetry over philosophy-objections to poetry and Sydney's answer)

Unit-III	Neo Classical Criticism	12 Hours

1. John Dryden: An Essay of Dramatic Poesy (Dryden's defense of the English dramatic tradition – function of poetry – dramatic poetry)

Unit-IV	Alexander Pope	12 Hours

1. Essay on Criticism

Unit-V	Dr. Johnson	12 Hours

1. Preface to Shakespeare

Books for Study:

1. History of Literary Criticism, Kishan Das
2. Literary Criticism in Theory and Practice , RN Sirivasthava
3. Literary Criticism,Bijay Ketan Pattanaya
4. Principels of Literary Criticism, Dr. Ashque Mohammed
5. https://www.poetryfoundation.org/articles/69379/an-essay-on-criticism

Books for Reference:

1. American Literature of the Nineteenth Century –An anthology, Eurasia Publishing House- New Delhi'
2. American Literature 1890-1965, an Anthology, Eurasia Publishing House, New Delhi.
3. A Hand Book of Literary Criticism, Durai Swamy
4. Collected Essay in Literary Criticism, Harbert Read
5. https://www.slideshare.net/kriangkrai/essay-on-criticism

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8EN5005	20TH CENTURYLITERATURE - I	4	1	2
Instructional Objectives				

1. ***To achieve sense of the historical significance.***
2. ***To instill critical analysis of the literature among students.***
3. ***To develop logical writing skills to write essays on literary topics.***
4. ***To acquaint them in literary debate.***
5. ***To know why 20th Century is era of international peace.***

Unit-I	**Poetry**	**9 Hours**

1. W.B. Yeats: A Prayer For My Daughter
2. Dylan Thomas: The Hunchback in the Park
3. A.S. Housman: The Carpenter's Son
4. T.S. Eliot: The Love Song of J. Alfred Prufrock
5. W.H. Auden: The Unknown Citizen
6. Thom Gunn: Ted Hughes

Unit-II	**Prose**	**9 Hours**

1. Sir James Jeans: Our Home in Space
2. J.B.S Haldane: The Scientific Point of View
3. Arnold Toynbee: "India's Contribution to world unity"

Unit-III	**Drama**	**10 Hours**

1. John Millington Synge:The Playboy of the Western World

Unit-IV	**Short Story**	**10 Hours**

1. The Mark on the wall, Virginia Woolf
2. Mr. Twiddle Loses His Handkerchief,Enid Blyton

Unit-V	**Fiction**	**10 Hours**

1. Joseph Conrad: Lord Jim
2. Graham Green: Heart of the Matter.

Books for Study/Online Materials:

1. https://poets.org/poem/prayer-my-daughter
2. http://btechenglish.blogspot.com/2014/01/the-scientific-point-of-view-j-b-s.html
3. https://www.gradesaver.com/the-playboy-of-the-western-world/study-guide/summary
4. https://www.enidblytonsociety.co.uk/book-details.php?id=411&title=Hello%2C+Mr.+Twiddle%21
5. https://www.penguinrandomhouse.com/books/354746/the-heart-of-the-matter-by-graham-greene/9780142437995/readers-guide/

Books for Reference:

1. World in the Twentieth Century,Geoffery Brun
2. Twentieth Century Poetry,Harold Monro
3. Twentieth Century British Leterature,Arvind M. Nawale &zinia Mitra
4. Twentieth Century Literary Criticism, Bijay Kumar Das
5. Poetic Artifice A Theory of Twentieth Century Poetry, Thomson.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8EN5006	AFRICAN-AMERICAN LITERATURE	4	1	2

Instructional Objectives

1. ***To acquaint students with a scope of African American authors***
2. ***To recognize poets and their contributions to the contextual fabric of America***
3. ***To explore many historical benchmarks within African American history such as slavery.***
4. ***To understand the reconstruction and the Civil Rights movement.***
5. ***To read it knows the pain, beauty and hope and whole range of emotions.***

Unit-I	Introduction To African American Literature	9 Hours

1. Short Biographies: Alice Walker (1944 – Present), James Weldon Johnson (1871 - 1938), Phillis Wheatley (1753 - 1784), James A. Emmanuel (1921 -2013)

Unit-II	Poem	9 Hours

1. An Hymn to Humanity : Phillis Wheatley (1753 - 1784)
2. Full Moon :Robert Hayden (1913 - 1980)

Unit-III	Novel	10 Hours

1. The Native Son: Richard Wright

Unit-IV	Short Story	10 Hours

1. New York Day Women: Edwidge Danticat

Unit-V	Drama	10 Hours

1. Come and Gone: Joe Turner

Books for Study/Online Materials:

1. https://www.amazon.ae/Study-Guide-Phyllis-Wheatleys-Evening/dp/1375376063
2. https://www.amazon.com/Collected-Poems-Robert-Hayden/dp/0871401592

3. https://www.amazon.com/Native-Son-Richard-Wright/dp/B0010WECYW
4. https://www.amazon.com/Sula-Toni-Morrison/dp/B000HJI8QW
5. https://www.amazon.com/Joe-Turners-Come-Gone-Magazine/dp/B00KD0S4SC
6. https://www.coachdanner.net/uploads/4/8/7/7/48772993/u6_new_york_day_women_se.pdf

Books for Reference:

1. https://www.biography.com/writer/james-weldon-johnson
2. http://www.shareyouressays.com/essays/short-summary-of-an-hymn-to-the-morning-by-phillis-wheatley/101049
3. https://www.gradesaver.com/native-son
4. https://www.gradesaver.com/sula/study-guide/summary
5. https://www.litcharts.com/lit/joe-turner-s-come-and-gone/summary

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8ENSB51	ENGLISH FOR COMPETITIVE EXAMINATIONS-I	2	1	1

Instructional Objectives

1. ***To make student proficient in writing letters***
2. ***To acquaint student with professional drafting in the field of management and administration,***
3. ***To inculcate the values and ethics of e-mail.***
4. ***To build a strong foundation in language.***
5. ***To enhance the skill of understanding the application of language concepts.***

Unit-I	Basics Grammar	5 Hours

1. Units of Grammar
2. Sentence Pattern
3. Clause Types
4. Phrase Types

Unit-II	Spotting Errors	5 Hours

1. How to Avoid Errors

Unit-III	Sentence Skills	4 Hours

1. Sentence Improvement
2. Sentence Arrangements
3. Sentence Fillers

Unit-IV	Vocabulary	5 Hours

1. Synonyms and Antonyms
2. Verbal Analogy
3. Word Substitution

Unit-V	Idioms and Phrasal Verbs	5 Hours

1. A Set of Most Commonly Used Idioms
2. Common Phrasal Verbs

Books for Study/Online Materials:

1. English for Competitive examination', Rajul Bhargava, Macmillan publishers.
2. English for competitive examinations, V. Saraswathi, Emerald Publishers.
3. General English for Competitive Exam, R. Gopalan&V. Rajagopalan.
4. English for Competitive Exam, RP. Bhatnagar
5. Objective English for Competitive Exam, Hari Mohan Prasad

Books for Reference/Online Materials:

1. English for Competitive examination, Dr.Ayothi
2. English for Competitive examination, Gopalan R.Hadhavan PK. &Rajagopalan V.
3. English for Competitive examination, second Edition, R. Gopalan&V. Rajagopalan
4. English for Competitive Exam, Third Edition,RP. Bhatnagar
5. https://easyengineering.net/objective-general-english-for-competitive-exams-by-disha-experts/

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor

SEMESTER VI

Course Code	Course Title	L	T	C
U8EN6001	JOURNALISM AND MASS COMMUNICATION	5	1	5

Instructional Objectives

1. ***To teach the learners how to expose serious misdemeanor***
2. ***To prevent learners from being mislead by statement or action.***
3. ***To study the practical skills of Journalism.***
4. ***To relate to enhance the process of education***
5. ***To correlate the cultural and entertainment***

Unit-I	Introduction to Journalism	12 Hours

1. Principles of Journalism
2. Social Responsibilities of the Press
3. Functional of the journalistic medium as a part of Mass communication

Unit-II	News: Introduction	12 Hours

1. Definition
2. Elements of News
3. The Inverted Pyramid style of news writing and the Five 'W' and One 'H

Unit-III	Reporting & Writing features	12 Hours

1. News value, human interest and story angle
2. opinion- editorials, personal columns, reviews etc.,

Unit-IV	Editorial Writing	12 Hours

1. Letters to the Editor
2. Art of interviewing, Crime reporting, Sports reporting

Unit-V	Role of the Editor	12 Hours

1. Duties of the news Editor
2. Functions of the Sub-editor
3. Characteristics of a Reporter
4. Ethics of Journalism

Books for Study/Online Materials:

1. Mass Communication and Journalism in India,DS Metha
2. A Complete Guide to Journalism for All, GK Gupta
3. Print and Broadcast Journalism, J. David
4. Visual Journalism, Rajesh Pandey
5. Journalism Innovation and Research, Das Gupta

Books for Reference/Online Materials:

1. Rangaswami Parthasarthy- Basic Journalism, Macmillan Publishers, Chennai.
2. B.N. Ahuja: Theory and practice of journalism, Surjeeth publishers
3. PathanjaliSethi- Professional Journalism, New Orient Longman, Bombay.
4. https://iedunote.com/mass-communication
5. http://www.preservearticles.com/importance-of/short-essay-on-the-importance-of-mass-communication/18792

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8EN6002	20TH CENTURY LITERATURE - II	5	1	5

Instructional Objectives

1. ***To achieve sense of the historical significance***
2. ***to develop critical analysis- develop logical writing skills***
3. ***to write essays on literary topics***
4. ***to know why 20th Century is era of international peace***
5. ***To acquaint them in literary debate.***

Unit-I	Poetry	12 Hours

1. W.H. Auden :The Unknown Citizen
2. D.H. Lawrence: Snake
3. T.S. Elliot: Journey of the Magi
4. Thomas Hardy: The Darkling Thrush

Unit-II	Prose	12 Hours

1. Aldous Huxley: Selected Snobberies

Unit-III	Drama	12 Hours

1. Galsworthy: Silver box

Unit-IV	**Short** Story	12 Hours
1. O. HenryHearts and Hands 2. Ray Bradbury:The Flying Machine:		
Unit-V	**Fiction**	**12 Hours**
1. Kinglsy Arms: Lucky Jim		

Books for Study/Online Materials:

1. https://www.gradesaver.com/w-h-auden-poems/study-guide/summary-the-unknown-citizen
2. https://www.gradesaver.com/journey-of-the-magi/study-guide/summary-journey-of-the-magi
3. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.392.6483&rep=rep1&type=pdf
4. https://study.com/academy/lesson/heart-and-hands-by-o-henry-summary-characters.html
5. https://englicist.com/notes/hearts-and-hands-o-henry

Books for Reference/Online Materials:

1. Nine Modern Poets, Ed. Black. Macmillan
2. https://interestingliterature.com/2016/12/15/a-short-analysis-of-t-s-eliots-journey-of-the-magi/
3. https://owlcation.com/academia/Very-Short-Stories-For-High-School
4. http://notesforba.blogspot.com/2019/01/selected-snobberies-by-aldous-huxley_92.html
5. https://subjectnotess.blogspot.com/2013/08/act-iii-of-silver-box-summary.html

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8EN6003	**COMMON WEALTH LITERATURE**	**5**	**1**	**5**
Instructional Objectives				

1. ***To extend student's knowledge of literature from common wealth countries***
2. ***To give training in research methods***
3. ***To develop writing skills***
4. ***To provide foundation knowledge of those who intending to proceed to an M.A. English***
5. ***To familiarize the students with democracy, human rights and rule of law.***

Unit-I	**Detailed poetry**	**12 Hours**

1. Derek Walcott- 'The Ruins of a Great House'

Unit-II	**Non-detailed poetry**	**12 Hours**

1.David Rubadiri- A Negro Labourer in Liverpool

2.Margaret Atwood- Journey to the Interior

Unit-III	**Prose**	**12 Hours**

1.Chiua Achebe- The Novelist as Teacher

Unit-IV	**Novel**	**12 Hours**

1.Margaret Atwood- Handmaid's Tale

Unit-V	**Drama**	**12 Hours**

1.Wole Soyinka- The Lion and the Jewel

Books for Study/Online Materials:

1. https://owlcation.com/humanities/Analysis-of-Poem-Ruins-Of-A-Great-House-by-Derek-Walcott
2. https://www.poeticous.com/margaret-atwood/journey-to-the-interior
3. https://www.sparknotes.com/lit/handmaid/summary/
4. https://muse.jhu.edu/article/246008/summary
5. https://www.researchgate.net/publication/326610023_A_Study_of_Wole_Soyinka's_Play_The_Lion_and_the_Jewel_in_the_Light_of_Cultures_in_Conflict

Books for Reference/Online Materials:

1. 'An Anthology of commonwealth poetry', edited by C.D. Narasimhaiah, Macmillan Publishers, Chennai.
2. 'Readings in commonwealth Literature', Edited by William Walsh, Oxford University Press, London.
3. https://brainly.in/question/6811924
4. http://moorthisukumarpgtrbenglishliterature.blogspot.com/2016/04/human-rights-in-literature-study-of.html
5. https://academicjournals.org/journal/IJEL/article-full-text-pdf/CA3913361861

SEMESTER VI

Course Code	**Course Title**	**L**	**T**	**C**
U8EN6004	**GENDER STUDIES**	**5**	**1**	**5**

Instructional Objectives

1. ***To demonstrate an understanding of the social construction of gender.***
2. ***To acquaint knowledge about gender issues as they affect diverse populations.***
3. ***To get familiarize with women's studies, men's studies and queer studies***
4. ***To acquire the connotation of cultural or attitudinal characteristics.***

5. ***To understand the characteristics or traits that are associated with biological aspect.***

Unit-I	**Poetry**	**12 Hours**

1. Emily Dickinson :Because I could not stop for Death
2. Sylvia Plath : Daddy

Unit-II	**poetry**	**12 Hours**

1. Kamala Das: My Grandmother's House
2. Grace Nicholas Of Course, when they ask for Poems

Unit-III	**Prose**	**12 Hours**

1. Virginia Woolf: A room of one's own

Unit-IV	**Fiction**	**12 Hours**

1.Thomas Hardy: Tess of the D'Ubervilles

Unit-V	**Drama**	**12Hours**

1. Henrick Ibsen : A Doll's House
2. Vijay Tendulkar : Silence! The court is in session

Books for Study/Online Materials:

1.https://www.westernreservepublicmedia.org/poetry/images/because-i-could-not-stop-for- death.pdf
2.https://www.poetrynook.com/poem/my-grandmothers-house
3.https://ebooks.adelaide.edu.au/w/woolf/virginia/w91r/contents.html
4.https://www.cliffsnotes.com/literature/t/tess-of-the-durbervilles/book-summary
5.https://www.sparknotes.com/lit/dollhouse/summary/

Books for Reference/Online Materials:

1. Sandra M Gilbert and Susan Gubar, 1985, The Norton Anthology of literature by Women, New York
2. An Anthology of American Women Writing, Rajani P, V. Rajagopalan and NirmalSelvamani, Dept. of English, Madras Christian College
3. https://www.shmoop.com/because-i-could-not-stop-for-death/summary.html
4. https://englishsummary.com/lesson/mygrandmother-house-kamala-das/
5. https://www.sparknotes.com/lit/roomofonesown/summary/
6. https://www.sparknotes.com/lit/tess/summary/

SEMESTER VI

Course Code	**Course Title**	**L**	**T**	**C**
U8EN6005	**CREATIVE WRITING**	**4**	**1**	**2**

Instructional Objectives

1. ***To create writing as an integral part of the English Department.***
2. ***It helps students to achieve critical thinking by reading between the lines.***
3. ***To express their inner voices nationally and internationally through structured writing.***

4. ***To help students to write their creative thoughts.***
5. ***To Master the foreign language.***

Unit-I	**Creative Writing**	**9 Hours**
1. Imagination and Writing-Measuring creative writing-The importance of Reading.		
Unit-II	**The Art of Writing**	**10 Hours**
1.Tropes and figures-Style and Register-Playing with words		
Unit-III	**Writing Poetry**	**9 Hours**
1. Definition of Poetry-Dominant modes of Poetry-Lyrical, Narrative and Dramat		
Unit-IV	**Writing Fiction and Short Stories**	**10 Hours**
1. Fiction and Non-fiction-Literary and popular fiction-Character, Plot, Point of View and Setting in short Story.		
Unit-V	**Writing Drama**	**10 Hours**
1. Concepts and Characteristics of Drama- Plot, Structure and Characterization.		

Books for Study/Online Materials:

1. https://grammar.yourdictionary.com/word-definitions/definition-of-creative-writing.htm
2. https://www.proofreadnow.com/blog/7-benefits-of-creative-writing-exercises
3. https://www.sarahseleckywritingschool.com/why-is-creative-writing-so-important/
4. https://study.com/academy/lesson/what-is-creative-writing-definition-types-examples.html
5. https://www.uvm.edu/wid/writingcenter/tutortips/WritingCreativePage.pdf

Books for Reference/Online Materials:

1. Creative writing: Anjana Neira Dev, Anuradha Marwah, Swathi Pal. Pearson Longman Publication
2. https://www.simplek12.com/reading-writing/4-benefits-to-creative-writing/
3. http://www.writerstreasure.com/creative-writing-101/
4. https://self-publishingschool.com/creative-writing/
5. https://twp.duke.edu/sites/twp.duke.edu/files/file-attachments/creative-writing-1.original.pdf

SEMESTER VI

Course Code	**Course Title**	**L**	**T**	**C**
U8EN6006	**SOFT SKILLS**	**4**	**1**	**2**

Instructional Objectives

1. ***It helps students to communicate short messages through gestures***
2. ***It helps students to communicate the message clearly to an individual or to a group.***
3. ***To teach an appropriate and reasonable decisions –***
4. ***To educate learners about unproductive thinking and self-defeating behaviors.***
5. ***It helps to understand the schedule and time management while communicating.***

Unit-I	**Realistic Work And Experience**	**9 Hours**

1. Work Experience
2. Positive work Ethics.

Unit-II	Reporting To Work On Time	9 Hours

1.Good personal appearance
2. Wanting to do good job
3. Flexibility

Unit-III	Safety, references and History	10 Hours

1. Safety rules
2. Good references
3. Good work history

Unit-IV	Interview Skills	10 Hours

1. Types of interviews : Group Interview, Panel and Telephone Interviews

Unit-V	Leadership Quality	10 Hours

1.Traits of leadership: Honesty, Integrity, Dedication, Responsibility, Goal setting and Decision making.

Books for Study/Online Materials:

1. A Course in Communication Skills,P.Kiranmai Dutt,Geetha Rajeevan,CLN Prakash
2. Communication Skills,Rajendra Pal J.S, Korlahalli
3. Learning the Communication Skills,D Mittal
4. Soft Skills, S.Hriharan,N.Sundararajan
5. https://www.slideshare.net/SeyidKadher1/soft-skills-68073286

Books for Reference/Online Materials:

1. Soft skills and Professional Communicaion, Francis Peter SJ.
2. Personality Development and Soft Skills, Barun K. Mitra
3. Soft Skills tools for Success, Rajat Gupta
4. Secret of Improving Soft Skills,Dilip Achrya
5. Soft Skills for Success, Murty G.R.K.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8ENSB61	ENGLISH FOR COMPETITIVE EXAMINATIONS-II	2	1	1

Instructional Objectives

1. ***To make student proficient in writing letters***
2. ***To acquaint student with professional drafting in the field of management and administration,***
3. ***To inculcate the values and ethics of e-mail.***
4. ***To build a strong foundation in language.***
5. ***To enhance the skill of understanding the application of language concepts.***

Unit-I	Reconstructing Passages	5 Hours

1. Jumbled Sentences

Unit-II	**Precis Writing**	**5 Hours**
1. How to write a Precis		
Unit-III	**Reading Comprehension**	**4 Hours**
1. Technical levels involved 2. Wide range of skills and intrests 3. Multi-dimensional affair 4. Drawn inference from the context		
Unit-IV	**Composition**	**5 Hours**
1. How to put Words in Sequence 2. Choices of Words 3. To know its Complexity 4. Rule governed nature of Verbal Construction		
Unit-V	**Letter Writing and Report Writing**	**5 Hours**
1. As an art and Technique 2. Formal or Informal Letters 3. Invitations and Replies 4. Job Application		

Books for Study:

1. To make student proficient in writing letters
2. To acquaint student with professional drafting in the field of management and administration,
3. To inculcate the values and ethics of e-mail.
4. To Build a strong foundation in language.
5. To enhance the skill of understanding the application of language concepts.

Books for Reference:

1. English for Competitive examination,Dr.Ayothi
2. English for Competitive examination,Gopalan R.Hadhavan PK. &Rajagopalan V.
3. English for Competitive examination,second Edition, R. Gopalan&V. Rajagopalan
4. English for Competitive Exam, Third Edition,RP. Bhatnagar
5. English for competitive Examinations by Rajul Bhargava, Macmillan publishers.
6. English for Competitive examinations by Saraswathi, Emerald publishers.
7. Objective English for Comepetitive Exam, Hari Mohan Prasad

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

DEPARTMENT OF HISTORY
COURSE OUTCOMES
FOR SEMESTERS V &VI

COURSE TITLE	COURSE OUTCOME
History of India from 1857 A.D. to 1947A.D.	The students could understand the nature and philosophy of Indian Freedom Movement.
History of the Arabs from 500 A.D. to 750 A.D.	The students acquire knowledge about the contribution of Prophet Muhammad (PBUH) to humanity and Umayyad's administration, conquest and achievements.
History of U.S.A. from Colonisation to 1865 A.D.	The students understand the consolidation of America as anIndependent Nation from an Imperial Colony.
History of Europe from 1453 A.D. to 1789 A.D.	The students understand various stages of human progressin all aspects of their life inEurope through enlightened knowledge and they come to know the power of scientific approach and knowledge.
History of Japan from 1853 A.D. to 2000 A.D.	The students understand the rise of Japan from an Isolated state to an Imperial Stateand later as a non-interventionist technical hub.
Select Constitutions (Excl. Indian Constitution)	The Studentsacquire knowledge about the different constitutions and functioning of governments in different Countries
General Knowledge and General Awareness	Students acquire basic information on Indian Polity, Indian Economy and Indian Geography required for competitive examinations.
Semester VI	
Course Title	**Course Outcomes**

SEMESTER V

Course Code	Course Title	L	T	C
U8HI5001	HISTORY OF INDIA FROM 1857 A.D. TO 1947 A.D.	5	-	5

Instructional Objectives

1. ***To understand the nature and impact of transformation of Power***
2. ***To understand the impact of Socio-Religious Reform Movementson Indian society***
3. ***To understand the nature of Indian National Movement***
4. ***To understand the role of Moderates & Extremists in the freedom struggle***
5. ***To understand the role of Gandhi in the freedom struggle***

Unit-I	India under Direct British Rule	15 Hours

Impact of the Revolt of 1857 -Lord Canning - Lord Mayo - Lord Lytton's Viceroyalty-Lord Ripon and Local-Self-Government-Lord Dufferin - Lord Curzon

Unit-II	Indian Renaissance	15 Hours

Socio-Religious Reform Movements in India: BrahmoSamaj -PrarthanaSamaj - Arya Samaj-Ramakrishna Mission - TheosophicalSociety - Muslim Reform Movements -Depressed Class Movements: Jyothirao Phule and Satya Shodhak Samaj - Narayana Guru and SNDP -Young Bengal Movement-Parsi Reform Movement-Sikh Reform Movement

Unit- III	Establishment of National Movement	15 Hours

Causes for the National awakening - Formation of Indian National Congress-Moderates Period (1885-1905) Achievements of Moderates- Extremists Period(1906-1918) - Tilak, Bipin Chandra

Pal, LalaLajpat Rai -The Swadeshi Movement- MuslimLeague 1906-Minto-Morley Reforms Act of 1909

Unit-IV	**Gandhian Era I**	**15 Hours**

Home Rule Movement 1916- Montague Chelmsford Reforms Act of 1919- JallianwalaBaghMassacre -Khilafat Movement-Non-Cooperation Movement 1920 - SwarajParty-Simon Commission-Nehru Report -Civil Disobedience Movement 1930

Unit-V	**Gandhian Era II**	**15 Hours**

Gandhi Irwin Pact - Round Table Conferences - Communal Award- Poona Pact- Government of India Act 1935 -Provincial Governments - Individual Satyagraha - Quit India Movement- Indian National Army-Cripps Mission-Cabinet Mission- Indian Independence Act of 1947

Books for Study:

1. Bipin Chandra et. al., *India's Struggle for Independence*, Penguin India, New Delhi, 2000.
2. Mahajan V.D., *Modern Indian History*, S. Chand Publishers, New Delhi, 2010.
3. MangalaMurugesan N.K., *Indian History (1857 – 1947)*,Palaniappa Brothers, Chennai, 2008.
4. Sumit Sarkar, *Modern India 1885-1947*, Macmillan Press, New Delhi, 2002.
5. Thangavelu G., *Indian History (1526 – 1947)*, Palaniappa Brothers,Chennai, 2007.

Books for Reference:

1. Dharam Chand Gupta, *Indian National Movement and Constitutional Development*, VikasPublishing House Pvt. Ltd., Noida, 1983.
2. Majumdar R.C., Roychaudri H.C., & Datta K., *An Advanced History of India*, Macmillan India Ltd, New Delhi, 2004.
3. MaulanaAbulKalam Azad, *India Wins Freedom*, Orient Black Swan, Hyderabad, 2009.
4. Percival spear, *A History of India – From the Sixteenth Century to Twentieth Century, Vol. II*,Penguin Books, New Delhi, 1990.
5. Roberts P.E., *History of British India*, Oxford University Press, London, 1921.

L- Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	**Course Title**	**L**	**T**	**C**
U8HI5002	**HISTORY OF THE ARABS FROM 500 A.D. TO 750 A.D.**	**5**	**-**	**5**

Instructional Objectives

1. ***To develop knowledge about History of Arabia***
2. ***To know the background of the Rise of Islam***
3. ***To know the life of Prophet Muhammad (PBUH) and his teachings***
4. ***To enable the students to know the Significance ofPious Caliphs***
5. ***To enlighten on the importance of Umayyads***

Unit-I	**Pre - Islamic Arabs**	**15 Hours**

Geography of Arabia: Important provinces and cities: Makkah, MadinahandTaif -Inhabitants of

Arabia-Jahiliya Period-Political, Social, Cultural and Religious life of the Arabs		
Unit-II	**Prophet's Life at Makkah**	**15 Hours**
Prophet Muhammad (PBUH): Parentage, Birth, Early life and Marriage - Revelation of the Holy Quran - Prophethood- Preaching of Islam -Hostility of Quraysh-Emigrations to Abyssinia-Pledges of Aqaba – Hijrat		
Unit-III	**Prophet's Lifeat Madinah**	**15 Hours**
Establishment of Brotherhood -Constitution of Madinah - Political, Religious and Social institutions -Five Pillars of Islam-Battle of Badr-Battle of Uhud-Battle of Ditch-Treaty of Hudaybiah-Conquest of Khaybar- FulfilledPilgrimage- Battle of Mutah - Conquest of Makkah - Battle of Hunayn - Campaign of Tabuk - The Farewell Pilgrimage - Administration under the Prophet - Prophet as a Multifaceted Personality -Quran and Hadith		
Unit-IV	**Pious Caliphate**	**15 Hours**
Hazrat Abu Bakr: His services to Islam - Nomination as Caliph- Condition of Arabia after the demise of the Prophet - False Prophets -Apostasy Movement-His Administration-**Hazrat Umar:**His services to Islam - Nomination as Caliph- Expansion of Islam and Conquests - Administration-**Hazrat Usman:**His services to Islam - Nomination as Caliph -Administration-**Hazrat Ali:**His services to Islam - Nomination as Caliph -Battle of Jamal-Battle of Siffin-Administration-Fall of Pious Caliphate		
Unit-V	**Umayyad Dynasty**	**15 Hours**
Establishment of Umayyad Dynasty: Hazrat Amir Muawiyah: YazidI-Tragedy of Karbala-Abdul Malik and His Reforms -Al-WalidI-Hajjaj bin Yusuf-Umar bin Abdul Aziz-Administration under the Umayyad dynasty - Downfall		

Books for Study:

1. Abdur Rahim Khan, *Muslim Contribution to Science and Culture*, New Delhi, 1946.
2. Ali K., *A Study of Islamic History*: Mohammad Ahmad, Idara-e-Adabiat - I - Delli, New Delhi, 2009.
3. Ameer Ali Syed, *History of the Saracens*, KitabBhawan, New Delhi, 1995.
4. Ameer Ali Syed, *The Spirit of Islam*, Idara-i-Adabiat - I - Delli, New Delhi, 1997.
5. Syed Shahabuddeen Dr., *Arabia Varalarum Panpadum*, Ahmed Publications, Vaniyambadi, 2001.

Books for Reference:

1. Abbas Ali, *Civilization in Islam*, Reference Press, New Delhi, 2005.
2. Arnold Thomas, *The Legacy of Islam*, Oxford University Press, London, 1931.
3. Ehsan Masood, *Science and Islam – A History*, Icon Books, London, 2009.
4. Hitti Philip K., *History of Arabs*, Mac Millan India, New Delhi, 1974.
5. ZaydanJuriji, *History of Islamic Civilization*, KitabBhawan, New Delhi, 1978.

L- Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI5003	**HISTORY OF THE USA FROM COLONIZATION**	**5**	**-**	**5**

	TO 1865 A.D.			

Instructional Objectives

1. ***To impart the knowledge about the emergence of USA***
2. ***To evaluate the role of important personalities in the Nation Building***
3. ***To understand the period of consolidation through redressal and reformation***
4. ***To inculcate knowledge about the circumstances that led towards the value of Individual Rights of Human beings***
5. ***To study about the liberation of Blacks***

Unit-I	**Road to Independence**	**15 Hours**

English Colonization of America - Thirteen Colonies- Red Indians - American War of Independence - Causes and course of the Revolution - The Treaty of Paris 1783 - Confederation - The Constitutional Convention

Unit-II	**Formation of National Governments**	**15 Hours**

Federalist and Republicans - George Washington - John Adams - Republican Revolution - Administration of Jefferson

Unit-III	**Period of Consolidation**	**15 Hours**

Grievances of the Indians - Tecumseh Missions - The War of 1812 - Treaty of Ghent 1814 - Monroe Doctrine - Jackson and his Democracy

Unit-IV	**Westward Expansion**	**15 Hours**

Territorial Expansion - Louisiana Purchase - Acquisition of Florida - Manifest Destiny - Colonization of Texas and Oregon - President Polk and Manifest Destiny - The Mexican War

Unit-V	**From Slavery to Freedom**	**15 Hours**

Issues of Slavery - Abraham Lincoln - The Civil War - Causes, Course and results of the Civil War

Books for Study:

1. *An Outline of American History*, Office of International Information Programs, United States Department of State.
2. Krishnamurthy, *History of the United States of America, 1492 – 1965*, Madurai Printers, Madurai, 1980.
3. Nambi Arooran A., *History of the USA* (Tamil), Tamil Nadu Text Book Society Publication, Chennai, 1980.
4. Parkes, H. B., *The Unites States of America- A History*, Scientific Book Agency, Calcutta, 1975.
5. Rajayyan, K., *A History of the United States*, Madurai Publishing House, Madurai, 1978.

Books for Reference:

1. Charles A. Beard and Mary A. Beard, *The Rise of American Civilization*, Macmillan, New York, USA, 1946.
2. Carl N. Degler, *Out of Our Past, the forces that shaped Modern America*, Wiley Eastern Limited, New Delhi, 1986.
3. James Macgregor Burns, *The Vineyard of Liberty*, Universal Book Stall, New Delhi, 1986.
4. Marshall Smelser, *American History – At A Glance*, Barnes and Noble, INC, New York, 1962.
5. Richard B. Morris (Ed.), *Encyclopedia of American History*, Harper Row Publishers, New York, 1976.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI5004	**HISTORY OF EUROPE FROM 1453 A.D. TO 1789 A.D.**	**5**	**-**	**5**
Instructional Objectives				

1. ***To impart the knowledge about the transformation of Europe towards progress***
2. ***To understand the development process and progress of society towards secular attitude***
3. ***To inculcate students about the spirit of nationalism leading to despotism***
4. ***To analyse the merits and demerits of benevolent despotism***
5. ***To analyse the circumstances that led to the emergence of Enlightened Despotism and its results and impact on European polity***

Unit-I	**Renaissance and Geographical Discoveries**	**15 Hours**

Europe at the end of the Middle Ages- Renaissance in Europe - Renaissance in Art, Architecture & Literature - Renaissance in Science - Geographical Discoveries: Prince Henry - Bartholomew Diaz -Christopher Columbus - Vasco da Gama - Ferdinand Magellan - Francisco Pizarro - Hernando Cortez - Jacques Cartier

Unit-II	**Reformation and Counter Reformation**	**15 Hours**

Religious Reformation: Lutheranism in Germany - Reformation in Switzerland - Calvinism - Reformation in France: Huguenots - Massacre of Vassy - St. Bartholomew's Day Massacre - Henry VIII & Reformation in England - Counter Reformation: Ignatius Loyola - Francis Xavier - Society of Jesus

Unit-III	**Rise of Nation States to Despotism**	**15 Hours**

Rise of Nation States and Monarchs: Spain - Ferdinand and Isabella - France- Joan of Arc - England - Dutch War of Independence - Thirty Years War - Treaty of Westphalia - Royal Absolutism- Despotism

Unit-IV	**Age of Benevolent Despotism**	**15 Hours**

France: Henry IV - Louis XIII: Cardinal Richelieu - Jules Mazarin - Louis XIV - Jean Baptist Colbert - Frederick II of Prussia - Joseph II of Austria - Peter the Great and Catherine II of Russia - Gustavus Augustus of Sweden

Unit-V	**Decline of Enlightened Despotism in France**	**15 Hours**

Louis XV: John Law - Cardinal Fleury- Petticoat Government: Madam de Pompadour - Madam du Barry - Louis XVI: Turgot and Necker - Ancient Regime - France on the eve of French Revolution

Books for Study:

1. ArunBhattacharjee, *A History of Europe (1453-1789),* Sterling Publishers Pvt Ltd, New Delhi, 1981.
2. Ishwari Prasad, *A History of Modern Europe (From 1453 To 1789 A.D.),* Surjeet Publications, New Delhi, 2018.
3. Khurana K. L., *Modern Europe 1453 – 1789 A.D.*, Lakshmi Narain Agarwal Publications, New Delhi, 2008.
4. Mukherjee L., M.A., *A Study of European History (1453-1815),* Surjeet Publications, New Delhi, 2017.
5. RaoB.V. *History of Europe 1450 – 1815*, Sterling Publishers Pvt. Ltd., New Delhi, 2012.

Books for Reference:

1. ChaurasiaR.S., *History of Europe 1453 – 1648*, Volume I, Atlantic Publishers& Distributors (P) Ltd New Delhi, 2002.
2. ChaurasiaR.S., *History of Europe 1649 – 1789*, Volume II, Atlantic Publishers& Distributors (P) Ltd New Delhi, 2002.

3. Fisher H.A.L., *History of Europe*, Volume I, Cambridge Publications, U.K. 1935.
4. NandaB.N. A *History of Europe*, Arise Publishers & Distributors, New Delhi, 2013.
5. Wiesner-Hanks Merry E., *Early Modern Europe, 1450-1789*, Cambridge University press, U.K., 2013.

L- Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI5005	**HISTORY OF JAPAN FROM 1853 A.D. TO 2000 A.D.**	**4**	**-**	**2**

Instructional Objectives

1. ***To understand the circumstances that led to the opening of Japan's curtain to western countries***
2. ***To understand the growth of Japan as a world power***
3. ***To impart the knowledge about the Imperialism that led to downfall of Japan***
4. ***To inculcate the knowledge about the Japanese progress from Zero Degree***
5. ***To study the position of Japan in the post War World***

Unit-I	**Japan in the Second Half of 19th Century**	**12 Hours**

Background:Japan up to the 19th century- Arrival of Europeans-Missionaries Activity and Policy of seclusion -Fall of Tokugawa Shoguns -Opening of Japan to the west- Perry Mission and Harris Treaty

Unit-II	**Meiji Era - Japan Becomes A Great Power**	**12 Hours**

Meiji restoration- End of feudalism - Beginning of Constitutional Movement- Modernization of Japan - Constitution of 1889 - Sino - Japanese war -Russo- Japanese war - Treaty of Portsmouth- Accession of Mutsuhito

Unit-III	**Japanese Imperialism and the First World War**	**12 Hours**

Causes of Imperialism - Japan and the First world war -Twenty- One Demands - Washington Conference - Rise of Militarism - Manchurian Crisis - Rome Berlin Tokyo Axis - Second World War and Japan

Unit-IV	**Post - War Japan**	**12 Hours**

Occupation of Japan - Loss of territories - New Constitution - Reconstruction of Japan - Political Social and Economic Reforms - Industrial Growth - Japan as an economic super power

Unit-V	**Post War Politics**	**12 Hours**

Foreign policy of Japan - Signing of Peace treaties - Japan's Relations with USA, USSR, China, ASEAN, Indo-China, Japan and the UNO - Great Economic recovery - Post War Politics

Books for Study:

1. Andrew Gordon, *A Modern History of Japan*, Oxford University Press, U. K., 2019.
2. Brett L. Walker, *A Concise History of Japan*, Cambridge University Press, U. K., 2015.
3. Clyde, P. H., & Beers B. F., The Far East, Prentice Hall of India Pvt. Ltd. New Delhi, 1976.
4. Mason R.H.P., & Caiger J.G., *A History of Japan*, Tutle Publishing, North Clarendon, U.K.,

2011.
5. Thangavelu G., *History of Japan (Tamil & English)*, Tamil Nadu Textbook Society, Chennai, 2017.

Books for Reference:

1. George Feiffer, *Breaking Open Japan: Commodore Perry, Lord Abe, and American Imperialism in 1853*, Smithsonian Books, Washington, D. C, U. S. A., 2006.
2. Ian Buruma, *Inventing Japan: 1853-1964 (Modern Library Chronicles)*, The Modern Library, The Random House Publishing Group, New York, 2004.
3. John W. Dower, *Embracing Defeat: Japan in the Wake of World War II*, W. W. Norton & Co., U.S.A,1999.
4. Peter Booth Wiley, *Yankees in the Land of the Gods: Commodore Perry and the Opening of Japan*, Viking Publishers, New York, U. S. A., 1990.
5. Rhoda Blumberg, *Commodore Perry in the Land of Shogun*, Harper Collins Publishers, New York, 2003.

L- Lecture, T - Tutorial C– Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI5006	**SELECT CONSTITUTIONS (U. K., U. S. A., SWITZERLAND, CHINA AND JAPAN)**	**4**	**-**	**2**

Instructional Objectives

1. ***To comprehend the salient features of different constitutions***
2. ***To understand the working of Government in various countries***
3. ***To know the legislative process in diverse situations***
4. ***To study the judicial system in various nations***
5. ***To recognize the Party systems in different countries***

Unit-I	**United Kingdom**	**12 Hours**
Salient Features of the Constitution - Conventions - Position of the Crown - The Cabinet - The Legislature - Committee System - Legislation - Party System - Judiciary - Local Government		
Unit-II	**United States of America**	**12 Hours**
Salient features of the Constitution - Federal System - Amendment Procedure -The President – Election- Powers - The Cabinet - The Legislature - Legislation - Party System - Judiciary		
Unit-III	**Switzerland**	**12 Hours**
Salient features of the Constitution - Amendment Procedure - Federal Executive- Federal Legislature- Federal Judiciary- Direct Democratic Devices		
Unit-IV	**Japan**	**12 Hours**
Salient features of the Constitution- Amendment Procedure - Fundamental Rights and Duties- Powers and Functions of the Executive - Composition, Function and Powers of the Legislature- Judicial System- Political Parties		
Unit-V	**People's Republic of China**	**12Hours**
Salient Features of the Constitution- Legislature-Committee System-Executive- Local Governments - Judiciary- Party System- Electoral procedure- Fundamental Rights and Duties		

Books for Study:

1. Johari J.C., *Modern Constitution*, S. Chand & Co. New Delhi, 1990.
2. Kapur A.C. &Misra K.K., *Select Constitutions*, S. Chand & Co, New Delhi, 2010.
3. Mahajan V.D., *Select Modern Governments,*S. Chand & Co. New Delhi, 2008.
4. Strong C.F., *Modern Political Constitutions*, Sidgwick& Jackson Limited, London, 1973.
5. Wheare K.C., *Modern Constitutions*, O.U.P. London, 1966.

Books for Reference:

1. Amal Roy and Mohit Bhattacharya, *Political Theory: Ideas and Institutions*, The WorldPress, Calcutta, 2002.
2. Appadurai A., *Substance of Politics*, Oxford University Press, New Delhi, 1990.
3. Dicey A.B., *TheLaw of the Constitution*, Macmillan, London, 1959.
4. Johari. J. C, *Principles of Modern Political Science*, Sterling, New Delhi, 1999.
5. Kapur A.C., *Principles of Political Science*, S. Chand & Co., New Delhi, 2000.

L- Lecture, T - Tutorial C – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HISB51	GENERAL KNOWLEDGE	2	-	1

Instructional Objectives

1. ***To empower students to face Competitive Examinations***
2. ***To develop expertise in Indian Economy***
3. ***To understand the Indian Government and Politics***
4. ***To understand the Indian Geographical conditions***
5. ***To develop the idea about the different Research organizations***

Unit-I	General Information	06 Hours

National Symbols- Profile of States- Eminent personalities and places in news and Sports - Books and authors - Current socio - Economic issues - Scientific inventions

Unit-II	Indian Economy	06 Hours

Features of Indian Economy: Division of Indian Activities-Unemployment-Poverty-Population-National Income-Agriculture-Industrial policies-Money and Banking-Foreign Trade-International Organizations-Five Year Plans-Public Finance

Unit-III	Indian Government and Politics	06 Hours

Constitution: Salient Features - Fundamental Rights-Directive principles, Fundamental Duties-Indian Parliament-President of India-Vice President of India-Prime Minister, Council of Ministers-State Government - Central State Relations-Supreme Court of India-High Court-Political Parties and Elections

Unit-IV	Indian Geography	06 Hours

Physical features of India-Climate & Weather, Atmosphere Soils and Vegetation-Drainage system - Crops - Mountains - Plains - Deserts - Islands- Belts and Calms-Earth Quakes-Rivers-Lakes-Waterfalls-Winds - Forests - Ecosystem - Agriculture - Maps-Rocks

Unit-V	Various Academies & Organizations	06 Hours

Cultural Academies at Centre and State level - Educational, Scientific, Environmental, Economic and Research organizations of Repute- Space and Astronomy-Defense Organization-Various awards and Prizes - Important Resources-Sports &Games Organizations

Books for Study:

1. BasuD. D., *An Introduction to Indian Constitution*LexisNexis Publication, Haryana, 1960.
2. Bipin Chandra et. al., *India's Struggle for Independence*, Penguin India, Delhi, 2000.
3. Majid Husain, *Indian Geography*, Penguin Publishers, New Delhi, 1981.
4. Mishra S.K. &Purl V.K., *Indian Economy*, Himalayas Publications, New Delhi, 1985.
5. Ravi Chopra, *Encyclopedia of General Knowledge & General Awareness,* Asian Books Pvt. Ltd., 2012.

Books for Reference:

1. *Competition Success Review-Year Book,* Competition Success Review Publications, New Delhi.
2. *Competition Success Review–Monthly Magazine*, Competition Success Review Publications, New Delhi.
3. Azeem Ahmed Khan et. al.*Student's Encyclopedia of General Knowledge*, General Press, New Delhi.

4. *Manorama Year Book,* Malayala Manorama Publications, Kottayam, Kerala.
5. *Upkar's Year Book,* Upkar Prakashan, New Delhi.

L- Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8HI6001	HISTORY OF INDIA FROM 1947 A.D. TO 2014 A.D.	5	-	5

Instructional Objectives

1. ***To understand the reconstruction of India after Independence***
2. ***To understand the Indian Foreign Policy***
3. ***To know about the Non-Congress Government Policies***
4. ***To study the policies of Prime Ministers of Independent India like Rajiv Gandhi,V.P Singh and Narasimha Rao***
5. ***To provide information to the students about the problems faced by India***

Unit-I	Nehru's India	15 Hours

Background-Accession of Princely states- Language Problem- Linguistic reorganization of states - Regionalism- Five Year Plans - International relations - Development of Science and Technology- Education Policies-Agricultural Policies-Legacy of Nehru

Unit-II	Shastri to Indira Gandhi	15 Hours

Shastri Years- Early years of Indira Gandhi- Jayaprakash Narayan and Total Revolution -20 Points Programme- Garibi Hatao - Green Revolution -Emergency - Janata Government- Re-emergence of Indira Gandhi -Nationalization of Banks - Abolition of Privy Purse -Khalistan issue and Operation Blue Star

Unit-III	Rajiv Gandhi and V. P. Singh	15 Hours

Rajiv Gandhi - Programmes and Policies -Anti Defection Law- Shah Bano Case-Economic Policies- Insurgency Punjab and North East- V.P. Singh and National Front Government- Mandal Commission

Unit-IV	P. V. Narasimha Rao to Manmohan Singh	15 Hours

P.V. Narasimha Rao -Babri Masjid Problem - Genesis, Demolition and Impact -NewEconomic Policy- Coalition Prime Ministers-Vajpayee -Manmohan Singh -UPA I & II

Unit-V	Challenges facing India	15 Hours

Challenges facing India - Changing trends in Economy, Education, Science and Technology - Foreign policy -Social Development - Communal Polarization

Books for Study:

1. Christopher Jaffrelot, *India since 1950*, New Delhi, Yatra Books, 2012.
2. Mahajan, V.D., *History of Modern India (1919 - 1982)*, New Delhi, S. Chand & Co. 2004.

3. Ramachandra Guha, *India after Gandhi*, Picador, Noida, 2008.

4. Venkatesan G., *A History of Contemporary India*, J.J.Publications, Madurai, 2001.
5. Venkatesan G., *History of Contemporary India*, V.C. Publications, Rajapalayam, 2010.

Books for Reference:

1. Bipan Chandra, Mridula Mukherjee and Aditya Mukherjee, *India after Independence*, Penguin Books, New Delhi, 2000.
2. DuttV.P., *India's Foreign Policy*, Vikas Publications, New Delhi, 1993.
3. Grover, B.L., and Grover, S. A., *A New Look at Modern Indian History*, S. Chand & Co., New Delhi, 2004.
4. Majumdar R.C., Roychaudri H.C. & Datta K., *An Advanced History of India*, Macmillan India Ltd, New Delhi, 2004.
5. Sathianathaier R., *A History of India*, Vol.III. S.Vishwanathan& Co, Chennai, 1999.

L- Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI6002	**HISTORY OF THE ARABS FROM 750 TO 1258 A.D.**	**5**	**-**	**5**

Instructional Objectives

1. ***To know the history of the Abbasids***
2. ***To enable students to know the administration of Abbasids and causes for downfall***
3. ***To study Crusades and its impact***
4. ***To study about Moors of Spain***
5. ***To understand the impact of Fatimids of Egypt***

Unit-I	**Abbasid Dynasty I**	**15 Hours**

Establishment of the Dynasty - AbulAbbas as-Saffah -Unique features of the Abbasids - Abu Jafar al-Mansur: Conquests - Contribution - Al-Mahdi - Al-Hadi

Unit-II	**Abbasid Dynasty II**	**15 Hours**

Harun al-Rasheed: Rise and fall of Barmakids-Administration- Character -Mamun al-Rasheed: Civil war between Ameen and Al-Mamun -Achievements-Al-Mutawakkil: Achievements - Downfall of Abbasids

Unit-III	**Crusades**	**15 Hours**

Causes and Course of the Crusades-ImaduddinZengi- Conquest of Edessa -Nuruddin Mahmud - The Second Crusades - Expedition of Egypt - Sultan Salahuddin Ayyubi-Results of the Crusades

Unit-IV	**Moors in Spain**	**15 Hours**

Abdul Rahman I: Administration- Character and Achievements -Abdul Rahman II: Character and Achievements - Abdul Rahman III: Administration - Character and Achievements- Fall of the Moors in Spain		
Unit-V	**Fatimids of Egypt**	**15 Hours**
Origin-Ubaidullah al-Mahdi: Establishment of Fatimid Dynasty - Conquests-Al-Muiz: Accession and conquests - Al-Aziz: Accession and conquests - Downfall of the Fatimids		

Books for Study:

1. Abdur Rahim Khan, *Muslim Contribution to Science and Culture,* New Delhi, 1946.
2. Ameer Ali Syed,*The Spirit of Islam,* Idara-I -Adabiat - I -Delli, New Delhi, 1997.
3. Ameer Ali Syed, *History of the Saracens,* KitabBhawan, New Delhi, 1995.
4. Syed Mahmudun, *Islam its concept and History*, KitabBhawan, New Delhi, 1981.
5. Syed Shahabuddeen Dr., *IslamiaVaralarumPanpadum,* Ahmed Publications, Vaniyambadi, 2001.

Books for Reference:

1. Abbas Ali, *Civilization in Islam*, Reference Press, New Delhi, 2005.
2. Arnold Thomas, *The Legacy of Islam*, Oxford University Press, London, 1980.
3. Hitti Philip. K., *History of Arabs,* Mac Millan India, New Delhi, 1974.
4. KhudaBaksh. S.,*The Orient under the Caliphs,* Idara - I - Adabiat - I - Delli, New Delhi, 1893.
5. Syed Shahabuddeen Dr., *Contributions of Muslims to Humanity,* Vijay Nicole Imprints Pvt. Ltd. Chennai, 2016.

L - Lecture, T - Tutorial C – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U5HI6003	**HISTORY OF U.S.A. FROM A.D. 1865 TO A.D. 2014**	**5**	**-**	**5**

Instructional Objectives

1. ***To develop knowledge about the era of Reconstruction***
2. ***To inculcate knowledge about Progressivism***
3. ***To understand the journey from isolationism to internationalism in International politics***
4. ***To study the role of U.S.A in Cold War***
5. ***To comprehend the recent developments in U.S.A.***

Unit-I	**Era of Reconstruction**	**15 Hours**
Reconstruction - End of the Reconstruction-Rise of Big Business-Rail Roads-Growth of Industry-Labour Movement-Granger and Populist Movements-Growth of Imperialism-The Spanish-American War of 1898		
Unit-II	**Theodore Roosevelt to Woodrow Wilson**	**15 Hours**
Open Door Policy-Theodore Roosevelt-Progressive Reforms-Foreign Policy-W.H. Taft-Dollar Diplomacy-Woodrow Wilson-New Freedom-USA and the First World War- Wilson's 14Points-Treaty of Versailles		
Unit-III	**Warren Hardinge to Franklin D. Roosevelt**	**15 Hours**
Warren Hardinge -Coolidge Prosperity-Hoover-Great Depression-Franklin D.Roosevelt-New Deal-Good Neighbour Policy- USA and Second World War		

Unit-IV	Truman to John F. Kennedy	15 Hours
Domestic and Foreign Policy of Harry S.Truman-Cold War-D.Eisenhower-John F.Kennedy-Internal Policy-Foreign Policy-Civil Rights Movements- Martin Luther King		
Unit-V	**Lyndon B. Johnson to George Bush Jr.**	**15 Hours**
Lyndon B.Johnson-Richard Nixon-Gerald Ford-Jimmy Carter-Ronald Reagan-George Bush-Gulf War and Saddam Hussain-End of the Cold War-Bill Clinton- George Bush Jr.		

Books for Study:

1. *An Outline of American History*, Office of International Information Programs, United States Department of State.
2. Hill. C.P., *History of the Unites States*, Edward Arnold, London, 1974
3. NambiArooran, K., *History of the United States of America (Tamil)*, TamilNadu Text Book Society, Government of TamilNadu, Chennai, 1975
4. Parkes, H.B.,*The Unites States of America – A History*, Scientific Book Agency, Calcutta, 1975.
5. Rajayyan. K., *A History of the United States*, Madurai Publishing House, Madurai, 1978.

Books for Reference:

1. Charles A. Beard and Mary A. Beard, *The Rise of American Civilization*, Macmillan, New York, USA, 1946.
2. Carl N. Degler, *Out of Our Past, the forces that shaped Modern America*, Wiley Eastern Limited, New Delhi, 1986.
3. James Macgregor Burns, *The Vineyard of Liberty*, Universal Book Stall, New Delhi, 1986.
4. Marshall Smelser, *American History – At A Glance*, Barnes and Noble, INC, New York, 1962.
5. William W. Freehling, *The Reintegration of American History*, Oxford University Press, 1996.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI6004	**HISTORY OF EUROPE FROM 1789 A. D.TO 2000 A. D.**	**5**	**-**	**5**

Instructional Objectives

1. ***To know the nature and impact of French revolution***
2. ***To understand the achievements of Napoleon Bonaparte***
3. ***To understand the Reconstruction of Europe***
4. ***To study the Unification of Italy and Germany***
5. ***To discuss20th century developments in Europe***

Unit-I	French Revolution	15 Hours

France at the eve of Revolution- Political, Social, Religious and Economic conditions - Causes- Role of Philosophers: Montesquieu,Voltaire and Rousseau- Course of the Revolution-Estates General- Tennis Court Oath-Fall of Bastille and results of French Revolution		
Unit-II	**Napoleon Bonaparte**	**15 Hours**
Napoleon BonaparteEarly life- As a First consul- Conquests-local and foreign policies- As an Emperor-Civilian Works- Continental System- Battle of Waterloo		
Unit-III	**The Era of Metternich**	**15 Hours**
France after 1815-Congress of Vienna-Metternich as a Chancellor of Austria - Reconstruction of Europe- Concert of Europe- Holy Alliance-Revolution of 1830 and 1848		
Unit-IV	**Unification of Germany & Italy**	**15 Hours**
Unification of Germany: Bismarck: War of Denmark 1864 - War of Austria -Prussia-1866 and War of France and Prussia 1870-71-Unification of Italy: Carbonari-Joseph Mazzini-Victor EmmanuelII-Count Cavour-Joseph Garibaldi- Stages of Unification of Italy & Germany- Second Republic - Napoleon II - Eastern Question.		
Unit-V	**World Wars**	**15 Hours**
Third French Republic-First World War -Causes,Course and Results -League of Nations-Rise of Dictatorship- Nazism: Hitler - Fascism: Mussolini- Causes, Course and Results of the II World War- Cold War - NATO - Suez Crisis - Re-Unification of Germany - Break of Yugoslavia - Dissolution of Soviet Union - European Union		

Books for Study:

1. David S. Mason, *A Concise History of Modern Europe*, Mittal Books India, 2019.
2. Mahajan V.D., *History of Modern Europe since1789*, S.Chand Publications, New Delhi, 2010.
3. RaoB.V. *History of Europe 1789 – 2010*, Sterling Publishers Pvt. Ltd., New Delhi, 2012.
4. RaoB.V. *History of the Modern world from 1500 to 2013*, Sterling Publishers Pvt. Ltd., New Delhi, 2012.
5. Roger Price, *A Concise History of France*, Cambridge University Press, U.K., 2005.

Books for Reference:

1. BlanningT.C.W. *The oxford illustrated History of Modern Europe*, Oxford University press, New York, U. K., 1996.
2. Fisher H.A.L., *History of Europe, Volume II: From the beginning of the 18th Century A.D to 1935 A.D*, Cambridge Publications, U.K., 1936.
3. Kettleby C.D.M., *A History of Modern Times from 1789*, OUP, New Delhi, 1973.
4. Robin Okey, *Eastern Europe 1740 – 1980, Feudalism to communism*, Hutchinson & Co., Publishers, London, 1982.
5. Steven Rosefielde, *Russia in the 21st Century - The Prodigal Super Power*, Cambridge University Press, U.K., 2005.

[L - Lecture, T - Tutorial C – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI6005	HISTORY OF CHINA FROM 1900A.D. TO 2000A.D.	4	-	2

Instructional Objectives

1. ***To understand the circumstances leading to the Chinese revolution***
2. ***To know the Peoples Republic of China***
3. ***To understand the victory of Communism in China***
4. ***To know the role of China in World Wars***
5. ***To understand the emergence of China as a world Power***

Unit-I	Impact of West on China	12 Hours

Early history of China- Western impact on China-Hundred Days Reforms - Boxer Rebellion-Manchu Reforms-Dowagress Tsu Hsi - Revolution of 1911: Causes, Course & Results - Decline of Manchus

Unit-II	Beginning of the New Era	12 Hours

Dr. SunYat-sen: Ideas of SunYat-sen - Tung MingHui - Contribution of Dr. SunYat-sen -Yuan Shih-kai - China and The First World War -Twenty - One Demands of Japan - War Lords -May 4th Movement - Washington Conference

Unit-III	Rise of the Nationalist Governments	12 Hours

Rise of Kuomintang Party - Chiang Kai-shek - Birth of Communism in China - Struggle between Kuomintang and Communists- The Long March - Manchurian Crisis -Second Sino - Japanese War

Unit-IV	Era of Mao Tse Tung	12 Hours

China and Second World War - Growth of Communism - Civil war - MaoTse-tung - Establishment of Peoples Republic of China - Reforms - Cultural Revolution - Estimate of Mao

Unit-V	China and World Affairs	12 Hours

Foreign policy of China Since 1949- Deng Xiaoping- Reorganization of Communism - 1982 Constitution - Socialist Modern Economy - Special Economic Zones- China as a World Power

Books for Study:

1. Paul. H. Clyde & Burton F, Beers: *The Far East - A History of Western Impacts and*

Eastern Responses 1830-1975, Prentice - Hall of India (P) Ltd, New Delhi, 1988
2. David M.D., *Rise and Growth of Modern China*, Himalaya Publishing House, Bombay, 1993
3. Majumdar and Srivastava, *History of Far East*, Surjeet Publications, Delhi 1976.
4. Shiv Kumar and Jain S., *History of Far East in Modern Times*, Surjeet Publications, Delhi.
5. Gupta M. L., *A short History of China*, Gopi Nath Seth, Navin Press, Delhi, 1998.

Books for Reference:

1. Ahamed, L.L.,*History of the Far East in Modern Times*, S.Chand& Co. Ltd, Ram Nagar, New Delhi - 55,1981.
2. Shiv Kumar &Jain, *History of Modern China*, S. Chand &Co. Ltd, Ram Nagar, New Delhi - 55, 1981.
3. HsuC.Y. *The Rise of Modern China*, Oxford University Press, Hong Kong,1983.
4. Prakash Kumar Dubey, *History of China and Japan*, Dominant Publishers and Distributors, New Delhi, 2006.
5. Majumdar R. K.,& Srivastava A. N., *History of China*, SBD Publishers & Distributors, Delhi, 1995.

L - Lecture, T - Tutorial C – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8HI6006	**MUSLIMS CONTRIBUTION TO HUMANITY**	**4**	**-**	**2**

Instructional Objectives

1. ***To understand about the importance of education in Islam***
2. ***To identify the legacy of Muslims to Medical Sciences***
3. ***To study the Muslims contribution to Physical Sciences***
4. ***To discuss the progress of Mathematics and Astronomy***
5. ***To understand the progress made in Social Sciences***

Unit-I	**The Glorious period of Islamic Civilization**	**12 Hours**

Introduction -Education in Islam - Branches of Knowledge in Quran - Renaissance before the European Renaissance- Public Libraries

Unit-II	**Contribution to Medicine and Hospitals**	**12 Hours**

Tibb-i-Nabawi - Ibn Sina (Avicenna) - Abu Al-Jarrah - Al-Razi - Ali Ibn Al-Abbas-Al-Zahravi - Al-Tabari - Abbas Ibn Firnas - Ibn Al-Nafis - Al-Kindi - Al-Walid-Bimaristan

Unit-III	**Contribution to Physical Sciences**	**12 Hours**

Chemistry - Physics - Botany - Zoology - Jabir Ibn Hayyan - ZakriyaRazi -Imam Jafaral-Sadiq - AbulQasimi - Al-Kindi- Al-Hasan Ibn Al-Haytham Ibn Nahsiyah -Al Asmai -Al-Jahiz

Unit-IV	**Contribution to Astronomy and Mathematics**	**12 Hours**

Al-Khawarizmi - Al-Farghani - Ibn Younus - Ibn Al-Shatir - Al-Biruni- Ibn Al-Haytham –

Omar Khayyam		
Unit-V	**Contribution to Social Sciences**	**12 Hours**
Al-Masudi - Al-Kindi - Ibn Al-Jazzar - Al-Tamimi - Al-Masihi - Ali Ibn Ridwan -Muhammad Al-Idrisi - Ahmed Ibn Fadlan-Ibn Khaldun		

Books for Study:

1. Abdur Rahim Khan, *Muslim Contribution to Science and Culture,* New Delhi, 1946.
2. Arnold, Sir Thomas, *The Legacy of Islam*, Oxford, London, 1913**.**
3. Ehsan Masood, *Science and Islam – A History, Oxford,* London, 2009.
4. Major Syed Shahabuddeen Dr., *Muslims Contribution to Humanity*, Vijay Nicole Imprints Pvt. Ltd.Chennai, 2016.
5. Philip K. Hitti, *History of the Arabs,* Macmillan, London, 1984.

Books for Reference:

1. Browne, E.G., *History of Arabian Medicine,* Cambridge University Press, Cambridge, 1921.
2. Doughty, C.M., *Travels in Arabian Desert*, Limited Editions Club, New York, 1953.
3. Gibb, H.A.R., *Islamic Society and the West*, London, 1960.
4. Haskins, C. H., *Arabic Science in Western Europe*, The University of Chicago press, Chicago, 1925.
5. Syed Ameer Ali, *The Spirit of Islam*, New Delhi, 1922.

Course Code	Course Title	L	T	C
U8HISB61	**COMPETITIVE EXAMINATIONS**	**2**	**-**	**1**

Instructional Objectives

1. To impart overall idea about Competitive Examinations
2. To create awareness about various Central Level Competitive Examinations
3. To educate the students about various State Government Services and Examinations
4. To create awareness about the opportunities in teaching positions both Central/State and School/Higher Education.
5. To motivate the students through preparation tips and suggestions.

Unit-I	**Introduction to Competitive Examinations**	**6 Hours**
Competitive Examinations in India: Civil Services - Preliminary and Main Examinations - Government Employment in other services - Examination patterns and stages - Written Test - Oral Test - Negative Marks - Reservation policies of State/Central Governments in selection process: Horizontal Reservations - Vertical Reservations		
Unit-II	**Central Level Competitive Examinations**	**6 Hours**
Central Services: Union Public Service Commission (UPSC) - Pattern and Stages - Staff Selection Commission CGL/CHSL - Stages of Selection - Railway Recruitment Board (RRB): NTPC - ALP - Stages of Selection - Defence Examinations - LIC/GIC Examinations: AAO/Assistants - Stages of Selection - Institute of Banking Personnel Selection Examinations		

(IBPS) - P.O/Clerical - Stages of Selection

Unit-III	**State Level Competitive Examinations**	**6 Hours**

TNPSC: Tamil Nadu Public Services Examinations - One Time Online Registration - Combined Civil Service Examinations, Group I& II - Stages of Selection - Madras High Court Service Examinations: Typist/Assistants/Xerox Machine Operator/Reader -District Educational Officers Examinations - Group IV & V.A.O. Examinations -Other Technical Examinations

Unit-IV	**Recruitment for Educational Teaching Services**	**6 Hours**

UGC: JRF/NET Examinations - Central Teachers Eligibility Test (CTET) – UGC - NET - SET - Teachers Recruitment Board: TNTET - PGTRB -Asst. Professors to Collegiate Education- Qualification and Stages of Recruitment

Unit-V	**Competitive Examination Preparation Techniques**	**6 Hours**

Reading Newspapers, Magazines, Reference Books for Subjects - Subjects of study: General Science (Physics, Chemistry, Biology) - History, Economics, Geography, Indian Polity - Maths, Reasoning and General Awareness/General English - General Tamil - Perusing Previous Years Question Papers - Homework - Attending Oral Interviews: Mock Interview - Tackling FAQ's during Interviews - Review of Interview

Books for Study:

1. Aarif Qadir, *How to Crack UPSC Civil Services Examination: An Ultimate Strategy Book to Crack Civil Service Examinations*, Amazon Digital Services LLC, 2014.
2. Das S.K., *The Civil Services in India: Oxford India Short Introductions*, Sri Padmavathi Publications, Chennai, 2013.
3. Usmangani AnsariMd.Dr., *Mission IAS - Prelim/ Main Exam, Trends, How to prepare, Strategies, Tips & Detailed Syllabus*, Disha Publishers, New Delhi, 2016.
4. Khullar D.R. & RaoJACS**,** *Environment for Civil Services Prelims and Mains and Other Competitive Examinations*, Manav Books, Distributors, Agra, U.P, 2015
5. *NCERT & SCERT Textbooks Class VI to XII*

Books for Reference:

1. Divya S IyerDr., *Path Finder: Civil Services Main Examination*, DC Books Pvt Ltd., New Delhi.
2. Edgar Thorpe, *The Pearson CSAT Manual 2013: Civil Services Aptitude Test for the UPSC Civil Services Preliminary Examination*, New Delhi.
3. MajidS.A. *Special Current Affairs for Civil Services Examinations*, Kalinjar Publications, New Delhi.
4. SanjivVerma, *The Indian Economy: for UPSC & State Civil Services Preliminary & Main Examinations*, Unique Publications, New Delhi.
5. Veera Sekaran, *TNPSC Group II*, Kizhakku Publishers, Chennai.

L- Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

DEPARTMENT OF BUSINESS ADMINISTRATION Course Outcomes		
SEMESTER-V		
CO	Sub Code : **U8BA5001**	Subject : **HUMAN RESOURCE MANAGEMENT**
CO1	Acquired knowledge on HRM, its scope, functions and environment	
CO2	Students learnt about recruitment, selection-methods of selection, and Interview techniques.	
CO3	Gained knowledge on training and career development	
CO4	Students learnt about concepts of performance appraisal, remuneration and welfare measures.	
CO5	Students learnt about human resource audit, nature and approaches	
CO	Sub Code : **U8BA5002**	Subject : **BUSINESS LAW**
CO1	To know the primacy of contract, offer and acceptance.	
CO2	Describe the capacity of parties and incapacity of parties in contract.	
CO3	To provide the knowledge regarding performing of contract and to understand the method of discharge of contract.	
CO	Sub Code : **U8BA5003**	Subject : **COST ACCOUNTING**
CO1	Identify the preparation of cost sheet.	
CO2	Identify the advantages of cost accounting, differences between cost and financial accounting.	
CO3	Identify the accounts of stock level	
CO4	Describe the pricing methods of material issues.	
CO5	Classify the methods of wage payment and incentive plan.	
CO6	Classify the different types of overhead and identify the allocation of overhead.	
CO	Sub Code : **U8BA5004**	Subject : **ENTREPRENEURIAL DEVELOPMENT**
CO1	Demonstrate the ability to provide a self-analysis in the context of an entrepreneurial career	
CO2	Demonstrate the ability to find an attractive market that can be reached economically.	

CO3	Understand the concept of entrepreneurship, entrepreneurial culture, socio-economic origin of entrepreneurship, factors influencing entrepreneurship, traits of a good entrepreneur.	
CO4	Create appropriate a business model.	
CO5	Develop a well presented business plan that is feasible for the students.	
CO	Sub Code : **U8BA5005**	Subject : **MARKETING MANAGEMENT**
CO1	Understand the marketing concepts and its evolution.	
CO2	Analyse the market based on segmentation, targeting and positioning.	
CO3	Know the consumer behaviour and decision making process.	
CO4	Make decision on product, price, promotion mix and distribution	
CO	Sub Code : **U8BA5006**	Subject : **RETAIL MANAGEMENT**
CO1	To introduce the Scope and significance of Retail industry, Trends and Challenges.	
CO2	To enlighten on Retail Strategies, Opportunities and Competitive advantage.	
CO3	To comprehend knowledge on all areas of Retail business operations.	
CO	Sub Code : **U8BASB51**	Subject : **EXPORT MANAGEMENT**
CO1	Identify the problems of export.	
CO2	Understand the role, functions of Government Institutions in promoting export.	
CO3	Describe the methods of payments.	
CO4	Identify the export procedure and Classify the export documents	
SEMESTER-VI		
CO	Sub Code : **U8BA6001**	Subject : **INDUSTRIAL RELATIONS**
CO1	To impart basic knowledge of the Indian Industrial legislations.	
CO2	To understand the maintenance of industrial harmony and ensuring healthy relationship among the workforce for achieving the organizational goals.	
CO3	To familiarize with the different concepts and practices of the Public Relations in organizations.	
CO	Sub Code : **U8BA6002**	Subject : **ADVERTISING AND SALESMANSHIP**
CO1	Understand the basic concepts and functions of advertising	
CO2	Develop awareness about the various methods and application on advertising.	
CO3	Enhance their creativity and understanding the practical concept of advertising.	
CO4	Understand the responsibilities, qualities of salesman and organisation of sales department.	
CO5	Plan, select, train and motivate the sales force in an organisation.	

CO	Sub Code : **U8BA6003**	Subject : **GROUP PROJECT**
CO1	To bridge the gap between industry and institution.	
CO2	To gain on the field experience and identify contemporary problems faced by the industry.	
CO3	To equip students for placement.	
CO4	To gain practical exposure to become future professional / Entrepreneur.	
CO	Sub Code : **U8BA6004**	Subject : **MARKETING RESEARCH**
CO1	Understand and apply the techniques for researching market and to offer basic research orientation.	
CO2	Describe the application marketing research.	
CO3	Describe the methods of collection of data.	
CO4	Describe the methods of Interview and observation.	
CO5	Classify the types of sampling.	
CO	Sub Code : **U8BA6005**	Subject : **COMPUTER APPLICATION IN BUSINESS**
CO1	To introduce the students about basics of MS-Office	
CO2	To provide knowledge exposure to MS- Word	
CO3	To provide knowledge exposure to MS-Excel	
CO4	To provide knowledge exposure to MS- Power Point	
CO5	Develop the competence of Electronic database management	
CO	Sub Code : **U8BA6006**	Subject : **COMPANY LAW**
CO1	To understand the concept behind the formation of companies.	
CO2	To determine the laws governing the functioning of the company.	
CO3	To have understanding of various types of meeting and their requirement.	
CO	Sub Code : **U8BASBP8**	Subject : **MS-OFFICE (PRACTICAL**
CO1	To provide practical knowledge exposure to MS- Word	
CO2	To provide practical knowledge exposure to MS-Excel	
CO3	To provide practical knowledge exposure to MS- Power Point	

SEMESTER V

Course Code	Course Title	L	T	C
U8BA5001	HUMAN RESOURCE MANAGEMENT	5	1	5

Instructional Objectives

1. ***To highlight the importance and functions of HRM in an organiation***
2. ***To familiarize the students with the process and mechanism of managing human resources.***
3. ***To equip students with knowledge, skills and competencies to manage people in the organisation.***

Unit-I	Introduction	15Hours

Meaning, Nature of HRM – Scope-Objectives- Importance- Functions- Skills and Role of HR manager-Difference between Personnel Management and HRM- Strategic HRM- –Challenges of HRM.

Unit-II	Job Analysis and HR Planning	15 Hours

Job Analysis- uses- process- methods- Job description and job specification.
Human Resource Planning – objectives- Importance- process- Effective HR planning.

Unit-III	Recruitment, Selection and Training	20 Hours

Recruitment –meaning- sources of recruitment- process- factors affecting recruitment – Selection – Definition- selection process– Application of various Tests – Interview techniques in selection Training-Meaning- needs for Training – Training vs. Development- Methods of training.

Unit-IV	Performance Appraisal	15 Hours

Performance Appraisal – Objectives- Process- Methods (Traditional and Modern Methods) - Essential characteristics of effective appraisal.

Unit-V	Promotion, Transfer and Termination	10 Hours

Promotion- Need- Basis of promotion- merits and demerits- Transfer- need-causes- Termination of services – Process.

Books for Study:

1.Aswathappa : Human Resource and Personnel Management
2.J Jayasankar : Human Resource Management
3.Subba Rao P : HRM and Industrial Relations
4. C.B.Gupta :Human Resource Management

Books for Reference:

1.Memoria C B : Personnel Management

2.Gary Dessier	: Human Resource Management
3.Dwivedi R S	: Human Relations and Organization Behavior
4.Beard well and Holden	: Human Resource Management

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA5002	**BUSINESS LAW**	**5**	**1**	**5**

Instructional Objectives

1. ***To heighten the students the elements of general and special contract***
2. ***To enable the student to understand and deal with various contract in his day to day life, be it for his business or profession.***
3. ***To instil in the students an awareness of legal framework in sales of goods.***

Unit-I	**Introduction**	**20 Hours**

Business Law-Introduction and meaning-Nature of contract- Classification of contract- offer-acceptance- consideration.

Unit-II	**Contractual capacity**	**15 Hours**

Capacity to contract- Free Consent-Coercion, Undue Influence, Misrepresentation Fraud, and Mistake.

Unit-III	**Performance and Discharge of Contract**	**20 Hours**

Legality of Object- Void Agreements -Contingent Contracts -Performance of Contract- Discharge and Breach of Contract- Quasi Contract.

Unit-IV	**Special Contract**	**10 Hours**

Bailment - Meaning and Essentials- duties of bailor and bailee- Pledge-essentials- duties of pawnor and pawnee-Rights of pawnor and pawnee-Lien- Hypothecation charge- Mortgage.

Unit-V	**Sale of Goods Act**	**10 Hours**

Formation of a contract of sale- distinguishes between sale and agreement to sell- conditions and warranties - Transfer of Property- rights and duties of buyer- Unpaid Seller- Rights and duties.

Books for Study:

1.Kapoor N D : Business Law
2. V. Balachandran&S.Thothadiri : Business Law
3.R S N Pillai &Bagavathi: Business Law

Books for Reference:

1. M.C. Shukla : Business Law
2. P C Tulsian : Business Law
3. Sreenivasan M R : Business Law
4. Pathak : Legal aspects of Business

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA5003	COST ACCOUNTING	5	1	5

Instructional Objectives

1. ***To provide students with an exposure to the basic concepts of costing, costing system and cost accounting techniques.***
2. ***To provide an in-depth knowledge of elements of cost.***
3. ***To impart the knowledge of preparing cost sheet.***
4. ***To explain the pricing method of material issue***
5. ***To enable the students to understand the method of wage payment and incentive plan.***

Unit-I	Introduction	8 Hours

Definition of Cost, Costing and Cost Accounting- Objective, Advantages and Limitations – Financial Vs Cost Accounting - Cost Classification – Elements of cost – Methods of Costing. (only theory)

Unit-II	Cost Sheet and Quotations	20 Hours

Cost Sheet – Meaning – Objectives – Specimen of Cost Sheet – Preparation of Cost Sheet, Raw-Materials Consumed – Prime Cost – Works Cost – Cost of Production – Cost of Sales – Treatment of Stock or Inventories –Estimates, Tenders and Quotations.

Unit-III	Materials	20 Hours

Store Records – Bin Card – Store Ledger Account - EOQ -Levels of Stock –Re-Order Level, Maximum Level, Minimum Level, Average Level - Methods of Pricing of Material Issues - FIFO, LIFO, Simple Average price and Weighted Average price methods.

Unit-IV	Labour	15 Hours

Labour Cost – Meaning – Types - Methods of Wage Payment – Piece Rate – Straight Piece Rate – Differential Piece Rate –Taylor's Differential Piece Rate – Merrick's Multiple Piece Rate – Time Rate – Incentive Plan :Halsey plan , Rowan Plan.

Unit-V	Overhead	12 Hours

Overhead – Meaning - Classification of Overhead costs –Allocation and Apportion of overhead costs – Primary Distribution of Overhead –Basis of apportionment - Secondary distribution of overheads (Repeated Distribution Only) – Machine hour rate.

Note: Weightage of Marks - Problems 80%, Theory 20%

Books for Study:

1. T.S. Reddy &HariPrasad Reddy : Cost Accounting
2. Murthy A &Gurusamy : Essentials of Cost Accounting
3. S.P. Jain and Narang : Cost Accounting
4. S.N. Maheswari : Principles of Cost Accounting

Books for Reference:

1. Murthy A &Gurusamy S :Cost Accounting
2. Tulsian P.C. : Cost Accounting
3. S.P. Iyangar : Cost Accounting

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA5004	**ENTREPRENEURIAL DEVELOPMENT**	**5**	**1**	**5**

Instructional Objectives

1. ***To provide knowledge of entrepreneurship***
2. ***To make students aware about various entrepreneurship assistance provided by Government.***
3. ***To understand the challenges faced by various entrepreneurs.***
4. ***To create a learning system through which students can acquaint themselves with special challenges of starting new ventures.***
5. ***To familiarize the students with the different stages of project preparation and entrepreneurship development activities.***

Unit-I	**Introduction**	**10 Hours**

Entrepreneur – Meaning – Qualities of Entrepreneur – Characteristics of an Entrepreneur – Types of Entrepreneur - Classification of the Entrepreneurs – Entrepreneurship – Meaning –Factors influencing Entrepreneurship - Entrepreneur Vs Manager – Entrepreneur VsIntrapreneur .

Unit-II	**Role of entrepreneurs in Economic Growth**	**10 Hours**

Women Entrepreneurs – Rural Entrepreneurs – Small Scale Entrepreneurs.

Unit-III	**Role of Government in entrepreneurship development**	**20 Hours**

Entrepreneurial growth – Role played by government - Commercial Banks – DIC – NSIC – SIDO – SIDBI – SSI – All India Financial Institutions - IDBI, IFCI, ICICI – Role of Non-government institutions.

Unit-IV	**Criteria for Market Selection**	**15 Hours**

Business Idea generation Techniques – Identification of Business Opportunities – Marketing Feasibility Study : Marketing – Financial – Technical – Legal – Managerial – Locational.

Unit-V	**Project Formulation**	**20 Hours**

Project Appraisal – Methods : CPM – PERT – Techniques – Payback Period, Return on Investment, Internal Rate of Return, Net Present Value – Preparation of Business Plan – Content of a Business Plan – Project Report - Procedure for starting an enterprise

Books for Study:

1.Jayshree Suresh : Entrepreneurial Development
2.Raj Shankar :Essentials of Entrepreneurship
3.Khanka : Entrepreneurial Development
4. Munish Vohra : Entrepreneurial Development
5. S. Anil Kumar : Entrepreneurship Development

Books for Reference:

1.Gupta C B : Entrepreneurial Development
2.Saini : Entrepreneurship-Theory and Practice
3. Saravanavel P : Entrepreneurial Development.
4. S.K.Mohanty :Fundamental of Entrepreneurship

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA5005	**MARKETING MANAGEMENT**	**4**	**1**	**2**

Instructional Objectives

1. ***To familiarize the students with the concept of marketing.***
2. ***To develop the skill in market analysis and design customer driven strategies with regard to product, pricing and promotion.***
3. ***To inculcate the students skill in applying the analytical perspectives, decision tools and concepts of marketing to decisions.***

Unit-I	**Introduction**	**8 Hours**

Fundamentals of Marketing – Role of Marketing- Relationship of Marketing with other functional areas- Concept of Marketing Mix - Marketing approaches- Various Environmental factors affecting the marketing functions- Green Marketing- Direct Marketing;

Unit-II	**Marketing Strategies**	**14 Hours**

Buyer Behavior- Buying motives- Buyer Behavior Model- Factors influencing buyer behavior. Market segmentation- Need and basis of segmentation- Marketing Strategy.

Unit-III	**Product Strategies**	**14 Hours**

Sales Forecasting- various methods of Sales Forecasting- The Product- Characteristics- Classification- Consumer goods- Industrial goods-New product development-process- Product Life Cycle- Product line and product mix decisions- Branding- Packaging.

Unit-IV	**Pricing Strategies**	**14 Hours**

Pricing- Factors influencing pricing decisions – Pricing objectives – Pricing policies – Pricing strategies

Unit-V	**Distribution Strategies**	**10 Hours**

Channels of Distribution – Definition-Importance- Types-Factors considered in selecting channels – Classification of middle men –Wholesaler-Definition-Functions- Retailer- Definition-Functions of Retailers.

Books for Study:

1.Rajan Nair :Marketing
2.J. Jayasankar :Marketing
3. Sontakki :Marketing Management
4. RajanSaxena :Marketing Management

Books for Reference:

1.Philip Kotler & Armstrong :Marketing Management
2..Ramaswamy and Namakumari : Marketing Management
3.Varshney and Gupta S L : Marketing Management

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA5006	RETAIL MANAGEMENT	4	1	2

Instructional Objectives

1. ***To introduce the scope and significance of retail industry.***
2. ***To enable the students to know about the retailing trend in India and role of technology in retailing.***
3. ***To familiarize the students to gain insights on the issue in operational and administrative aspects.***
4. ***To provide an understanding about retail locations.***
5. ***To inculcate the skills of merchandising and promotion.***

Unit-I	Introduction	10 Hours

Definition of retailing- feature of retailing-importance of retailing- functions of retailing- types of retailers -Retail in India-Retailing from International perspectives.

Unit-II	Shopper Behavior and Online Retailing	12 Hours

Retail shopper behavior –factor influencing the retail shopper-the customer decision making process-online retailing- importance of online retailing-advantage of online retail- disadvantage of online retail- types of online retail.

Unit-III	Retail Location	15 Hours

Site selection –influencing factor in site selection –location decision (location area, market area and primary trading /concentric zones)- Retail Development - types (solitary site,unplanned shopping area site, planned shopping area site) – types of planned shopping area.

Unit-IV	Merchandise, Category and Space Management	12 Hours

Merchandise Management – phases in developing merchandise plan- methods of calculating merchandise levels- functions of a merchandiser-visual merchandise management – objectives.
Category Management – reasons- process of category management.
Space Management- objectives- space planning- process.

Unit-V	Retail Promotion	11 Hours

Retail promotion – definition – promotion al objectives –SMARRTT objectives – promotional advertising –sales promotion.

Books for Study:

1. Dr.L.Natarajan : Retail Management
2. Suja Nair :Retail Management
3. Swapan Pradhan : Retailing Management
4. K.Venkataraman : Retail Management
5. A rifSakh : Retail Management

Books for Reference:

1. Berman Berry & Joel Evans : Retail Management
2. Pradhan : Retail Management
3. Levy Michale& Barton : Retail Management
4. Gibson G. Vedamani : Retail Management
5. Chetan Bajaj Etal : Retail Management

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BASB51	**EXPORT MANAGEMENT**	**2**	**1**	**2**

Instructional Objectives

1. ***To convey the relevance of export and foreign exchange***
2. ***To highlights the export incentives***
3. ***To gain the basic understanding of export finance***
4. ***To create an understanding on export procedure and documentation.***

Unit-I	**Introduction**	**4 Hours**

Export Management – Meaning and Definition –Need for Export Management–functions of Export Manager – Barriers to Export.

Unit-II	**Export Incentives**	**6 Hours**

Export Incentives –Duty Entitlement Pass Book Scheme- Duty Exemption Entitlement –Export Promotion Capital Goods Scheme –Export Oriented Units-Export Houses – Trading Houses- Star Trading Houses.

Unit-III	**Export Finance**	**6 Hours**

Export Finance - Pre-shipment Finance -Post-shipment Finance- Role of EXIM Bank and Export Credit Guarantee Corporation.

Unit-IV	**Export Procedure**	**8 Hours**

Export Procedures (Customs formalities and Shipping).
Documentation (Pro forma Invoice ,Commercial Invoice ,GR 1 Form , ,Bills Receivables ,Shipping Bill ,Shipping Order ,Vehicle Ticket, Bill of Lading, Mate Receipt, Airway Bill.
Terms of Payment (Free On Board (FOB), Cost and Freight (C&F),,Cost Insurance and Freight (CI &F),Documents against Acceptance (D/A), Documents against payment (D/P).
Letter of Credit (L/C) - Advantages - Types of Letter of Credit(L/C)

Unit-V	**Role of Government Institutions in promoting export.**	**6 Hours**

Government Institutions assisting in promoting export (Ministry of Commerce, Directorate General Of Foreign Trade- Export Promotion Council- Indian Institute of Foreign Trade –India Trade Promotion Organization-Federation of Indian Export Organization only).

Books for Study:

1. P.R.Khurana :Export Management
2 .Balagopal:Export Management.
3. Kumar and Mittal :Export Management
4. D.C .Kapoor :Export Management

Books for Reference:
1.Francis Cheruvilam :Export Management,

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA6001	**INDUSTRIAL RELATIONS**	**5**	**1**	**5**

Instructional Objectives

1. ***To enable the students to understand the concept of industrial relations.***
2. ***To facilitate students to understand the causes, types and machineries available under Industrial Disputes Act.***
3. ***To understand the concept of collective bargaining, its functions and have knowledge of Trade Union, its features and functions.***
4. ***To make the students capable of maintain peace and harmony in the organisation by the application of various labour laws and ensuring maximum efficiency.***

Unit-I	**Introduction**	**15 Hours**

Industrial Relations –Meaning – Characteristics- Nature and Scope of Industrial Relations – Objectives- Factors influencing industrial relationship- Importance of harmonious Industrial Relations.

Unit-II	**Industrial Disputes**	**15 Hours**

Industrial Disputes – Definition – Causes- Types – Machineries available under Industrial Dispute Act- Prevention and settlement of Industrial disputes – Causes for Industrial Dispute – Employee Dissatisfaction – Disciplinary Action – Strikes – lockout – Legal and illegal – Prevention of Strikes and Lockouts.

Unit-III	**Trade Union**	**15 Hours**

Definition- features- Functions- Procedure for registration- Rights of registered trade union- measures to strengthen trade union in India.

Unit-IV	**Collective Bargaining and WPM**	**15 Hours**

Meaning- Importance- Functions- Process- Role of Government in Collective Bargaining- Workers participation in management- features- objectives- scope- methods

Unit-V	**Indian Factories Act**	**15 Hours**

Indian Factories Act, 1948 – Objectives –Provisions of the Act regarding Welfare, Health and Safety of Workers.

Books for Study:

1. Sreenivasan M R :Industrial Relations and Labor legislations
2. Monoppa : Industrial Relations
3. B.Nanda Kumar :Industrial Relations Labour Welfare and Labour Laws
4. Subba Rao p :Human Resource Management and Industrial Relations
5. N.D.Kapoor :A handbook of Industrial Laws

Books for Reference:

1. BD Singh :Industrial Relations: Emerging paradigm
2. Piyali Ghosh ShefaliNandan: Industrial Relations and Labour Laws
3. CB Mamoria : Dynamics of Industrial Relations
4. J.R.Carby Hall :Principles of Industrial Law
5. H. Samuel :Industrial Law

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA6002	**ADVERTISING AND SALESMANSHIP**	**5**	**1**	**5**

Instructional Objectives

1. ***To familiarize the students with the concepts of advertising and salesmanship.***
2. ***To develop the creativity skill of the students in preparing advertisement copy.***
3. ***To develop the student's skill in sales presentation***
4. ***To enlighten the students about selection, training and motivating the sales forces.***

Unit-I	**Introduction**	**10 Hours**

Advertising- Meaning and Definition-Publicity Vs Advertising-Objectives- Benefits of Advertising to Manufacturers, Customers, Middlemen and Sales force-Arguments against Advertising. Kinds of Advertising

Unit-II	**Advertisement Copy**	**15 Hours**

Advertising Layout- Advertisement Copy - Qualities of a good Advertisement Copy –Advertising Budget- Methods of advertising appropriation - Advertising Agency- Role.

Unit-III	**Advertisement Media**	**20 Hours**

Advertisement Media –Indoor Advertising and Outdoor Advertising-Merits and Demerits – Factors influencing in the selection of Media –Measuring the advertisement effectiveness.

Unit-IV	**Salesmanship**	**15 Hours**

Salesmanship – Meaning and Definition –Salesmanship Vs Advertising –Process of Selling – Kinds of salesmen. Qualities of a successful Salesman.

Unit-V	**Training & Remuneration**	**15 Hours**

Training and supervising the salesman – Remunerating salesman – Motivating the salesman.

Books for Study:

1. Dawar S.R :Salesmanship and Advertisement
2. P.K. Agarwal :Advertising Management
3. C.N.Sontaki:Advertising
4. P.K. Sahu and K.C.Rout :Salesmanship and Sales management
5. S.L. Gupta :Sales and Distribution Management

Books for Reference:

1. Still, Cundiff, Govoni : Sales Management
2. U.C.Mathur :Advertising Management
3. Chunawala&Sethia: Foundation of Advertising -Theory and Practice.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	P	T	C
U8BAPJ61	GROUP PROJECT	5	-	5

Instructional Objectives

1. ***To bridge the gap between industry an institution.***
2. ***To gain on the field experience.***
3. ***To identify the problems faced by the industry.***
4. ***To equip students for placement.***

A group of not exceeding 5 students will be sent for training in Business Establishments for 15 days and assigned a project in the beginning of **VI Semester.** The project report shall be submitted before the end of **VI Semester.** The project report shall be evaluated by external examiner and internal examiner. Project report shall carry 75 marks and viva-voce examination 25 marks. Total marks 100. If a candidate fails to submit the project work or fails to appear for the viva-voce examination then the candidate should submit or appear only in the next viva-voce examination.

Guidelines:

1. The students must undergo with their project work in any of the private limited and public limited company.
2. Candidate should submit the internship certificate to the head of the department.
3. Project work can be in any field of specialisation such as HR, Finance, Marketing and other related management based topics.
4. The project report should be neatly presented in not less than 50 pages.
5. 1.5 spacing should be used for typing the general text. The text should be justified and typed in the font style (Times Roman, Font size 12pt for text and 14pt for Sub-headings.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor

Course Code	Course Title	L	T	C
U8BA6003	MARKETING RESEARCH	5	1	5

Instructional Objectives

1. To understand the various aspects of marketing research.

2. To familiarize the students with collection of data and application of statistical tool in business research.

3. To familiarize students in the area of sampling

4. ***To cultivate the skill needed to prepare and present research report.***

Unit-I	Introduction	15 Hours

Marketing Research – Definition – Objectives –Growing importance of Marketing Research – Main Divisions of Marketing Research – Uses of Marketing Research – Limitations – Market research Vs Marketing research - Marketing Research Process.

Unit-II	Marketing Research Methodology	10 Hours

Approaches to Marketing research – Historical approach – Merits – Limitation – Descriptive approach – Merits – Limitations – Exploratory Research – Merits – Limitations – Case Study Research – Merits – Limitations.

Unit-III	Sampling Techniques	20 Hours

Sampling – Meaning – Advantagesand Limitations of Sampling – Sampling Techniques – Probability sampling – Types – Merits – Demerits - Non-Probability Sampling.

Unit-IV	Data Collection	20 Hours

Data Collection – Methods of Data Collection – Secondary Data – Sources of Secondary Data – Primary Data – Primary Data Vs Secondary Data - Collection of Primary Data – Observation – Merits - Questionnaire – Merits – Demerits – QuestionnaireVs Schedule – Types of Questionnaire - Designing a Questionnaire – Interview – Merits – Demerits – Types of Interview – Interviewingskills on the part of the investigator

Unit-V	Product Research	10 Hours

Product – Meaning – Classification – Product Life Cycle – Marketing Strategies of Different stages of Product Life Cycle – Application of Marketing research for New Product Development – Application of Marketing research in Test Marketing.

Books for Study:

1. Dr.P. Ravilochanan :Marketing Research
2. Sharma D : Marketing Research
3. S.L. Gupta : Marketing Research
4. G.C. Berry : Marketing Research
5 . S. Sumathi and P. Saranaval, :Marketing Research and Consumer Behaviour

Books for Reference:

1. Tull and Hawkings :Marketing Research 2. Boyd and Westfall :Marketing Research 3. Aaker :Marketing Research

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA6004	**COMPUTER APPLICATION IN BUSINESS**	**4**	**1**	**2**

Instructional Objectives

1. ***To acquaint the students with special applications of IT in business.***
2. ***To familiarize students regarding IT application in documents handling MS-Wordand various other computer application in business.***
3. ***To acquire working knowledge about MS-Excel,***
4. ***To equip the presentation skill using MS-Power Point.***
5. ***To understand E-commerce and its activities***

Unit-I	**Introduction**	**10 Hours**

Information Technology – Meaning - definition –Need for Information Technology– components of Information Technology – Role of Information Technology in Business.

Unit-II	**MS Word**	**15 Hours**

Word processing with MS Word- starting MS word – MS word environment –working with word documents – working with text – working with tables – checking spelling and grammar – printing a document.

Unit-III	**MS Excel**	**15 Hours**

Spreadsheets and MS Excel: Starting MS Excel – MS Excel environment – working with Excel workbook – working with worksheet – Formulas and Functions – Inserting Charts – printing in Excel.

Unit-IV	**MS Power Point**	**10 Hours**

Making presentation with MS power point: Starting MS power point – MS power point environment – working with power point – working with different views – designing presentation – printing in power point.

Unit-V	**E-Commerce**	**10 Hours**

Electronic Commerce – Types – Advantages and disadvantages – Electronic data interchange (EDI) – How EDI works – EDI benefits – EDI limitations – SMART card – SMART card applications.

Books for Study:

1 Leon & Leon :Computer Application in Business
2. Dr.P. Rizwan Ahmed : Computer Application in Business with Tally
3. Mohan Kumar : Computer Application in Business
4. AnanthiSheshasayee : Computer Application in Business
5. Dr. R. Parameswaran :Computer Application in Business

Books for Reference:

1. Introduction to Information Technology:ITL ESL
2. Ramachandran N.T.M: Business Application using Computers.
3. ReemaThareja: IT and its application in Business.
4. Niranjan Shrivastava: Computer Applications in Management.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BA6005	**COMPANY LAW**	**4**	**1**	**2**

Instructional Objectives

1. ***To understand the concept behind the formation of companies.***
2. ***To highlights the laws governing the functioning of the Company***
3. ***To make students understand the raising of capital***
4. ***To make students understand the various types of Meeting.***

Unit-I	Introduction	10 Hours

Company –Definition- Characteristics of a Company - Types of Company, Private and Public Limited Company –Distinction between private and public company – Holding and Subsidiary Company – Government Company.

Unit-II	Articles of Association	15 Hours

Articles of Association – Meaning and contents of Articles of Association -Memorandum of Association – Meaning –Content of Memorandum of Association - Prospectus -meaning and contents - Statement in lieu of Prospectus.

Unit-III	Share Capital	15 Hours

Share Capital – Types of Share s –Equity Shares – Preference Shares – Types of Preference Shares – Debentures – Types of Debentures –Management of Company – Powers of Directors and Managing Director.

Unit-IV	Company Meetings	10 Hours

Company Meetings – Types of Meeting -Statutory, Annual General Body, Extraordinary General Body Meeting only) – Procedures for conducting meetings.

Unit-V	Winding up	10 Hours

Winding up of companies – Meaning – Modes of Winding up of a Company -Compulsory winding up under order of Court – Grounds for compulsory winding up – Voluntary Winding up of company – Types of voluntary winding up.

Books for Study:

1N D Kapoor : Company Law
2. R.R. Gupta and V.S.Gupta :Indian Company Law
3. Avtar Singh : Indian Company law
4. M.P. Tandon :Text Book of Company Law
5. Shukla :Company Law

Books for Reference:

1. Dr. M R Sreenivasan :Company Law
2. P C Tulsian : Company Law
3. RSN Pillai and Bagavathi :Company Law

L – Lecture, T – Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	P	T	C
U8BASBP6	**MS OFFICE (PRACTICALS)**	**2**	**-**	**1**

Instructional Objectives

1. ***To provide practical knowledge in the MS Word***
2. ***To provide practical knowledge in the MS Excel***
3. ***To provide practical knowledge in the MS Power Point.***

Total 30 Hours

(A) MS-WORD

1. Usage of Numbering, Bullets, Tools and Headers
2. Usage of Spell Check and Find and Replace
3. Text Formatting
4. Picture Insertion and Alignment
5. Mail Merge Concept
6. Creation of Tables, Formatting Tables
7. Splitting the Screen
8. Inserting Symbols in Documents

(B) MS-EXCEL

1. Changing of Column Width and Row Height (Column and Range of Column)
2. Moving, copying, Inserting and Deleting Rows and Columns
3. Creating Chart.
4. Using Excel Function (Date, Time)
5. Using Excel Function (Statistical Mathematics)
6. Using Excel Function (Financial)

(C) MS-POWER POINT

1. Working with Slides
2. Creating, saving, Running Slides
3. Adding Headers and footers
4. Changing slide layout
5. Working fonts and bullets
6. Inserting Clipart

DEPARTMENT OF COMMERCE
COURSE OUTCOMES
FOR SEMESTERS V &VI

COs	Sub Code: U8CO5001	Subject: Cost Accounting I
CO1	Understand and explain the nature, Scope of cost accounting, Financial Accounting Vs Cost Accounting Reconciliation of Cost and Financial Profits.	
CO2	Helps to gather knowledge on preparation of Inventory Control and its Techniques, Levels of stock	
CO3	Facilitate the idea and meaning of pricing of material issues and accounting for material losses	
CO4	Develop the knowledge about time and piece rate system, remuneration and incentives	
CO5	Understand and Evaluate the primary and secondary overheads, machine hour rate, labour hour rate.	

COs	Sub Code: U8CO5002	Subject: Management Accounting I
CO1	Identify the scope and importance of Management accounting and know about the difference between Management accounting and Financial accounting	
CO2	Spread the awareness about the Functions and duties of Management accountant and organisation of Management accounting	
CO3	Familiarize the students on the various tools available for financial statement analysis	
CO4	Understand the application of Ratio analysis and its advantages and limitations	
CO5	Describe the various classification of ratios and financial statement from ratios and other data	
CO6	Know the need and advantages and disadvantages of fund flow statement and impact the knowledge on the preparation of fund flow statement	
CO7	Explain the students with the concepts, importance about cash flow statement and know difference between fund flow and cash flow , and enhance the knowledge on the preparation of cash flow statement and equip the students well with the theoretical method of accounting for changing prices	

COs	Sub Code: U8CO5003	Subject: Income Tax Law & Practice I
CO1	Mastering the Basic Concepts in Income Tax	
CO2	Determination of Residential Status for any kind of Person	
CO3	Capable of understanding the computation of Income from Salaries	
CO4	Determination of Computation of Income from House Property	
CO5	Computing Business and Professional Income Computation	

COs	Sub Code: U8CO5004	Subject: Auditing
CO1	Evaluate the knowledge of students on Basic knowledge on Auditing, Audit Note Books and Audit Working Papers	
CO2	Make them learn the fundamentals of Internal Control, Internal Check and Internal Audit.	
CO3	Examine the students' intelligence on Procedures related to Vouching, Depreciation and Reserves	
CO4	Test whether students are familiar with valuation and verification process of Assets and Liabilities	
CO5	Assess the student's understanding on Comptroller and Auditor General of India.	
CO6	Evaluate the performance of students on Audit Report and make them prepare that.	
CO7	Examine that students get to know the latest trends in HRD Audit.	

COs	Sub Code: U8CO5005	Subject: Human Resource Management
CO1	Understand the concepts of Human Resource Management	
CO2	Able to do Human Resource Planning	
CO3	Understand the Sources of Recruitment and Selection Procedure	
CO4	Evaluate the Different Techniques of Training & Analyse the methods of Performance Appraisal	
CO5	Understand the various ways of solving the employee grievances	

COs	Sub Code: U8CO5006	Subject: Service Marketing
CO1	Understand and explain the nature and scope of services marketing.	
CO2	Be able to know the marketing of services in e-Commerce and e-Marketing.	
CO3	It will enable them to develop marketing strategies for various services marketing-mix measures.	
CO4	Be able to demonstrate how pricing concepts may be applied in marketing of services.	
CO5	Acquainted with better understanding of distribution and promotion of services.	
CO6	Students will be able to explain how wide range of services be marketed.	

COs	Sub Code: U8COSB51	Subject: E-Commerce
CO1	Define E-Business, E-Commerce, various current and emerging business models in E-Commerce, M-Commerce, O2O, IoT, Intelligent Assistants, Artificial Intelligence, Deep Learning & Machine Learning.	
CO2	Differentiate E-Commerce from Traditional Commerce,	
CO3	Enumerate the Features, Advantages & Disadvantages of E-Commerce	
CO4	Underline the Security Issues in E-Commerce and stress out the importance of security and privacy	
CO5	Define and Discuss the usage of Internet, WWW, TCP/IP, Domain Names, DNS, URL, Client/Server Computing, Mobile platform, Cloud Computing, The Web,	

	HTML, XML, RSS, Web Server, Web Client, Web Browser, Intranet, and Extranet
CO6	Define Online Shopping and discuss its modes of product delivery, modes of payment, advantages and disadvantages
CO7	Understand and Evaluate Government of India's Policy on FDI in E-Commerce
CO8	Trace the Origin & Evolution of E-Commerce and Project its Growth in the near future

COs	**Sub Code: U8CO6001**	**Subject: Cost Accounting II**
CO1	Preparation of Job, Batch and Contract Costing	
CO2	Preparation of Process Costing, by product and joint product	
CO3	Familiarizing the Treatment of service costing	
CO4	Acquainting with the preparation of standard Costing	
CO5	Knowing marginal Costing and cost audit	

COs	**Sub Code: U8CO6002**	**Subject: Management Accounting -II**
CO1	Equip the students well with the concepts, importance and methods of budgeting and to focus on the various types of budgets	
CO2	Compute the Master budget and demonstrate an understanding of the relationship between the components	
CO3	Make the students familiarize with the features , advantages and limitations of marginal costing and various techniques available in marginal costing	
CO4	Enhance the knowledge on cost volume profit analysis and impact the knowledge on pricing decision and make or buy decision	
CO5	Make the students learn various techniques in capital budgeting	
CO6	Impart the knowledge on the students with regard to working capital Management	
CO7	Develop the skills of the students as to Responsibility accounting , cost centres vs Responsibility centre and make the students know about the Management audit and how it will differ with financial audit and enhance the knowledge about conducting management audit	

COs	**Sub Code: U8CO6003**	**Subject: Income Tax Law & Practice II**
CO1	Mastering the Computation of Income from Capital Gains	
CO2	Determination of Income under the head Income from Other Sources	
CO3	Capable of using Clubbing Provisions and Set-off and Carry Forward Provisions	
CO4	Determination of Total Income and Taxability Computation	
CO5	Familiarising Filing of Return and Assessment Provisions	

COs	**Sub Code: U8CO6004**	**Subject: Financial Management**
CO1	Position the students to spell out the financial Management	
CO2	Teach them in such a way that they know to differentiate the profit maximization from wealth maximisation	
CO3	Enable the student calculate the cost of equity, preference share capital apart from learning cost of debt	
CO4	Evaluate the student's knowledge on techniques of planning the capital structure	
CO5	Teach the student to calculate overall leverages along with examples.	
CO6	Bring out the student's discussion on capital rationing	

CO7	Teach them various approaches to capital rationing

COs	Sub Code: U8CO6005	Subject: Entrepreneurial Development
CO1	Understand the context of entrepreneurial activities so as to undertake them in due course of time.	
CO2	Understand the entrepreneurial development programmes and role of Government in organising EDPs.	
CO3	Get an overview of key concept of project management and idea generation.	
CO4	Able to identify future business opportunities in different business environments.	
CO5	Have an insight into sources of finance and role of various agencies assisting entrepreneurs.	
CO6	Gain deeper understanding of incentives and subsidies available to entrepreneurs.	

COs	Sub Code: U8CO6006	Subject: Industrial Legislations
CO1	Understand the factories act 1948 and Health, safety, welfare measures.	
CO2	Make the students learn industrial disputes like Strikes and Lockouts, Layoff, Retrenchment and dispute settlement.	
CO3	Design and understand the calculation and payment of compensation under the Employees Compensation Act 1923.	
CO4	Understand the legal structure provided for social welfare under the Gratuity Act 1972.	
CO5	Acquaint with the basic framework of equal payment remuneration men and women worker	

COs	Sub Code: U8COSBP6	Subject: Commerce Practical
CO1	Fill up different forms related to Banking, Insurance, Cost Accounting, Income Tax and GST	
CO2	Prepare Office Communications such as Agenda, Minutes of the Meeting	
CO3	File electronically IT returns	
CO4	Register a firm under GST and file electronically its returns	
CO5	Drafting an Advertisement copy	

SEMESTER V

Course Code	Course Title	L	T	C
U8CO5001	COST ACCOUNTING I	5	1	5

Instructional Objectives

1. ***To understand the concepts of Cost Accounting***
2. ***To understand the accounting process, methods of control of material and labour cost***
3. ***To understand the classification, allocation, apportionment and absorption of overheads***

Unit-I	Introduction	15 Hours

Cost Accounting - Definition and Features - Nature and Scope – Objectives - Advantages and Limitations – Financial Accounting Vs Cost Accounting – Cost Concepts and Classifications – Requisites of a Good Costing System – Cost Sheet, Tender and Quotation – Target Costing - Reconciliation of Cost and Financial Profits.

Unit-II	Materials	15 Hours

Material Control – Inventory Control – Objectives, Advantages & Limitations – Essentials of Material Control – Inventory Control and its Techniques – Inventory Turnover Ratio – ABC Technique – Levels of Stock and EOQ – Perpetual Inventory System.

Unit-III	Pricing & Issue of Materials	15 Hours

Pricing of Material Issues – FIFO – LIFO – Simple and Weighted Average Method – Market Price Method – Store keeping and stock control – meaning and importance- location and layout of stores- centralized and decentralized stores – Accounting for material losses.

Unit-IV	Labour	15 Hours

Labour Turnover – Idle and Over time – Remuneration and Incentives – Time Rate System – Piece Rate System – Taylor's, Merrick's, Gantt's, Halsey and Rowan Plans – Calculation of Earnings of Workers.

Unit-V	Overheads	15 Hours

Overhead – Meaning - Classification - Importance – Allocation, Absorption and Apportionment of Overhead Costs – Primary and Secondary Distribution of Overheads – Computation of Machine Hour Rate and Labour Hour Rate.

Books for Study:

1. T.S. Reddy & Hari Prasad Reddy, Cost Accounting – Margham Publication, Chennai.
2. Murthy A & Gurusamy S, Cost Accounting, Vijay Nicole Imprints Pvt. Ltd. Chennai
3. S.P Jain and Narang, Cost Accounting – Kalyani Publishers, New Delhi.

4. S.N Maheswari, Principles of Cost Accounting – Sultan Chand & Sons, New Delhi.
5. S.P Iyengar, Cost Accounting _ Sultan Chand & Sons, New Delhi.

Books for Reference:

1. P.C Tulsian, Cost Accounting – Tata McGraw Hills, New Delhi.
2. Jhamb, H. V. Fundamentals of Cost Accounting. Ane Books Pvt. Ltd, New Delhi.
3. Singh, Surender. Elements of Cost Accounting, Kitab Mahal, Allahabad/New Delhi.
4. Arora, M. N. Cost and Management Accounting-Principles and Practice. Vikas Publishing House, New Delhi.
5. Lal, Jawahar & Seema Srivastava. Cost Accounting. McGraw Hill Publishing Co., New Delhi.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8CO5002	MANAGEMENT ACCOUNTING I	5	1	5

Instructional Objectives

1. ***To enable the students to understand the concept and various tools of Management Accounting.***
2. ***To access the financial status of the organization.***
3. ***To familiarize the students with various tools of Management Accounting.***

Unit-I	Introduction	15 Hours

Management Accounting – Meaning – Definition - Objectives – Functions - Nature & Scope – Advantages & Limitations – Management Accounting Vs. Financial Accounting – Functions of Management Accountant - Duties of Management Accountant.

Unit-II	Analysis and Interpretation	15 Hours

Financial Analysis – Types – Tools – Comparative Statements – Common Size Financial Statements – Trend Percentages.

Unit-III	Ratio Analysis	15 Hours

Ratio Analysis – Meaning - Definition – Advantages & Limitations of Ratio Analysis Classification of Ratios - Profitability Ratios - Turnover Ratios – Solvency / Financial Ratios – Preparation of Financial Statements from Ratios and other data.

Unit-IV	Fund Flow Statement	15 Hours

Fund Flow Statement - Meaning – Definition - Need – Advantages & Limitations – Statement of Changes in Working Capital – Calculation of Funds from Operation – Preparation of Fund Flow Statement (As per AS - 7)

Unit-V	Cash Flow Statement	15 Hours

Cash Flow Statement - Meaning – Definition – Objectives and Scope - Advantages and Limitations – Fund Flow Statement Vs Cash Flow Statement – Calculation of Cash From Operations - Preparation of Cash Flow Statement as per AS – 3 – Methods of Accounting for Changing Prices (Theory only)

Books for Study:

1. Management Accounting- R.S.N Pillai & V. Bhagavathi, Cost Accounting, S.Chand Publishing, New Delhi, 2008.
2. Management Accounting - Dr.Ramachandran and Dr.R.Srinivasan, Sri Ram Publication, Tiruchy.

3. T.S.Reddy & Y. Hari Prasad Reddy, Management Accounting, Margham Publications,
4. Sharma & Sasi K. Gupta, Management Accounting, Kalyani Publications, New Delhi.
5. Dr. A. Murthy & Dr. A. Guruswamy, Management Accounting, Vijay Nicole imprints Private Ltd., Chennai.

Books for Reference:

1. I M Pandey, Management Accounting, Vikas Publishing House, New Delhi.
2. S N. Maheswari, Management Accounting, Sultan Chand & Sons, New Delhi.
3. Khan and Jain, Management Accounting, Tata McGraw Hill, New Delhi.
4. Ravi M Kishore, Management accounting, Taxman Publications, New Delhi.
5. Robert S Kaplan and Anthony Atkinson, Advance Management Accounting, Prentice Hall, New Delhi.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8CO5003	INCOME TAX LAW & PRACTICE I	5	1	5

Instructional Objectives

1. ***To familiarize with Basic Concepts of Income Tax***
2. ***To understand the computation of Income from Salaries & House Property***
3. ***To learn the Business and Professional Income Computation***

Unit-I	Basic Concepts, Residential Status & Exempted Incomes	15 Hours

History of Income Tax in India - Basic Concepts – Income – Persons – Previous Year – Assessment Year – Assessee – Gross Total Income – Total Income – Determination of Residential Status – Scope of Total Income and Incidence of Tax – Incomes Exempt from Tax u/s 10.

Unit-II	Income from Salaries	15 Hours

Salary – Definition – Characteristics of Salary Income – Allowances – Perquisites – Profits in Lieu of Salary – Deductions from Salary Income – Provident Fund – Computation of Income from Salary.

Unit-III	Income from House Property	15 Hours

Income from House Property – Basis of Charge –Exemptions – Annual Value – Self-Occupied, Let-out and Deemed to be Let-Out Properties – Deductions u/s 24 – Computation of Income from House Property.

Unit-IV	Unit - IV: Profits and Gains of Business or Profession	15 Hours

Income from Business – Basis of Charge – Basic Principles – Specific Deduction under the Act – General Deductions – Specific Disallowances – Deemed Profits – Computation of Income from Business – Computation of Income from Profession.

Unit-V	Depreciation	15 Hours

Depreciation Allowance – Section 32 – Conditions for Claiming Depreciation – Block of Assets – Computation of Normal Depreciation Allowance – Additional Depreciation – Conditions and Rates of Depreciation – Meaning of Actual Cost – Unabsorbed Depreciation – Terminal Depreciation – Balancing Charge.

Books for Study:

1. Gaur & Narang, Income Tax Law and Practice, Kalyani Publishers, New Delhi.
2. Murthy A, Income Tax, Vijay Nicole Imprints Private Ltd., Chennai.

3. Girish Ahuja & Ravi Gupta, Practical Approach to Income Tax, Wolters Kluwer India Pvt. Ltd., Mohali, Chandigarh.
4. Vinod K Singhania & Monica Singhania, Students' Guide to Income Tax, Taxmann, New Delhi.
5. Anita Raman, Income Tax Theory, Law & Practice, Mc Graw Hill, New Delhi.

Books for Reference:

1. Mehrotra H C, Income Tax Law and Practice, Sahithya Bhavan, Agra.
2. Hariharan N, Income Tax Law & Practice, Vijay Nicole Imprints Pvt.Ltd., Chennai.
3. Vinod K Singhania & Kapil Singhania Direct Taxes Law & Practice -With special reference to Tax Planning, Taxmann, New Delhi.
4. Master Guide to Income Tax Rules, Taxmann, New Delhi.
5. Income Computation & Disclosure Standards, Taxmann, New Delhi.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8CO5004	AUDITING	5	1	5

Instructional Objectives

1. ***To impart the knowledge on Practice of Auditing in modern era.***
2. ***To get the students equipped with Computerized Audit and teach them about the recent developments in it.***
3. ***To teach the students about the mode of preparation of Audit Report.***

Unit-I	Auditing, Audit Note Book and Audit Working Papers	15 Hours

Auditing: Definition – Objectives – Merits and Demerits - Types of Audit, Audit Note Book: Importance – Contents, Audit Working Papers: Contents – Characteristics.

Unit-II	Internal Control, Internal Check and Internal Audit	15 Hours

Internal Control: Definition – Objectives , Internal Check: Definition - Objectives - Principles - Internal Audit: Purpose – Differences between Internal Audit and Internal Check

Unit-III	Vouching, Depreciation, Reserves and Provisions	15 Hours

Vouching: Definition – Objectives - Vouching of Trading Transactions - Depreciation: Auditors' Duties in respect of Depreciation – Reserves & Provisions: Meaning – Definition - Classification.

Unit-IV	Verification, Valuation and Company Audit	15 Hours

Verification of Assets and Liabilities – Distinction Between Verification and Valuation – Company's Audit: Qualification and Disqualification of a Company Auditor – Rights and Duties.

Unit-V	Audit Report, Digital Audit and HRD Audit	15 Hours

Audit Report: Definition - Importance – Contents, Digital Audit: Definition – Uses - HRD Audit: Definition – Features – Objectives - Comptroller & Auditor General (CAG) of India.

Books for Study:

1. Kamal Gupta, Contemporary Auditing –Tata Mc Graw Hill. New Delhi.
2. B.N. Tandon, Practical Auditing –S Chand and Co., New Delhi.

3. S.K. Basu, Fundamentals of Auditing – Pearson Indian Publication, New Delhi
4. S. Vengadamani, Practical Auditing – Margham Publication, Chennai, Tamil Nadu
5. Jagadish Prakash, Auditing Principles, Practices and Problems – Kalyani Publishers, Tamil Nadu

Books for Reference:

1. Dr. K. Sundar, Auditing –Vijay Nicole Imprints Private Limited, Chennai.
2. V.H. Kishadwala, Auditing Principles and Practices –Sultan Chand & Sons, New Delhi.
3. Dr. L. Natarajan, Practical Auditing – Margham Publication, Chennai, India
4. D P. Jain, Auditing –Konark Publishers Pvt. Limited.
5. Pankaj Kumar Roy, Auditing – Oxford University Press, India

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8CO5005	HUMAN RESOURCE MANAGEMENT	4	1	2

Instructional Objectives

1. ***To familiarize students with various concepts and techniques of HRM***
2. ***To impart knowledge on Human Resource Planning, Recruitment, Selection and Training***
3. ***Analyse the Methods of Performance Appraisal***

Unit-I	Introduction to HRM	12 Hours

Human Resource Management - Definition - Characteristics – Scope – Objectives – Importance – Functions – Personnel Management vs Human Resource Management – HRM in a Changing Environment.

Unit-II	Human Resources Planning, Recruitment and Selection	12 Hours

HR Planning - Definition - Need and Importance – Steps in HR Planning – Job Analysis – Job Description – Job Specification. Recruitment: Definition – Sources. Selection: Meaning - Selection Process.

Unit-III	Induction, Training and Development	12 Hours

Meaning of Placement and Induction - Training - Need and Importance – Methods and Techniques – Executive Development – Methods and Techniques – Training vs Development.

Unit-IV	Performance Appraisal	12 Hours

Performance Appraisal – Objectives – Uses – Methods - Traditional and Modern Methods – Performance Appraisal vs Potential Appraisal.

Unit-V	Discipline and Grievances	12 Hours

Employee Discipline- Types of Discipline – Causes of Indiscipline – Employee Grievances – Features - Gender Discrimination at Workplace – Causes of Grievances – Grievance Redressal System.

Books for Study:

1. C.B. Gupta, Human Resource Management, Sultan Chand and Sons, New Delhi.
2. J. Jayasankar, Human Resources Management, Margham Publications, Chennai.
3. Garry Dessler, Human Resource Management, Pearson Education, New Delhi
4. Biju Varkkey, Human Resource Management, Mc Graw Hill, New Delhi
5. K. Aswathappa, Human Resopurce Management, Mc Graw Hill, New Delhi

Books for Reference:

1**.** Dr. Neeru Kapoor, Human Resource Management, Taxmann's Publication, New Delhi.

2. K. Sundar & J. Srinivasan, Essentials of Human Resource Management, Vijay Nicole Imprints Private Ltd., Chennai.

3. S.S Khanka, Human Resource Management, S. Chand Publishing, New Delhi.

4.Dr. Neeru Vasisth & Dr. Vibhuti Vasishth, Fundamentals of Human Resource Management, Taxmann's Publication, Odisha

5. John M. Ivancevich, Human Resource Management, McGraHill Education, New Delhi.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8CO5006	SERVICE MARKETING	4	1	2

Instructional Objectives

1. ***To develop an understanding of services marketing***
2. ***To develop an understanding of services marketing mix, pricing of services.***
3. ***To acquaint the students to gain expert knowledge in marketing of various services.***

Unit-I	Introduction	12 Hours

Nature of Services – Meaning – Definition – Characteristics – Difference between Goods and Services – Classification of Services – Contribution of Service Sector to the Indian Economy. Services Marketing – Concept of Services Marketing – Need for Services Marketing – Service Marketing in e-Commerce and e-Marketing.

Unit-II	Service Marketing Mix and Service Product	12 Hours

Service Marketing Mix - Definition – 7Ps of Services Marketing - Concept of Service Product – Planning and Creating of Services – Identifying and Classifying Supplementary Services – Product Life Cycle – Branding of Services – New Service Development (NSD).

Unit-III	Pricing of Services	12 Hours

Pricing of Services - Objectives – Factors Affecting Pricing Decisions – Approaches to Pricing of Services – Methods of Pricing – Problems in Pricing of Services.

Unit-IV	Distribution and Promotion of Services	12 Hours

Distribution in a Service Context – Service Location Decision – Options for Service Delivery – Service Delivery in Cyberspace – Role of Intermediaries – Distribution Channels – Promotional Objectives – Sales Promotion Tools.

Unit-V	Marketing of Services	12 Hours

Overview of Different Service Sectors – Marketing of Services - Education Services – Retailing Service - Online Services – IT Services – Event Management Services - Public Utility Services – Social Services by NGOs.

Books for Study:

1. Dr. Natrajan L, Services Marketing, Margham Publications, Chennai.
2. Khan M Y, Services Marketing, Tata McGraw Hill, New Delhi.
3. Dr. Balaji B, Services Marketing and Management, S. Chand & Company Ltd., New Delhi.
4. Jain N C and Saakshi – Services Marketing, AITBS Publisher, New Delhi.
5. Jha S M, Services Marketing, Himalaya Publishing House, Mumbai.

Books for Reference:

1. Valarie A. Zeithmal & Mary JoBitner, Services Marketing, New Delhi, Tata Mcgraw Hill Publishing Co.
2. Rao, Services Marketing, Pearson Education.
3. Nargundkar, Rajendra, Services Marketing, Tata McGraw Hill.
4. Ravi Shankar, Services Marketing, Excel Publishing.
5. Lovelock, Christopher, Services Marketing, Prentice Hall.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8COSB51	E-COMMERCE	2	1	1

Instructional Objectives

1. ***To explain the concepts of E-Commerce***
2. ***To familiarise students the technology behind E-Commerce***
3. ***To impart knowledge on future tools and techniques related to E-Commerce***

Unit-I	Introduction to E-Commerce	6 Hours

E-Business – E-Commerce – Features – Components – Advantages – Limitations – Security Issues – E-Commerce vs. Traditional Commerce

Unit-II	E-Commerce Models	6 Hours

Models based on Transacting Parties – B2B – B2C – C2C – B2G – G2B – G2C- Models based on Transaction type – Definition of Storefront, Marketplace, Online Auction, Online Advertising, Info-mediary, Online Brokerage, Freemium, Virtual Communities, Subscription, Access Charge Models

Unit-III	E-Commerce Infrastructure	6 Hours

Internet – WWW - Packet Switching – TCP/IP – Domain Names – DNS – URL – Client/Server Computing – Mobile platform – Cloud Computing – The Web – HTML – XML – RSS – Web Server – Web Client – Web Browser – Intranet – Extranet. **(Basic Concepts only: Definitions & Uses)**

Unit-IV	EDI & Online Shopping	6 Hours

EDI – Scope – Components – Process – Benefits - Online Shopping & E-Tailing – Product Delivery modes – Advantages – Disadvantages – Modes of Payment

Unit-V	E-Commerce: Past, Present & Future	6 Hours

E-Commerce - Evolution & Growth – Future Prospects – Government of India's Policy on FDI in E-Commerce - Definitions of Modern Terminology : M-Commerce – O2O – IoT – Intelligent Assistants – Artificial Intelligence, Deep Learning & Machine Learning.

Books for Study:

1. K. Abirami Devi & Dr. M. Alagammai, E-Commerce, Margham Publications, Chennai.
2. Kenneth C. Laudon & Carol Guercio Traver, E-Commerce, Pearson Education India, Delhi
3. P.T.Joseph, S.J., E- Commerce – An Indian Perspective, Prentice Hall of India, New Delhi.
4. Dr. S. V. Srinivasa Vallabhan, E-Commerce, Vijay Nicole Imprints Pvt Ltd, Chennai
5. Dr. P. Rizwan Ahmed, E- Business & E- Commerce, Margham Publications, Chennai.

Books for Reference:

1. Elias M. Awad, Electronic Commerce, Prentice Hall of India, New Delhi.
2. Gary P.Schneider, E-Commerce – Strategy, Technology and Implementation, Cengage Learning India Pvt. Ltd., New Delhi.
3. Greenstein & Merylin, Electronic Commerce, Tata Mc.Graw Hill, New Delhi.
4. Rahul Srivastava & U S Pandey, E-Commerce and Mobile Commerce Technologies, S. Chand & Co. Ltd. New Delhi
5. Manjot Kaur, Fundamentals of E-Commerce, Kalyani Publishers, Ludhiana

Electronic & Web Resources

1. Consolidated FDI Policy Circular of 2017, Website of Department for Promotion of

Industry and Internal Trade, Government of India, https://dipp.gov.in/sites/default/files/cfpc_2017_final_released_28.8.17_0.pdf
2. Press Note No. 2 (2018): Review of the Policy on FDI in E-Commerce, Website of Department for Promotion of Industry and Internal Trade, Government of India, https://dipp.gov.in/sites/default/files/pn2_2018.pdf
3. Wikipedia Page on E-Commerce, https://en.wikipedia.org/wiki/E-commerce

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8CO6001	COST ACCOUNTING II	5	1	5

Instructional Objectives

1. ***To make an understanding of Job, Contracts and Process costs***
2. ***To enable students to understand the procedure for Service Costing***
3. ***To familiarise decisions related to different business situations using Standard Costing.***

Unit-I	Job & Batch Costing	15 Hours

Job Costing – Definition and Features – Distinction between Job Costing and Contract Costing – Cost Accumulation - Batch Costing – EBQ.

Unit-II	Contract Costing	15 Hours

Contract Costing – Definition – Features – Work Certified and Uncertified – Incomplete Contract – Escalation Clause – Cost Plus Contract and Contract Account.

Unit-III	Process Costing	15 Hours

Definition and Features – Advantages and limitations– Job Costing vs Process Costing – Normal Loss and Abnormal Loss – Abnormal Gain – By Product and Joint Products – Process Accounts.

Unit-IV	Service Costing	15 Hours

Operating Cost Units – Operating Costing in some Service Industries – Transport Costing – Advantages of Operating Costing in Transport Organisation – Costing Procedure in Transport Organisation – Costing for Lodging Houses, Hotels and Tourism.

Unit-V	Standard Costing	15 Hours

Standard Costing - Advantages and Limitations – Analysis of Variances – Direct Material – Direct Labour and Overhead.

Books for Study:

1. T.S. Reddy & Hari Prasad Reddy, Cost Accounting – Margham Publication, Chennai.
2. Murthy A & Gurusamy S, Cost Accounting, Vijay Nicole Imprints Pvt. Ltd. Chennai
3. S.P Jain and Narang, Cost Accounting – Kalyani Publishers, New Delhi.
4. S.N Maheswari, Principles of Cost Accounting – Sultan Chand & Sons, New Delhi.
5. S.P Iyengar, Cost Accounting _ Sultan Chand & Sons, New Delhi.

Books for Reference:

1. P.C Tulsian, Cost Accounting – Tata McGraw Hills, New Delhi.
2. Jhamb, H. V. Fundamentals of Cost Accounting. Ane Books Pvt. Ltd, New Delhi.
3. Singh, Surender. Elements of Cost Accounting, Kitab Mahal, Allahabad/New Delhi.
4. Arora, M. N. Cost and Management Accounting-Principles and Practice. Vikas Publishing House, New Delhi.
5. Lal, Jawahar & Seema Srivastava. Cost Accounting. McGraw Hill Publishing Co., New Delhi.

SEMESTER VI

Course Code	Course Title	L	T	C
U8CO6002	MANAGEMENT ACCOUNTING II	5	1	5

Instructional Objectives

1. ***To enable the students to understand the concept and various tools of Management Accounting.***
2. ***To learn about budgeting tactics and implementation***
3. ***To familiarize the students with various tools of Management Accounting.***

Unit-I	Budget & Budgetary Control	15 Hours

Meaning and Definition - Objectives - Advantages - Limitations – Classification of Budgets – Zero Based Budgeting – Preparation of Sales Budget –Material Budget- Production Budget – Cash Budget – Flexible Budget – Master Budget.

Unit-II	Marginal Costing	15 Hours

Marginal Costing – Meaning – Definition – Features – Advantages & Limitations – Cost-Volume-Profit Analysis – Break Even Point – Margin of Safety – Pricing Decision – Make or Buy Decision – Product Mix – Key Factors.

Unit-III	Capital Budgeting	15 Hours

Capital Budgeting – Meaning- Definition- Features – Need and Significance – Evaluation of Capital Budgeting Proposals – Pay Back Period (PBP) – Accounting Rate of Return (ARR) – Discounted Cash Flows – Net Present Value (NPV) – Internal Rate of Return (IRR) – Profitability Index Method (PIM).

Unit-IV	Working Capital Management	15 Hours

Meaning – Need and Objectives of Working Capital – Types of Working Capital – Sources of Working Capital – Advantages & Limitations - Determination of Working Capital Needs.

Unit-V	Responsibility Accounting and Management Audit	15 Hours

Responsibility Accounting - Meaning – Definition- Steps- Advantages –Cost centres Vs. Responsibility centres - Management audit- Meaning-Objectives – Need–Difference between Financial Audit and Management Audit – Conducting Management Audit.

Books for Study:

1. Management Accounting, R.S.N Pillai & V. Bhagavathi, S.Chand Publishing, New Delhi, 2008.
2. Management Accounting, Dr.Ramachandran and Dr.R.Srinivasan, Sri Ram Publication, Tiruchy.
3. T.S.Reddy & Y. Hari Prasad Reddy, Management Accounting, Margham Publications,
4. Dr. A. Murthy & Dr. A. Guruswamy, Management Accounting, Vijay Nicole imprints Private Ltd., Chennai.
5. Sharma & Sasi K. Gupta, Management Accounting, Kalyani Publications, New Delhi.

Books for Reference:

1. S N. Maheswari, Management Accounting, Sultan Chand & Sons, New Delhi.
2. Khan and Jain, Management Accounting, Tata McGraw Hill, New Delhi.
3. I M Pandey, Management Accounting, Vikas Publishing House, New Delhi.
4. Ravi M Kishore, Management accounting, Taxman Publications, New Delhi.
5. Robert S Kaplan and Anthony Atkinson, Advance Management Accounting, Prentice Hall, New Delhi.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8CO6003	INCOME TAX LAW & PRACTICE II	5	1	5

Instructional Objectives

1. ***To learn the computation of income from Capital Gains and Other Sources of Income***
2. ***To know the Clubbing Provisions, Set-Off & Carry Forward Provisions***
3. ***To learn the assessment of Individuals, their Taxability, Filing of Returns and Assessment Provisions***

Unit-I	Capital Gains	15 Hours

Capital Gains and its Computation – Capital Assets – Definition – Exceptions – Short-term and Long-term Capital Assets – Transfer – Exceptions – Computation of Capital Gain – Indexed Cost – Deductions under Section 54.

Unit-II	Income from Other Sources	15 Hours

Income from Other Sources and its Computation – Specific Incomes and Other Incomes – Deductions.

Unit-III	Clubbing of Income, Set-Off and Carry forward & Set-Off of Losses	15 Hours

Clubbing of Income (Aggregation of Income) – Deemed Incomes - Set-Off, Carry Forward and Set-Off of Losses.

Unit-IV	Assessment of Individuals and Taxability	15 Hours

Deductions from Gross Total Income – Deductions in respect of Certain Payments and Deductions in respect of Certain Incomes (80C to 80U). Computation of Taxable Income of an Individual – Computation of Tax Liability.

Unit-V	Filing of Return of Income and Assessment	15 Hours

Procedure for Filing of Return of Income – E-Filing – Due Date of Filing of Return – PAN – Types of Assessment– Self Assessment – Regular Assessment – Best Judgment Assessment and Income Escaping Assessment.

Books for Study:

1. Gaur & Narang, Income Tax Law and Practice, Kalyani Publishers, New Delhi.
2. Murthy A, Income Tax, Vijay Nicole Imprints Private Ltd., Chennai.
3. Girish Ahuja & Ravi Gupta, Practical Approach to Income Tax, Wolters Kluwer India Pvt. Ltd., Mohali, Chandigarh.
4. Vinod K Singhania & Monica Singhania, Students' Guide to Income Tax, Taxmann, New Delhi.
5. Anita Raman, Income Tax Theory, Law & Practice, Mc Graw Hill, New Delhi.

Books for Reference:

1. Mehrotra H C, Income Tax Law and Practice, Sahithya Bhavan, Agra.
2. Hariharan N, Income Tax Law & Practice, Vijay Nicole Imprints Pvt.Ltd., Chennai.
3. Vinod K Singhania & Kapil Singhania Direct Taxes Law & Practice -With special reference to Tax Planning, Taxmann, New Delhi.
4. Master Guide to Income Tax Rules, Taxmann, New Delhi.
5. Income Computation & Disclosure Standards, Taxmann, New Delhi.

SEMESTER VI

Course Code	Course Title	L	T	C
U8CO6004	FINANCIAL MANAGEMENT	5	1	5

Instructional Objectives

1. ***To impart the knowledge on basic concepts and fundamentals of Financial Management***
2. ***To convey the subject knowledge on calculation of Cost of Capital, Value of firm under different capital structure theories***
3. ***To make the students familiarize with the concept and scope of capital rationing and Leverages***

Unit-I	Introduction	15 Hours

Financial Management – Definition – Scope – Objectives – Significance - Profit Maximization vs Wealth Maximization – Finance Function - Role of Financial Manager – Methods and Tools of Financial Management.

Unit-II	Cost of Capital	15 Hours

Meaning – Importance - Components of Cost of Capital – Factors determining Cost of Capital – – Cost of Debt – Cost of Equity – Cost of Redeemable Preference Share (excluding Dividend Yield Method) – Computation of Cost of Capital.

Unit-III	Capital Structure	15 Hours

Capital Structure – Definition – Optimum Capital Structure – Features of an Appropriate Capital Structure – Factors Determining Capital Structure – Techniques of Planning the Capital Structure - Capital Structure Theories – Net Income Approach – Net Operating Income Approach.

Unit-IV	Leverages	15 Hours

Leverage – Definition – Types – Operating Leverage – Degree of Operating Leverage – Financial Leverage – Degree of Financial Leverage - Combined Leverage.

Unit-V	Capital Rationing	15 Hours

Capital Rationing: Definition – Importance – Types - Steps Involved in Capital Rationing - Variopus Aproaches to Capital Rationing

Books for Study:

1. Maheshwari S N, Financial Management, Sultan Chand & Sons, New Delhi.
2. Murthy A, Financial Management, Margham Publications, Chennai.
3. Khan M Y & Jain P K, Financial Management, Tata McGraw Hill Publishing Co., New Delhi.
4. Periasamy, Financial Management – Vijay Nicole Imprints, Chennai
5. Paramasivam C, Subramanian T, Financial Management – New Age International Publishers, New Delhi.

Books for Reference:

1. Bhalla V K, Financial Management, S.Chand Publishing, New Delhi.
2. Pandey I M, Financial Management, Vikas Publishing House, New Delhi.
3. Srinivasan& Periasamy, Financial Management - Vijay Nicole Imprints, Chennai
4. M.R. Agarwal, Financial Management – Garima Publication, Rajasthan
5. Anil Kumar Dhagat, Financial Management – Dreamtech Press India Pvt. Ltd, New Delhi

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8CO6005	ENTREPRENEURIAL DEVELOPMENT	4	1	2

Instructional Objectives

1. ***To provide an understanding of basic concept in the area of entrepreneurship***
2. ***To expose students to the idea generation, creating awareness of business opportunities, and familiarizing them with formal practices in effective project formation.***
3. ***To provide insights to students on entrepreneurial finance and role of various government agencies in assisting entrepreneurship.***

Unit-I	Introduction	12 Hours

Entrepreneur and Entrepreneurship – Concept – Definition - Classification of Entrepreneur – Women Entrepreneur - Functions of an Entrepreneur - Traits of successful Entrepreneur - Entrepreneurs Vs Professional Managers – Role of an Entrepreneur in Economic Development - Future challenges.

Unit-II	Entrepreneurial Development	12 Hours

Entrepreneurial Development Programmes – Meaning - Evolution and Objectives of EDP - Institutional efforts to develop Entrepreneurship - National Skill Development Corporation (NSDC) - Role of Government in Organising EDPs - Operational Problem of EDPs.

Unit-III	Project Management and Idea Generation	12 Hours

Project Management - Project Identification - Project Formulation - Project Design and Network Analysis – Overview of Project Appraisal - Project Report - Identification and Selection of Business Opportunity – Idea Generation – Overview of Techniques used for Idea Generation. - Individual creativity.

Unit-IV	Entrepreneurial Finance and Development Agencies	12 Hours

Sources of Finance – Commercial Banks and Development Banks - Role of Agencies in assisting Entrepreneurship - District Industries Centers (DIC), Small Industries Service Institute (SISI), Entrepreneurship Development Institute of India (EDII), National Institute of Entrepreneurship & Small Business Development (NIESBUD), National Entrepreneurship Development Board (NEDB).

Unit-V	Unit – V: Government Policies and Benefits	12 Hours

Tax Benefits – Tax Holidays – Allowance for deducting Depreciation – Rehabilitation Allowance – Benefits available for MSMEs: PMEGP – NEEDS – UYEGP.

Books for Study:

1. Dr. S.S. Khanka, Entrepreneurship Development - S. Chand & Co., New Delhi.
2. Jayashree Suresh, Entrepreneurial Development –Margham Publication, Chennai.
3. Vasant Desa, Dynamics of Entrepreneurial Development –Himalaya Publication.
4. Robert D. Hisrich, Michael P. Peters & Dean A. Shepherd, Entrepreneurship - Tata McGraw Hill Publishing Company Limited, New Delhi.
5. Ravindranath V. Badi & Narayana, Entrepreneurship, Vrinda Publication (P) Ltd, New Delhi.

Books for Reference:

1. Rabindra N. Kanungo, Entrepreneurship and Innovation, Sage Publications, New Delhi.
2. Holt D. H., Entrepreneurship New Venture Creation. New Delhi: Prentice Hall of India.

3. Hisrich R, and Peters, M., Entrepreneurship. New Delhi: Tata McGraw Hill.

4. Rajkonwar A.B., Entrepreneurship, Kalyani Publisher, Ludhiana.

5. Charantimath, Poornima, Entrepreneurship Development and Small Business Enterprises, Pearson Education, New Delhi.

Webliography

1. Website of Commissionerate of Industries and Commerce, Micro, Small and Medium Enterprises Department, Government of Tamilnadu,**http://www.indcom.tn.gov.in/pmegp.html**
2. Website of Commissionerate of Industries and Commerce, Micro, Small and Medium Enterprises Department, Government of Tamilnadu,**http://www.indcom.tn.gov.in/needs.html**
3. Website of Commissionerate of Industries and Commerce, Micro, Small and Medium Enterprises Department, Government of Tamilnadu, **http://www.indcom.tn.gov.in/uyegp.html**

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8CO6006	INDUSTRIAL LEGISLATIONS	4	1	2

Instructional Objectives

1. ***To familiarize the students with the concepts and provisions of legislations related to industries***
2. ***To understand the health, safety and welfare measures available to the workers***
3. ***To understand the legal structure provided for social welfare under The Payment of Gratuity Act, 1972.***

Unit-I	**The Factories Act, 1948**	**12 Hours**

The Factories Act: Definitions – Health – Safety – Welfare – Working Hours – Special Provisions for Women and Young Children - Annual Leave with Wages – Penalties.

Unit-II	**The Industrial Disputes Act, 1947**	**12 Hours**

The Industrial Disputes Act: Industrial Dispute - Objectives - Definitions - Strikes and Lockouts - Layoff – Retrenchment – Closure - Special Provisions - Unfair Labour Practices – Dispute Settlement Machinery.

Unit-III	**The Workmen's Compensation Act, 1923**	**12 Hours**

The Workmen's Compensation Act: Workman's Compensation – Scope - Defences available to Employers before Passing of the Act – Rules - Defenses available to Employees – Amount of Compensation –Occupational Diseases.

Unit-IV	**The Payment of Gratuity Act, 1972 & The EPF & Miscellaneous Provisions Act, 1952**	**12 Hours**

The Payment of Gratuity Act: Gratuity - Scope - Definitions - Payment of gratuity - Compulsory Insurance and Protection of Gratuity - Determination and Evaluation of Gratuity - Obligation and Rights of Employee and Employer - Penalties. The EPF & MP Act - Definitions – EPF schemes NPS - CPF – Fund – Employees Deposit Linked Insurance Scheme.

Unit-V	Equal Remuneration Act, 1976	12 Hours

Equal Remuneration Act: Definitions -Payment of Remuneration at Equal Rates to Men and Women Workers and Other Matters -Duty of employers to maintain registers - Inspectors - Penalties - Offences by companies - Act not to apply in certain special cases.

Books for Study:

1. N.D. Kapoor , A Handbook on Industrial Laws, Sultan Chand & Sons, New Delhi, 2005.
2. Dr.M.R.Sreenivasan & C.D Balaji, Industrial Law & Public Relations, Margham Publications, Chennai.
3. S.C.Srivastava, Vikas Publications House Pvt Ltd., New Delhi
4. Sumeet Malik, Industrial Laws, Eastern Book Company, Lucknow, 2008.
5. Sinha P.R.N., SinhaInduBala&ShekharSeemaPriyadarshini, Industrial Relations,Trade Unions and Labour Legislation, PHI, 2012.

Books for Reference:

1. Arora Sushma, and Arora R., Industrial Laws, Taxmann Pvt Ltd.
2. Malik, K. L., Industrial Laws and Labour Laws, Eastern Book Company, Lucknow.
3. Bhushan, Bharat. Kapoor, N.D., Abbi, Rajni, "Elements of Industrial Law", Sultan Chand & Sons Pvt. Ltd.
4. Sharma, J. P. (2018). Simplified Approach to Labour Laws. Bharat Law House Pvt. Ltd., New Delhi
5. Singh, Avtar, Introduction to Labour and Industrial Laws.Nagpur, Wadhwa and Company.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	P	T	C
U8COSBP6	COMMERCE PRACTICAL	2	1	1

Instructional Objective

1. ***To impart practical knowledge in filling up of different forms related to Banking & Insurance sector***
2. ***To prepare Business Documents***
3. ***To file Income Tax and Goods & Services Tax Returns electronically***

LIST OF EXPERIMENTS

Unit – I

1. Preparation of Invoice, Receipts, Voucher, Delivery Challan, Entry Pass, Gate Pass - Debit and Credit Notes.
2. Preparation of transaction from the Receipts, Vouchers - Credit Notes and Debit Notes.
3. Preparation of Application for Shares and Allotment - Letter for Share Transfer forms.

Unit – II

4. Drawing, Endorsing and Crossing of Cheques - Filling up of Pay in Slips – Demand Draft Application and Preparation of Demand Drafts.
5. Making entries in the Pass Book and Filling up of Account Opening Forms for SB account, Current Account and FDR's.
6. Drawing and Endorsing of Bills of Exchange and Promissory Notes.

Unit – III

7. E-Filing of Income Tax Returns
8. Filling up Loan Application Forms and Deposit Challan.
9. Filling up Jewel Loan Application Form, procedure for releasing of Jewellery in Jewel Loans and Repayment.

Unit – IV

10. Preparation of Agenda and Minutes of Meetings-both General Body and Board of Directors.
11. Using Bin Card and Inventories.
12. Using Cost Sheets.

Unit – V

13. Filling up of an Application Form for LIC policy, Filling up of the Premium Form - Filling up the Challan for Remittance of Premium.
14. Preparation of an Advertisement Copy, Collection of Advertisements in Dailies and Journals, Critically Evaluating the Advertisement Copy.
15. E-Filing of GST Returns (Registration of firms under GST ACT- Procedure)

NOTE: Students may be requested to collect original or Photocopies of the documents and affix them on the record note book after having filled up. Drawing of the documents should not be insisted.

P - Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

DEPARTMENT OF COMMERCE [FINANCE & ACCOUNTS]
COURSE OUTCOMES
FOR SEMESTERS V & VI

COs	**Subject Code: U8FA5001**	**Subject: Income Tax Law & Practice - I**
CO1	Students learn about the fundamentals of Income tax and its terminologies	
CO2	Knowing how to calculate the income under the head Salary.	
CO3	Learning the way of calculating income under the head House property.	
CO4	Comprehensive knowledge on the allowable and disallowable expenses and provisions relating to income from business and profession.	
CO5	Gaining the knowledge the depreciation concept under income Tax Act 1961.	

COs	**Subject Code: U8FA5002**	**Subject: Cost Accounting - I**
CO1	It enhances student's knowledge on Basic concepts in Cost Accounting and knows how to differentiate the financial accounting from cost accounting.	
CO2	This unit will make students become familiar with cost components such as ABC and EOQ.	
CO3	Students are taught how to compute price the materials under various methods such as FIFO, LIFO, Simple and Weighted Average Methods.	
CO4	Students will get to know about how to calculate labour turnover, idle time and overtime. This enables the students apply various plans in order to calculate earnings of wages	
CO5	It describes about all overhead namely allocation, absorption and Apportionment of overhead cost.	

COs	**Subject Code: U8FA5003**	**Subject: Management Accounting**
CO1	Students familiarize the concepts of management accounts and its techniques.	
CO2	Familiarized the importance of ratio analysis in business.	
CO3	Student attains expertise about the fund flow analysis.	
CO4	Gain knowledge on calculation of cash flow analysis.	
CO5	Comprehend the preparation of budget and budgetary control techniques.	

COs	**Subject Code: U8FA5004**	**Subject: Human Resources Management**

CO1	Comprehend human resource management function and issues to tackle evolving challenges
CO2	Understand the job analysis, process of recruitment and steps in selection process
CO3	Craft policies to acquire, develop, motivate and retain human resources by training
CO4	Performance appraisal of employees to fix pay, compensation, profit sharing , fringe benefits etc.
CO5	Appreciate the dynamics of industrial relations and to manage them i.e., maintaining and retaining process

COs	**Subject Code: U8FA5005**	**Subject: Marketing Management**
CO1	Understand the marketing concepts and its environment.	
CO2	Exposure on segmentations and consumer behaviour and its theories.	
CO3	Acquire knowledge on product planning and product life cycle.	
CO4	Understand the concept of pricing and various methods of promotions.	
CO5	Gain the knowledge on choice of channels of distribution.	

COs	**Subject Code: U8FA5006**	**Subject: Business Environment**
CO1	Provide knowledge about the various forms of Business Environment.	
CO2	Gaining knowledge about the role of social Environment in Business.	
CO3	Comprehensive knowledge about the various legal environments followed in business.	
CO4	Knowing the impact of Economic Environment in business.	
CO5	Familiar with the role of Financial Environment in business.	

COs	**Subject Code: U8FASB51**	**Subject: Fundamentals of Islamic Finance**
CO1	Learn the fundamental concepts of Islamic Law or Shariah.	
CO2	Understand the major prohibitions in Islamic finance (Riba, Gharar, Maysir and Qimar).	
CO3	Possess the knowledge of Islamic Law of contracts.	
CO4	Familiar with various classification of contract under Shariah.	
CO5	Obtain comprehensive understanding of principles of Islamic financial System.	

COs	**Subject Code: U8FA6001**	**Subject: Income Tax Law & Practice - II**
CO1	Students familiarize the calculation of income under capital gains and its provisions.	
CO2	Gaining the knowledge about those incomes which are treated as Income from other sources.	
CO3	Enhancing the knowledge on the Clubbing of Income and Set off and carry forward of losses.	
CO4	Knowing the various deductions applicable for Assessee.	
CO5	Awareness about the various Income tax authorities and procedure of filling of return.	

COs	**Subject Code: U8FA6002**	**Subject: Cost Accounting - II**

CO1	It enhances student's knowledge on Job, Batch and Contract Costing. Ensure whether students have gained knowledge on said topics.
CO2	This unit will make students become familiar with process costing and it s importance
CO3	This section is very crucial wherein students are taught to calculate the operating cost and transport costing.
CO4	This unit enables the students to prepare marginal costing and its various techniques.
CO5	This unit helps students calculate variance analysis and standard costing.

COs	**Subject Code: U8FA6003**	**Subject: Financial Management**
CO1	Gain knowledge and skills in financial management and value of risk.	
CO2	Students gain the knowledge on the investment decision undertaking the business.	
CO3	Students should be able to understand cost of capital.	
CO4	Knowing how company pays its dividends to shareholders.	
CO5	Familiarize the calculation of working capital and its types.	

COs	**Subject Code: U8FA6004**	**Subject: Tally & Computer Applications (LAB)**
CO1	Have basic skills in data entry and data formatting.	
CO2	Creating the powerful power point presentations.	
CO3	Understanding about the computerised accounting.	
CO4	Enhance the creation of company, ledger and group.	
CO5	Capable to create voucher entries and ledger for accounting and inventory.	

COs	**Subject Code: U8FA6005**	**Subject: Practical Auditing**
CO1	Able to understand the role of auditor in business world.	
CO2	Understand importance of audit programme and internal control system.	
CO3	Knowledge about verification and valuation of assets.	
CO4	Aware on company auditor, functions, duties and rights and report preparation	
CO5	Become aware about vouching and their importance and overview of auditing	

COs	**Subject Code: U8FA6006**	**Subject: Company Law**
CO1	Students are familiarizing the revised Company Act 2013 and its provision.	
CO2	Provide an idea about promoters and its role.	
CO3	Gaining the knowledge on the procedure of companies' registration and its process.	
CO4	Understanding the role of directors in a company.	
CO5	Knowing the procedure of winding up of company and its legal process.	

COs	**Subject Code: U8FASB61**	**Subject: Islamic Banking Products & Services**
CO1	Understand the mechanism of resource mobilization and fund utilization by Islamic Banks.	
CO2	Categorize different types of Islamic Credit Card offered by Islamic Banks.	
CO3	Enlighten the concept and structure of various Islamic banking products.	
CO4	Classify the different issues related to Islamic mode of financing and its application.	
CO5	Acquire the knowledge of other miscellaneous services and activities by Islamic Banks.	

Course Code	Course Title	L	T	C
U8FA5001	INCOME TAX LAW & PRACTICE – I	5	1	5

Instructional Objectives

1. ***To gain basics of income tax Act.***
2. ***To know the income calculation under head salary.***
3. ***To find out the income under house property.***
4. ***To gain the knowledge on the income from business or profession***
5. ***To get a comprehensive knowledge on depreciation and its calculation.***

Unit-I	Basic concept of Income Tax	10 Hours

Basic Concepts –Income tax- Assessment Year – Previous Year – Persons – Assesses – Scope of Income – Determination of Residential Status – Individual – HUF – Firm – Company – Relationship between Residential Status of person -Incidence of Tax- Income from Agriculture- Income exempted from Income Tax.

Unit-II	Income from Salary	20 Hours

Income under the head Salaries and its Computation – Characteristics of Salary Income – Basic Allowances – Perquisites – Profits in Lieu of Salary – Deductions from Salary Income – Treatment of Provident Funds – Deduction under Section 80C- Exempted income from Salary.

Unit-III	Income from House Property	15 Hours

Income under the head income from House Property and its Computation – Basis of Charge – Exemption – Annual Value – Self-occupied and Let-out House Property– Deductions- Exempted Income from House Property.

Unit-IV	Income from Business or Profession	20Hours

Meaning - Computation of Income under the head Business or Profession – Basic of Charge – Specific Deduction – General Deductions -Allowable- Disallowable Expenses– Deemed Income

Unit-V	Depreciation	10Hours

Concept of Depreciation – Depreciation Provisions – U/s-32 – Conditions for Claiming Depreciation – Block of Assets – Computation of Normal Depreciation – Additional Depreciation – Conditions and Rates of Depreciation – Meaning of Actual Cost – Unabsorbed Depreciation – Terminal Depreciation – Balancing Charge.

Note: Weightage of Marks: Theory 20% and Problems 80%

Books for Study:

1. Gaur and Narang, "Income Tax Law and Practice", Kalyani Publishers, New Delhi-2019.
2. T.S Reddy & Hari Prasad Reddy, "Income Tax Theory Law & Practice", Margham Publication, Chennai-2019.
3. T.Srinivasan, "Income Tax Theory Law & Practice", Vijay Nicole Private Limited, Chennai-2019.
4. Anita Raman, "Income Tax Theory Law & Practice", Mc Graw Hill, New Delhi-2019.
5. Dr.A.Murthy, "Income Tax Law and practice", Vijay Nicole imprint Private Limited, Chennai-2019

Books for Reference:

1. Usha Devi, Bhaskera B.G, "Income Tax-I", Vision Book House- Bangalore- 2019.
2. Dr.Vinod K Singhania, Dr.Monica Singhania, "Taxmann students' guide to Income Tax", Taxmann Publication Pvt Ltd, - 2019.
3. Chandra Mahesh & Shukla D.C "Income Tax Law & Practice", Pragathi Publication, Delhi.
4. Gaur V.P, Narang D.B, Puja Gaur & Rajeev Puri "Income Tax Law and Practice", Kalyani Publisher, New Delhi- 2019.
5. Dr.Mehrotra D.C & Dr.Goyal S.P "Income Tax Law And Practice", Sahitya Bhavan Publications, New Delhi-2019.

Course Code	Course Title	L	T	C
U8FA5002	COST ACCOUNTING - I	5	1	5

Instructional Objectives

1. ***To gain knowledge of basic concepts and techniques of cost accounting.***
2. ***To enable them to understand cost component***
3. ***To know about computations of pricing material.***
4. ***To impart the knowledge of labour cost management system.***
5. ***To analyse the various overheads cost.***

Unit-I	Basic concept of Cost Accounting	18 Hours

Introduction - Cost Accounting – Nature and Scope – Objectives, Advantages and Limitations - Cost Concepts and Classification Financial Vs Cost Accounting –- Elements of Cost – Preparation of Cost Sheets and Quotation.

Unit-II	Inventory Control	14 Hours

Inventory Control – ABC Technique – Levels of Stock and EOQ – Perpetual Inventory System.

Unit-III	Pricing of Materials	15 Hours

Pricing of Materials - Methods of Pricing of Material Issues - FIFO – LIFO – Simple and Weighted Average Method – Accounting for Material Losses.

Unit-IV	Labour Cost	15 Hours

Labour: Labour Turnover – Idle and Overtime – Remuneration and Incentives – Time Rate and Piece Rate System – Taylor's, Merrick's Gantt's, Halsey and Rowan Plans – Calculation of Earning of Workers.

Unit-V	Overheads	13 Hours

Overhead - Classification of Overhead Costs – Allocation, Absorption and Apportionment of Overhead Cost – Primary and Secondary Distribution of Overheads.

Note: Weightage of Marks: Theory 20% and Problems 80%

Books for Study:

1. T.S.Reddy and Hari Prasad Reddy, "Cost Accounting", Margham Publication, Chennai-2016.
2.Nirmal Gupta, "Cost Accounting", Ane Books Pvt.Ltd -2017
3. S.P. Jain and Narang "Cost Accounting", Kalyani Banglore-2012.
4. A. Murthy, "Cost Accounting" Vijay Nicole Imprints, Chennai.-2018
5. Rayudu, "Cost Accounting" Tata McGraw Hill, New Delhi-2018

Books for Reference:

1. T.S.P. Iyengar, "Cost Accounting", Sultan Chand & Sons, New Delhi-2015.
2. Shukla,Grawal & Gupta,"Cost Accounting", S.Chand & Co Pvt ltd,, New Delhi-2013.
3. R.S.N. Pillai, "Cost Accounting" S Chand Publishing, New Delhi-2015
4. M.N. Arora, "Cost Accounting" Vikas Publishing House, NewDelhi.-2014
5. S. Thothadhitri, S. Nafeesa and R.B.S. A. Jalaludheen"Cost Accounting" Tata McGraw Hill,

Delhi-2018

Course Code	Course Title	L	T	C
U8FA5003	MANAGEMENT ACCOUNTING	5	1	5

Instructional Objectives

1. ***To make the students to understand the concept of Financial Management***
2. ***To know about the calculation of ratio analysis and its significance.***
3. ***To familiarise the fund flow analysis.***
4. ***To know the importance of cash flow analysis.***
5. ***To gain the knowledge about budget and budgetary control.***

Unit-I	Financial Statement Analysis	10 Hours

Introduction - Management Accounting – Meaning – Definition - Objectives – Nature & Scope – Advantages & Limitations – Management Accounting vs. Financial Accounting – Management Accountings vs. Cost Accounting – Financial statement analysis – Comparative and common size statements – Trend analysis.

Unit-II	Ratio Analysis	20 Hours

Ratio Analysis-Meanings, Significance, Advantages and Limitations– Types of Ratio- Liquidity Ratio – Solvency Ratio - Profitability Ratio - Turnover Ratio – Financial Ratio.(Balance Sheet) (Simple Problem)

Unit-III	Fund Flow Analysis	15 Hours

Meaning - Need – Advantages and Limitations – Statement of Changes in Working Capital – Calculation of Funds from Operation - Preparation of Funds Flow Statement.

Unit-IV	Cash Flow Analysis	20 Hours

Meaning - Objectives and Scope – Funds Flow Statement Vs Cash Flow Statement – Cash from Operations- Preparation of Cash Flow Statement as per AS-3.

Unit-V	Budget and Budgetary Control	10 Hours

Budget and Budgetary Control – Objectives - Advantages and Limitations – Classification of Budgets – Zero Based Budget – Preparation of Sales Budget – Production Budget – Cash Budget – Flexible Budget.

Note: Weightage of Marks: Theory 20% and Problems 80%

Books for Study:

1. S.Reddy & Y.Hari Prasad Reddy, "Management Accounting", Margham Publications, Chennai-2016.

2. A.Murthy S.Gurusamy, "Management Accounting Theory & Practice", Vijay Nicole Publications, Chennai, 2018

3. K.Gupta & R.K. Sharma Neeti Gupta, "Management Accounting", Kalyani publishers-2019

4. Pillai Bagawathi, "Management Accounting", Sultan Chand & Co, New Delhi-2010.

5. Muniraju K.Ramachandra, , "Management Accounting", Himalaya publishing House, New Delhi-2018

Books for Reference:

1. S.Reddy & Y.Hari Prasad Reddy, "Cost and Management Accounting", Margham Publications, Chennai-2016.
2. S.N. Maheswari, "Management Accounting", Sultan Chand & Sons, New Delhi-2015.
3. Agarwal, "Management Accounting", G.P Publishers, Jaipur-2014.
4. M.Y. Khan P.K. Jain, "Management Accounting", Tata McGraw Hill Publishers, New Delhi, 2016
5. T.P. Ghosh, Management Accounting, Excel Books Publishers, Thrissur-2003

Course Code	Course Title	L	T	C
U8FA5004	HUMAN RESOURCE MANAGEMENT	5	1	5

Instructional Objectives

1. ***To gain knowledge of basic concepts and techniques on Human Resource Management.***
2. ***To familiarise job analysis, recruitment and steps involved in selection process.***
3. ***To know the significance, purpose, types, techniques of employee training***
4. ***To get a comprehensive knowledge on different methods of performance appraisal***
5. ***To impart dynamics of industrial relations and to manage them***

Unit-I	Introduction	12 Hours

Nature of Human Resources Management - Concept – Characteristics – Objectives – Importance – Functions and Scope- Qualities of Human Resource Manager- Role of Human Resource Manager- Characteristics.

Unit-II	Recruitment and Selection Process	16 Hours

Human Resource Planning – Objectives – Need and Importance – Job Analysis and Job design – Recruitment and Selection: Process of recruitment – Sources – Steps in selection process – Testing – Interviewing – Placement – Induction – Socialization.

Unit-III	Training & Development	16 Hours

Employee Training – Need – Importance – Types of Training – Objectives – Methods – Executive development: Objectives and importance – Methods and techniques.

Unit-IV	Performance Appraisal	16 Hours

Managing Performance and Compensation - Appraisal – Methods – Problems – establishing pay plans – Basics of Compensation – Factors determining the pay rate – Current trends in Compensation – Concept of profit sharing – Fringe benefits.

Unit-V	Retaining Process	15 Hours

Maintaining and Retaining of Human Resource - Concept of transfer – Promotion and Demotion – Absenteeism and Labour turnover – Causes of absenteeism – Effects of absenteeism – Causes of labour turnover – Work Environment – Fatigue – Monotony and Boredom – Causes and Effects.

Books for Study:

1. J.Jayasankar "Human Resource Management", Margham Publications, Chennai-2016.
2. J.N Jain "Human Resource Management", Regal Publications, Kottayam-2011.
3. S.K Bhatia "Human Resource Management", Deep & Deep Publications, New Delhi, 2010.
4. S.P. Singh "Human Resource Management", .A.I.T.B.S Publishers, New Delhi-2018.
5. T.N. Chhabra & Monica S. Chhabra "Human Resource Management", Chennai-2014.

Books for Reference:

1. Aswathappa, "Human Resource and Personnel Management", TATA McGraw Hills, New Delhi-2009.
2. Dr.S.S.Khanka, "Human Resource Management", S.Chand & Company, New Delhi-2015.

3. L M Prasaad, "Human Resource Management", S Chand & Co., New Delhi.2014.
4. P.G Aquinas "Human Resource Management", Vikas Publishing House Pvt Ltd, 2006.
5. Biju Varrkey & Deddler Gary "Human Resource Management", Pearson, New Delhi-2017

Course Code	Course Title	L	T	C
U8FA5005	MARKETING MANAGEMENT	4	1	2

Instructional Objectives

1. ***To gain the knowledge of basic concept of Marketing and its techniques.***
2. ***To understand the Market Segmentation & Consumer Behaviour and its theories.***
3. ***To obtain knowledge on Product Planning and Product Life Cycle.***
4. ***To know the concept of pricing and various methods of Promotions.***
5. ***To expand the knowledge on choice of Channels of Distribution.***

Unit-I	Introduction to Marketing	10 Hours

Nature, Scope and Importance of marketing- Evolution- Types of Market- Marketing Mix- Marketing Environment – Macro and Micro Environment.

Unit-II	Market Segmentation & Consumer Behaviour	10 Hours

Market Segmentation- Benefits- Basis- Types- Consumer behaviour – Consumer Buying Motives- Theories of Consumer Behaviour.

Unit-III	Product	15 Hours

Meaning- Importance- Product Classification- Product Mix- Product line and items- Expansion of Product Mix- Positioning the Product- Product Life Cycle- Product Management- New product development- Product differentiation- Product Deletion.

Unit-IV	Pricing and Promotion	15 Hours

Significance of pricing in marketing - Factors affecting pricing-objectives of pricing policies- Pricing decision- Kinds of pricing- procedure for price determination- Resale price maintenance- Nature and importance of promotion- promotion tools- Promotion Mix- Consumer sales promotion- Advertising- Types of advertising- Advertising media and its advantages and disadvantages- Advertising agency – Functions of advertising agency- Personal Selling – Kinds of salesmen- Characteristics of successful salesmen- Selling as a career.

Unit-V	Channels of Distribution	10 Hours

Meaning- Importance- Types- Factors affecting choice of distribution of channels- Logistic Management (Basic concepts).

Books for Study:

1. R.S.N Pillai and Bagavathi, "Modern Marketing", S.Chand & Company, New Delhi-2014.
2. Philip Kotler, "Marketing Management", Prentice Hall, New Delhi-2012
3. C.C.Sontakki, "Marketing", Kalyani Publishers, Bangellur-2010.
4. Dr. J.Jayasankaran, "Margham Publications", Chennai-2016.
5. Stonton, Etzel and Walker, "Fundamentals of Marketing", Tata McGraw Hill, New Delhi.2014

Books for Reference:

1. Dr.N.Rajannair & Sanjith R.Nair "Marketing", Sultan Chand & Sons, New Delhi-2018

2. Philip Kotler, Garry Armstrong "Principles of Marketing", Prentice Hall, New Delhi-2011
3. Dr.L.Natarajan "Marketing", Margham Publications, Chennai-2016.
4. Sexana and Rajan, "Marketing Management",Tata McGraw Hill, New Delhi-2007.
5. McCarthy.E.J, "Marketing Management- A Managerial Approach", Irwin Professional Publishing, New York-1994.

Course Code	Course Title	L	T	C
U8FA5006	BUSINESS ENVIRONMENT	4	1	2

Instructional Objectives

1. ***To familiarise various Business Environment and their impact on Business***
2. ***To know the impact of social environment on business***
3. ***To know the role of legal environment on business.***
4. ***To get a knowledge of economic environment.***
5. ***To know the support of financial environment on business.***

Unit-I	Concept of Business Environment	10 Hours

The concept of business environment- its nature and significance- brief objectives of political-Cultural- Legal-Economic and Social Environment and their impact on business and strategic decision.

Unit-II	Social and Cultural Environment	15 Hours

Social Environment- Cultural Heritage- Social attitudes- Impact of foreign culture- Cases and communities- Business Ethics-Corporate Governance-Corporate Social responsibilities.

Unit-III	Legal Environment	15 Hours

Important Acts relating to legal environment in India- Indian Contract Act- Indian Companies Act-Income Tax Act- IDRA- Consumer Protection Act(COPRA)- FEMA- SEBI-TRIPS-GATT-WTO.

Unit-IV	Economic Environment	10 Hours

Economic system and their impact on business- Macro Economic- GDP- Growth rate-Population- Monetary and fiscal Policies- per capita income-NITI Aayog- Industrial Policy - Liberalisation-Privatisation- Globalisation.

Unit-V	Financial Environment	10 Hours

Financial System- Commercial Bank- Financial Institution- RBI-Money Market- Capital Market- Stock Exchange-IDBI-IFCI-SIDBI-NABARD-BIFR-Non-Banking financial companies-Financial services - Factoring-Leasing- Merchant Banking.

Books for Study:

1. Sankaran; "Business Environment",Margham Publication, Chennai-2016.
2. Dr.Premavathy M "Business Environment", Sri Vishnu Publication, Chennai- 2016
3. Dr.Khatri P.V "Business Environment", Global Academy Publishers- New Delhi- 2018
4. Ghosh P.K "Business Environment", Sultan Chand & Sons, New Delhi-2014
5. Dr.Namita Gopal "Business Environment", Vijay Nicole , Chennai- 2015

Books for Reference:

1. Cherunilam, Francis, "Business Environment - Text and Cases", Himalaya Publishing House, New Delhi-2014.
2. Aswathappa, K. "Essentials of Business Environment", Himalaya Publishing House, New Delhi-2014.
3. Prof.D.A Mustafa, "Business Environment & Law", A.I.T.B.S Publishers,New Delhi-2010.
4. Shaikh Saleem, "Business Environment", Pearson Education, New Delhi- 2015

5. Gupta C.B," Business Environment", Sultan Chand & Sons, New Delhi- 2013

Course Code	Course Title	L	T	C
U8FASB51	FUNDAMENTALS OF ISLAMIC FINANCE	2	1	1

Instructional Objectives

1. ***To enable the student to learn basic concepts of Sharia'h (Islamic Law)***
2. ***To understand the major prohibition in Islamic Finance***
3. ***To gain knowledge on Islamic Law of Contract***
4. ***To familiar with prerequisite conditions for validity of contract***
5. ***To Posses the foundation and characteristics of Islamic Finance.***

Unit-I	Introduction to Sources of Islamic Law (Shari'ah)	04 Hours

Definition- Concept- Sources of Shari'ah: Quran, Sunnah, Ijma, Qiyas- Objectives of Shariah- Concept of Ijtihad- necessary conditions- Principles of Fiqh- Introduction- importance.

Unit-II	Major Prohibitions in Islamic Finance	05 Hours

Riba(Interest)- Definition and Classification- Gharar (Ambiguity/ Uncertainty)- Definition and Classification- Maysir & Qimar (Gambling)- Definition and Classification.

Unit-III	Islamic Law of Contracts	08 Hours

Principles of Islamic Business- Contract- Definition and Classification- Aqd (contract), Wad (Promise)- Muwa'adah/ Mu'ahida (Bilateral Promise)- Elements of Contract- Conditions for its Validity.

Unit-IV	Classification of Contracts (Unilateral & Bilateral)	07 Hours

Contract of Exchange (Sale Contracts)- Contract of Partnership (Mudarabaha, Musharakah)- Contract of Trust/ Safe Custody (Wadi'ah, Amanah)- Contract of Security (Kafalah, Rahn, Hawalah)- Contract of Usufruct utilization (Ijarah)- Other Contracts: Wakalah, Jo'alah.

Unit-V	Principles of Islamic Financial System	06 Hours

Islamic Finance- Definition- Concept- Foundation- Features- Objectives- Islamic Finance Vs Conventional Finance- A Brief introduction of Islamic Financial Instruments- Glossary of Islamic Finance Terminologies.

Books for Study:

1. Abdel Fattah M.Farah, "An Introduction to Islamic Banking & Finance", Ajman Chamber of Commerce and Industry,UAE, -2009

2. Umar Chapra**, "**Islam and the Economic Challeng", Islamic foundation, Leicestershire-2016

3. Dr. Muhammad Sharif, "Fundamentals of Islamic Economic System". Lahore-1999

4. Masum Billah, "Islamic and Modern Insurance (Principles and Practices)".Ilmiah Publishers-Selangor.2003

5. Karen Hunt, "Contemporary Islamic Finance: Innovation, Application and Best Practices" Wiley publishers, Manhattan- 2013

Books for Reference:

1. Certified to Islamic banker (CelB) program - Islamic-finance.com.

2. Meezan's Bank's Guide to Islamic Bank.

3.M.Taqi Usmani, "An Introduction to Islamic Finance".Idara, New Delhi-2007

4. Mohammed Obaidullah, "Islamic Financial Services",Scientific Publishing Centre-Saudi Arabia-2005

5. Nataile Schoon, "Islamic assets Management", Edinburgh University Press, U.K-2011

Course Code	Course Title	L	T	C
U8FA6001	INCOME TAX LAW & PRACTICE – II	5	1	5

Instructional Objectives

1. ***To gain basics knowledge on income from capital assets and its calculation.***
2. ***To get information about the income charges under the head other sources.***
3. ***To know the procedure of set off and carry forward of losses.***
4. ***To calculate the assessment of Individual, firms and association.***
5. ***To give a comprehensive knowledge about the e-filling procedure.***

Unit-I	Income from Capital Gains	15 Hours

Basic of Capital Gains – Capital Assets – Meaning – Types - Exemptions – Short-term and Long-term Capital Assets – Transfer of Capital Assets – Exemptions – Computation of Short-term and Long term Capital Gain – – Indexed Cost – Exemptions.

Unit-II	Income under the Income from other Sources	15 Hours

Meaning- Computation of Specific Incomes and Other Incomes – Permissible Deductions under income from other sources.

Unit-III	Clubbing of Income, Set-Off and Carry Forward	15 Hours

Clubbing of Income and Set-off of Losses - Aggregation of Income– Transfer of Income without Transfer of Assets - Set-off and Carry Forward of Losses – Intra Head and Inter Head Adjustments.

Unit-IV	Assessment of Individual, Firms	15 Hours

Assessment of Individuals, Firms - Deductions from Gross Total Income – Deductions from Section 80C to 80U.

Unit-V	Filling of Income Tax Return	15 Hours

Filing of Return of Income, Assessment & Tax Planning - procedure for Filing of Return of Income – Time of Filing of Return – PAN – Income Tax Authorities- Types of Assessment– Self Assessment – Regular Assessment – Best Judgment Assessment and Re-Assessment – Tax Planning – Meaning, Need and Limitations – Tax Evasion – Tax Avoidance- E filling

Note: Weightage of Marks: Theory 20% and Problems80%

Books for Study:

1. Gaur and Narang, "Income Tax Law and Practice", Kalyani Publishers, New Delhi-2019.
2. Dr.A.Murthy, "Income Tax Law and practice", Vijay Nicole imprint Private Limited, Chennai-2019
3. T.S Reddy & Hari Prasad Reddy, "Income tax theory law & practice", Margham Publication, Chennai-2019.
4. T.Srinivasan, "Income tax theory law & practice", Vijay Nicole Private Limited, Chennai-2019.
5. Anita Raman, "Income tax theory law & practice", Mc Graw hill, New Delhi-2019.

Books for Reference:

1.Usha Devi,Bhaskera B.G, "Income tax-I", Vision Book House- Bangalore- 2019.
2. Dr.Vinod K Singhania, Dr.Monica Singhania, " Taxmann students' guide to Income Tax", Taxmann Publication Pvt Ltd, - 2019.
3. Chandra Mahesh & Shukla D.C "Income Tax Law & Practice", Pragathi Publication, New Delhi-2019
4. Gaur V.P, Narang D.B, Puja Gaur & Rajeev Puri "Income Tax law and Practice", Kalyani Publisher, New Delhi- 2019.
5. Dr.Mehrotra D.C & Dr.Goyal S.P "Income tax law and practice",Sahitya Bhavan-2019 Publications, New Delhi-2019.

Course Code	Course Title	L	T	C
U8FA6002	COST ACCOUNTING - II	5	1	5

Instructional Objectives

1. ***To gain knowledge of basic concepts and techniques of Job cost accounting***
2. ***To understand the methods process costing***
3. ***To impart the knowledge of Transport and Service Costing***
4. ***To enable them to understand about Marginal Cost.***
5. ***To know about more on variance analysis of material, labour and overheads.***

Unit-I	Job, Batch & Contract Costing	20 Hours

Job Costing – Meaning and Features – Procedure – WIP – Cost Accumulation. Batch Costing – EBQ. Contract Costing – Meaning – Features – Work Certified and Uncertified – Incomplete Contract – Escalation Clause – Cost Plus Contract and Contract Account.

Unit-II	Process Costing	13 Hours

Process Costing – Definition and Features – Job vs. Process Costing – Normal Loss and Abnormal Loss – Abnormal Gain – By Product and Joint Products.

Unit-III	Operations Cost	15 Hours

Meaning and Importance - Operating Cost Units – Operating Costing in some Service Industries – Transport Costing –Organization – Costing for Hotels, Hospitals & Cinema Houses.

Unit-IV	Marginal Costing	14 Hours

Marginal Costing: Meaning - Advantages and Limitation – CVP Analysis – Contribution – Break Even Analysis and Break Even Point – Margin of Safety – Key Factor – Changes in Selling Price – Desired Level of Profit.

Unit-V	Standard Costing	13 Hours

Standard Costing: Meaning – Advantages and Limitations – Analysis of Variances – Material Cost Variance, –Labour Cost Variance and Overhead Variance. (Simple Problem Only)

Note: Weightage of Marks: Theory 20% and Problems 80%

Books for Study:

1. T.S.Reddy and Hari Prasad Reddy, "Cost Accounting", Margham Publication, Chennai-2016.
2. Nirmal Gupta, "Cost Accounting", Ane Books Pvt.Ltd
3. S.P. Jain and Narang "Cost Accounting", Kalyani Banglore-2012.
4. A. Murthy, "Cost Accounting" Vijay Nicole Imprints, Chennai.
5. Rayudu, "Cost Accounting" Tata McGraw Hill, New Delhi.

Books for Reference:

1. T.S.P. Iyengar, "Cost Accounting", Sultan Chand & Sons, New Delhi-2015.
2. Shukla,Grawal & Gupta,"Cost Accounting", S.Chand & Co Pvt ltd,, New Delhi-2013.
3. R.S.N. Pillai, "Cost Accounting" S Chand Publishing, New Delhi.
4. M.N. Arora, "Cost Accounting" Vikas Publishing House, NewDelhi.
5. S. Thothadhitri, S. Nafeesa and R.B.S. A. Jalaludheen"Cost Accounting" Tata McGraw Hill, New Delhi.

Course Code	Course Title	L	T	C
U8FA6003	FINANCIAL MANAGEMENT	5	1	5

Instructional Objectives

1. ***To gain a knowledge about the basic functions financial management***
2. ***To make Students to know the importance of investment decision.***
3. ***To know the importance of financing decision in business.***
4. ***To familiarise the students to know the role of share holders in business***
5. ***To calculate the working capital requirements and its importance in business.***

Unit-I **Introduction** **15 Hours**

Nature and Scope of financial management- Objectives of financial management Functions of financial management-Position and role of finance manager- Functions of financial manager- Time value of money- Risk and return.

Unit-II **Investment Decision** **15 Hours**

Long term investment decisions- the capital budgeting process-Payback period method- Accounting Rate of Return method- Net Present Value (NPV) - Internal rate of return- Profitability index- Decision Tree Method.

Unit-III **Financing Decisions** **15 Hours**

Sources of Long term and Short term finance- Estimation and component of Cost of Capital- Cost of Debt- Cost of Equity- Cost of retaining Earning- Weighted Average Cost of Capital- Capital Structure- Theories of Capital Structure- Determinants of Capital Structure.(Simple Problems Only)

Unit-IV **Dividend Decisions** **20 Hours**

Dividend policy decisions- Types of Dividends- Factors determining Dividend Policy – Dividend Theories: Walter's Model- Gordon's Model- MM approach- Dividend policy in practices.

Unit-V **Working Capital Decision** **10 Hours**

Working capital Decision- Concept of Working Capital- Types of Working Capital- Sources of Working Capital- Determinant of Working Capital requirements- Forecasting of Working Capital requirements. .(Simple Problems Only)

Note: Weightage of Marks: Theory 60% and Problems 40%

Books for Study:

1. A. Murhty, "Financial Management", Margham publication-2016
2. S.N. Maheshwary, Fundamentals of Financial Management, Sulthan Chand & Sons- New Delhi-2009.
3. Shashi K.Gupta, Neeti Gupta,"Financial Management", Kalyani Publishers, New Delhi-2013.
4. V.Gurumurthy G. Selvaraj R.Swarnalakshmi, "Financial Management" Charulatha Publications, Chennai-2016
5. N.Premavathy & M.Inbalakshmi, "Financial Management" Sri Vishnu Publication-2010

Books for Reference:

1. Fundamentals of Financial Management, Von Horne, Prentice Hall, New Delhi - 2013
2. Prasana Chandra, "Financial Management-Text & Practices," Tata McGraw hill- New Delhi-2006.
3. I.M Pandey, "Financial Management- Text & Practices," Vikas Publishing House- New Delhi-2009.
4. M.Y. Khan & P.K.Jain, Financial Management, Tata McGraw Hill-New Delhi-2005
5. V.K. Bhalla, "Financial Management" Sulthan Chand & Sons-New Delhi-2014

Course Code	Course Title	L	T	C
U8FAPR61	TALLY & COMPUTER APPLICATIONS (Lab)	5	1	5

Instructional Objectives

1. ***To gain basic skills in data entry and data formatting.***
2. ***To creating powerful power point presentations***
3. ***To understanding about the computerised accounting.***
4. ***To develop the creation of company, ledger and group.***
5. ***To create voucher entries and ledger for Accounting and Inventory.***

Unit-I	Word Processing and Excel	12 Hours

Word processing with MS Word - Starting MS word – MS word environment –working with word documents – working with text – working with tables – checking spelling and grammar – printing a document.

Spreadsheets and MS Excel: Starting MS Excel – MS Excel environment – working with Excel workbook – working with worksheet – Formulas and Functions – Inserting Charts – printing in Excel.

Unit-II	Power Point Presentation	15 Hours

Making presentation with MS power point- Starting MS power point – MS power point environment – working with power point – working with different views – designing presentation – printing in power point.

Unit-III	Introduction to Tally	18 Hours

Introduction to Tally-Advantages of Tally Accounting- Salient features of Tally- General features- Accounting features – Inventory features.

Unit-IV	Basics in Tally	18 Hours

Gate way of Tally- Creation of company-Altering, Deleting and Shutting of Company-Company information-Groups-Sub groups-Creation of Groups-Altering, Deleting of Groups-Creating, Displaying and Altering Multiple groups-Creation of Individual and Group Ledger-Displaying and Altering of Individual and Group Ledgers.

Unit-V	Voucher Entry and Ledgers	12 Hours

Vouchers- Types of Vouchers- Creation and Alteration of Vouchers- Cancellation and Deletion of Vouchers (Excluding Inventory Vouchers)-Passing Entries in Tally- Preparing Ledger Accounts and Trail Balance. Accounting with Inventories- creation of inventory Groups- Creation of Inventory Ledger- inventory voucher entries-Inventory master & reports-Stock summary- Statement of Inventory- BRS.

Books for Study:

1. S. Palanivel**,** Tally - Accounting Software, Margham Publications, Chennai-2017.

2. A. Zakiuddin Ahmed, Computer Application in Business, Thakur Publishers, Chennai.2014.

3. Dr.P.Rizwan Ahmed, "Computer Application in Business With Tally ERP 9", Margham Publication, 2018.

4. Summer.M, "Computer Concepts and Uses", Englewood Cliffs, New Jersy.2015

5. Dr.R.G.Saha, "Computer Application in Business", Himalaya Publishing House, Bengaluru-2018.

Books for Reference:

1. Dr.R.Parameswaran**,** "Computer Applications in Business", S.Chand Publication, New Delhi.-2018.
2. Dr.P.Rizwan Ahmed, "Tally ERP 9", Margham Publication, 2018.
3. Hem Chand Jain & H.N.Tawari", Fundamentals Computer Applications in Business, Taxamann's Publication, Odisha-.2016
4. V.Rajaraman, "Fundamental of Computer",Prentice Hall India Learning Private Limited-New Delhi-2003.
5. Garg and Venkitakrishnan, "ERP- Concepts and Practices", Prentice Hill, New Delhi**.**2004

Course Code	Course Title	L	T	C
U8FA6004	**PRACTICAL AUDITING**	**4**	**1**	**2**

Instructional Objectives

1. ***To gain basic knowledge of the principles and practice of auditing.***
2. ***To understand internal check, audit, working papers, vouching etc.***
3. ***To differentiate verification and valuation of assets & liabilities***
4. ***To familiarise the auditors appointment, rights and duties, functions and qualifications***
5. ***To understanding the audit by computerized accounting***

Unit-I **Concept of Auditing** **10 Hours**

Meaning and Definitions of Auditing – Objectives – Types – Advantages and Limitations – Qualities of an Auditor - Accountancy, Auditing and Investigation.

Unit-II **Internal Control System** **15 Hours**

Internal Control – Internal Check and Internal Audit – Audit Note Book – Working Papers – Vouching- Vouching of Personal Ledger – Vouching of Impersonal Ledger.

Unit-III **Verification and Valuation** **15 Hours**

Verification and Valuations of Assets and Liabilities – Auditor's Position regarding the Valuation and Verification of Assets and Liabilities - Depreciation –Reserves and Provisions.

Unit-IV **Company Audit** **10 Hours**

Company Audit – Qualifications and Disqualifications of Auditors Appointment and Removal – Right and Duties – Comptroller and Audit General – Appointments –Functions, Right and Duties – Branch, Joint and Special Audit – Audit Report – Types.

Unit-V **Investigation** **10 Hours**

Investigation – Objectives – Differences between Investigation and Auditing – Points to be noted while conducting an Investigation – Audit of Computerized Accounts – Electronic Audit- Auditing Ethics.

Books for Study:

1. Vengadamani, "Practical Auditing," Margham Publication, Chennai-2016.
2. Dr.N.Preemavathy, "Practical Auditing", Sri Vishnu Publication,Chennai-2012
3. Dr.G.Rajapriya, "Practical Auditing", Thakur publication,Chennai-2012
4. . Dr.T.R.Sharma, ,"Practical Auditing",Sahitya Bhavan Publication,Agra -2017
5. R.G.Saxena' ,"Practical Auditing",Himalaya publishing Pvt Ltd,Mumbai-2016.

Books for Reference:

1. B.N. Tandon, "Practical Auditing", S Chand & Co, New Delhi-2006.
2. A.R Solanki, "Auditing Principles & Techniques", Cyber Tech Publication, New Delhi-2015.
3. Kamal Gupta and Ashok Arora, "Fundamentals of Auditing", TATA McGraw Hills, New Delhi-2002
4. K.Sunder & Pari,"Practical Auditing", Vijay Nicole Imprints Pvt Ltd, Chennai-2014.

5. Aruna Jha, "Auditing",Taxmann Publication, New Delhi- 2018

Course Code	Course Title	L	T	C
U8FA6005	COMPANY LAW	4	1	2

Instructional Objectives

1. ***To impart the basic knowledge of the companies Act among the students.***
2. ***To know the procedure of formation of companies.***
3. ***To get the knowledge about the documents required for formation of company.***
4. ***To familiarise the role of directors in a company.***
5. ***To get the basic knowledge about the meetings and winding up of company.***

Unit-I	Introduction	10 Hours

Meaning- Definition- Characteristics of Company- Types of Company including one person company- Difference between public Vs Private companies- characteristics of Public and Private company- Advantages and disadvantages of public and private companies- Conversion of public company to private company.

Unit-II	Formation of Companies	15 Hours

Incorporation of companies- certificate of incorporation- Promoters Functions of promoter- Legal status of Promoter.

Unit-III	Memorandum and Articles of Association	15 Hours

Memorandum of Association- Contents of Memorandum of Association- Alteration of Memorandum of Association- Articles of Association- Contents of Articles of Association- Alteration of Articles of Association.

Unit-IV	Directors of a company	10 Hours

Meaning – Eligibility to become a Director – Number of Directorships – Appointment of Directors – First Directors – Subsequent Directors – Vacation of Office – Removal of Directors – Positions of the Directors – Powers, Duties and Liabilities of Directors

Unit-V	Company meeting and Winding up	10 Hours

Meeting of the company- types of meeting – requisites of valid meeting- Agenda- chairman- proxy- Resolution and its types- Minutes of meeting- Voting's- winding up of companies- Methods of winding up and its procedures- Liquidator's –Liquidator's Power, Duties and liabilities.

Books for Study:

1. J.Santhi, "Company Law (As per Companies Act 2013),"Margham Publications, Chennai- 2019

2. Abdul Gaffor P.M.S & Thothadri S, "Company Law", Vijay Nicole Imprints Pvt Ltd, Chennai- 2018

3. Dr.Srirenganayaki.P "Company Law & Secretarial Practice", Charulatha Publication, Chennai- 2019

4. Dr.V.Balachandran "Company Law & Practice", Sultan Chand & Sons Publiscation, New Delhi-2017

5. Dr.Umesh Maiya "A Text book of Company Law", Jagadhamba Publishing House, New Delhi- 2015

Books for Reference:

1. Dr.M.Sreenivasan, "Company Law", Margham Publication, Chennai-2015.

2. Kapoor N.D, "Elements of Company Law", Sultan Chand & Sons, New Delhi-2010**.**

3. Gonga,P.P.S "A Text book of Company Law",S.Chand & Co.,2015.

4. Krati Rajoria "Company Law", Allahabad Law Agency, Faridabad-2016

5. Sangeeta Kedia "Company Law' Pooja Law Publishing Company-2017

Course Code	Course Title	L	T	C
U8FASB61	ISLAMIC BANKING PRODUCTS & SERVICES	2	1	1

Instructional Objectives

1. ***To explain the various deposits products in Islamic Bank.***
2. ***To expose the students different Islamic card products in Islamic Banks.***
3. ***To understand the structure of Islamic financing instruments.***
4. ***To know the mechanism of resource mobilization and fund utilization by Islamic Banks.***
5. ***To gain knowledge of other miscellaneous services and activities by Islamic Banks.***

Unit-I	Deposit Products in Islamic Banks	04 Hours

Islamic Banks Deposits: Current Account- Saving Account- Investment Deposit Account: General Investment Deposit Account- Special Investment Deposit Account- Deposit Management.

Unit-II	Card Products in Islamic Banks	05 Hours

Islamic Credit Cards in the market: Bai-al Ina Credit Card Structure- Tawarruq Credit Card Structure- Ijarah Credit Card Structure- Ujrah Credit Card Structure- Kafalah Credit Card Structure- Islamic Covered Card.

Unit-III	Islamic Modes of Financing - I	07 Hours

Equity Based Products: Musharakah, Mudarabah- Deferred sale Financing- Bai Muajjal & Murabahah- Advance Sale Financing Product- Salam & Parallel Salam.

Unit-IV	Islamic Modes of Financing - II	08 Hours

Financing Asset under Construction: Istisna & Parallel istisna- Lease Based Product- Ijarah & Ijarah Muntahiyah Bit-Tamleek- Services Based Products: Wakalah (Agency) - Kafalah (Guarantee) - Bai- al 'Inah- Twarruq- Financing for liquidity Management.

Unit-V	Other Miscellaneous Services & Activities	06 Hours

Letters of Credit- Cheque Payment System- Sarf (Foreign Exchange) & Hawalah (Remittance)- Bai Istijrar (supply Contract- Ujrah (fee)- Bai- al- Dain (Debt Trading)- Qard-e Hasanah (Interest- free Loan)- Others.

Books for Study:

1. M. Taqi Usmani, "An Introduction to Islamic Finance" Idara, New Delhi-2015.
2. Muhamad Ayub, "Understanding slamic Finance".Wiley Publishers,Manhattan-2013
3. Mohammed Obaidullah, "Islamic Financial Services",Scientific Publishing Centre-Saudi Arabia-2005
4. Nataile Schoon, "Islamic Assets Management".Edinburgh University Press,U.K-2011
5. Noureddine Krichene, "Islamic Capital Markets: Theory and Practices".Wiley Publishers,Manhattan-2013

Books for Reference:

1. Dr. Muhammad Sharif, "Fundamentals of Islamic Economic System".Lahore-1999
2. Certified to Islamic banker (CelB) program - Islamic-finance.com.
3. Hogan Lovells, "Sukuk and Islamic Capital market".Global Law and Business, U.K-2013
4. Masum Billah, "Islamic and Modern Insurance (Principles and Practices)".Ilmiah Publishers,Selangor-2003
5. Umar Chapra, "Islamic Economics", Islamic Foundation, Islamic FoundationLeicestershire-2016

DEPARTMENT OF COMMERCE (COMPUTER APPLICATIONS)
COURSE OUTCOMES
FOR SEMESTERS V &VI

Year: III **Semester: V**
Subject Name: Cost Accounting
Subject Code: U8CA5001

CO 1: Students acquaint with the knowledge of different techniques of Costing
CO 2: Students acquaint with the knowledge of different methods of costing.
CO 3: Develop expertise in cost accounting skills.
CO 4 : Enable students to adopt suitable method to solve costing problems

Year: III **Semester: V**
Subject Name: INCOME TAX LAW AND PRACITCE – I
Subject Code: U8CA5002

CO 1: students acquaint with basic knowledge of provisions of income tax.
CO 2: acquaint with powers of Income Tax Authorities
CO 3: Familiarize students with the concept of Tax Planning & Tax Evasion

Year: III **Semester: V**
Subject Name: PRACTICAL AUDITING
Subject Code: U8CA5003

CO 1: Familiarise the students with various aspects of auditing.
CO 2: students understand different procedures of auditing
CO 3: Students learn Concepts of internal control
CO 4: Students understand the concepts of vouching
CO 5: Students learn laws related auditor.

Year: III **Semester: V**
Subject Name: ENTREPRENEURIAL DEVELOPMENT
Subject Code: U8CA5004

CO 1 : Students develop entrepreneurial thinking in study
CO 2 : Students learn basic entrepreneurial skills
CO 3: Students familiarize with procedure of starting and running a business
CO 4: Students Acquaint with women entrepreneurship
CO 5 : Students Acquaint with project management

Year: III **Semester: V**
Subject Name: COMPUTER APPLICATIONS IN FINANCE
Subject Code: U8CA5005

CO 1 : Students acquaint with the knowledge of Finance
CO 2: Students get familiar with the mechanisms of Financial Institutions
CO 3: Develop expertise for conducting business transactions through electronic means
CO 4: Make students acquaint with screen based trading systems.

Year: III **Semester: V**
Subject Name: WEB TECHNOLOGY (PRACTICAL)
Subject Code: U8CAPR51

CO 1 : Students Acquire basic knowledge of HTML and Java Script
CO 2 : Students get hands-on experience in developing Web Page
CO 3 : Students Acquire programming skills.

Year: III **Semester: V**
Subject Name: QUANITATIVE APTITUDE & REASONING
Subject Code: U8CASB51

CO 1 : Students acquaint with basic Quantitative Techniques
CO 2 : Familiarize students with roots and Averages
CO 3 : Students understand reasoning and logical reasoning

Year: III **Semester: VI**
Subject Name: ACCOUNTING FOR DECISION MAKING
Subject Code: U8CA6001

CO 1 : Students aware of principles of management accounting
CO 2 : Familiarize applications of management accounting
CO 3 : Acquaint students with financial statements analysis
CO 4 : Familiarize students on marginal costing
CO 5 : Make students learn budgeting

Year: III **Semester: VI**

Subject Name: Income Tax Law & Practice -II

Subject Code: U8CA6002

CO 1 : Students understand important provisions of income Tax Law relating to computation Tax.

CO 2: Familiarize students with the concept of capital gains and aggregation of income

CO 3: Make students acquaint with the assessment procedure

Year: III **Semester: VI**

Subject Name: BANKING LAW & PRACTICE

Subject Code: U8CA6003

CO 1 : Acquire basic knowledge of banking law

CO 2: Familiarize with functioning of central bank

CO 3 : Familiarize with functioning of commercial banks

CO 4 : Acquaint with banking reforms in India

CO 5 : Familiarize with banking in IT era

Year: III

Semester: VI

Subject Name: Multimedia Theory & Practice

Subject Code: U8CA6004

CO 1 : Familiarize the students with the practical applications of multimedia.

CO 2 : Acquaint students with hardware of multimedia.

CO 3 : Create awareness on Multimedia Audio.

CO 4 : Students learn Multimedia Text and Animations.

CO 5 : Students learn Multimedia Graphics and Videos.

Year: III **Semester: VI**

Subject Name: HUMAN RESOURCE MANAGEMENT

Subject Code: U8CA6005

CO 1 : Students familiarize with the basic concepts of Human Resource Management.

CO 2 : Acquaint students with planning for human resource.

CO 3 : Aware of methods of improving human resource.
CO 4 : Know how to evaluate efficiency of human resources.
CO 5: Familiarize students on position movement of employees.

Year: III **Semester: VI**
Subject Name: INSTITUTIONAL TRAINING

Subject Code: U8CAPJ61

CO 1 : Students learn Practical aspects functioning of organizations
CO 2: Hands on training in E-Commerce Transactions.
CO 3: Familiarize students with preparation of project report. **Year: III** **Semester: VI**

Subject Name: E-COMMERCE AND ITS APPLICATIONS
Subject Code: U8CASB61

CO 1 : Students acquaint with the knowledge of E-Commerce
CO 2: make the students familiar with the mechanisms of E-Commerce
CO 3: Develop expertise for conducting business transactions through electronic means
CO 4: enable students abridge traditional and contemporary Commerce

Course Code	Course Title	L	T	C
U8CA5001	COST ACCOUNTING	5	-	5

Instructional objectives

1. ***To make the students acquaint with the knowledge of different techniques of Costing***
2. ***To make the students acquaint with the knowledge of different methods of costing.***
3. ***To develop expertise in cost accounting skills.***
4. ***To enable students to adopt suitable method to solve costing problems***

Unit-I	Introduction to cost accounting and cost sheet	15 Hours

Introduction - Definition - Meaning and Objective - Advantages - Limitation of cost Accounting - Cost Centre and Cost Unit - Cost Accounting Vs Financial Accounting – Classification of Cost – Preparation of Cost Sheet with detail of Overheads.

Unit-II	Material cost	15 Hours

Material Control: Meaning, Objectives and Advantages of Material Control – **Inventory Control:** Meaning and Importance – Techniques of Inventory Control - Various Stock Levels – Economic Order Quantity (EOQ) – **Pricing of Material Issues** – FIFO, LIFO, HIFO and Simple Average Methods.

Unit-III	Labour cost	15 Hours

Computation and Control of Labour Cost – Labour Turnover – **Methods of Remuneration and Incentive System:** Time and Piece Wages – Taylor's and Merrick's Differential Piece Rate System – Halsey Plan and Rowan Plan – Treatment of 'Over time & "Idle Time'

Unit-IV	Overheads cost	15 Hours

Overhead Cost: Definition – Meaning and Classification of Overhead costs - Allocation and Apportionment of Overheads – Primary Distribution of Overheads – Secondary Distribution of Overheads (Repeated Distribution Method only) – **Machine Hour Rate**

Unit-V	Process costing	15 Hours

Meaning – Characteristics – Advantages of Process Costing – Types of Industries using Process Costing – **Process Losses:** Normal Loss and Normal Gain – Abnormal Loss and Abnormal Gain – Problems in Process Accounts

(ratio of problems and theory = 80% : 20%)

Books for Study

1. T.S. Reddy and Y. Hari Prasad Reddy : Cost Accounting - Margham Publications.
2. Jain and Narang : Cost Accounting - Kalyani Publications
3. S.N.Maheshwari : Cost and Management Accounting - Sulthan Chand Publications
4. S.P. Iyangar : Cost Accounting - Sulthan Chand Publications

Books for Reference :

1. Jain S.P and Narang K.L – Cost accounting
2. Khanna B.S, Pandey I.M, Ahuja G.K and Arora M.N – Practical Costing
3. N.K.Prasad and V.K.Prasad – Cost Accounting
4. Hansen/Mowen – Cost & management Accounting and Control

Course Code	Course Title	L	T	C
U8CA5002	INCOME TAX LAW AND PRACITCE – I	5	-	5

Instructional objectives:

1. ***To make the students acquaint with basic knowledge of provisions of income tax.***
2. ***To acquaint with powers of Income Tax Authorities***
3. ***To Familiarize students with the concept of Tax Planning & Tax Evasion***

Unit-I	Introduction to Income Tax	15 Hours

Income Tax Act - 1961 - Current Finance Act - Definitions - Agricultural Income - Assesses - Assessment Year - Income- Person - Previous Year - Residential Status and Incidence of Tax - Exempted Incomes.

Unit-II	Income From Salary	15 Hours

Income - under the head Salaries - Definition - Features - Allowances - Perquisites - Provident Fund - Profit in lieu of salary - Deductions - Computation of Salary income.

Unit-III	Income From House property	15 Hours

Income from House property - Annual Value - Determination - Let out houses - Self Occupied Houses - Computation of Income from House property.

Unit-IV	Profit and Gains of Business and Profession	15 Hours

Profits and Gains of Business or Profession - Definitions - Chargeability - Admissible Deductions - Inadmissible Expenses Computation of Business Income - Computation of Professional Income

Unit-V	Income Tax Authorities	15 Hours

Income Tax Authorities and their Powers - Permanent Account Number (PAN) – Tax Planning – Tax Avoidance – Tax Evasion – Tax Planning by Individuals – Partnership firms - Companies

Books for Study:

1. T.S. Reddy and Harry Prasad Reddy : Income Tax Law & Practice – Margham Publications

2. A. Murthy : Income Tax Law & Practice, Vijay Nicole Publications

Books for Reference :

1. T.S. Reddy and Harry Prasad Reddy : Income Tax Law & Practice – Margham Publications

2. A. Murthy : Income Tax Law & Practice, Vijay Nicole Publications

Course Code	Course Title	L	T	C
U8CA5003	PRACTICAL AUDITING	5	-	5

Instructional objectives

1. ***To familiarize students with various aspects of auditing.***
2. ***To make students understand different procedures of auditing.***
3. ***To explain Concepts of internal control.***
4. ***To acquaint students with concepts of vouching***
5. ***To familiarize students with laws related auditor.***

Unit-I	Introduction to Auditing	15 Hour

Introduction- meaning and object of audit - difference between Auditing and accountancy - kinds of audit - advantages and limitations of Audit - audit programme and audit working papers

Unit-II	Internal Control	15 Hour

Internal control - Meaning and object - Internal check - Meaning and object - Internal control regarding purchases - Internal control regarding sales - Internal control regarding payment of wages.

Unit-III	Vouching	15 Hour

Vouching - meaning - objects - features of good vouching – procedure of vouching - vouching of cash transactions - verification of assets and liabilities.

Unit-IV	Laws Related to Auditor	15 Hour

Auditor - Qualification of Auditor - Disqualification - Appointment - Removal - Duties – Powers - Liabilities - Remuneration.

Unit-V	Specialized Audit & Computerized Audit	15 Hour

Specialized Audits: Audit of Charitable Institutions - Audit of Educational Institutions - Audit of Hospitals - Audit of Hotels - Auditing in Computerized Environment - Online Computer System Audit - Types of Online Computer System Audit

Books for Study

1) Practical Auditing-Dr. L.Natarajan - Margam Publications – Chennai.
2) Practical Auditing - Venkadamani - Margam Publications - Chennai
3) Auditing - Dinker Pagare - Sultan Chand & Sons – New Delhi.
4) Practical Auditing - B.N. Tandon: - S. Chand & Sons - New Delhi.
5) Practical Auditing - Dr. Premavathy - - Sri Vishnu Publishing Co - Chennai .

Books for Reference :

1) Auditing: Principles and Techniques - Basu - Dorlington Kindersley (India) Pvt. Ltd – Noida.
2) Auditing Principles and Practices - Ravinder Kumar Virender Sharma - Prentice Hall India – New Delhi.
3) Practical Auditing - Sundar. K & Paari. K - Vijay Nicole Imprints Pvt. Ltd. Chennai
4) Auditing - D.P. Jain - Konark Publishers Pvt. Ltd – New Delhi
5) Contemporary Auditing - Kamal Gupta - Tata McGraw Hill – Noida.

Course Code	Course Title	L	T	C
U8CA5004	ENTREPRENEURIAL DEVELOPMENT	5	-	5

Instructional objectives

1. ***To develop entrepreneurial thinking in study***
2. ***Impart basic entrepreneurial skills***
3. ***To familiarize procedure of starting and running a business***
4. ***To Acquaint students with women entrepreneurship***
5. ***To Acquaint students with project manager***

Unit-I	Introduction to Entrepreneurship	15 Hours

Meaning - characteristics and types of entrepreneurship - Entrepreneur and enterpriser - Functions of entrepreneurs – Desirable traits of successful entrepreneur – Successful Entrepreneurs of Vellore District

Unit-II	Women and Rural Entrepreneurs	15 Hours

Concept of women entrepreneurs - Definition - Problems faced by women entrepreneurs - Remedies to the problems - Rural entrepreneurs - Definition - Problems of rural entrepreneurs - Steps to promote rural entrepreneurs.

Unit-III	Project and Business Planning	15 Hours

Meaning - classification of Projects- Project Ideas generation techniques- Project Formulation - Project Selection - Feasibility Study Report – Preparation of Preliminary Project Report - Project life cycle.

Unit-IV	Forms of Ownership	15 Hours

Sole Trader – Partnership- Cooperative Societies- Private Ltd. Company and Public Ltd Company - characteristics - merits and demerits.

Unit-V	Development and Promotion of Entrepreneurs	15 Hours

Entrepreneurial Development – Agencies –Commercial Banks – District Industries Centre – National Small Industries Corporation – Small Industries Development Organisation – Small Industries Service Institute. All India Financial Institutions – functions of IDBI –IFCI – ICICI – IRDBI.

Books for Study

1. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.
2. Donald F Kuratko, "Entreprenuership – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.

Books for Reference :

1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill, 2013.
2. Mathew J Manimala, "Enterprenuership theory at cross roads: paradigms and praxis" 2nd Edition Dream tech, 2005.
3. Rajeev Roy, 'Entrepreneurship' 2nd Edition, Oxford University Press, 2011.
4. EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad, 1986.

Course Code	Course Title	L	T	C
U8CA5005	Computer Applications in Finance	4	-	2

Instructional objectives

1. ***To make the students acquaint with the knowledge of Finance***
2. ***To make the students familiar with the mechanisms of Financial Institutions***
3. ***To develop expertise for conducting business transactions through electronic means***
4. ***To make students acquaint with screen based trading systems.***

Unit-I	Introduction to Finance	10 Hours

Meaning and definition of Finance – features of finance- functions of finance - Financial Environment of Business in India – Introduction -Types of Investors – Constraints -Goals of Investors

Unit-II	Financial Institutions and Regulators	10 Hours

Stock Exchanges meaning and features -Basics of stock exchanges –NSE –BSE –Other Exchanges. Depositories -meaning and features: Functions of NSDL and CDSL –SEBI and its Functions –SEBI and SEBI Guidelines for investor protection

Unit-III	Introduction to Financial Markets	10 Hours

Capital Markets features - Basics of capital market mechanism Primary Market features - Secondary Market features - Money Markets features - Basics of money market mechanism.

Unit-IV	IT systems and Screen-Based Trading System	5 Hours

Trading Floor Architecture -Market Data Network Architecture (MDNA) –Scope – NEAT&BOLT Meaning and features –Online order Matching system

Unit-V	Financial Software and Data Sources	5 Hours

Financial Websites - Features – Overview of Yahoo Finance –MoneyControl.Com Overview –Portfolio Tracking Websites –Meaning –Objectives -Features

Books for Study

1. Fundamentals of Financial Management (10th Edition)- Phương Linh
2. Fundamentals Of Financial Management By Prasanna Chandra
3. Financial Management - Dr. A. Murthy, Margam publications

Books for Reference :

1. NCFM Securities Market Basic Module- Textbook
2. NISM-Series-XII: Securities Markets Foundation- Textbook
3. NCFM Financial Markets: A Beginner's Module - Textbook

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Course Code	Course Title	P	T	C
U8CAPR51	Web Technology - Practical	4	-	2

Instructional objectives:

1. ***To impart basic knowledge of HTML and Java Script***
2. ***To give the students hands-on experience in developing Web Page***
3. ***To enhance programming skills.***
4. ***To sensitize and motivate students use technologies for business***

	EX NO. 1	**8 Hours…**
Design a simple HTML Web Page introducing you (Bio-Data), using various Text formatting tags.		
	EX NO. 2	**8 Hours…**
Design a Web page with Simple HTML which discuss your Hobbies, Goal etc., also use images		
	EX NO. 3	**8 Hours…**
Modify the above Web Pages EX NO 1 and EX NO 2 and insert Hyperlink for both front and back, from both the Web Pages.		
	EX NO. 4	**8 Hours…**
Create a Web Page to display your Class Time Table using HTML Table Tags.		
	EX NO. 5	**8 Hours…**
Create a Web Page using JavaScript that converts a given text to uppercase		
	EX NO. 6	**8 Hours…**
Design a Web Page using JavaScript, which manipulate to find the maximum of three given numbers.		
	EX NO. 7	**8 Hours…**
Create a HTML document with Java script to count the number of vowels in a text typed in a Text Area.		
	EX NO. 8	**4 Hours…**
Design a Simple Calculator on the Web Page using JavaScript to perform "+,-,*,/"		

Books for Study

1. Steven Holzner "HTML Black Book", Dremtech press.
2. Web Technologies, Black Book, Dreamtech Press

Books for Reference :

1. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India
2. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel Pearson.

Course Code	Course Title	L	T	C
U8CASB51	QUANITATIVE APTITUDE & REASONING	2	-	1

Instructional Objectives

1. ***To make students acquaint with basic Quantitative Techniques***
2. ***To familiarize students with roots and Averages***
3. ***To make students understand reasoning and logical reasoning***

Unit-I	Numbers and Test of Divisibility	12 Hours

Operation on Numbers: Numbers – Types of Numbers – Natural, Whole, Even and Odd Numbers, Prime Numbers – **Test of Divisibility:** Divisibility By 2, 3, 4, 5, 8, 9 – HCF and LCM of Numbers – Introduction – Concepts - Formulae (Simple Problems only)

Unit-II	Simplification, Roots and Average	12 Hours

Simplification – Introduction – Concepts - Square Roots and Cube Roots - Average - Problems in numbers and ages (Simple Problems only)

Unit-III	Reasoning	12 Hours

Introduction, Types of Reasoning - **Percentage** – Formulae and Concepts of percentage – Series Test – Direction Sense Test – Coding and Decoding – Alphabet Test (Simple Problems)

Unit-IV	Logical Reasoning	12 Hours

Time and Distance – Blood Relations – Height and Distances - Odd Man Out Series (Simple Problems only)

Unit-V	Data Interpretation & Comprehension	12 Hours

Sources and Classification of data – Data and Governance – Tabulation – Meaning, Types of tabulation – **Graphical Representation:** Bar and Line Graph – Pie Chart – Paragraph Comprehensive

(Ratio of Problems and Theory – 60% : 40%)

Books for Study:

R.S. Aggarwal - "Quantitative Aptitude for competitive examinations" - seventh revised edition - S.Chand and Co Ltd - New Delhi -2005.

Books for Reference :

Barron's Guide for GMAT - Galgotia publications - New Delhi – 2006

Quantum CAT by Sarvesh K Verma

Course Code	Course Title	L	T	C
U8CA6001	ACCOUNTING FOR DECISION MAKING	5	-	5

Instructional objectives

1. ***To make students aware of principles of management accounting***
2. ***To familiarize applications of management accounting***
3. ***To acquaint students on financial statements analysis***
4. ***To familiarize students on marginal costing***
5. ***To make students learn budgeting***

Unit-I	Introduction to Management Accounting and Financial Statement Analysis	15 Hours

Meaning and Definition – Scope, Objectives and Functions of Management Accounting – Management Accounting Vs Financial Accounting - **Analysis and Interpretation of Financial Statements**: Meaning of Financial Statements – Tools of Financial Statement Analysis - Comparative statements, Common Size statement and Trend Analysis.

Unit-II	Ratio Analysis	15 Hours

Introduction – Meaning of ratio – Advantages – Classification of Ratios – Profitability Ratios – Turnover Ratios or Activity Ratios – Solvency or Financial Ratios

Unit-III	Cash Flow Statement and Funds Flow Statement	15 Hours

Introduction – Meaning of Funds - Managerial Uses of Funds Flow Statement – Schedule of Changes in Working Capital - Preparation of Funds Flow Statement – Preparation of Cash Flow Statements (AS-3)

Unit-IV	Marginal Costing	15 Hours

Introduction – Definition of Marginal Cost - Advantages - Limitations - Cost Volume Profit Analysis - Fixed Cost, Variable Cost, Contribution, Break-Even Analysis – Margin of Safety

Unit-V	Budgeting and Budgetary Control	15 Hours

Meaning and Definition - Nature and objectives of Budgetary Control - Advantages and Limitations - Classification of Budgets - **Preparation of Budgets** - Production, Cash and Flexible Budget.

(THE RATIO OF PROBLES AND THEORY = 80% : 20%)

Books for Study

1. Management Accounting – T.S.Reddy & Y.S. Hariprasad Reddy, Margham Publications
2. Principles of Management Accounting - Dr. S. N. Maheswari, Sulthan Chand Publications
3. R.S.N. Pillai and Bagavathi: Management Accounting, S.Chand Publications

Books for Reference :

1. R.S.N. Pillai and Bagavathi: Management Accounting, S.Chand Publications
2. Dr.Maheswari S.N – Management Accounting
3. Chadwick – The Essence of Management Accounting
4. Charles T.Horngren and Gary N.Sundem – Introduction to Management Accounting

5. Sharma and Shashi K.Gupta – Management Accounting
6. Hansen/Mowen – Cost management Accounting and Control

Course Code	Course Title	L	T	C
U8CA6003	**BANKING LAW & PRACTICE**	5	-	5

Instructional objectives

1. ***To provide basic knowledge of banking law***
2. ***To familiarize functioning of central bank***
3. ***To Familiarize functioning of commercial banks***
4. ***To acquaint with banking reforms in India***
5. ***To Familiarize banking in IT era***

Unit-I	Introduction to Banking	15 Hours

Definition – Types of Banks – Functions of Banks – Banking Regulations Act, 1949 – Reserve Bank of India (RBI): Evolution – Organizational structure of RBI – Functions of RBI- Role of Bank in Economic Development – Interest Free Banking System

Unit-II	Commercial Banks	15 Hours

Definition- functions - Credit creation, Loans and Advances – NPAs - E-Banking, Credit cards, Debit cards, ATM cards, Electronic clearing system, Electronic Fund transfer-Real Time Gross settlement System and Internet Banking - . Cashless transactions – E-Payment gateways – E-wallets.

Unit-III	Bankers & Customer Relationship	15 Hours

Opening of an account, Types of deposit account - Types of customers, Relationship between banker and a customer -Importance of customer relations, KYC Forms - Customer grievances and redressal, role of banking ombudsman.

Unit-IV	Negotiable Instruments	15 Hours

Negotiable Instruments – Features –Promissory Note , Cheque, Demand Draft - Crossing – kinds of crossing - Endorsement – kinds of endorsements – CTS 2010

Unit-V	Banking Reforms in India	15 Hours

Banking Reforms in India: Sector Recommendations of Narasimham Committee- Banking Services: ATM, Credit Card, Debit Card, Rupay Card – E-Services – Online/
Internet Banking – Mobile Banking – EFT – Types of EFT – RTGS – NDS - CFMS – NFS - IFTP – IMPS.

Books for Study

1. E.Gordon & K. Natrajan, **"Banking Theory, Law & Practice"**, Himalaya Publishing House, 24th Revised Edition, 2015.
2. B.Santhanam **"Banking Theory, Law & Practice"**, Marghan Publications, Chennai. 2018.

Books for Reference :

1. G.S.Popli and Anuradha Jain,**"Principles and Systems of Banking"**, PHI Learning Private Limited, 2016.
2. K.P.M. Sundaram and P.N.Varshney, **"Banking Law and Practice"**, Sultan Chand & Sons Publishing House,18th Edition 2014.

3. Indian Institute of Banking and Finance, **"Principles & Practice of Banking"**, Macmillan Publishers India Private Ltd., 2016.
4. K.C.Shekar, Lekshmy Shekar,**"Banking theory and Practice"**,Vikas Publishing House Pvt.Ltd., 20th Edition, 2007.

Course Code	Course Title	L	T	C
U8CA6002	**Income Tax Law & Practice -II**	**5**	**-**	**5**

Instructional objectives

1. ***To make the students understand important provisions of income Tax Law relating to computation Tax.***
2. ***To familiarize students with the concept of capital gains and aggregation of income***
3. ***To make students acquaint with the assessment procedure.***

Unit-I	**CAPITAL GAIN**	**15 Hours**

Capital gain - Definition of Capital Assets - Kinds of Capital Assets - Exempted Capital Gains - Computations of Capital Gains.

Unit-II	**INCOME FROM OTHER SOURCES**	**15 Hours**

Income from other Sources - Income Chargeable to Tax - Deductions - Bond Washing Transactions - Computation of Income from other Sources.

Unit-III	**AGGREGATION OF INCOME**	**15 Hours**

Aggregation of Income - Deemed Incomes - Set off and Carry forward of losses - Deductions from Gross Total Income.

Unit-IV	**ASSESSMENT OF INDIVIDUALS**	**15 Hours**

Assessment of individuals - Computation of Total Income and Tax Liability.

Unit-V	**PROCEDURE FOR ASSESSMENT**	**15 Hours**

Procedure for Assessment - Types of Assessment - Filing of Returns - Advance Payment of Tax - Deduction of Tax at Source.

Books for Study:

1. T.S. Reddy and Harry Prasad Reddy : Income Tax Law & Practice – Margham Publications

2. A. Murthy : Income Tax Law & Practice, Vijay Nicole

Books for Reference :

1. **Gaur & Narang ,** Income Tax Law & Practice, Kalyani Publications
2. **T.S. Reddy and Harry Prasad Reddy :** Income Tax Law & Practice – Margham Publications
3. **A. Murthy :** Income Tax Law & Practice, Vijay Nicole

Course Code	Course Title	L	T	C
U8CA6005	Human Resource Management	4	-	2

Instructional objectives

1) ***To make the students familiarize with the basic concepts of Human Resource Management.***
2) ***To acquaint students with planning for human resource.***
3) ***To make aware on methods improving human resource.***
4) ***To know how to evaluate efficiency of human resources.***
5) ***To familiarize students on position movement of employees.***

Unit-I	Introduction to Human Resource Management	12 Hours

Meaning, Nature and scope of Human Resource Management – Difference between Personnel Management and HRM Functions of HRM – Environment of HRM – Recent trends in HRM.

Unit-II	Human Resource Planning	12 Hours

Human Resource Planning – Recruitment – Sources of Recruitment – Selection – Methods of Selection – Placement - Job Analysis and Job Description – Recruitment procedure of UPSC, SSC, RRB, TNPSC,TRB – Reservation Policies

Unit-III	Training and Development	12 Hours

Induction –Meaning of Training and Development - Training Methods – Techniques – Identification of Training needs – Training Methods of Leading MNCs (Google, Pepsi, Maruthi Suzuki, Amazon) – Training and Development of Women Employees

Unit-IV	Performance Appraisal & Motivation	12 Hours

Performance Appraisal – Need for Appraisal – Methods – Performance Appraisal in MNCs - Job Evaluation –Wages and Salary Administration — Stress Management – Grievance Redressal – Motivation – Need of Motivation – Maslow's theory of motivation – Motivation Techniques in Foot wear Industries.

Unit-V	Enhancement, Retrenchment and HR Audit	12 Hours

Transfer – Promotion - termination of services – Career development – Mentoring – HRM Audit – Nature – Benefits – Scope - Fringe benefits in Govt. companies and MNCs - Fringe benefits in Leather Industries

Books for Study

1) Human resource Management - Dr.C.D. Balaji - Margham Publications – Chennai.
2) Personnel Management - Dr.J.Jayasankar - Margham Publications – Chennai.
3) Human Resource and Personnel Management – Aswathappa - Himalaya Publishing House –

New Delhi.
4) Human Resource Management - Dr.S.S.Khanka - S.Chand & Company Ltd – New Delhi.
5) Human resource Management - P.Subba Rao - Himalaya Publishing House- New Delhi.

Books for Reference :

1) A Framework for Human Resource Management - Gary Dessler - Pearson Education - New Delhi.
2) Personnel/Human Resource Management – DeCenzo, D.A. and S.P. Robbins - Pearson Education - New Delhi
3) Human Resource Management - TN Chhabra,Dhanpat Rai & Co. New Delhi.
4) Human Resource Management - Ivancevich, John M - McGraw Hill – New Delhi.
5) Human Resource Management - Wreather and Davis -Pearson Education – New Delhi.

Course Code	Course Title	L	T	C
U8CA6004	**Multimedia Theory & Practice**	4	-	2

Instructional objectives

1. ***To familiarize the students with the practical applications of multimedia.***
2. ***To acquaint students with hardware of multimedia.***
3. ***To create awareness on Multimedia Audio.***
4. ***To make students aware on Multimedia Text and Animations.***
5. ***To create awareness on Multimedia Graphics and Videos.***

Unit-I	**Introduction to Multimedia**	**15 Hours**

Introduction to Multimedia - Scope of Multimedia - Digital Media that Make Up Multimedia -Understanding Multimedia - Various Type of Multimedia Applications - Interactive Multimedia - Non Interactive Multimedia – Applications of Multimedia in Business and Management.

Unit-II	**Multimedia Hardware**	**15 Hours**

Introduction - Multimedia Hardware Evolution - Basic Types of Multimedia Hardware- Multimedia Add-On Peripherals - External Multimedia Equipments - Choosing Right Multimedia Peripherals And Equipments - Installing Tips - Plug And Play - A Typical Multimedia System Configuration - Multimedia Upgrade Kits.

Unit-III	**Multimedia Audio**	**10 Hours**

Definition Of Digital Audio - Audio As A Part of Multimedia - Audio Sampling - Audio Sampling Parameters - Digital Audio Recording Pitfalls - Digital Audio File Sizes - Digital Audio File Formats.

Unit-IV	**Multimedia Text**	**10 Hours**

Digital Text - Text As A Part Of Multimedia - Text Design Basics - Parameters That Control Text Design – Fonts – Titling - Jaggies And Anti-Aliasing - Special Effects For Titles - Hypermedia - Hyperlinks In Multimedia Projects - Designing A Hypermedia System - Text Editing Software Tools.

Unit-V	Multimedia Graphics & Multimedia Videos	10 Hours

Definition Digital Graphics - Graphics As A Part Of Multimedia - Multimedia Animation & Uses In Multimedia - Multimedia Videos - Role Of Digital Videos In Multimedia Projects - Touch Screen Technology - Composition Of Touch Screen Monitors. Display Systems: PIDS-PDS-LED-LCD-CRT.

Books for Study

1. Multimedia Magic - S. Gokul - BPB PUBLICATIONS.
2. Multimedia: Making It Work - Tay Vaughan - Tata McGraw-Hill - New Delhi.
3. Multimedia Computing, Communication & Applications - Pearson Education – New Delhi
4. Multimedia: Computing, Communications Applications - R Steinmetz and K Naharstedt, Pearson Education.
5. Multimedia Handbook – Keyes - Tata McGraw-Hill - New Delhi.

Books for Reference :

1. Multimedia System - Design by K. Andleigh and K. Thakkar - Prentice Hall India - New Delhi.
2. Multimedia Systems - John F.Koegel Buford - Pearson edition – New Delhi.
3. Multimedia In Action – James E Shuman – Vikas Publishing House - Noida.
4. Principles of Multimedia - Ranjan Parekh- Tata McGraw Hill – Noida .
5. Multimedia Systems Design - Pearson Education – New Delhi

Course Code	Course Title	L	T	C
U8CAPJ61	INSTITUTIONAL TRAINING	5	-	5

Instructional objectives:

1. ***To bridge the gap between Academics and Industry***
2. ***To Acquaint the students with Practical aspects various functioning of organisations***
3. ***To provide hands on training in Computer Applications in Business.***
4. ***To familiarize students with preparation of project report.***

Unit-I	Training in Banking Operations	15 Hours

Opening of Bank Account – Documents for opening of Account – Applying for Cheque Book, DD, Credit Card, Locker facility, NEFT, RTGS – E-Payment Apps.

Unit-II	Training in E- Commerce Organisations	15 Hours

Organisational Set Up of E-Commerce Organisations – Flipkart – Amazon – Digital Marketing – Product Scoring – Social Marketing

Unit-III	Training in Stock Market Operations	15 Hours

Introduction to Stock Market – Trading Mechanism – Clearing And Settlement – Depositories – Depositary Participants – R & T Agents for Shares and Mutual Funds – Prominent Stock Brokers – Mutual Funds Web Portals

Unit-IV	Training in Transport Companies	15 Hours

Introduction to Transport Business – Private Transport Companies – Government Transport Companies – Booking of Tickets

Unit-V	Training in Logistics	15 Hours

Introduction to Logistics – Types of Logistics – Logistic Skill Council of India - Prominent Logistic Companies in India – International Logistic Companies in India – Documents required for Export & Imports

Books for Study:

1. David Whiteley, E-commerce: Strategy, Technology and Applications, McGraw Hill Education
2. Indian Institute of Banking and Finance, **"Principles & Practice of Banking"**, Macmillan Publishers India Private Ltd., 2016.

NOTE:

The paper on Institutional Training shall carry hundred marks and Internal and External Viva- Voce, based on a Group Project Report on functioning of an organisation visited by the group of students, under the guidance of a faculty member of the Department.

The report shall be submitted after completion of Industrial visit during holidays. The report should be evaluated jointly by the INTERNAL and EXTERNAL Examiners and conduct Viva-Voce.

The Evaluation of project report and Viva-Voce shall be for a maximum of 25 candidates per session. The marks shall consist of 75 Marks for Project Report and Viva Voce 25 Marks.

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

Course Code	Course Title	L	T	C
U8CASB61	**E-Commerce and Its Applications**	**2**	**-**	**1**

Instructional objectives:

1. To make the students acquaint with the knowledge of E-Commerce
2. To make the students familiar with the mechanisms of E-Commerce
3. To develop expertise for conducting business transactions through electronic means
4. To enable students abridge traditional and contemporary Commerce

Unit-I	**Introduction to Ecommerce**	**3 Hours**

Introduction to E-commerce: Evolution of E-Commerce Application - Understanding of E-commerce

Unit-II	**E-commerce business models and concepts- The internet and World Wide Web: Ecommerce infrastructure**	**7 Hours**

E-commerce Business Models- Business to Consumer (B2C) - Business to Business (B2B) business models- Business models in emerging E-commerce areas - structure and process- **The**

Internet: Technology Background- The Internet Today - The Future Infrastructure.		
Unit-III	**Security and Encryption**	**6 Hours**
Need and concepts- the e-commerce security environment: Dimension- definition and scope of e-security -security threats in the E-commerce environment - Security intrusions and breaches- attacking methods like hacking- sniffing- cyber-vandalism etc. - technology solutions Encryption- security channels of communication- protecting networks and protecting servers and clients.		
Unit-IV	**E-payment System**	**7 Hours**
Models and methods of e–payments: Debit Card- Credit Card- Smart Cards- e-money - Digital Signatures: Procedure- working and legal position - Payment Gateways- **online banking:** Meaning- Concepts- Importance- Electronic Fund Transfer- Automated Clearing House- automated ledger posting - Risks Involved in e-payments.		
Unit-V	**On-line Business Transactions**	**7 Hours**
Online Business: Meaning- Purpose- E-Commerce Applications in Banking - Insurance - Payment Of Utility Bills - Online Marketing - E-Tailing – Auctions - Online Portal - Online Learning- Publishing And Entertainment} Online Shopping (Amazon, Snapdeal, Alibaba, Flipkart)		
Books for Study: 1. Kenneth C. Laudon and Carlo Guercio Traver, E-Commerce, Pearson Education. 2. David Whiteley, E-commerce: Strategy, Technology and Applications, McGraw Hill Education 3. Bharat Bhaskar, Electronic Commerce: Framework, Technology and Application, 4th Ed., McGraw Hill Education		
Books for Reference : **1.** PT Joseph, E-Commerce: An Indian Perspective, PHI Learning **2.** KK Bajaj and Debjani Nag, E-commerce, McGraw Hill Education **3.** TN Chhabra, E-Commerce, Dhanpat Rai & Co. **4.** Sushila Madan, E-Commerce, Taxmann **5.** TN Chhabra, Hem Chand Jain, and Aruna Jain, An Introduction to HTML, Dhanpat Rai & Co.		

DEPARTMENT OF MATHEMATICS

COURSE OUT COMES FOR SEMESTER V & VI	
Semester V	
Course Title	**Course Outcomes**
Modern Algebra – I	The Students are well equipped with the knowledge of Group & Ring theory.
Real Analysis – I	The Students acquire the knowledge of properties of real numbers as well as the concept of Metric Spaces.
Complex Analysis – I	The students know about analytic functions, Harmonic functions and Conformality of some Special transformations.
Statics	Applications to real life problems.
Operations Research – I	The students are well equipped with the knowledge of solve real life problems in Business and Management.
Graph Theory	The students will have a strong background of graph theory which has diverse applications in the area of computer science, biology, chemistry, physics , sociology and engineering
Financial Mathematics	The students are enabled to face the competitive examinations with confidence.
Semester VI	
Modern Algebra – II	The readers are getting cognizance of the vector spaces and linear transformations.
Real Analysis – II	The students acquire the knowledge of Connectedness and Compactness, Rieman integration and interchanging limits and integration, limits and differentiation
Complex Analysis – II	The students will be able to solve integrals using Cauchy's theorem, Cauchy residue theorem, also they know the series development of an analytic function using Taylor's and Laurent's series
Dynamics	Behavior of Motion of objects and application in real-life problems.
Operations Research – II	The readers are getting confidence of solve real life problems in Business and Management
Mathematics for Competitive Examination	This course enables the students do face the competitive examinations without any fear.
Latex Lab	The students learn to write and present the reports.

SEMESTER V

Course Code	Course Title	L	T	C
U8MS5001	MODERN ALGEBRA - I	5	3	4

Instructional Objectives

1. ***This course aims to impart emphasis on concepts and technology of the groups and rings and their algebraic structures which have applications in Mathematical Physics and Computer Science.***
2. ***To introduce algebra from the basic concepts of functions***
3. ***To introduce and develop deeply into the concepts of Group theory***
4. ***To introduce the concepts of ring theory and ideals in a ring***
5. ***To introduce polynomial rings***

Unit-I	Group Theory	15 Hours

Definition of a Group – Some Examples of Groups – Some Preliminary Lemmas – Subgroups.
Chapter 2: Sections 2.1 to 2.4.

Unit-II	Group Theory (Contd…)	15 Hours

Counting Principle – Normal Subgroups and Quotient Groups – Homomorphisms.
Chapter 2: Sections 2.5 to 2.7.

Unit-III	Group Theory (Contd…)	15 Hours

Automorphisms – Cayley's theorem – Permutation Groups.
Chapter 2: Sections 2.8 to 2.10.

Unit-IV	Ring Theory	15 Hours

Definition and Examples of Rings – Some Special Classes of Rings – Homomorphisms – Ideal and Quotient Rings.
Chapter 3: Sections 3.1 to 3.4.

Unit-V	Ring Theory (Contd…)	15 Hours

More Ideals and Quotient Rings – The Field of Quotients of an Integral Domain – Euclidean Rings.
Chapter 3: Sections 3.5 to 3.7.

Books for Study:

TOPICS IN ALGEBRA, *I.N. Herstein* (2016), 2nd Edn, Wiley Eastern Ltd., New Delhi.

Books for Reference:

1. MODERN ALGEBRA, *S. Arumugam*, (2004), Scitech Publications, Chennai.
2. MODERN ALGEBRA, *M.L. Santiago*, (2002), Tata McGraw Hill, New Delhi.
3. MODERN ALGEBRA, *Surjeet Singh and Qazi Zameeruddin*, (1982), Vikas Publishing House Pvt. Ltd., New Delhi.

Course Code	Course Title	L	T	C
U8MS5002	REAL ANALYSIS – I	5	3	4

Instructional Objectives

- ***To understand various limiting behavior of sequences and series.***
- ***To explore the various limiting processes viz. continuity, uniform Continuity, differentiability and integrability.***
- ***To enhance the mathematical maturity and to work comfortably with concepts.***

Unit-I	Functions	15 Hours

Functions – Real valued functions – Equivalence , Countability – Real numbers – Least upper bound.

Chapter 1 :Section 1.3 to 1.7

Unit-II	Sequences of Real Numbers	15 Hours

Definition of Sequence and Subsequence – Limit of a Sequence – Convergent Sequence – Divergent Sequence – Bounded Sequence – Monotone Sequence.

Chapter 2 :Section 2.1 to 2.6

Unit-III	Sequences and Series of Real Numbers	15 Hours

Operations on Convergent Sequence – Operations on Divergent Sequence – Limit Superior and Limit Inferior – Cauchy Sequences – Convergence and Divergence – Series with non-negative terms – Alternating Series – Conditional Convergence and Absolute Convergence.

Chapter 2:Section 2.7 to 2.10

Chapter 3 :Section 3.1 to 3.4

Unit-IV	Series of Real Numbers, Limit and Metric Spaces	15 Hours

Rearrangement of Series – Tests for Absolute Convergence – Series whose terms form a non-increasing Sequence – Summation by Parts – Limit of a function on the real line – Metric Spaces – Limits in Metric Spaces.

Chapter 3: Section 3.5 to 3.9

Chapter 4 :Section 4.1 to 4.3

Unit-V	Continuous Functions on Metric Spaces	15 Hours

Functions Continuous at a point on the real line – Reformulation – Functions continuous on a Metric Space – Open Sets – Closed Sets.

Chapter 5 :Section 5.1 to 5.5

Books for Study:

Richard R. Goldberg, (1970), METHODS OF REAL ANALYSIS, Oxford &IBH Publishing Co., New Delhi

Books for Reference:

1. Tom M.Apostol, (1974), MATHAMATICAL ANALYSIS, 2nd Edition, Addison –Wesley, New York.
2. Bertle, R.G. and Shebert, (1976), REAL ANALYSIS, John Wiley and Sons, New York.
3. Malik, S.C. and Savita Arora, (1991), MATHEMATICAL ANALYSIS, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansi Lal, (1991), INTRODUCTION TO REAL ANALYSIS, Satya Prakashan, New Delhi.

Course Code	Course Title	L	T	C
U8MS5003	COMPLEX ANALYSIS I	5	3	4

Instructional Objectives

- ***To study the complex behavior of complex-valued functions.***
- ***To train the students in the operative techniques on complex valued functions.***
- ***This course provides a modern treatment of concepts and techniques of complex function theory and the methods to solve problems in Pure and Applied Mathematics.***

Unit-I **Analytic Functions** **15 Hours**

Neighbourhood of a point z_0 – Limit Point – Interior points and boundary points – Open set and closed set – Bounded set and unbounded set – Domain – Jordan arc – Function of a Complex variable – Continuity – Differentiability – Analytic function – Necessary and Sufficient conditions for $f(z)$ to be analytic – Polar form of Cauchy-Riemann conditions – Derivatives of w in polar form – Function of a function.

Chapter 2: Sections: 2.2 to 2.16

Unit-II **Analytic Functions (Contd…)** **15 Hours**

Orthogonal system – Harmonic functions – Determination of the conjugate function – To construct a function $f(z)$ when one conjugate function is given – To show that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)=4\frac{\partial^2}{\partial z\,\partial \bar{z}}$.

Chapter 2: Sections:2.17 to 2.21

Unit-III **Conformal Representation** **15 Hours**

Introduction – If $f(z)$ is analytic mapping is conformal – Converse. If mapping conformal, $w=f(z)$ analytic (Sufficient conditions of conformal mappings) – The case $f'(z_0)=0$, when $f'(z)=0$ – Geometric interpretation of $R=|f'(z)|$ and $\beta_1=\alpha_1+\lambda.$ – Transformation which are Isogonal but not conformal – Bilinear Transformation (Mobius Transformation). $w=\frac{az+d}{cz+b}$ – Bilinear Transformation – Every bilinear transformation is the resultant of bilinear transformation with simple geometric imports – Theorem. The equation $\arg\left(\frac{z-z_1}{z-z_0}\right)=\lambda$ represents a family of circles every member of which passes through two fixed points z_1, z_0 – Theorem. The bilinear transformation $w=\frac{az+d}{cz+b}$ transforms the circle $\arg\left(\frac{z-z_1}{z-z_2}\right)=\lambda$ into similar circle $\arg\left(\frac{w-w_1}{w-w_2}\right)=$ constant where w_1, w_2 correspond to z_1, z_2 respectively – Cross Ratio – Preservance of cross ratio under the bilinear transformation.

Chapter 3: Sections: 3.1 to 3.13

Unit-IV **Conformal Representation (Contd…)** **15 Hours**

Find the bilinear transformation which transforms the points z_1, z_2, z_3 of z plane respectively into the points w_1, w_2, w_3 of w-plane – Bilinear transformation of a circle

Chapter 3: Sections:3.14 to 3.15

Unit-V **Conformal Representation (Contd…)** **15 Hours**

Some Special Transformation – The transformation $w = z^2$ – The transformation $z = \sqrt{w}$ (Inverse mapping of $w = z^2$) – The transformation $w = \frac{1}{2}\left(z + \frac{1}{z}\right)$ – The transformation $w = e^z$ – The transformation $w = \cos z$ – The transformation $z = c \sin w$.

Chapter 3: Sections:3.16 to 3.19, 3.23, 3.24, 3.25

Books for Study:

FUNCTIONS OF A COMPLEX VARIABLE, *B.S. Tyagi*, (1984), 12th Edition, Kedar Nath Ram Nath Publications, Meerut, Delhi

Books for Reference:

1. COMPLEX VARIABLES AND APPLICATIONS, *R.V. Churchill and J.W. Brown*, (1990), McGraw Hill International Book Co., Singapore.

2. COMPLEX ANALYSIS, *P. Duraipandian & Laxmi Duraipandian*, (1976), Emerald Publishers, Chennai.

3. FOUNDATIONS OF COMPLEX ANALYSIS, *S. Ponnusamy*, (2000), Narosa Publishing House, New Delhi.

Course Code	Course Title	L	T	C
U8MS5004	STATICS	5	3	4

Instructional Objectives

- ***Concepts of Parallel Forces and Moments.***
- ***Concepts of Couples.***
- ***Friction laws and its properties.***
- ***Centre of Gravity.***
- ***Application of the principle of virtual work.***

Unit-I	Parallel Forces and Moments	15 Hours

Like and Unlike Parallel Forces – 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 the moment – Unit of moment – Varignon's Theorem of Moments.

Chapter III: Sections 1 to 12

Unit-II	Couples	15 Hours

Couples – Equilibrium of two couples – Equivalence of two couples – Couples in Parallel Planes – Representation of a couple by a vector – Resultant of coplanar couples – Resultant of a couple and a force – Theorems on couples.

Chapter IV: Sections 1 to 10

Unit-III	Friction	15 Hours

Introduction – Experimental Results – Statical, Dynamical and Limiting Friction – Laws of friction – Friction - a passive force – Coefficient of Friction – Angle of Friction – Cone of Friction – Numerical Values – Equilibrium of a body 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.

Chapter VII: Section 1 to 12

Unit-IV	Centre of Gravity	15 Hours

Centre of Gravity – Distinction between centre of gravity and centre of mass – The centre of gravity of a body is unique – Determination of centre of gravity in simple cases – Centre of Gravity by symmetry – Centre of Gravity of a uniform triangular lamina –Theorem – Centre of Gravity of three rods forming a triangle - Centre of Gravity by Integration

Chapter VIII: Sections 3 to 10,18,18.1,18.2,18.3,18.4

Unit-V	Virtual Work	15 Hours

Work – Theorem – Method of Virtual work – Principle of Virtual work for a system of coplanar forces acting on a body – Forces which may be omitted in forming the equation of virtual work– Work done by an extensible string – Work done by the weight of a body – Application of the principle of Virtual work.

Chapter IX: Sections 1 to 8

Books for Study:

STATICS, *Dr. M.K. VENKATARAMAN*, (2002) , Tenth Edition, Agasthiar publications, Tirchy.

Books for Reference:

1. Narayanan.S, Statics, Sultan Chand and Co., Channai 1986.
2. Duraipandian.P and Lakshimi Duraipandian, Mechanics, Emerald Publishers ,Chennai, 1987

Course Code	Course Title	L	T	C
U8MS5005	OPERATIONS RESEARCH – I	4	3	4

Instructional Objectives

- ***To improve the skill of solving very common problem which one come across in various fields like transportation and assignment, game and industries with machines***
- ***To enhance the mathematical maturity and to work comfortably with concepts.***

Unit-I	Linear Programming Problem	12 Hours

Linear programming problem (Introduction) – Requirements for a Linear Programming Problem – Assumptions in Linear Programming Models – Applications of Linear Programming Method Mathematical formulation of the problem – Graphical solution method

Chapter 2: Sections 2.1 – 2.11.

Unit-II	Linear Programming Problem	12 Hours

Some important definitions - Simplex method(Algorithm) – Artificial variables techniques (Big M- method only) – Duality in linear programming

Chapter 2: Sections 2.14 – 2.17.1(omit 2.15, 2.17.2)

Chapter 6: Sections 6.1

Unit-III	Transportation Problems	12 Hours

Transportation problem – Mathematical formulation – The transportation table – The transportation Algorithm – Degeneracy in Transportation – Variants in Transportation problems

Chapter 3: Sections 3.1 – 3.6.

Unit-IV	Assignment Problems	12 Hours

The Assignment problem – The assignment algorithm – Maximization Assignment problem – Travelling Salesman Problem.

Chapter 4: Sections 4.1 – 4.7 and 4.10

Unit-V	Game Theory	12 Hours

Game theory – Two-person zero sum game – The MaxiMin and MiniMax principle – Saddle points – Game without saddle points and Dominance Property.

Chapter 9: Sections 9.10 – 9.19

Books for Study:

OPERATIONS RESEARCH, *Prem Kumar Gupta and D.S. Hira,* (1998), S. Chand & Co., New Delhi.

Books for Reference:

1. PROBLEMS IN OPERATIONS RESEARCH, *Kanti Swaroop, P.K. Gupta and Manmohan*, (2002), Sultan Chand & Son.
2. OPERATION RESEARCH, *H.A. Taha,* (2003), Macmillan Publishing Company, New York.
3. OPERATIONS RESEARCH, *V.K. Kapoor*, (1989), Sultan Chand & Sons.
4. PROBLEMS IN OPERATIONS RESEARCH, *P.K. Gupta and D.S. Hira,* (2000), S. Chand & Co., New Delhi

Course Code	Course Title	L	T	C
U8MS5006	GRAPH THEORY	4	3	4

Instructional Objectives

- ***To develop knowledge in the concepts of graphs, sub graphs, trees, connectivity, Eulerian, Hamiltonian and planar graphs.***
- ***To apply graph theory based tools in solving practical problems.***
- ***To enhance problem solving skills.***
- ***To enable students graph theory applications in science, business and industry.***

Unit-I	Graphs and Subgraphs	12 Hours

Definition and Examples – Degrees – Subgraphs – Isomorphism – Ramsey Numbers – Independent Sets and Coverings.

Chapter 2: Section 2.1 to 2.6

Unit-II	Matrices and Degree Sequences	12 Hours

Matrices – Adjacency and incidence matrices – Operations on Graphs – Degree Sequences – Graphic Sequences.

Chapter 2: Section 2.8 to 2.9

Chapter 3: Section 3.1 to 3.2

Unit-III	Connectedness	12 Hours

Walks, Trials and Paths – Connectedness and Components – Blocks – Connectivity.

Chapter 4: Section 4.1 to 4.4

Unit-IV	Eulerian and Hamiltonian Graphs	12 Hours

Eulerian graphs – Hamiltonian graphs.

Chapter 5: Section 5.1 & 5.2

Unit-V	Trees and Planarity	12 Hours

Trees: Characterisation of Trees – Centre of a Tree – Planarity: Definition and Properties

Chapter 6: Section 6.1 & 6.2

Chapter 8: Section 8.1

Books for Study:

S. Arumugam and S. Ramachandran, (2013), **Invitation to GraphTheory**, SCITECH Publications India Pvt. Ltd. Chennai

Books for Reference:

1. S. Kumaravelu, Susheela Kumaravelu, **GraphTheory**, Publishers,182,Chidambaram Nagar, Nagercoil-629002.
2. K.R. Parthasarathy, Basic Graph Theory, McGraw-Hill Professional Publishing.
3. S.A. Choudham, **A first course in Graph Theory**, Macmillan IndiaLtd.
4. Robin J. Wilson, **Introduction to Graph Theory**, Longman GroupLtd.
5. Bondy and U.S.R.Murthy, **GraphTheorywithApplications**, Macmillon, London.

Course Code	Course Title	L	T	C
U8MSSB51	FINANCIAL MATHEMATICS	2	3	1

Instructional Objectives

- ***To develop knowledge in the concepts of Financial mathematics and its applications.***
- ***To develop expertise in Financial mathematics.***
- ***To enhance problem solving techniques.***
- ***To enable students to formulate, interpret and draw inferences from mathematical solutions.***

Unit-I		6 Hours

Percentage
Chapter:10

Unit-II		6 Hours

Profit & Loss
Chapter: 11

Unit-III		6 Hours

Ratio & Proportion

Chapter: 12

Unit-IV		6 Hours

Simple interest
Chapter: 21

Unit-V		6 Hours

Compound interest

Chapter:22

Books for Study:

Objective Arithmetic, Dr. R. S. Aggarwal, S.Chand publications. Ed: 2017

Books for Reference:

1. **Quantitative Aptitude for Competitive Examinations, Abhijit Gupta, Tata McGraw Hill Publisher, 2009.**
2. **Quantitative Aptitude, P. Gupta, Unique Publisher, 2013.**
3. **Quantitative Aptitude for Competitive Examinations, U. Mohan Rao, SCITECH Publications (India) Pvt Ltd.2013.**

SEMESTER VI

Course Code	Course Title	L	T	C
U8MS6001	MODERN ALGEBRA – II	5	3	4

Instructional Objectives

- ***To study the Algebraic Structures of Vector Spaces***
- ***To study the concept of Linear Transformation.***
- ***To study the applications of Linear Transformation.***

Unit-I	Vector Spaces	15 Hours

Elementary Basic Concepts – Linear Independence and Bases.
Chapter 4: Sections 4.1 – 4.2.

Unit-II	Vector Spaces (Contd…)	15 Hours

Dual Spaces – Inner Product Spaces.
Chapter 4: Sections 4.3 – 4.4.

Unit-III	Linear Transformations	15 Hours

The Algebra of Linear Transformations – Characteristic Roots.
Chapter 6: Sections 6.1 – 6.2.

Unit-IV	Linear Transformations (Contd…)	15 Hours

Matrices – Canonical Forms : Triangular Form.
Chapter 6: Sections 6.3 – 6.4.

Unit-V	Linear Transformations (Contd…)	15 Hours

Trace and Transpose.
Chapter 6: Section 6.8.

Books for Study:

TOPICS IN ALGEBRA, *I.N. Herstein* (Reprint 2016), 2nd Edn, Wiley Eastern Ltd., New Delhi.

Books for Reference:

1. MODERN ALGEBRA, *S. Arumugam*, (2004), Scitech Publications, Chennai.
2. MODERN ALGEBRA, *M.L. Santiago*, (2002), Tata McGraw Hill, New Delhi.
3. MODERN ALGEBRA, *Surjeet Singh and Qazi Zameeruddin*, (1982), Vikas Publishing House Pvt. Ltd., New Delhi.

Course Code	Course Title	L	T	C
U8MS6002	REAL ANALYSIS – II	5	3	4

Instructional Objectives

- ***To understand Integration process of Riemann.***
- ***To develop the understanding of point wise and uniform convergence of sequence and series of functions.***
- ***To enhance the mathematical maturity to work comfortably with concepts.***

Unit-I	Connectedness, Completeness	15 Hours

More about open Sets – Connected Sets – Bounded Sets and Totally Bounded Sets – Complete Metric Spaces.

Chapter 6 : **Section 6.1 to 6.4**

Unit-II	Compactness	15 Hours

Compact Metric Space – Continuous Functions on Compact Metric Spaces – Continuity of Inverse Functions – Uniform Continuity.

Chapter 6 : Section 6.5 to 6.8

Unit-III	Calculus	15 Hours

Sets of measure zero - Definition of the Riemann Integral – Properties of the Riemann Integral – Derivatives – Rolle's Theorem – The law of the Mean – Fundamental Theorem of Calculus.

Chapter 7 : Section 7.1, 7.2, 7.4, 7.5, 7.6, 7.7, 7.8(Omit Sections 7.3)

Unit-IV	Calculus(Contd…) and Taylor series	15 Hours

Improper Integrals – Taylor's theorem – The binomial theorem – L'Hospital rule

Chapter 7 : Section 7.9

Chapter 8 : Section 8.5,8.6 and 8.7

Unit-V	Sequence and Series of Functions	15 Hours

Pointwise convergence of sequence of functions – Uniform convergence of sequence of functions – Consequences of uniform convergence – Convergence and uniform convergence of series of functions – Integration and differentiation of series of functions.

Chapter 9 : **Section 9.1 to 9.5**

Books for Study:

Richard R.Goldberg, (2000),METHODS OF REAL ANALYSIS, Oxford &IBH Publishing Co., New Delhi

Books for Reference:

1. Tom M.Apostol, (1974), MATHAMATICAL ANALYSIS, 2nd Edition, Addison –Wesley, New York.
2. Bertle, R.G. and Shebert, (1976), REAL ANALYSIS, John Wiley and Sons, New York.
3. Malik, S.C. and Savita Arora, (1991), MATHEMATICAL ANALYSIS, Wiley Eastern Limited, New Delhi.
4. Sanjay Arora and Bansi Lal, (1991), INTRODUCTION TO REAL ANALYSIS, Satya Prakashan, New Delhi.

Course Code	Course Title	L	T	C
U8MS6003	COMPLEX ANALYSIS II	5	3	4

Instructional Objectives

- ***To study the complex behavior of complex-valued functions.***
- ***To study the use of general Cauchy integral theorem and formula.***
- ***To study the Residue theorem to compute several kind of real integrals.***
- ***To express some functions as infinite series.***

Unit-I	Complex Integration:	15 Hours

Complex integration – Some definitions – Rectifiable curves – Riemann's definition of Integration – Evaluation of some integrals – Complex integral as sum of two real line integrals – Some elementary properties of complex integrals – An upper Bound for a complex integral.

Chapter 4: Sections: 4.1 to 4.8

Unit-II	Complex Integration (Contd…)	15 Hours

Cauchy's Theorem – Cauchy Gousrat's theorem – Connected Region, Simply-Connected Region and Multi-Connected Region – Cross cut – Extension of Cauchy's Theorem to multi-Connected region – Indefinite integral – Derivative of $F(z)$ - Cauchy's Integral formula

Chapter 4: Sections: 4.9 to 4.15

Unit-III	Complex Integration (Contd…)	15 Hours

Extension of Cauchy Integral formula to multi-connected regions – Cauchy's Integral formula for the Derivative of an Analytic Function – Analytic character of the successive derivatives of an analytic function – Morea's theorem – Cauchy's Inequality – Liouville's Theorem

Chapter 4: Sections: 4.16 to 4.21

Unit-IV	Complex Integration (Contd…)	15 Hours

Taylor's theorem – Laurent's Theorem – Related problems

Chapter 4: Sections: 4.23, 4.24 & 4.26

Unit-V	The Calculus of Residues	15 Hours

Definition of the Residue at a Pole – Definition of the Residue at infinity – To show that a function $f(z)$ may be analytic at $z = \infty$ but it has a residue at $z = \infty$ – Cauchy's Residue Theorem – If a function $f(z)$ is analytic except at finite number of poles; the sum of the residues at these poles is zero – Computation of Residue at a finite pole – Integration Round the Unit Circle.

Chapter 5: Sections: 5.1 to 5.6 & 5.9

Books for Study:

FUNCTIONS OF A COMPLEX VARIABLE, B.S. Tyagi, (1984), 12th Edition, Kedar Nath Ram Nath Publications, Meerut, Delhi

Books for Reference:

1. COMPLEX VARIABLES AND APPLICATIONS, *R.V. Churchill and J.W. Brown*, (1990), McGraw Hill International Book Co., Singapore.
2. COMPLEX ANALYSIS, *P. Duraipandian & Laxmi Duraipandian*, (1976), Emerald Publishers, Chennai.
3. FOUNDATIONS OF COMPLEX ANALYSIS, *S. Ponnusamy*, (2000), Narosa Publishing House, New Delhi.

Course Code	Course Title	L	T	C
U8MS6004	DYNAMICS	5	3	4

Instructional Objectives

- ***Applications of Projectile in practical problems.***
- ***Behaviour of elastic bodies in real life problems.***
- ***Simple Harmonic Motion and its Applications.***
- ***Law of forces in central orbit.***
- ***Laws of compound pendulum.***

Unit-I	Projectiles	15 Hours

Introduction – Definitions – Two fundamental principles – To show that the path of a projectile is a parabola – Characteristics of the motion of a projectiles – A particle is projected horizontally from a point at a certain height above the ground; to show that the path described by it is a parabola – To determine when the horizontal range of a projectile in maximum, given the magnitude u of the velocity of projection – To show that, for a given initial velocity of projection there are, in general two possible directions of projections so as to obtain a given horizontal – Range on an inclined plane.

Chapter 6 : Sections 6.1 to 6.8, 6.12

Unit-II	Collision of Elastic Bodies	15 Hours

Introduction – Definitions - Fundamental laws of impact - Impact of a smooth sphere on a fixed smooth plane – Direct impact of two smooth spheres – Loss of kinetic energy due to direct impact of two smooth spheres - Oblique impact of two smooth spheres - Loss of kinetic energy due to oblique impact of two smooth spheres.

Chapter 8 : **Sections 8.1 to 8.8**

Unit-III	Simple Harmonic Motion	15 Hours

Introduction – Simple Harmonic Motion in a Straight line – General solution of the S.H.M. equation – Geometrical Representation of a Simple Harmonic Motion - Change of origin - Composition of two Simple Harmonic Motions of the same period and in the same straight line - Composition of two Simple Harmonic Motions of the same period in two perpendicular directions.

Chapter 10 : Sections 10.1 to 10.7

Unit-IV	Motion under the Action of Central Forces	15 Hours

Introduction – Velocity and Acceleration in Polar Coordinates – Equations of Motion in Polar Coordinates – Note on the equiangular spiral – Motion under a central force – Differential equation of central orbits Perpendicular from the pole on the tangent Formulae in polar coordinates – Pedal equation of the central orbit – Pedal equation of some of the well-known curves – Velocities in a central orbit.

Chapter 11 : Sections 11.1 to 11.10

Unit-V	Motion of a Rigid Body about a Fixed axis	15 Hours

Introduction - Kinetic Energy of a rigid body about a fixed axis – Angular Momentum of a rigid body about axis of rotation – Motion of a rigid body about the axis of rotation - Conservation of Angular Momentum – Principle of Energy – The Compound Pendulum.

Chapter 13 : **Sections 13.1 to 13.7**

Books for Study:

Dr. M.K. Venkataraman, Dynamics, (2017), Eighteenth Edition, Agasthiar Publications.

Books for Reference:

1. A.V.Dharmapadham, Dynamics, S. Viswanathan Printers & PublishersPvt Ltd 2006.
2. M.L. Khanna, Dynamics, Jai PrakashNath And Company, 2004.

Course Code	Course Title	L	T	C
U8MS6005	OPERATIONS RESEARCH – II	4	3	4

Instructional Objectives

- ***To develop computational skills and logical thinking in formulating industry oriented problems as mathematical problems and finding solutions to these problems***
- ***To enhance the mathematical maturity and to work comfortably with concepts.***

Unit-I	REPLACEMENT PROBLEMS	12 Hours

Replacement problems – Introduction – Replacement of items whose maintenance costs increase with time – Replacement of items whose maintenance costs increase with time and value of Money also changes with time - Replacement of items that fail suddenly.

Chapter 11 : Sections 11.1, 11.2, 11.2.1,11.2.2,11.3

Unit-II	NETWORK ANALYSIS IN PROJECT PLANNING (PERT and CPM)	12 Hours

Network scheduling by CPM/PERT – project network diagram – Critical Path Method (CPM) – PERT Computations.

Chapter 14 : Sections 14.1 to 14.13

Unit-III	SEQUENCING PROBLEMS	12 Hours

Sequencing problem – n jobs through 2 machines, n jobs through 3 machines – two jobs through m machines – (Graphical Method) – n jobs through m machines.

Chapter 5 :Sections 5.1 to 5.7

Unit-IV	QUEUING THEORY	12 Hours

Queuing Theory – Basic concepts – Steady state analysis of M/M/1 and M/M/N systems with finite and infinite capacities.

Chapter 10 : Sections 10.1 to 10.10

Unit-V	INVENTORY MODELS	12 Hours

Inventory models – EOQ model (a) Uniform demand rate infinite production rate with no shortages (b) Uniform demand rate finite production rate with no shortages – Inventory control with Price Breaks.

Chapter 12: Sections 12.1 to 12.5 and 12.7

Books for Study:

OPERATIONS RESEARCH, *P.K. Gupta and D.S. Hira* (1998),S. Chand & Co., New Delhi..

Books for Reference:

1. OPERATIONS RESEARCH: THEORY AND APPLICATIONS, *J.K. Sharma,* (1998) Macmillan, New Delhi.
2. PROBLEMS IN OPERATIONS RESEARCH, *Kanti Swaroop, P.K. Gupta and*

Manmohan, (2002), Sultan Chand & Sons.
3. OPERATIONS RESEARCH, *A. Ravindran, D.T. Philips and J.J. Solberg*, (1987), John Wiley & Sons, New York.
4. OPERATIONS RESEARCH, *H.A. Taha*, (2003), Macmillan Publishing Company, New York.
5. OPERATIONS RESEARCH, *P.R. Vittal*, (2003), Margham Publications, Chennai.
6. OPERATIONS RESEARCH, *S.J. Venkatesan*, J.S. Publishers, Cheyyar.

Course Code	Course Title	L	T	C
U8MSSB61	**Mathematics For Competitive Examinations**	**2**	**3**	**1**

Instructional Objectives

- ***To develop knowledge in the concepts of Mathematics for Competitive Examinations and its applications.***
- ***To develop expertise in mathematics.***
- ***To enhance problem solving techniques.***
- ***To enable students to formulate, interpret and draw inferences from mathematical solutions.***

Unit-I		**6 Hours**

Numbers
Chapter: 1

Unit-II		**6 Hours**

HCF & LCM
Chapter: 2

Unit-III		**6 Hours**

Simplification
Chapter: 4

Unit-IV		**6 Hours**

Time & Work
Chapter:15

Unit-V		**6 Hours**

Arithmetic Progression & Geometric Progression
Chapter:33

Books for Study:

Objective Arithmetic, Dr. R. S. Aggarwal, S. Chand publications. Ed: 2017

Books for Reference:

1. **Quantitative Aptitude for Competitive Examinations, Abhijit Gupta, Tata McGraw Hill Publisher, 2009.**
2. **Quantitative Aptitude, P. Gupta, Unique Publisher, 2013.**
3. **Quantitative Aptitude for Competitive Examinations, U. Mohan Rao, SCITECH Publications(India) Pvt Ltd.2013.**

Course Code	Course Title	L	T	C
U8MSPR61	**Latex Lab**	**4**	**3**	**4**

Instructional Objectives

This course aims to practice the students in Mathematics document preparation and utilizing the software facility available for tedious computations

List of Experiments

1. Title creation
2. Page Layout
3. Fonts
4. List Structures
5. Tables
6. Include Images
7. Header and Footer
8. Mathematical Equations
9. Bibliography Management

Books for Study:

LAB Manual, prepared by the Department of Mathematics

Books for Reference:

- Online Latex Manual

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

DEPARTMENT OF PHYSICS
COURSE OUTCOMES
FOR SEMESTERS V & VI

Semester V	
Course Title	**Course Outcome**
Electricity and Electromagnetism (U8PY5001)	On the completion of this course the student will be able to CO1: understand the fundamental laws of electrostatics and their applications. CO2:describe the magnetic and chemical effect of electric current. CO3:understand the fundamentals of electromagnetic induction and its significance. CO4:distinguish DC and AC circuits and their working. CO5:understand the Maxwell's equation and their application in explaining the propagation of electromagnetic waves
Atomic Physics (U8PY5002)	On the completion of this course the student will be able to CO1: make student understand the basic concepts of discharge phenomenon through gases. CO2: Itillustrates the importance of photoelectric effect. CO3:to provide idea about the vector atom model and selection rules for electronic transitions. CO4: to distinguish Zeeman and anomalous Zeeman effect and its influence of electric and magnetic fields on atomic states. CO5: make students understand the laws of X-rays and interpretation of different spectra.
Applied Electronics (U8PY5003)	On the completion of this course the student will be able to understand the basic construction methods and uses of diodes and new Microwave Diodes, the characteristics, working and applications of semiconductor devices, the fundamentals of Amplifiers and Oscillators, basic ideas of timing circuits and applications of operational amplifier, the basis of analog and digital communications.
Digital Electronics (U8PY5004)	On successful completion of this course the student acquire the fundamental concepts of combinational & sequential logic circuits and gain a depth of knowledge for simplification techniques of complicated digital circuits into simple circuit using Karnaugh map method. The aim of the Project circuits is to acquire practical knowledge on the implementation of perception studied through this course.
Maintenance and Servicing of Home Appliances (U8PYSB51)	On the completion of this course the student will be able to CO1: the basics of transformer and working principle alongwith the troubleshooting of invertors. CO2: the working and maintenance of automatic iron, fan and lamps. CO3: the working and troubleshooting of washing machine,microwave oven,induction stove and reverse osmosis. CO4: the basic units of personal computers and principles of cellphone technology. CO5: the working of refrigerator, air condition and water heaters.
Physics Practical V (U8PYPR51)	On the completion of this course the student will be able to CO1: determination of Young's modulas by Koenig's method and to

	prove parallel axes theorem using bifilar pendulum. CO2:determination of radius of curvature and refractive index of the lens material. CO3:determination of earth's magnetic induction using deflection magnetometer. CO4: determination of dispersive power of a prism and cauchy's constant using spectrometer.
Practical VI Electronics Experiments I (U8PYPR52)	CO1: construction of logic gates using discrete components. CO2:verification of NAND and NOR as universal logic gates. CO3:technique of simplifying logic equation using Karnaugh map. CO4: verification of demorgan's theorem. CO5: construction of Inverter, Non-Inverter, Adder, Subtractor using OP-AMP. CO6:design of half adder, full adder, half subtractor and full subtractor using NAND IC. CO7:study and design of integrator and differentiator usingOP-AMP. CO8:8-Bit Addition, Subtraction, Multiplication & Division using 8085. CO9:construction of Phase shift and Wien's bridge Oscillator using Transistor. CO10:study of R-S, JK and D flip-flop using NAND gate.
Semester VI	
Course Title	**Course Outcome**
Nuclear and Particle Physics (U8PY6001)	On the completion of this course the student will be able to CO1: basic concepts of nuclear models. CO2: basic principles of radioactivity. CO3:fundamentals of radiation detectors and working of particle accelerators. CO4: basic ideas and principles behind nuclear reactions. CO5: classification and fundamental interaction of elementary particles.
Wave Mechanics and Special functions (U8PY6002)	On the completion of this course the student will be able to CO1: impart fundamental principles of quantum mechanics. CO2: provides ideas about the importance and applications of Schrodinger wave equation in solving quantum mechanical problems. CO3: explain the types and properties of matrices for acquiring skills to solve linear equations. CO4: give the basic ideas of vector analysis. CO5: techniques of using special functions for solving differential equations.
Numerical methods and Fundamentals of "C" (U8PY6003)	On the completion of this course the student will be able to CO1: Solve simultaneous linear equations by Gauss elimination method and gauss Jordan method and iteration methods. CO2: To solve higher order differential equations and integration by new methods. CO3: To apply Lagrange's and Newton's interpolation formula. CO4: To understand fundamentals of Cprogramme. CO5: To write simple c programs.
Microprocessor and its Application-8085 (U8PY6004)	On the completion of this course the student will be able to understand the Architecture of Microprocessor 8085 and itsinterrupts, the Basics of programming and different instructions of Microprocessor8085, the fundamentals of calculations ofTime delay, basic ideas of Peripheral devices

	for processor 8085 and memory Interfacing, the applications of Microprocessor 8085.
Television Maintenance & Troubleshooting (U8PYSB61)	After completing this course, Student must have a basic knowledge of testing methods of various electrical and electronic components in electronic circuits. The Students should be well versed to troubleshoot various faults in Television circuit and all the circuits used in Home appliances.
Physics Practical VII (U8PYPR61)	On the completion of this course the student will be able to CO1: determination of Young's modulas by Koenig's uniform bending method. CO2:determination of earth's magnetic induction using vibration magnetometer. CO3:determination of resistance and specific resistance using carey foster's bridge. CO4: determination of dispersive power of a grating and wavelength of prominent colours of mercury spectrum. CO5: determination of emf of a thermocouple and conversion of millammeter into ammeter by potentiometer. CO6:determination of absolute capacitance and comparison of emf using BG. CO7:study VI characteristics of transistor,UJT and construction of Colpitt's oscillator and relaxation oscillator. CO8:determination of frequency of rod by kundt's tube.
Practical VIII - Electronics Experiments II (U8PYPR62)	On the completion of this course the student will be able to CO1: construction of 4 Bit binary adder, subtractor and binary counter. CO2:construction of BCD counter and shift registers. CO3:study of multiplexer, demultiplexer and up/down counter. CO4: design of Astable multivibrator using Timer- 555. CO5: conversion of BCD to HEXAand HEXA to BCD using 8085. CO6:conversion of Binary to ASCII and ASCII to Binary using 8085. CO7:conversion ofASCII to BCD conversion and BCD to ASCII using 8085. CO8:generation of wave form ramp and square using 8085. CO9:construction of ring counter, johnson's counter and BCD decoder.

Course Code	Course Title	L	T	C
U8PY5001	ELECTRICITY AND ELECTROMAGNETISM	5	1	5

Instructional Objectives

To introduce the laws governing the distribution and propagation of electromagnetic fields created by static and dynamic charge distributions and their interaction with matter

Unit-I	ELECTROSTATICS*	12 Lectures

Coulomb's law in Vacuum expressed in vector form- unit of charge (SI system)- Conservation and quantization of charge-calculation of E(r) for simple distributions of charge at rest: monopole, dipole. Work done on a charge in an electrostatic field expressed as a line integral – Electric field as a gradient of scalar field $E(r) = - \nabla V$ – Potential at a point due to uniform charged conducting sphere-Potential due to an infinitely charged long wire- Potential at a point on the Rim of the disc and electric field- Potential Energy due to charge distribution- Electrostatic energy of a uniformly charged sphere. Flux of the electric field- Gauss law and its applications for finding electric field- Coulomb's Theorem – Poisson's and Laplace's Equations.

Unit-II	MAGNETIC AND CHEMICAL EFFECT OF ELECTRIC CURRENT	12 Lectures

Biot and Savart's law –Magnetic field intensity due to a solenoid carrying current – effect of Iron core in solenoid – Helmholtz galvanometer - Moving coil ballistic galvanometer – Theory - Damping correction – Determination of the absolute capacity of a condenser using BG- Faraday's laws of electrolysis- Electrical conductivity of an electrolyte- Determination of Specific conductivity of an electrolyte (Kohlrausch Bridge)

Unit-III	ELECTROMAGNETIC INDUCTION	12 Lectures

Faraday's laws of electromagnetic induction – Integral and differential form – Self Induction- Expression for self inductance of a coil- Determination of self-inductance of a coil using Rayleigh's method- Calculation of self inductance – Two parallel wires – Two coaxial cylinders – Toroidal coil of rectangular cross section – Mutual inductance – Expression for mutual inductance- Experimental determination of mutual inductance – Coefficient of coupling.

Unit-IV	DC AND AC CIRCUITS*	12 Lectures

DC Circuit: Growth and decay of current in a circuit containing resistance and inductance – Growth and decay of charge in a circuit containing resistance and capacitor- Measurement of High Resistance by the method of leakage- Dissipation of energy during charging of the

capacitor– Growth and decay in an LCR circuit – Condition for the discharge to be oscillatory-frequency of oscillation.

A C Circuit:Peak, average and RMS values of AC voltage and current – Power factor and current values in an AC circuit containing LCR – series and parallel resonant circuits – Comparative study of a series Resonant and a parallel Resonant circuit- Wattless current.

Unit-V	ELECTROMAGNETISM	12 Lectures

Displacement current- Magnitude of displacement current- Maxwell's equation- Maxwell's equation in free space- Propagation of electromagnetic wave in a nonconducting medium- Hertz experiment- energy density of electromagnetic wave – Poynting's theorem – energy per unit volume- Expression for velocity of electromagnetic wave in free space

Books for Study:

1. Duggal and Chhabra, Electricity and Magnetism. (Publisher)
2. M. Narayanamurthy and N. Nagarathnam, Electricity and Magnetism 5th Edition National Publishing Co. Meerut.
3. R. Murugeshan – Electricity and Magnetism 9th Edition 2009 S. Chand and Co. New Delhi.
4. Brijlal N. Subramanyan and JivanSeshan Electricity and Magnetism, Eurasia Publishing House (Pvt) Ltd, New Delhi.

Books for Reference:

1. Sehgal D.L. Chopra K.L. Sehgal NK – Electricity and Magnetism, Sultan Chand and Sons, New Delhi.
2. David J. Griffiths Introduction to Electrodynamics 2nd Edition 1997 Prentice Hall ofIndia Pvt. Ltd. New Delhi.
3. Electricity and Magnetism by K.K. Tewari S. Chand and 3rd Edition 2001.

Course Code	Course Title	L	T	C
U8PY5002	ATOMIC PHYSICS	5	1	5

Instructional Objectives

To provide and understanding of discharge Phenomena, Photoelectric effect, Atomic structure and to familiarize the students with the basics of X-rays.

Unit-I	Positive Ray Analysis	10 Lectures

Discovery - Positive rays - properties - e / m of positive rays - Thomson's parabola method - Aston's, Dempster's and Bainbridge mass spectrographs–Isotopes – Atomic masses – Explanation of failure by classical mechanics – Black body radiation and photo electric effect.

Unit-II	Photoelectric Effect	10 Lectures

Introduction - Photoelectric emission - laws - Lenard's experiment - Richardson and Compton experiment - Einstein's photoelectric equation - experimental verification of Einstein's photoelectric equation by Millikan's experiment - photo electric cells – Photo emission cell – Photomulitiplier.

Unit-III	AtomicStructure	14 Lectures

Bohr and Sommerfeld's relativistic atom Model – Vector Atom Model - Various quantum numbers – Coupling Schemes - L.S and J.J couplings - Pauli's Exclusion principle - magnetic dipole moment of electron due to orbital and spin motion - Bohr magneton - Stern and Gerlach experiment – The Selection rules – Selection rules for LS and JJ coupling – Intensity rule –Fine Structure of Sodium D lines

Unit-IV	Fine Structure of Spectral Lines	14 Lectures

Critical potential – Excitation and ionization potentials - experimental determination of critical potentials - Frank and Hertz's experiment - Davis & Goucher's experiment - Zeeman effect – Lorentz classical theory of normal Zeeman effect- Larmor's theorem - Debye's explanation of normal Zeeman effect. Anamalous Zeeman effect - theoretical explanation. Lande's 'g' factor and explanation of splitting of Dl and D2 lines of sodium – Paschen – Back Effect – Stark Effect.

Unit-V	X-Rays and Crystals Structure Analysis	12 Lectures

Introduction – Production of X rays – Polarisation of X- rays – Bragg's law and its derivation – Bragg's X-ray Spectrometer - Diffraction of x-rays - Details of Laue, rotating crystal and powder methods - Compton effect - derivation of expression for change in wavelength - experimental verification – Application of X-rays [industry, medical field and instrumentation only].

Books for Study:

1. Modern Physics by R.Murugesan, S.Chand& Co., 8th Edition, 2001.
2. Modern Physics. By Sehgal & Chopra.

Books for Reference:

1. Atomic Physics by J.B.Rajam.
2. Atomic & Nuclear Physics by N.Subrarnaniam& Brij Lal, S.Chand& Co., 5th Edition, 2000.
3. Atomic Physics by A.B.Gupta& Dipak Ghosh - Books & Allied Publishers
4. Modern Physics by J. H. Hamilton and Yang, McGraw Hill Publication, 1996.
5. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi, 1997.

Course Code	Course Title	L	T	C
U8PY5003	**APPLIED ELECTRONICS**	**5**	**1**	**5**

Instructional Objectives

1. ***To provide brief introduction to semiconductor theory and semiconductor devices***
2. ***To enhance the knowledge on working principle of oscillators, Op-Amp, Optoelectronic devices and communication electronics***.

Unit-I	**SEMICONDUCTOR THEORY AND SEMICONDUCTOR DIODES**	**12 Lectures**

Materials: conductor-insulator- Semiconductors-intrinsic and extrinsic semiconductor- Fermi energy level- Junction Diode. Special diodes: Zener diode - PIN Diode. Optoelectronic diodes: Light emitting diode (LED) – Liquid crystal display (LCD) – Photo diode – Photoconductive cell- Laser Diode-Golay Cell. Microwave Diodes: Tunnel Diode- Varactor Diode- Gunn Diode.

Unit-II	**SEMICONDUCTOR DEVICES***	**12 Lectures**

Transistor construction –Working- characteristics in CE and CB mode- FET – Characteristics – parameters – MOSFET – Depletion and Enhancement modes – UJT characteristics– UJT relaxation oscillator –– SCR characteristics – SCR as half and full wave rectifier-DIAC and TRIAC.

Unit-III	**AMPLIFIERS AND OSCILLATORS**	**12 Lectures**

Types of Amplifier (Class A, Class B, Class AB and Class C) - Single Stage RC coupled amplifier- frequency response-power amplifier-push pull– Feedback amplifier- Voltage gain – negative feedback -Barkhausen criterion – Oscillators: Hartley and Colpitt's Oscillator– Phase Shift Oscillator - Wien's bridge Oscillator – Crystal Oscillator- Armstrong Oscillator.

Unit-IV	**MULTIVIBRATORS AND OP-AMP ***	**12 Lectures**

RC times circuits- wave shaping circuits -clipping and clamping- multivibrators – astable, mono stable and bi-stable multivibrator using transistor.

OP AMP- pin Configuration of IC 741 -Ideal characteristics of OP-AMP – Voltage follower- Inverting and Non inverting amplifier – Summing amplifier – averager -Difference amplifier – Integrator – Differentiator – Comparator- solving simultaneous equation.

Unit-V	**RADIO COMMUNICATION**	**12 Lectures**

Communication – Modulation –Need for modulation - Amplitude Modulation – Frequency Modulation – Phase Modulation – AM Transmitter -–FM Transmitter- Superhetrodyne receiver-digital modulation technique-Principles of ASK,FSK,PSK.

Books for study:

1. Basic Electronics by B.L.Theraja, S. Chand &Co. New Delhi
2. A text book in Electrical Technology-BL Theraja, S Chand &Co.
3. Physics of Semiconductor devices by S.M. Sze, (John Wiley, New York, 1982).
4. High speed Semiconductor devices by S.M. Sze (John Wiley, New York, 1996).
5. Applied Electronics –RS Sedha, S. Chand &Co.New Delhi.
6. A Text Book of Electronics Engineering (English, Paperback, Dr. D.C. Tayal, Praveen

Tayal)

7.A Introduction to Analog & Digital Communicationsby Simon Haykin, Michael Moher (Author)

Books for Reference:

1. Integrated Electronics by Tauband Schilling Mc Graw Hill.
2. Physics and Technology of semiconductors by S.M. Sze (John Wiley, New York, 1990)
3. Microwave Engineering (English, Paperback, Das)
4. Digital Communication (Sharma S)

*Compulsory problem in Section B

Course Code	Course Title	L	T	C
U8PY5004	**DIGITAL ELECTRONICS**	**5**	**1**	**5**

Instructional Objectives

1. ***To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.***
2. ***To prepare students to perform the analysis and design of various digital electronic circuits***.

Unit-I	**Number Systems and Logic Families:**	**12 Lectures**

Decimal, binary, octal and hexadecimal systems – Conversion from one code to another - Binary arithmetic: – binary addition – subtraction – multiplication – division - 1's, 2's and 9's complements of decimal number- Binary Codes – 8421 code - Gray Code and Excess-3 code

AND, OR and NOT gates using diode and transistor – NAND, NOR and Ex-OR –gates - NAND & NOR as universal gates – Logic families: – RTL NOR – DTL NAND – TTL NAND – ECL OR/NOR – CMOS logic – CMOS Inverter – CMOS – NAND and NOR – Positive & Negative logic

Unit-II	**Simplification of Logic Circuits and Combinational Logic Circuits:**	**12 Lectures**

Boolean algebra – Simplifications of logic equations using Boolean algebra - De Morgan's theorems and their circuit implementations - Karnaugh map – pairs, quads, octets – 2,3 and 4 variables – Don't care conditions -Sum of product – Product of Sums – NAND-NAND network – NOR-NOR network

Arithmetic circuits – Half adder – Full adder – Half subtractor – Full subtractor- 4-bit Adder – 4-bit subtractor - Multiplexer – Demultiplexer – Decoder – BCD to Seven Segment Decoder – Encoder – Programmable Logic Array

Unit-III	**Sequential Logic circuits, Shift registers & Counters**	**12 Lectures**

Flip-flops – RS Flip-flop – clocked RS Flip-flop – D Flip-flop – Edge triggering concept - JK Flip-flop – JK master slave Flip-flop - T Flip-flop

Shift Registers: Serial in-serial out – serial in-parallel out – parallel in-serial out – parallel in-parallel out – Counters: Asynchronous/Ripple counter - up down counter – Synchronous counter – decade counter

Unit-IV	**Memory Devices**	**12 Lectures**

Read only memory – PROM – EPROM – EEPROM – Random access memory – Static RAM – Dynamic RAM – Memory expansion - Memory parameters - Magnetic core memory – Magnetic disc memory – Hard disc system –Buffer – Cache memory

Unit-V	**Timers and AD & DA Converters**	**12 Lectures**

555-Timer internal structure - pin diagram– Astable, monostable operations – Schmitt trigger – Simple project circuit using 555-Timer
OP-AMP - Pin configuration - Binary Weighted Resistor D/A converter – R-2R Ladder D/A converter – Counter type A/D - Converter - Successive Approximation A/D converter – Dual Slope A/D converter – 741 project circuit.

Books for Study:

1. Digital Principles and Applications-A.P. Malvino, McGraw Hill International Editions (Fourth Edition)
2. Modern Digital Electronics- R.P.Jain, Tata McGraw Hill Pub. Company (Fourth Edition)
3. Digital Fundamentals-Thomas L. Floyd, Universal Book Stall
4. Introduction to Integrated Electronics-V.Vijayendran, Viswanathan Pub.Chennai.
5. Fundamentals of digital computers-Arul Thalapathi, Comptek Publishers, Chennai

Books for Reference:

1. Digital Electronics with Practical Approach- G.N Shinde, Shivani Pub. Nanded
2. Digital electronics: An Introduction to Theory and Practice – William H. Gothmann, Prentice Hall of India.
3. Digital Integrated electronics- Herbert Taub and Donald Schilling, Mc. Hraw Hill.
4. Fundamental of Digital electronics and Microprocessors, 2 nd revised and enlarged Ed.- Anoka Singh and A. K Chhabra, S Chand& Co, Ltd., New Delhi

Course Code	Course Title	L	T	C
U8PYSB51	MAINTENANCE AND SERVICING OF HOME APPLIANCES	2	1	1

Instructional Objectives

This paper aims to impart the awareness about safety, practical knowledge in maintenance and repair of electrical and electronic Home Appliances.

Unit-I **5 Lectures**

Transformer and Classification of transformers -Continuity testing - Switch – Types of Switches - Fuse -Battery for Inverter – Battery types – Checking battery acid level – Power supply for Battery charger - Principle of inverter – Inverter circuit – Inverter Installation - Common faults and Troubleshooting

Unit-II **5 Lectures**

Automatic electric iron – Bimetal and adjustable Thermostats – Troubleshooting in an automatic iron – Ceiling fan – Construction – Regulator – General faults and remedy – Table fan – Construction – Servicing – Fluorescent lamps – Electronic Ballast – LED lamp

Unit-III **5 Lectures**

Semi-Automatic Washing Machine – working –trouble shooting– Microwave oven– various parts of microwave oven – working – trouble shooting– Induction stove –working -trouble shooting – Reverse Osmosis – Principle -workingand troubleshooting.

Unit-IV **5 Lectures**

Power supply of Personal Computers – Power supply outputs –Troubleshooting – Personal computers: Monitor – Key board – Mouse – Computer cables – Printers - Cellular Phone Basics-Cell Phone Components-Cell Phone battery charger-Subscriber Identity Module (SIM) - Cell Phone Display – Blue tooth

Unit-V **4 Lectures**

Refrigerator – Principle –Various parts of a refrigerator - working –Common fault findings – Air-condition – principle - working – Troubleshooting – Electric Water heater : Storage and Solar type.

Books for Study:

1. Repair of Home Appliance, National Instructional Media Institute, Chennai, CIT Campus , Chennai 600 032
2. Repair & Maintenance of Washing Machine and Micro Oven, National Instructional Media Institute, Chennai, CIT Campus , Chennai 600 032
3. Basic Electronics- Repair & Maintenance of power supply, Inverter & UPS, National Instructional Media Institute, Chennai, CIT Campus , Chennai 600 032

Books for Reference:

1. Modern Power Inverter, compiled by Manahar Loti, BPB Puplications, New Delhi.

2. Uninterrupted power supply, compiled by ManaharLoti , BPB Puplications, New Delhi

SEMESTER V

Course Code	Course Title	L	P	C
U8PYPR51	**MAIN PHYSICS PRACTICAL V**	**-**	**4**	**2**

Instructional Objectives

To develop the ability of the students to conduct, observe, analyzes and report an experiment

To strengthen the student knowledge and enhance the ability to deal with physical models

List of Experiments (Any Twelve)

1. Young's modulus by Koenig's method (Non-Uniform bending)
2. Bifilar Pendulum-perpendicular axis theorem.
3. Newton's rings – R_1, R_2 and μ of a convex lens
4. Field along the axis of a coil- Deflection Magnetometer.
5. Carey Foster`s Bridge-Temperature Coefficient of resistance.
6. Spectrometer i –i′ curve
7. Spectrometer-Prism- Determination of Cauchy`s constants.
8. Spectrometer - Dispersive power of a prism
9. Potentiometer – Calibration of High Range Voltmeter
10. Potentiometer – Conversion of milliammeter into a Voltmeter
11. Internal resistance of a cell-BG
12. Comparison of Capacitances- BG
13. Characteristics of Transistor CE mode
14. Hartley Oscillator
15. FET Characteristics.

SEMESTER V

Course Code	Course Title	L	P	C
U8PYPR52	PRACTICAL VI ELECTRONIC EXPERIMENTS I	-	4	2

Instructional Objectives

To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
To prepare students to perform the analysis and design of various digital electronic circuits.

List of Experiments (Any Twelve)

1. Logic gates using Discrete components
2. NAND as Universal gate
3. NOR as Universal gate
4. Karnaugh map reduction and logic circuit implementation
5. Verification of Demorgan`s theorems
6. Construction of Inverter, Non-Inverter, Adder, Subtractor using Op-Amp
7. Study of integrator and differentiator using Op-Amp 741
8. Half Adder and Full Adder.
9. Half Subtractor And Full Subtractor
10. Study of R-S, JK and D flip-flop using NAND gate
11. Construction of Phase shift Oscillator using Op-Amp.
12. Construction of Wien's bridge Oscillator using Op-Amp.
13. 8-Bit Addition & Subtraction using Microprocessor 8085
14. 8-BitMultiplication & Division using Microprocessor 8085
15. Selection of largest and smallest element from an arrayusing Microprocessor 8085.

Course Code	Course Title	L	T	C
U8PY6001	NUCLEAR AND PARTICLE PHYSICS	5	1	5

Instructional Objectives

To provide brief introduction to the various nuclear models and the experiments data supporting the model and provide an introduction to nuclear interaction and nuclear reaction.

Unit-I	GENERAL PROPERTIES OF NUCLEI*	13 Lectures

Nuclear size, charge, mass-determination of nuclear radius-mirror nucleus method-massdefect and binding energy-packing fraction –average binding energy and its variation with mass number-binding energy with mass number curve-N/A plot- nuclear spin - magnetic dipole moment – electricquadrupole moment-nuclear models-liquid drop model-Weizacker`s semi-empirical mass formula.

Unit-II	RADIOACTIVITY*	12 Lectures

Natural radioactivity-law of disintegration-half life and mean life period-units of radioactivity -radiocarbon dating-age of earth –basics of alpha decay process-alpha raycharacteristics-Geiger Nuttal law - α-ray spectra- beta rays-characteristics-beta ray spectra-energy kinematics for beta decay-neutrino hypothesis-violation of parity conservationexperimentalverification with Co^{60}-gamma ray emission.

Unit-III	RADIATION DETECTORS AND PARTICLE ACCELERATORS	12 Lectures

Ionisation chamber-G.M.Counter-quenching and resolving time-scintillation counter-photo multiplier tube –semiconductor detectors for charged particle and photon detection–Linear accelerator-Cyclotron-Synchrocyclotron-Betatron.

Unit-IV	NUCLEAR REACTIONS	12 Lectures

Conservation laws-nuclear reaction Kinematics-Q-value-threshold energy – artificial radioactivity-radioisotopes and its uses-classification of neutrons-nuclear fission-chain reaction -critical mass and size-nuclear reactor-breeder reactor –nuclear fusion-thermonuclear reactions-sources of stellar energy.

Unit-V	ELEMENTARY PARTICLES	11 Lectures

Classification of elementary particles-fundamental interaction-elementary particle quantum numbers –Lepton number, Isospin and Strangeness –color quantum number-conservation laws and symmetry- Types and characteristics of quarks – quark`s model of nucleus.

Books for Study:

1. Atomic and Nuclear Physics by N. Subrahmanyam and Brijlal, S Chand & Co., NewDelhi(1996).
2. Nuclear Physics by Tayal D.C., Himalaya Publishing House, Mumbai(2006).
3. Nuclear Physics by R.C.Sharma, K.Nath& Co., Meerut (2000)
4. Nuclear Physics by Irving Kaplan, Narosa Publishing house, New Delhi.

Books for Reference:

1. Nuclear Physics by R.R.Roy and B.P.Nigam, New Age International (P) Ltd., New Delhi(1997).
2. Fundamentals of Elementary Particle Physics by Longo, Mc Graw-Hill.
3. Nuclei and Particles by Serge., W.A. Benjamin, USA
4. Elements of Nuclear Physics by ML Pandya and RPS Yadav, Kedarnath Ram Nath, Meerut

Course Code	Course Title	L	T	C
U8PY6002	WAVE MECHANICS AND SPECIAL FUNCTIONS	5	1	5

Instructional Objectives

To provide brief introduction to the various nuclear models and the experiments data supporting the model and provide an introduction to nuclear interaction and nuclear reaction.

Unit-I	Inadequacy of Classical theory	12 Lectures

Black body radiation – difficulties with classical theory of black body radiation – Planck's hypothesis – Planck's radiation formula- difficulties with classical theory of specific heat of solids – Einstein's theory of specific heat – the Frank-Hertz experiment –Quantization rule for the harmonic oscillator and its limitation.

Unit-II	Foundations of Wave Mechanics*	12 Lectures

Dual nature of matter – Davison and Germer's experiment – G.P. Thomson's experiment – velocity of de-Broglie wave – Wave packet – Group velocity – Phase velocity – Uncertainty principle – Postulates of wave Mechanics – Properties of wave functions - Expectation values.

Unit-III	Formulation of Wave Mechanics	12 Lectures

Operators – Basic definitions – orthonormal functions – Eigen functions and Eigen values – Hermitian operator – Operator formalism - Measurability of Observables – Superposition state and probability – Characteristics of wave function – Probability Interpretation – Probability current density – Expansion theorem – Ehrenfest's theorem (Statement and Proof).

Unit-IV	**Schrödinger's Wave Equation and its Applications**	**14 Lectures**

Equation of motion of matter wave – time independent Schrodinger equation – Schrödinger equation for a free particle – time dependent Schrödinger equation – physical interpretation of wave function – solution of Schrödinger equation – Applications of Schrödinger's equations – Particle in a one-dimensional box - Linear harmonic oscillator – Zeropoint energy – Barrier - penetration and Tunneling effect.

Unit-V	**Special function and differential equations***	**10 Lectures**

Beta and gamma functions – Relation between Beta and gamma functions – Simple problems – Bessel's differential equation- Legendre differential equations- Hermite's differential equations – Simple problems – Dirac delta functions and its properties.

Books for Study:

1. Sathya Prakash and G.K. Singh, Quantum Mechanics, First edition, Kedar Nath Ram Nath & Co,1991
2. G. Aruldhas and P. Rajagopal, Modern Physics, Second edition, Prentice Hall of India, 2005.
3. G. Aruldhas, Classical Mechanics, Second edition, Prentice Hall of India, 2008 UNIT I Chapter 1 Sections 1.3 - 1.

Books for Reference:

1. R. Murugesan, Modern physics, S.Chand& Company Ltd, 4th edition, 2005

Course Code	Course Title	L	T	C
U8PY6003	**NUMERICAL METHODS AND FUNDAMENTALS OF "C"**	**5**	**1**	**5**

Instructional Objectives

To expose the students to the foundation of various numerical methods and to introduce the learner to the basics of 'C' Programming

Unit-I	**SIMULTANIOUS LINEAR ALGEBRAIC EQUATIONS**	**12 Lectures**

Gauss elimination method – Gauss- Jordan method –Gauss- Siedel - Gauss Jacobi – Interaction method- Computation of inverse of a matrix using Gauss elimination method – Eigen values and Eigen vectors

Unit-II	**NUMERICAL DIFFERENTIATION AND INTEGRATION**	**12 Lectures**

Numerical integration by Trapezoidal and Simpson 1/3 and 3/8 rules – Romberg's method – Double integration using Trapezoidal and Simpson's rules –Runge – Kutta method for solving second and fourth order equations

Unit-III	**INTERPOLATION AND APPROXIMATION**	**12 Lectures**

Lagrange's interpolation formula for unequal intervals- Lagrange's Inverse interpolation

formula- Newton's Divided Difference formula- Newton's Forward interpolation formula- Newton's Backward interpolation formula.

Unit-IV	C FUNDAMENTALS	12 Lectures

C fundamentals –character set – identifiers and keywords - data types – constant variable – declaration – expression –statement –arithmetic, relational, logical, assignment, conditional and common operators- library functions.

Unit-V	SIMPLE PROGRAMS	12 Lectures

Data input/output functions- simple C programs (addition, subtraction, multiplication and comparison) – flow of control –control structure, break and continue-go to, for statement.

Books for Study and Reference:

1. Venkatraman M.K (1977) Numerical methods in Science and Engineering, national publishing company- Chennai.
2. Shastry SS Introductory methods of numerical methods – Prentice Hall Ltd
3. Sankara Rao K Numerical methods for Scientist and engineers 3rd edition Print ail Hall of India Private Ltd
4. Veerarajan. T and Ramachandran T,Numerical methods with Programming in C Tata Mc Graw Hill Publishing Co Ltd
5. E.Balagurusamy, Programming in C
6. Yashwant Kanithkar, Let us C

Course Code	Course Title	L	T	C
U8PY6004	**MICROPROCESSOR AND ITS APPLICATIONS – 8085**	**5**	**1**	**5**

Instructional Objectives

To introduce the student to understand the architecture, functioning of microprocessor 8085

To enhance the knowledge of programming and interfacing technique of microprocessor 8085

Unit-I	Microprocessor Architecture and Interrupts	12 Lectures

Microprocessors – Architecture of 8085 – Functions of different pins of 8085 – Bus organization and timings: buses – buffer – address bus, data bus, multiplexing address/data bus and control & status signals – ALU – registers in 8085 – flags– 8085 -interrupt – interrupt priorities-clock and RESET signals.

Unit-II	Programming model and Instructions of 8085	12 Lectures

Basics of programming:Algorithm-Flow chart- Labels-Reset Accumulator.Classification of instructions and format: 8-bit,16-bit data transfer, arithmetic, logical and branch instructions – Addressing modes – stack and subroutine instructions– Logical rotate and compare instructions – RIM and SIM interrupt instructions.

Unit-III	Time delay and Instruction timings	12 Lectures

Time delay: delay calculations, time delay using one and pair of registers – different delay routines for

square wave, ramp wave.

Instruction timings of 8085 –T-states -instructions cycle, machine cycle- WAIT state- timing diagram for memory read and memory write cycles - data transfer instructions. – Static and dynamic debugging of a program.

Unit-IV	Peripheral devices for processor 8085 andInterfacing	12 Lectures

Peripheral devices for processors: 8255 – Parallel Communication Interface (PPI),8251 – Serial communication Interface (USART- Universal Synchronous/Asynchronous Receiver/Transmitter),8257 – DMA Controller,8279 – Keyboard/Display Controller,8259 – Programmable Interrupt controller,8254 – Programmable Timer.

Interfacing Types: Memory Interfacing. 2K X 8, 4K x 16 ROM and RAM interface. I/O Interfacing: Types- Memory mapped I/O device, Standard I/O mapped I/O device –difference between direct I/O and memory mapped I/O.

Unit-V	Microprocessor applications	12 Lectures

LED interface to display 8 binary numbers using 8085,seven segment display interface through 8255, multiplexed LED displays using 8085, D/A interfacing with 8085-ADC interfacing with 8085.

Timing control: stepper motor- Traffic signal Control.Temperature Control: microprocessor application in oven.

Book for study:

1. Microprocessor Architecture, Programming and applications with the 8085 – R.S. Goankar, 3rdEdn. Prentice Hall.
2. Fundamental of Microprocessor – 8085 – Architecture, programming and interfacing – V. Vijayendran, S. Viswanathan, Pvt., Ltd. 2003.

Book for reference:

1. Digital computer electronics: an introduction to microcomputers – Malvino, 2ndEdn., Tata McGraw Hill.
2. Fundamentals of Microprocessors and microcomputers – B. Ram.
3. Computer system architecture – Moris Mano, 3rdEdn., Prentice Hall India.
4. Introduction to microprocessors: software, hardware, programming – Lance A. Leventha, Prentice Hall India.

Course Code	Course Title	L	T	C
U8PYSB61	TELEVISION MAINTENANCE & TROUBLESHOOTING	2	1	1

Instructional Objectives

1. ***To provide the knowledge of testing of various electronic components.***
2. ***To provide an understanding of the various sections in Television and impart knowledge of servicing techniques adopted in various Television system***

Unit-I	8 Lectures

Resistors: colour coding and types of resistors - Capacitors: fixed and variable - inductors – Types of Transistors - Testing of resistors, Capacitor, inductor and transistor using multimeter. Printed circuit board (PCB) – Troubleshooting technique of PCB – Servicing instruments:Analog &Digital Multimeter – Cathode Ray Oscilloscope

Unit-II	8 Lectures

Low voltage power supply – Switch Mode Power Supply (SMPS) – Troubleshooting techniques of low voltage and SMPS power supply – Block diagram of monochrome TV receiver – Function of each section – RF Tuner – VHF Tuner and function of various blocks – Troubleshooting techniques for each section of TV.

Unit-III	8 Lectures

Monochrome Picture tube construction and working principle – Control circuit of a Picture Tube – Precaution in handling Picture Tube – Yoke assembly – EHT transformer - Horizontal and Vertical Scanning – Simple and Interlaced Scanning – Composite Video Signal – Blanking pulses – Equalizing pulses –Repairing procedure for Weak picture Tube –

Unit-IV	8 Lectures

Colour picture Tube: Principle, construction and working – Adjustments for Colour Picture Tube: Colour Purity – Colour Convergence – Degaussing – Pincushion Correction - Compatibility – Three Colour Theory – Mixing of Colors – Luminance Signal (Y) - NTSC Colour TV system – PAL Colour TV system – SECAM system

Unit-V	8 Lectures

Television Antenna – Resonance antennas and their Characteristics – Antenna Parameters – Yagi-Uda Antenna and Design – Satellite Communication System – Transponders - Block diagram of Digital Colour TV Receiver - Cable TV: Signal sources for Cable TV- Cable Signal Distribution

Books for Study:

1. Modern Television Practice - R.R. Gulati, New Age International (P) Limited, Publishers,

New Delhi.
2. Television Engineering and Video Systems Second Edition - RG Gupta, Tata McGraw Hill Education Private Limited New Delhi.
3. Television and Video Engineering – J Rangarajan, Charulatha Publications, Chennai.

Books for Reference:

1. Basic television theory & Servicing – Paul B Zbar, petter W One, Tata McGraw Hill Education Private Limited New Delhi.
2. Modern television circuit – S.K Gupta, BPB Publication, New Delhi
3. Standard Handbook of Video and Television Engineering - Jerry C Whitaker and K. Blair BensonTata McGraw Hill Education Private Limited New Delhi.
4. TV and Video Engineering,- A. M. Dhake, New Age International (P) Limited, Publishers, New Delhi.
5. Digital Television Fundamentals- Michael Robin and Michel Poulin, Tata McGraw Hill Education Private Limited New Delhi.
6. A Practical Guide to Television Sound Engineering- Dennis Baxter Taylor & Francis, 2014

SEMESTER VI

Course Code	Course Title	L	P	C
U8PYPR61	MAIN PHYSICS PRACTICAL VII	-	4	2

Instructional Objectives

To develop the ability of the students to conduct, observe, analyzes and report an experiment

To strengthen the student knowledge and enhance the ability to deal with physical models

List of Experiments (Any Twelve)

1. Young's modulus – Koenig's method – uniform bending
2. Field along the axis of the coil-vibration magnetometer.
3. Carey Faster`s Bridge- Resistance and specific resistance.
4. Potentiometer – EMF of a thermocouple
5. Conversion of milliammeter into Ammeter-Potentiometer.
6. Spectrometer-Diffraction grating-Normal incidence- determination of wavelength.
7. Spectrometer - Dispersive power of a grating
8. Spectrometer – Narrow Angled Prism-refractive index.
9. BG – comparison - emf of cells
10. BG – Absolute capacitance of a capacitor
11. Characteristic of transistor -CB Mode.
12. Single stage RC Coupled Amplifier-Frequency response

13. Colpitt`s Oscillator using Transistor.

14. Determination of velocity of sound in air- Kundt`s Tube

15. UJT Characteristics & Relaxation Oscillator

Course Code	Course Title	L	P	C
U8PYPR62	**PRACTICAL VIII ELECTRONICEXPERIMENTS II**	**-**	**4**	**2**

Instructional Objectives

To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
To prepare students to perform the analysis and design of various digital electronic circuits.

List of Experiments (Any Twelve)

1. 4 Bit Binary Adder and Subtractor
2. 4 Bit Binary Counter.
3. BCD Counter.
4. Shift Registers (4 bit).
5. Study of Multiplexer and Demultiplexer (4 bit).
6. Study of Up/down counter
7. Astable multivibrator using -555 timer.
8. BCD to seven segment decoder (Common anode and Common cathode)
9. Ring counter and Johnson's counter.
10. BCD TO HEXA Conversionusing 8085.
11. HEXA to BCD conversion using 8085.
12. Binary to ASCII and ASCII to Binary conversionusing 8085.
13. ASCII to BCD conversion and BCD to ASCII conversionusing 8085.
14. Ramp Wave Form Generation using 8085.
15. Square Wave Form Generationusing 8085

DEPARTMENT OF CHEMISTRY
COURSE OUTCOMES
FOR SEMESTERS V & VI

Semester - V	
COURSE TITLE	**COURSE OUTCOME**
U8CH5001 Core- CC13 Inorganic Chemistry - I	CO1: Estimates various metal ions by Gravimetric analysis. CO2: The significance of heavy metal ions in industrial production and utilization is understood by the students. CO3: Identifies heavy metal toxicity in food products and also in the environment.
U8CH5002 Core - CC14 Organic Chemistry - I	CO1: Classifies carbohydrates and elucidates the structure glucose and fructose. Inter converts aldoses and ketoses CO2: Classifies stereochemical isomerism. Explains RS notation and conformational analysis CO3: Compares reactivity of Carbonyl group and explains tautomerism and naming reactions. CO4: Describes the preparation, properties and applications of Heterocyclic compounds CO5: Understands the synthesis and properties of quinoline, isoquinoline, indole and dyes
U8CH5003 Core - CC15 Physical Chemistry - I	CO1: Acquires the knowledge about solutions and their behaviours and also the methods of distillation of mixture of liquids. CO2: Applies the colligative properties in reverse osmosis and also understands the chemical equilibrium. CO3: Obtains an insight in Phase Equilibria and its application to one component and two component systems. CO4: Gets the understanding in concepts of adsorption, its types and applications in catalytic reactions. CO5: Determines the rate of the reaction, order and molecularity of the reaction types of order of reactions and understands the theories of reaction rates.
U8CH5004 Core - CC16 Applied Chemistry - I	CO1: Gains the knowledge of leather production and its uses in industries. CO2: Characterises waste water based on physical, chemical and biological properties. Learns the water treatment techniques such as reverse osmosis, ion exchange process and zeolite process. CO3: Understands the concept of polymers, types and techniques of polymerisation process. CO4: Understands uses and impact of agrochemicals such as fertilizer, insecticide and pesticide in agricultural field.
U8CHPR51 Core Practical- CC17 Practical –V Gravimetric Estimation-I	CO1: Able to precipitate metal ions in the form of metal salts and weigh the precipitate to estimate the amount of metal ions present in the salt solution. CO 2: Estimates Sulphate, Barium, and Lead by gravimetric methods. CO3: Develops skills in the gravimetric laboratory practices and minimization of errors.
U8CHPR52 Core Practical-CC18 Practical –VI Physical Chemistry-I	CO1: Studies the kinetics and mechanism of simple organic compounds CO2: Gains the knowledge of determining transition temperature of salt hydrides. CO3: Understands Rast's method and determines the molecular

	weight of the given compounds. CO4: Gains knowledge of equivalent conductance of electrolytes. CO5: Carries out experiments to understand the effect of impurity.
U8CHSBP5 Skill based Practical-AEC5 Practical –VII Organic Chemistry Practical-I	CO1: Analyses organic compounds containing different functional groups CO2: Analyses systematically carbohydrates, phenol, ester, aldehydes, ketone, carboxylic acid, nitro compound and diamide CO3: Understands elemental analysis

B.Sc. Chemistry	
Semester - VI	
Course Title	**Course Outcome**
U8CH6001 Core–CC19 Inorganic Chemistry-II	CO1: Distinguishes isotopes, isobars and isotones. Calculates binding energy and mass defects. CO2: Understands detection and measurement of radio activity and half life period. Distinguishes fission and fusion reactions. CO3: Explains the properties of semiconductors. CO4: Compares the properties and characteristics of d- and f- block elements. CO5: Understands biological functions, toxicity of elements, the significance of fuel gases, and the composition and production of industrial chemicals.
U8CH6002 Core–CC20 Organic Chemistry - II	CO1: Describes amino acids, peptides and structure of proteins. CO2: Describes RNA & DNA, structure of nucleic acids. CO3: Understands isoprene rule and elucidates the structures of terpenes and vitamins. CO4: Interprets the spectra and identifies the simple organic compounds. CO5 : Understands the types of photochemical reactions and the basics of Molecular rearrangements.
U8CH6003 Core–CC21 PhysicalChemistry - II	CO1: Promotes understanding the concept of Photochemistry, and its applications in various fields. CO2: Inculcates the basic knowledge in electrochemistry CO3: Provides an insight in types of cells, types of electrodes and electrode potential. CO4: Acquires knowledge of electrochemical series, its applications, concentration cells, liquid junction potential, cell electromotive force, applications of electromotive force measurement etc. CO5: Imparts the concepts and applications of Polarisation, storage cells, fuel cells and Polarography.
U8CH6004 Core –CC22 Applied Chemistry - II	CO1: Describes the types and uses of the drugs curing various diseases. CO2: Understands the analgetics, antiseptics and antibiotics. CO3: Provides an insight in biological chemistry of soil CO4: Analyses the compounds in various food products and understands food adulteration CO5: Acquires the basic knowledge in various chromatographic techniques.

U8CHPR61 Core Practical – CC23 Practical-VIII Gravimetric Estimation - II	CO1: Precipitates the metal ions in the form of metal salts and complexes and weighs the precipitate to calculates the amount of metal ions present in the salt solution. CO2: Estimates Nickel, Magnesium, Calcium, and sulphate by gravimetric method.
U8CHPR62 Core Practical – CC24 Practical-IX Physical Chemistry Practical -II	CO1: Determines the critical solution temperature of some simple physical systems. CO2: Carries out the titration between acids and bases conductometrically. CO3: Finds the partition co-efficient of Iodine between various immiscible liquids CO4: Determines the equilibrium constant. CO5: Carries out the experiments to determine the order of the reaction.
U8CHSBP8 Skill Based Practical – AEC6 Practical-X Organic Chemistry Practical -II	CO1: Prepares aspirin by acetylation of salycilic acid. CO2: Acquires in-depth knowledge of Nitration CO3: Prepares Picric acid from phenol CO4: Describes diazotization and understands the preparation of methyl orange CO5: Understands the concept of oxidation and oxidises bezaldehyde to benzoic acid.

V SEMESTER

Course Code	Course Title	L	T	C
U8CH5001	**INORGANIC CHEMISTRY- I**	**5**	**1**	**5**

Instructional Objectives:

1. ***To understand the principle of gravimetry.***
2. ***To give students a firm grounding in coordination chemistry.***
3. ***To gain the knowledge of halogens and related compounds.***
4. ***To appraise the online resources in analytical chemistry to students.***

UNIT- I : Gravimetric Analysis and Thermoanalytical methods 15 HOURS

1.1 Principles of gravimetric analysis - Characteristics of precipitating agents - choice of precipitants - conditions of precipitation – specific and selective precipitants - DMG, cupferron, salicylaldehyde, ethylenediamine - use of sequestering agents - co-precipitation – post precipitation - differences - reduction of error - peptisation - precipitation from homogeneous solution - calculation in gravimetric methods - use of gravimetic factor.

1.2 Detection of potassium ion, separation of Cu and Cd ions, Estimation of Ni using DMG and Al using oxine.

1.3 Thermoanalytical methods - principles involved in thermogravimetric analysis and differential thermal analysis - characteristics of TGA and DTA -thermograms – factors affecting TGA and DTA curves - discussion of various components of the instrument with

block diagrams - applications of TGA and DTA – Examples -(CaC_2O_4. $2H_2O$ & $CuSO_4$. $5H_2O$)Thermometric titration, Electrogravimetry - principle and applications.

UNIT-II: Theories of Bonding **15 HOURS**

2.1 Molecular Orbital theory – Bonding, anti-bonding orbitals – Relative order of energies of molecular orbitals – MO diagrams of H_2, He_2, N_2, O_2, O_2^+, $O_2^-$and CO – Bond order – stability and magnetic property of the molecules – Comparison of VB and MO theories..

2.2 Pi-acceptor ligands - bonding, hybridization, structures and properties of mono and Bi nuclear carbonyl complexes of Ni, Cr, Fe, Co & Mn - compounds of P and As acceptor ligands.

UNIT-III: Coordination Compounds – I **15 HOURS**

3.1 Definition of terms used - classification of ligands - chelation and effect of chelation applications of EDTA - coordination number and stereochemistry of complexes - nomenclature. Detection and structure determination of complexes.

3.2 Bridged (or) polynuclear complexes – inter metallic complexes -Isomerism in complexes – ionization isomerism, hydrate isomerism, linkage isomerism, ligand isomerism, Metamerism isomerism, coordination isomerism, polymerization isomerism, geometrical and optical isomerism in 4 and 6 coordinate complexes.

UNIT-IV: Coordination Compounds - II **15 HOURS**

4.1 Werner's theory, Sidgwick theory- EAN rule, theory of Bonding- Valence bond theory - hybridization - geometry and magnetic properties - failure of VBT.

4.2 Crystal field theory - spectrochemical series - splitting of d - orbitals in octahedral and tetrahedral complexes - crystal field stabilization energy - calculation of CFSE in octahedral and tetrahedral complexes. Low spin and high spin complexes-explanation of magnetic properties, colour and geometry using CFT. Comparison of VBT and CFT theories

UNIT-V: Halogens and their Compounds **15 HOURS**

5.1 Halogens – Basic properties of Halogens, comparative study of F, Cl, Br, and I - comparison of reactivity's F and O - exceptional properties of fluorine, positive iodine – evidences.

5.2 Oxy acids of halogens –preparation, properties and its structure. Inter halogen compounds- pseudo halogens – Per acids of sulphur – Preparation and Properties.

Books for Study:

1. Inorganic chemistry - P.L. Soni - Sultan Chand
2. Inorganic chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia – Vallabh Publications
3. Selected topics in inorganic chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications
4. Inorganic chemistry - J.E. Huheey, Harper and Collins - NY IV edition
5. Concise Inorganic chemistry - J.D. Lee - III edition - Von Nostrand
6. Vogel's handbook of quantitative inorganic analysis – Longman

Books for Reference

1. Industrial chemistry - B.K Sharma - Goel Publications
2. Industrial chemistry R.K. Das - Kalyani Publications, New Delhi
3. Coordination chemistry - S.F.A. Kettle - ELBS
4. Coordination chemistry - K. Burger - Butterworthy
5. Text book of qualitative inorganic analysis - A.I. Vogel - III edition
6. Source book on atomic energy –Samuel Glasstone, Van Nostrand Co.,
7. Nuclear and radiochemistry –Frielander and Kennedy John wiley and sons
8. Nuclear chemistry - H.J. Arnikar - Wiley Eastern Co.,
9. Advanced Inorganic chemistry - Cotton and Wilkinson - V Edition – Wiley and Sons

V SEMESTER

Course Code	Course Title	L	T	C
U8CH5002	**ORGANIC CHEMISTRY - I**	**5**	**1**	**5**

Instructional Objectives:

1. ***To effectively impart knowledge about Carbohydrate chemistry, Stereochemistry, Heterocyclic chemistry, polynuclear hydrocarbons and dyes.***
2. ***To make the students more inquisitive in learning the mechanistic details in Organic Chemistry through the teaching of the named reactions***
3. ***To learn the synthetic applications of certain organic compounds***
4. ***To explore to use multimedia tools in organic structural analysis.***

UNIT- I: Chemistry of Carbohydrates 15 HOURS

1.1. Carbohydrates : classification - reactions of glucose and fructose - osazone formation, mutarotation and its mechanism – structural elucidation of glucose and fructose - pyranose and furanose forms.

1.2 Determination of ring size - Haworth projection formula - configuration of glucose and fructose - epimerization – chain lengthening and chain shortening of aldoses - inter conversion of aldoses and ketoses

1.3 Disaccharides and poly saccharides: reactions and structural elucidation of sucrose, maltose and cellulose

UNIT- II: Isomerism and Stereochemistry 15 HOURS

2.1 Stereoisomerism : definition - classification into optical and geometrical isomerism. Projection formulae : Fischer, Flying Wedge, Sawhorse and Newmann projection formulae - rotation of optical isomers - Cahn - Ingold - Prelog rules - D, L notations- R, S notation of optical isomers with one and two asymmetric carbon atoms - Optical activities in compounds not containing asymmetric carbon atoms : biphenyls, allenes and spiranes

2.2. Geometrical isomerism : cis - trans, syn - anti and E, Z notations - geometrical isomerism in maleic and fumaric acid - methods of distinguishing geometrical isomers using melting points, dipole moment, solubility, dehydration, cyclisation, heat of hydrogenation and combustion.

2.3 Conformational analysis : introduction of terms - conformers, configuration, dihedralangle, torsional strain, conformational analysis of ethane and n-butane including energy diagrams – conformation analysis of cyclohexane - axial and equitorial bonds - ring flipping - conformers of mono and 1,2-,1,3- and 1,4-dimethylcyclohexane.

UNIT- III: Isomerism and Name Reactions 15 HOURS

3.1. Tautomerism: definition - keto-enol tautomerism - amido-imidol, nitro- acinitro tautomerisms .Carbonyl polarization - reactivity of carbonyl group - acidity of alpha hydrogen.

3.2. Malonic, acetoacetic and cyano acetic esters - Characteristic reactions of active methylene group - synthetic uses of malonic, acetoacetic and cyano acetic esters in mono, dicarboxylic acid

3.3. Mechanism of Aldol, Perkin and Benzoin condensations .Knoevenagel, Claisen, Wittig, Cannizaro, Reformatsky and Michael reactions

UNIT- IV: Aromaticity and Heterocyclic compounds 15 HOURS

4.1 Heterocyclic compounds - Huckel's rule –Aromaticity of benzene, naphthalene, anthracene and other hetrocyclic compounds using Huckel rule. Preparation, properties and uses of furan, pyrrole, and thiophene.

4.2 Preparation, properties and uses of pyridine and piperidine. Methods of opening of heterocyclic rings - oxidation, reduction, Hoffman's exhaustive methylation, Van Braun's method. Comparative study of basicity of pyrrole, pyridine and piperidine with aromatic and aliphatic amines.

4.3 Synthesis and reactions of quinoline, isoquinoline and indole with special reference to Skraup, Bischler Napieralskii and Fischer Indole syntheses

UNIT- V: Hydrocarbons and Dyes 15 HOURS

5.1 Polynuclear hydrocarbons - synthesis, properties and uses of naphthalene, anthracene and phenanthrene - structural elucidation of naphthalene - chemistry of naphthaquinones.

5.2 Diazonium compounds- diazo methane, benzene diazonium chloride and diazoacetic ester - preparations and their uses.

5.3. Dyes - Theory of colour and constitution - classification according to the structure and method of application. Preparation and uses of - Azo dye - methyl orange and congo red -

Triphenyl methane dye - malachite green - Phthalein dye - phenolphthalein and flourescein - Vat dye - Indigo dye - Anthraquinione dye – alizarin

Books for study:

1. Organic Chemistry - R. T. Morrison and Boyd - Pearson Education
2. Organic Chemistry - I. L Finar - Volume I and II - Pearson Education
3. Text Book of Organic Chemistry - P.L.Soni - Sultan Chand
4. Advanced Organic Chemistry - Bahl and ArunBahl - S. Chand
5. Stereochemistry, conformations and mechanisms - Kalsi - New Age

Books for Reference:

1. Organic Chemistry of Natural Products - Volume I and II- O.P. Agarwal – GOEL Publishing House
2. A guide book to mechanism in Organic Chemistry - Peter Skyes – Pearson Education
3. Stereo Chemistry of Organic Compounds - D. Nasipuri - New Age
4. Chemistry of Natural Products - GurdeepChatwal- Himalaya Publishing House
5. Reactions and Reagents - O.P. Agarwal- GOEL Publishing House
6. Organic reaction mechanisms - GurdeepChatwal- Himalaya Publishing House
7. A text book of Organic Chemistry K.S.Tewari, N.K.Vishol, S.N.Mehrotra -Vikas Publishing House
8. Organic Chemistry- M.K.Jain and S.C.Sharma-ShobanLal and Nagin Chand
9. Reaction, Mechanism and Structure- Jerry March- John Wiley and Sons
10. Organic Chemistry –Bruice - Pearson Education
11. Organic Reaction and Mechanism by Ahluwalia.

V SEMESTER

Course Code	Course Title	L	T	C
U8CH5003	**PHYSICAL CHEMISTRY - I**	**5**	**1**	**5**

Instructional Objectives

1. ***To study about the solutions and colligative properties***
2. ***To know about Chemical Equilibrium.***
3. ***To study phase rule.***
4. ***To study the basics in surface chemistry, catalysis & che*mical kinetics.**

UNIT-I: Solutions **15 HOURS**

1.1 Solutions of gases in liquids - Henry's law - solution of liquids in liquids - Raoult's law - vapour pressure of ideal solutions - activity of a component in an ideal solution Gibb's Duhem Margulus equation - Thermodynamics of ideal solutions – Free energy change of mixing for an ideal solution - volume change and enthalpy changes of an ideal solution - vapour pressures of real or non-ideal solutions - vapour pressure - composition and Boiling point- composition curves of completely miscible binary solutions-Fractional distillation of binary liquid solutions.

1.2 Azeotropic mixtures - Distillation of immiscible liquids - solubility of partially miscible liquids - phenol water system - CST and effect of impurities on CST.

UNIT-II: Colligative properties and chemical equilibrium **15 HOURS**

2.1 Colligative properties: Lowering of vapour pressure - osmosis and osmotic pressure - relation between osmotic pressure and vapour pressure lowering of an ideal solution - elevation of boiling point - depression of freezing point – thermodynamics derivations and determination of molar mass – vant Hoff factor.

2.2 Chemical equilibrium: law of mass action - law of Chemical equilibrium- thermodynamic derivation of law of Chemical equilibrium – Vant Hoff reaction isotherm - standard free energy change - and its relation with equilibrium constant - temperature dependence of equilibrium constants – Vant Hoff's isochore - Le Chatelier principle and its applications.

UNIT-III: Phase Equilibria **15 HOURS**

3.1 Gibb's phase rule - statement and definition of terms - Application to one component systems - Water and sulphur system - Reduced phase rule - Two component systems - simple eutectic system - lead - silver system - Freezing mixtures .

3.2 Thermal analysis and cooling curves - compound formation with congruent melting point - Zn-Mg system, Ferric chloride - water system – compound formation with incongruent melting point Na-K system

UNIT- IV: Surface Chemistry **15 HOURS**

4.1 Adsorption - Physisorption and Chemisorptions - Applications of adsorption - Adsorption of gases by solids – Adsorption isotherms- Freundlich adsorption isotherm - Langmuir's theory of adsorption –merits and demerits.

4.2. Catalysis- General characteristics of catalytic reactions, Acid-base catalysis- Enzyme catalysis Mechanism and kinetics of enzyme catalyzed reactions – Michaelis - Menton equation - Effect of temperature on enzyme catalysis.

UNIT-V: Chemical Kinetics **15 HOURS**

5.1 The rate equation - order & molecularity of a reaction – Derivation of integrated rate equations of first, second, third and zero order reactions – Half life time of a reaction - methods of determining order of a reaction – order and molecularity of simple reactions - experimental methods in the study of kinetics of reaction - volumetry and polarimetry - effect of temperature on reaction rates – Arrhenius equation - concept of activation energy - energy barrier -Effect of catalyst.

5.2 Collision theory and derivation of rate constant for bimolecular reactions – Lindermann's theory of unimolecular reaction- theory of absolute reaction rates - thermodynamic derivation for the rate constant for a bimolecular reaction – Eyring equation - comparison of collision theory and ARRT.

Books for study:

1. Principles of physical chemistry - B.R. Puri and Sharma - S Chand & Co.,
2. Text Book of physical chemistry - P.L. Soni - Sultan Chand.
3. Physical chemistry - Negi and Anand - New Age.
4. Physical chemistry - Kundu and Jain - S. Chand.
5. Physical chemistry - K.L Kapoor - Macmillan - 4 volumes

Books for Reference:

1. Elements of physical chemistry - Glasstone and Lewis - Macmillan.
2. Text book of physical chemistry - S.Glasstone, Macmillan.
3. Fundamentals of physical chemistry - Maron and Lando - Colier - Macmillan.
4. Physical chemistry - G.W. Castellan - Narosa publishing house.
5. Physical chemistry - Walter J. Moore - Orient Longman.
6. Numerical problems on physical chemistry Gashal, Books and Allied (P) Ltd.,
7. Universal General Chemistry, C.N.R. Rao, Macmillan.

V SEMESTER

Course Code	Course Title	L	T	C
U8CH5004	**APPLIED CHEMISTRY- I**	**5**	**1**	**5**

Instructional Objectives:

1) To learn about processing of Leather and various methods of water treatment.

2) To gain the knowledge in industrial usage chemicals.

3) To learn recent development in industrial chemistry.

UNIT-I: Leather Chemistry **15 HOURS**

1.1 Introduction- structure of hide and skin- leather processing-drying, salt curing, brine curing, soaking, liming, tanning process-vegetable tanning, chrome tanning (one bath and two bath) oil tanning, finishing process- dyeing and fat Liquoring.

1.2 Treatment of Tannery effluent- primary, secondary, tertiary treatment. Activated sludge process. Waste Management-Application .Pollution and its control-Water and Air pollution.

1.3 Dyes-chromophores, auxochrome, bathochromic shift colour of the substance- quinonoid theory of molecular orbital approach-method of application of dyes. Application of dyes in medicine, chemical analysis, cosmetics, cosmetics, coloring agent, food and beverage.

UNIT-II: Water Treatment & Analysis **15 HOURS**

2.1 Water-Portability of water-TSS, TS, pH, Conductivity. Alkalinity –types and determination-Hardness-unit-types-carbonate and non carbonate-determination of hardness-complexometric method using EDTA. Problem based on hardness.

2.2 Softening method-Lime soda-hot and cold lime soda process-zeolite process .Ion Exchange process. Desalination-electrodialysis and reverse osmosis. Domestic water treatment-

coagulation-contact and electrochemical coagulation sterilization (ozonation, UV) disinfectant, chlorination and break point chlorination.

2.3 Analysis of chemical substance in effluent water - dissolved oxygen, biological oxygen demand, COD, ammonia ,cyanide.

UNIT-III: Polymer Chemistry **15 HOURS**

3.1 Plastics-types, preparation, properties and uses of Bakelite, polyvinyl chloride and Teflon, biodegradable plastics –starch, soy based plastics-Plasticulture. Adhesive- preparation, properties of epoxy resins. Application of Polymethacrylic acid, Polyanhydride (Gliadel wafer) in medicinal use.

3.2 Textile fibers- preparation, properties and uses - cotton and wool - synthetic fibres-rayon, polyamide, polyester and acrylic fibers.

3.3 Rubber- vulcanisation -gutta percha-synthetic rubber-Buna-S, polysulfide rubber. Conducting polymer- preparation, properties and uses of polyacetylene-conducting polymer in transistors, LED and solar cell.

UNIT-IV: Industrial Chemistry – I **15 HOURS**

4.1 Oil, fats and waxes- hydrogenation of oil, principle and manufacturing of delacts, saponification, iodine, RM and helmer values and their significance. Manufacture and cleaning action of soap.

4.2 Detergent, anionic -alkyl aryl sulphonate, sulfonated olefins. Cationic - cetyltrimethyl ammonium bromide, on ionic - sorbitan esters

4.3 Lubricants – types -oiliness, flash point, fire point and cloud point, pour point, aniline point. Liquid lubricants-castor oil. Solid lubricants-molybdenum sulphide. semi-solid-greases. Synthetic lubricants-silicone oil.

UNIT-V: Industrial Chemistry – II **15 HOURS**

5.1 Ceramics-types- silicon nitride, zirconia, White pottery .Refractories-types- silica refractories, magnesia refractories and graphite refractories.

5.2 Liquid crystal-behaviour of PAA and MBBA. Application of liquid crystal in displays thermography. Superconductor -types and application. Optical fibers-preparation and uses. Organoelectronic transistors-uses.

5.3 Nanomaterials-preparation, properties and uses of fullerene and CNT. Functional material - Shape memory alloys -nickel titanium based alloys. Composites -types-Fibre reinforced composites. Biosensors, Biochip-uses.

Books for study:

1. Industrial chemistry (including chemical – engineering) – B.K Sharma – Goel

   Publishing house, Meerut.

2. Pollution control in process industries – S.P Mahajan – Tata Megraw – hill Publishing Company Ltd., New Delhi.

3. Water pollution and management – C.K Varashney – wiley Eastern Ltd.,Chennai-20.

4. Applied chemistry by K.Bagavathi - Sundari, MJP Publishers.

Books for Reference:

1. Fundamental concept of Applied chemistry by Jayashree Ghosh, S.Chand& Company Ltd.,
2. Chemical treatment of hides a leather by J. Partridge Noyes, Park Ridge,N.J
3. Materials Science-Rajendran
4. Industrial Chemistry-B.N.Chakrabarthy,Oxford Publishing Co.Pvt Ltd.,
5. College Industrial Chemistry-P.P.Singh ,T.M.Joseph,R.G.Dhavale,Himalaya Publishing House.
6. Material Science and Engineering-V.R Raghavan ,Prince Hall Ltd.
7. Material Science –P.K Palaniswamy,SCITECH Publication India Pvt Ltd.,

8. Perfumes,Cosmetic and Soap-W.A. Poucher(Vol.3)
9. Engineering Chemistry-R.Gopalan,D.Venagappya

V SEMESTER

Course Code	Course Title	P	T	C
U8CHPR51	**PRACTICAL - V GRAVIMETRIC ESTIMATION – I**	**4**	**1**	**2**

Instructional Objective:

1. ***To learn basic laboratory skills in gravimetric estimation techniques.***

2. To develop skills in the estimation of metal ions using gravimetry techniques

LIST OF EXPERIMENTS

1. Estimation of barium as barium sulphate.
2. Estimation of barium as barium chromate.
3. Estimation of lead as lead chromate.
4. Estimation of lead as lead sulphate

Marks Distribution: 75 marks

1 .Record	*10marks*
2. Experimental work	*35marks*
3. Accuracy/ Result	*25marks*
4. Viva Voce	*05marks*

Books for study

1. Text book of Practical Chemistry V. Veeraswamy
2. Qualitative Inorganic Analysis by V.V. Ramanujam.

Reference Books:

1. Text book of Practical Inorganic Chemistry by Vogel.

V SEMESTER

Course Code	Course Title	P	T	C
U8CHPR52	**PRACTICAL – VI PHYSICAL CHEMISTRY PRACTICAL - I**	**4**	**1**	**2**

Instructional Objectives:

1. ***To study the kinetics of a reaction.***
2. ***To find out the transition temperature of Hydratated salt by thermometric method.***
3. ***To gain the knowledge of determination of molecular weight of a solute.***
4. ***To study phenol sodium chloride to component system.***
5. ***To learn the determination of cell constant and equivalent conductance.***

List of Experiments

1. Studying the Ester Hydrolysis and showing it follows first order Kinetics.
2. Determination of the transition temperature of the given salt hydrates,

$Na_2S_2O_3.5H_2O$, $CH_3COONa.3H_2O$, $SrCl_2.6H_2O$, $MnCl_2.4H_2O$.

3. Molecular weight determination by Rast's method.
4. Conductometric determination of cell constant and equivalent conductance of two different strong electrolytes.
5. Phenol sodium chloride system.

Marks Distribution: 75 marks

1. Record	*10marks*
2. Procedure	*10marks*
3. Viva Voce	*05marks*
4. Experiment	*50marks (Expt. 25 + Manipulation 25)*

Books for study:

1. Basic principles of Practical chemistry by A.R. kulandaivelu.

Books For Reference:

1. Basic principles of Practical chemistry by V. Venkatesaran
2. Basic principles of Practical chemistry by R. Veeraswamy.

V SEMESTER

Course Code	Course Title	P	T	C
U8CHSBP5	**PRACTICAL VII** **ORGANIC CHEMISTRY PRACTICAL - I**	**2**	**1**	**1**

Instructional Objective:

1. ***To understand the reactivity of the functional groups.***
2. ***To learn the recrystallization techniques.***
3. ***To gain firsthand knowledge by visiting industry.***

List of Experiments

I. Analysis of organic compounds containing one functional group and Characterization with a derivative.

Reactions of the following functional groups:

- Carboxylic acid (mono and di),
- Phenol
- Ester
- Aldehyde
- Ketone
- Carbohydrate
- Primary Amine
- Amide
- Nitro compound
- Diamide
- Anilide

Marks Distribution: 75 marks

1 . Record *10marks*

2. Procedure *15marks*

3. Aliphatic / Aromatic *06marks*

4. Saturated/Unsaturated *06marks*

5. Element present/ absent *12marks*

6. Functional Group *12marks*

7. Derivative *09marks*

8. Viva Voce *05marks*

Reference Books:

1. Vogel's text book of chemical analysis.
2. Practical chemistry - A.O. Thomas - Scientific book center, Cannanore.
3. Practical chemistry-S. Sundaram - 3 Volumes - S. Viswanthan.
4. Vogel's text book of practical organic chemistry – Longmann.

VI SEMESTER

Course Code	Course Title	L	T	C
U8CH6001	**INORGANIC CHEMISTRY - II**	**5**	**1**	**5**

Instructional Objectives :

1. ***To impart knowledge about radioactivity and nuclear chemistry.***

2. To understand the metallic bond and bio-inorganic chemistry.

3. To learn about d and f block elements.

4. To provide knowledge about the industrial chemistry.

UNIT-I: Nuclear Chemistry – I **15 HOURS**

1.1 Introduction - composition of nucleus - nuclear forces operating between the nucleons - n/p ratio, curves, stability belts – isotopes, isobars, and isotones, packing fraction.

1.2 Nuclear binding energy - Mass defect - simple calculations involving mass defect and binding energy per nucleon - magic numbers - liquid drop model - shell model (elementary).

UNIT-II: Nuclear Chemistry – II **15 HOURS**

2.1 Natural radioactivity - Detection and measurement of radioactivity -radioactive series including neptunium series - group displacement law - Rate of disintegration and half - life period - Average life period.

2.2 Artificial radioactivity - induced radioactivity - uses of radioisotopes - medical applications - hazards of radiations - nuclear fission - nuclear energy - nuclear reactors-nuclear fusion - thermo nuclear reactions - sun and stars as a source of energy.

UNIT-III: Metals and Semi Conductors 15 HOURS

3.1 Metallic bonds –General Properties and theories of bonding in metals - electron pool theory - valence bond theory -MO theory - semiconductors –Intrinsic , extrinsic and types of semiconductors.

3.2 Alloys, Ionic compounds- Interstitial Alloys and related compounds- Substantial Alloys- Superconductivity

UNIT-IV: d and f elements 15 HOURS

4.1 Chemistry of d block elements - characteristics of d block elements -variable valency - magnetic properties and colour - comparative study of Ti, V, Cr, Mn and Fe group metals - occurrence, oxidation states, magnetic properties and colour - preparation and uses of ammonium molybdate, V_2O_5 and UF_6

4.2 Chemistry of f block elements - comparative account of lanthanides and actinides, occurrence, elements, oxidation states, magnetic properties, colour and spectra - lanthanide contraction - causes, consequences and uses -comparison between 3d and 4f block elements.

UNIT-V: Bio inorganic and Industrial Chemistry 15 HOURS

5.1 Bioinorganic chemistry - Biological aspects of Fe, Zn, Mg, Co and Mo- Role of Na, K, Ca, and P - Biological functions and toxicity of some elements.

5.2 Industrial chemistry - Fuel gases - calorific value - composition and sources of water gas, semi water gas, carburreted water gas, producer gas, oil gas, natural gas, LPG and bio gas.

5.3 - Manufacture of cement - Composition and setting of cement - examples for pigments - constituents of paints and their functions - type of glasses - manufacture of glass. Composition of Match sticks and match box- Industrial making of safety matches.

Books for Study:

1. Inorganic chemistry - P.L. Soni - Sultan Chand.
2. Inorganic chemistry - B.R. Puri, L.R. Sharma and K.C. Kallia – Vallabh Publications.

3. Selected topics in inorganic chemistry - W.U. Malik, G.D. Tuli and R.D. Madan - S. Chand Publications .
4. Inorganic chemistry - J.E. Huheey, Harper and Collins - NY IV edition .
5. Concise Inorganic chemistry - J.D. Lee - III edition - Von Nostrand
6. Industrial chemistry - B.K Sharma - Goel Publications .

Books for Reference:

1. Industrial chemistry R.K. Das - Kalyani Publications, New Delhi.
2. Coordination chemistry - S.F.A. Kettle - ELBS .
3. Coordination chemistry - K. Burger - Butterworthy .
4. Vogel's handbook of quantitative inorganic enalysis - Longman.
5. Text book of qualitative inorganic analysis - A.I. Vogel - III edition .
6. Source book on atomic energy - Van Nostrand Co.,.
7. Nuclear and radiochemistry - John wiley and sons .
8. Nuclear chemistry - H.J. Arnikar - Wiley Eastern Co., - II edition (1987).
9. Advanced Inorganic chemistry - Cotton and Wilkinson - V Edition – Wiley and Sons

VI SEMESTER

Course Code	Course Title	L	T	C
U8CH6002	**ORGANIC CHEMISTRY - II**	**5**	**1**	**5**

Instructional Objectives:

1. ***To understand the basic concepts of organic photochemistry and Molecular Rearrangements.***
2. ***To kindle interest in students in learning bio-organic chemistry through the introduction of topics such as Nucleic acids, Proteins, Terpenes, Alkaloids and rearrangements.***
3. ***To assign the spectra using simple organic molecules.***

UNIT-I: Amino acids & Proteins **15 HOURS**

1.1 Amino acids : Classification of amino acids - zwitter ion , isoelectric point, General Reaction and properties of proteins (Test for Proteins) preparations and properties of alpha amino acids - with special reference to Gabriel phthalimide synthesis, Strecker synthesis, -

1.2 Poly peptides and proteins:. Classification of proteins based on physical and chemical properties and physiological functions -peptide synthesis- Bergman synthesis.

1.3 Primary structure of proteins - End group analysis - Akabori method, reduction method, Edman method, Sanger's method, secondary structure of protein - helical and sheet structures - denaturation of proteins.

UNIT- II: Nucleic Acids and Heterocyclic Bases **15 HOURS**

2.1 Nucleic acids: Nucleoside, nucleotide, degradation of nucleotide chain - structure of nucleic acids, functions of nucleic acids - RNA and DNA - elementary idea about protein synthesis

2.2 Synthesis of pyrimidine and purine bases - guanine, adenine, uracil, cytosine and thymine.

2.3 Antibiotics: Classification and its importance and structural elucidation of penicillin.

UNIT- III: Alkaloids & Terpenes **15 HOURS**

3.1 Alkaloids: General methods of isolation and structural elucidation of codeine and nicotine

3.2 Terpenes - isoprene rule –structural elucidation of menthol and α-terpeniol.

3.3. Vitamins: Classification – importance of vitamins - structural elucidation of ascorbic acid

UNIT- IV: UV-Visible & NMR Spectroscopy 15 HOURS

4.1 Basic principle of UV-visible spectroscopy - origin of UV spectroscopy - Factor affecting wavelength absorption. Basic principle of Infra red Spectroscopy-Fingerprint region-its applications. Spectral interpretation of benzaldehyde, vinyl chloride, aniline, cinnamic acid and methyl propanoate by UV and IR spectroscopy.

4.2 Basic Principle of Nuclear Magnetic Resonance spectroscopy- chemical shift –shielding and deshielding. Identification of Alcohol, 2-methyl propene and phenol by using NMR spectroscopy.

UNIT- V: Photochemistry and Rearrangements 15 HOURS

5.1 Organic photochemistry: Types of photochemical reactions- photo dissociation- gas phase photolysis - isomerisation- cyclisation- dimerisation and oxetane formation.

5.2 Norrish-I and II reactions. Barton reaction- photo - Fries rearrangement -photochemical formation of smog- photochemistry of vision.

5.3 Molecular rearrangements: Classification - anionotropic and cationotropic, inter molecular and intra molecular rearrangements .-Pinacol-pinocolone, Benzilic acid, Cope, oxy Cope, Beckmann, Hoffmann, Curtius, Baeyer-Villiger, Wolff, Claisen and Fries rearrangements.

Books for Study:

1. Organic Chemistry - R. T. Morrison and Boyd - Pearson Education
2. Organic Chemistry - I. L Finar - Volume I and II - Pearson Education
3. Text Book of Organic Chemistry - P.L.Soni - Sultan Chand
4. Advanced Organic Chemistry - Bahl and ArunBahl - S. Chand

Books for Reference:

1. Stereochemistry, conformations and mechanisms - Kalsi - New Age
2. Organic Chemistry of Natural Products - Volume I and II- O.P. Agarwal – GOEL Publishing House
3. A guide book to mechanism in Organic Chemistry - Peter Skyes – Pearson Education

4. Stereo Chemistry of Organic Compounds - D. Nasipuri - New Age
5. Chemistry of Natural Products – Gurdeep Chatwal- Himalaya Publishing House
6. Reactions and Reagents - O.P. Agarwal- GOEL Publishing House
7. Organic reaction mechanisms – Gurdeep Chatwal- Himalaya Publishing House
8. A text book of Organic Chemistry K.S.Tewari,N.K.Vishol,S.N.Mehrotra-Vikas Publishing House
9. Organic Chemistry- M.K.Jain and S.C.Sharma-ShobanLal and Nagin Chand
10. Reaction, Mechanism and Structure- Jerry March- John Wiley and Sons
11. Organic Chemistry - Bruice - Pearson Education

VI SEMESTER

Course Code	Course Title	L	T	C
U8CH6003	**PHYSICAL CHEMISTRY - II**	**5**	**1**	**5**

Instructional Objectives

1. ***To study the basic principles of photo chemistry and laser.***
2. ***To learn about Electro chemistry and its applications.***
3. ***To study about the basics in Electro analytical techniques***

UNIT- I: Photochemistry **15 HOURS**

1.1 Laws of photochemistry – Quantum Yield- Jablonski diagram - Non radiative transitions – IC – ISC – Radiative transitions - Fluorescence and phosphorescence - chemiluminescence - photosentisation – Photosynthesis.

1.2 Kinetics of hydrogen - Chlorine reaction. Lasers - principle and uses.

UNIT-II: Electrochemistry - I **15 HOURS**

2.1 Introduction: Metallic and Electrolytic conductors – Specific – Equivalent - Molar Conductance – Variation of Specific and Equivalent conductance with dilution - Transport number and its determination by Hittorff's and moving boundary method - effect of temperature and concentration on ionicmobility and ionic conductance - Kohlrausch's law and its applications - salt hydrolysis - degree of hydrolysis and pH of a salt solution, buffer action and it's applications.

2.2 Applications of conductivity measurements – degree of dissociation of weak electrolyte and solubility product - conductometric titrations.

UNIT-III: Electochemistry - II **15 HOURS**

3.1. Theory of strong electrolytes - Debye - Huckel - Onsager theory -verification of Onsager equation - Wein effect and Debye Falkenhagen effect -ionic strength - activity and activity coefficients of strong electrolytes.

3.2 Galvanic cells - reversible and irreversible electrodes and cells -standard cell - emf and its measurement - types of electrodes – Gas electrode – Metal - Metal ion electrode – Metal Metal insoluble salt electrode – Redox electrode – Glass electrode - electrodereactions - electrode potentials - reference electrodes - Standard electrodepotentials. Derivation of Nernst equation for electrode potential and cell emf.- sign conventions.

UNIT-IV: Electochemistry - III **15 HOURS**

4.1 Electrochemical series and its applications - Chemical cells and concentration cells with and without transference - examples and derivation of expressions for their Emfs - liquid junction potential and its significance.

4.2 Applications of Emf measurement – Determination of Transport numbers, valency of ions in doubtful cases and solubility products. - Determination of pH using quinhydrone and glass electrodes - Potentiometric titrations. Calculation of ΔG, ΔH, ΔS and Equilibrium constant.

UNIT-V: Polarography **15 HOURS**

5.1 Polarization - decomposition potential over voltage - storage cells -lead acid battery - mechanism of discharging and recharging - fuel cells.

5.2 Polarography - principle - concentration polarization – dropping mercury electrode - advantages and disadvantages - convection, migration and diffusion currents - Ilkovic equation (derivation not required) and significance -current voltage curve - oxygen wave - Polarography as analytical tool in quantitative and qualitative analysis.

Books for Study:

1. Principles of physical chemistry - B.R. Puri and Sharma – S.Chand & Co.,
2. Text Book of physical chemistry - P.L. Soni - Sultan Chand.
3. Physical chemistry - Negi and Anand - New Age.
4. Physical chemistry - Kundu and Jain - S. Chand.
5. Physical chemistry - K.L kapoor - Macmillan - 4 volumes

Books for Reference::

1. Elements of physical chemistry - Glasstone and Lewis - Macmillan.

2. Text book of physical chemistry - S.Glasstone, Macmillan.
3. Fundamentals of physical chemistry - Maron and Lando - Colier - Macmillan.
4. Physical chemistry - G.W. Castellan - Narosa publishing house.
5. Physical chemistry - Walter J. Moore - Orient Longman.
6. Numerical problems on physical chemistry Gashal, Books and Allied (P) Ltd.,
7. Universal General Chemistry, C.N.R. Rao, Macmillan.

VI SEMESTER

Course Code	Course Title	L	T	C
U8CH6004	**APPLIED CHEMISTRY-II**	**5**	**1**	**5**

Instructional Objective:

1. ***To effectively impart knowledge about - various diseases and their treatment.***
2. ***To understand about chemical characteristic of soil.***
3. ***To impart knowledge of food adulteration.***
4. ***To separate the drug using chromatography technique.***

UNIT- I: Pharmaceutical Chemistry - I **15 HOURS**

1.1 Important terminology used in pharmaceutical chemistry-Medicinal herbs and their uses - mode of action- -Mechanism of drug action- Principle of drug design-traditional analog-QSAR.

1.2. Application of computers in drug discovery: Basic of computer architecture-use of computer in drawing and naming drug molecules –paractamol, Aspirin (Chem Sketch).Calculation of properties from software- pH.Software interface for QSAR using statistical methods (basic statistical terms to be included).

1.3 Antibiotics-classification-Preparation, properties and therapeutic uses of chloramphienicol, penicillin, streptomycin. Antiseptics-disinfectant-phenol coefficient-Preparation, therapeutic uses -phenol compounds, chloro compounds and organic mercurial.

UNIT – II: Pharmaceutical Chemistry - II **15 HOURS**

2.1 Anaesthetic-general anaesthetic-preparation, properties and therapeutic uses of ether, halothene, cyclopropane-non volatile anaesthetic-thiopental sodium, local anaesthetic-cocaine,procaine.

2.2 Analgesic-Narcotic analgesics morphine, pethidine and methodine.Non-narcotic analgesics, antipyretic, anti-inflammation salicylic derivatives, paracetamol, ibuprofen cause and treatment of cancer, AIDS, AZT, DDC and diabetes.

2.3 Enzyme- nomenclature, properties of enzymes-mechanism of enzyme action, cofactor and co-enzyme. Hormones-chemical nature, properties and function adrenaline, thyroxine, oxytocin. Digestion and adsorption of carbohydrates, proteins, fats.

UNIT- III: Chemistry of Soil **15 HOURS**

3.1 Soil – properties- soil water, air, temperature, pH,acidity, alkalinity, soil colloids - types - Fertilizer - biofertilizers-organic matures and their important - role of N, P, K secondary nutrients and micronutrients in plants growth.

3.2 Nitrogenous fertilizer - preparation and uses of calcium ammonium nitrate, Urea, Sindri fertilizer. Phosphate fertilizer - preparation and uses of monoammonium and diammonium phosphate. Potassium fertilizer - potassium sulphate.

3.3 Pesticides - classification - preparation and uses of fluorene compounds, boron compounds, arsenic compounds, organomercuric compounds, DDT, BHC, pyridine compounds.

UNIT IV: Food Chemistry **15 HOURS**

4.1 Food additive-artificial sweetener-saccharin, cyclomate, asparatame. food flavors- ester, aldehyde and heterocyclic compounds. Food colours- restricted uses. Spurious colour - emulsifying agents

4.2 Soft drinks, soda, fruit juices and alcoholic beverages- cirrhosis of liver. Composition of soft drinks. Excess use leading to urinary bladder stones, preservation of tetrapak.

4.3 Adulteration- common adulteration in different foods- milk products, oils, fats, spices and condiments,cereals,pulses and sweetening agents. Contamination with toxic chemicals- pesticide and insecticides. Methods of preservation and processing.

UNIT V: Applications of Chromatography **15 HOURS**

5.1. Chromatography techniques - principle of adsorption and partition chromatography, column chromatography - principle - absorbent used-preparation of column - adsorption - elution - recovery of substances - application.

5.2 Thin layer chromatography - principle - choice absorbent and solvent - preparation of chromatogram - Rf value - application of TLC in organic and inorganic chemistry

5.3 Paper chromatography – choice of paper and solvent principle, Rf value factors - application - separation of amino acids mixture - radial paper chromatography .Application of HPLC and GC in organic and inorganic chemistry

Books for Study:

1. A text book of Pharmaceutical chemistry - Jayashree Ghosh - S. Chand
2. Pharmaceutical Chemistry - S. Lakshmi Sultan Chand
3. Pharmacology and Pharmatherapeutics - R.S. Satoskar - popular prakashan - Vol.I and II.
4. Medicinal Chemistry – Asutosh Kar - New Age
5. A text book of Synthetic drugs - O.D. Tyagi - Ammol publications.
6. Soil science-A.Sankara.
7. Food Chemistry –L.H.Meyer-CBS Publisher

Books for Reference:

1. Nature and properties of soils-Harry,O.Bukman.
2. Principles of instrumental methods of analysis - D.A. Skoog and Saunders - College publications - III edition (1985).
3. Applied chemistry for home science and allied science –T.Jacob,Macmillan.
4. Applied chemistry-theory and practice-O.P.Veramani and A.K.Narula.
5. Food Science-Srilakshmi.B
6. Agricultural Chemistry Vol. I & Vol. II edited by B.A. Yagodin– NewCentury books (P) Ltd.,
7. The nature and properties of soils - IX Edition - Nyle.C.Bready - S.Chandand Company Ltd.,
8. Soils and soil fertility - Louis M.Thompson - and Frederick. R.Troch- TataMc. Graw hill.

VI SEMESTER

Course Code	Course Title	P	T	C
U8CHPR61	**PRACTICAL VIII GRAVIMETRIC ESTIMATION – II**	**4**	**1**	**2**

Instructional Objectives:

1. ***To learn basic laboratory skills in gravimetric estimation techniques.***

2. To develop skills in the estimation of metal ions using gravimetry techniques.

3. To develop skills in the estimation of anions using gravimetry techniques.

List of Experiments

1. Estimation of calcium as calcium oxalate monohydrate.
2. Estimation of sulphate as barium sulphate.
3. Estimation of Nickel as Nickel dimethyl glyoxime.
4. Estimation of Magnesium as Magnesium oxinate.

Marks Distribution: 75 marks

1 .Record	*10marks*
2. Execution of work	*35marks*
3. Accuracy/ Result	*25marks*
4. Viva Voce	*05marks*

Books for study

1. Text book of Practical Chemistry V. Veeraswamy

Reference Books:

1. Text books of Practical Inorganic Chemistry by A.I. Vogel.

VI SEMESTER

Course Code	Course Title	P	T	C
U8CHPR62	**PRACTICAL- IX** **PHYSICAL CHEMISTRY PRACTICAL - II**	**4**	**1**	**2**

Instructional Objectives:

1. ***To study the critical solution temperature of immiscible binary system.***
2. ***To gain the knowledge of conductometric neutralization titration.***
3. ***To study the Nernst distribution law.***
4. ***To study the zero order kinetics.***
5. ***To learn the determination of equilibrium constant.***

List of Experiments

1) Using Phenol-water system, upper critical solution temperature and composition determination.
2) Neutralization titration of strong acid and a strong base by conductometric method.
3) Distribution Co-efficient of Iodine between aqueous and organic layer.
4) Study of Equilibrium constant of a reaction between KI and Iodine.
5) Kinetic study of Iodination of Acetone in the presence of sulphuric acid.

Marks Distribution: 75 marks

1. *Record* *10marks*
2. *Procedure* *10marks*
3. *Viva Voce* *05marks*
4. *Experiment* *50marks (Expt. 25 + Manipulation 25)*

Books for Study:

1. Basic principles of Practical chemistry by A.R. kulandaivelu

Reference Books:

1. Basic principles of Practical chemistry by V. Venkatesaran.
2. Basic principles of Practical chemistry by R. Veeraswamy.

VI SEMESTER

Course Code	Course Title	P	T	C
U8CHSBP6	**PRACTICAL X** **ORGANIC CHEMISTRY PRACTICAL - II**	**2**	**1**	**1**

Instructional Objective:

1. ***To learn the skills of preparative methods.***
2. ***To learn the determination of boiling points of liquids.***

List of Experiments

Organic Preparations

Acylation

a. Acetylation of salicylic acid or aniline.
b. Benzoylation of aniline or phenol.

Nitration

a. Preparation of m-dinitrobenzene
b. Preparation of p- nitroacetanilide

Halogenation

a. Preparation of p-bromoacetanilide
b. Preparation of 2,4,6-tribromophenol

Diazotization / coupling

a. Preparation of methyl orange.
b. Preparation of benzoic acid from toluene

Hydrolysis:

a. Hydrolysis of ethyl benzoate (or) methyl salicylate

Benzoylation

Preparation of benzanilide from aniline

Oxidation

Preparation of benzoic acid from benzaldehyde

Determination of boiling point of Water, Ethanol, Benzene, Acetic Acid and Toluene

Marks Distribution: 75 marks

1 . Record	*10marks*
2. Procedure	*15marks*
3. Preparation	*25marks*
4. Recrystallisation	*05marks*
5. Boiling point	*15marks*
6. Viva Voce	*05marsk*

Reference Books:

1. Vogel's text book of chemical analysis.
2. Practical chemistry - A.O. Thomas - Scientific book center, Cannanore.
3. Practical chemistry-S. Sundaram - 3 Volumes - S. Viswanthan.
4. Vogel's text book of practical organic chemis-try – Longman.
5. Practical Organic Chemistry by Gnanaprakasam.

DEPARTMENT OF BIOCHEMISTRY

COURSE OUTCOMES FOR SEMESTERS V & VI

SEMESTERS V

Enzymes

1) They will be able to demonstrate various classes of enzymes with mechanism of action and kinetics. Along with the structure and functions of coenzymes.
2) The students will be able to discuss factors that affect enzymatic activity.
3) They should be able to demonstrate how a given inhibitor affects the kinetics of an enzymatic reaction.
4) They should be able to discuss various methods of immobilization of enzymes and their industrial applications.

Genetics And Molecular Biology

1) Students will able to understand Mendalian principles of gene expression
2) Students will able to know mechanism of the prokaryotic &retroviral replication
3) Students will able to understand mechanism of the prokaryotic transcription
4) Students will able to understand mechanism of the translation in prokaryotes
5) Students will able to know the mechanism of genetic mutation and repair processes
6) Students will able to envisage thorough knowledge in genetics, genome organizations in organisms and their developmental aspects.

Human Physiology

1) Students will be able to explain the structure and functions of skeletal system.
2) Students will be able to explain structure and functions of nervous system and cardiovascular system.
3) Students will be able to relate structure and functions of tissues.
4) Students will be able to recognize and identify different cell and tissue types.
5) Students will be able to describe of digestion, excretion, respiration and hormone action.

MLT

1) Students will be skilled in current laboratory practices as entry-level practioners.
2) Students will demonstrate the ability to think critically and solve problems in a laboratory setting.
3) Students will demonstrate the ability to communicate verbally and in writing.
4) Students will act as ethical and responsible members of health care team.
5) Students will be eligible for employment in a hospital, public or private health laboratory, health care clinic, veterinary office, research lab, forensic lab or pharmaceutical lab, performing a wide variety of blood, chemical, microbiological and other clinical laboratory tests.

Biotechnology-I

1) Students will able to understand enzymatic tools of genetic engineering.
2) Students will able to know about various cloning vectors.
3) Students will able to understand various gene transfer methods.
4) Students will able to know various experimental techniques used in recombinant

technology.

5) Students will able to understand exploitation of genetic engineering for human welfare.
6) Students will able to understand the genetic concepts into manipulating living things for human benefit.

SEMESTERS VI

Metabolism

1) The students will be able to explain how biochemical energy is generated in the cells.
2) They will be able to write the chemical reactions involved in the biochemical pathways that produce ATP, such as glycolysis, TCA cycle and electron transport chain.
3) They will be able to describe the metabolism of carbohydrates, lipids, amino acids and nucleotides they will be able to write chemical reactions for each pathway.

Clinical Biochemistry

1) The student will be able to identify and summarize the use of standard precautions applied in clinical laboratories during the collection and processing of biological specimens for analysis.
2) They will be able to relate laboratory results to clinical diagnosis and relationships to heart, liver, kidney, GI tract and pancreas.
3) They will be able to describe and identify inborn error in metabolism and correlate them with deficiency of key metabolic enzymes.

Immunology

1) Students will be able to describe cellular and molecular basis of immune responsiveness.
2) Students will be able to explain how immune responses are triggered.
3) Students will be able to understand the significance of immunity in the maintenance of health.
4) Students will be able to demonstrate immunological methods.
5) To understand and explain the basis of allergy and mechanism of inflammation

Nutritional Biochemistry & Dietetics

1) Students will be able to understand basic food groups and habits.
2) They will know how to determine the calorific value of foods and their importance.
3) They will be able to plan diet for various stages of life.
4) They will be able to plan diet for various diseases.
5) They will know about food hygiene and adulterant.

Biotechnology-II

1) Students will able to understand instrumentation of tissue culture lab.
2) Students will know about various plant tissue culture techniques.
3) Students will know about various steps in mammalian tissue culture techniques.
4) Students will know about production and applications of transgenic plants and animals.

SEMESTER V

Course Code	Course Title	L	T	C
U8BI5001	**ENZYMES**	**5**	**1**	**5**

Instructional Objectives

1. To understand the various classes of enzymes, their kinetics; mechanism of action and inhibition.
2. To understand the structure and functions of coenzymes.
3. To understand how to manipulate enzymes.
4. To study the applications of some enzymes in industries.

Unit-I	**INTRODUCTION & CLASSIFICATION**	**15 Hours**

Discovery, nomenclature and classification of enzymes. Active site, lock and key hypothesis, induced fit hypothesis. Enzyme specificity (stereo-, reaction and substrate specificity). Non-protein enzymes- ribozymes and DNA enzymes.

Unit-II	**ENZYME KINETICS**	**15 Hours**

Factors affecting enzyme activity (enzyme and substrate concentration, pH, temperature and activators). Kinetics of single substrate enzyme-catalyzed reactions- Michaelis-Menten equation, Km, Lineweaver-Burk equation. Kinetics of multi-substrate enzyme-catalyzed reactions- Ping-pong, bi-bi mechanism. Enzyme units-katal, U, turnover number.		
Unit-III	**CATALYSIS AND INHIBITION**	**15 Hours**
Mechanism of catalysis- general acid-base catalysis, electrostatic catalysis, covalent catalysis. Enzyme inhibition- reversible inhibition (competitive, uncompetitive, noncompetitive and allosteric). Irreversible inhibition (only concepts).		
Unit-IV	**COFACTORS & ISOENZYMES**	**15 Hours**
Cofactors-prosthetic group, Vitamin and non-vitamin coenzymes. Coenzymes-structure and functions of NAD^+, $NADP^+$, FMN, FAD and coenzyme A. Isoenzymes-Isoenzymes of LDH with their diagnostic importance.		
Unit-V	**ENZYMES IN INDUSTRIES**	**15 Hours**
Industrial uses of some enzymes (amylases, protease, pectinase, catalase, glucose isomers and cellulase). Immobilization of enzymes- methods (physical adsorption, encapsulation, covalent bonding, copolymerization, entrapment in matrix and liposome), advantages and applications.		
Books for Study: 1. Biochemistry- U Satyanarayan and U Chakarapani 5th edition, Books and Allied (P) Ltd. 2019. 2. Biotechnology- V. Kumaresan, Third Edition, Saras Publication 2014. 3. Enzymes- Trevor Palmer, Second Edition, Ellis Horwood Ltd, 2008.		
Books for Reference: 1. Fundamentals of Biochemistry- D.Voet, J.G.Voet, C.W. Pratt, 5th edition, Wiley Publications, 2016 2. Lehninger Principles of Biochemistry – D.L. Nelson and M.M. Cox, 7th Edition, Macmillan Worth Publications, 2015. 3. Harper's Illustrated Biochemistry — RK. Murray, et al, 31st edition, Mc GrawHill Publications, 2018.		

SEMESTER V

Course Code	Course Title	L	T	C
U8BI5002	**GENETICS AND MOLECULAR BIOLOGY**	**5**	**1**	**5**
Instructional Objectives 1. To understand gene and gene inheritance. 2. To study about gene expression and regulation repair and mutation 3. To study about gene repair and mutation				
Unit-I	**GENETICS**			**15 Hours**
Mendelian genetics: Mendel's laws of inheritance – mono hybrid experiments, law of dominance, law of segregation, phenotype, genotype, alleles, homozygous, heterozygous, test cross, back cross, di hybrid experiments - law of independent assortment and law of incomplete dominance.				
Unit-II	**REPLICATION**			**15 Hours**

DNA as genetic material, Types of replication, evidence for semi conservative replication. Replication in prokaryotes, DNA polymerases I, II, III, topoisomerases, Okazaki fragments, DNA ligases and inhibitors of replication. Reverse transcriptase, retroviruses.

Unit-III	**TRANSCRIPTION**	**15 Hours**

Prokaryotic transcription, RNA polymerases, role of sigma factor, initiation, elongation and termination. (Rho - dependent and independent). Inhibitors of transcription, rRNA and tRNA modification.

Unit-IV	**TRANSLATION**	**15 Hours**

Genetic code - definition, deciphering and salient features of genetic code, composition of ribosomes, structure of t-RNA, coding and non-coding strands of DNA Translational activation of amino acids, initiation, elongation and termination of protein synthesis in prokaryotes. Inhibitors of protein synthesis. Brief account of post translational modification of proteins.

Unit-V	**GENE- MUTATION, REPAIR AND REGULATION**	**15 Hours**

Gene mutation types - point mutation (transition and transversion) and frame shift mutation (insertion and deletion)- consequences. DNA repair mechanism – base excision, nucleotide excision, SOS. Prokaryotic gene regulation - Operon, Lac operon, positive and negative control.

Books for Study:

1. Biochemistry- U Satyanarayan and U Chakarapani 5th edition, Books and Allied (P) Ltd. 2019.
2. Lehinger's Principle of Biochemistry- David L Nelson and Michael M Cox, 7th edition, Freeman Publishers, 2015.
3. Harper's Illustrated Biochemistry - RK. Murray, et al, 31st edition, Mc GrawHill, 2018.
4. Lippincott's illustrated Biochemistry - Denise R Ferrier 6th edition, Lippincott's Publication, 2013.

Books for Reference:

1. Lewis Genes XII. Benjamin Lewin, Oxford Univ press, 2017.
2. Molecular Biology - David Freifielder 2nd Edition, Narosha, publication 2004.
3. Molecular Cell Biology – Harvey Lodish, glolbal Edition ,Freeman Publication, 2014
4. Cell and Molecular Biology - N.Y Karp. 6th Edition, John Wiley and Sons, 2015.
5. Essential of Microbiology David Freifielder 4th Edition 2015.

SEMESTER V

Course Code	Course Title	L	T	C
U8BI5003	**HUMAN ANATOMY AND PHYSIOLOGY**	**5**	**1**	**5**

Instructional Objectives

1. To explain anatomy and physiology of vital human tissues and organs.
2. To impart the knowledge of basic physiological principles.
3. To enable students to recognize tissue structures.
4. To describe the mechanism of digestion, absorption, excretion, urine formation, respiration, blood coagulation, muscle contraction and cardiac cycle.

Unit-I	**SKELETAL & MUSCULAR SYSTEM**	**15 Hours**

Types of human tissues- Muscle, Nervous, Epithelial and Connective tissues. Classification of Muscles - Skeletal, Cardiac and Smooth muscles, Structure of skeletal muscle, Mechanism of muscle contraction. Neuromuscular junction. Homeostasis.

Unit-II	**DIGESTIVE & RESPIRATORY SYSTEM**	**15 Hours**

Secretions of digestive tract, Digestion, absorption and assimilation of carbohydrates, proteins, and fats. Functional anatomy of respiratory tract, Structure of respiratory unit, Mechanism of respiration. Transport and exchange of respiratory gases between lungs and tissues.

Unit-III	**CARDIOVASCULAR SYSTEM**	**15 Hours**

Composition and functions of blood, properties of blood, Mechanism of blood coagulation, Types of blood circulation, Function of arteries, veins and capillaries. Structure and function of heart, cardiac cycle.

Unit-IV	**EXCRETORY & REPRODUCTIVE SYSTEM**	**15 Hours**

Structure and functions of kidney. Structure of nephron. Dialysis. Mechanism of urine formation. Structure and functions of the male and female reproductive organs, Physiology of pregnancy.

Unit-V	**ENDOCRINE & NERVOUS SYSTEM**	**15 Hours**

Brief outline of various endocrine glands and their secretions, physiological role of hormones. Classification of nervous system. Structure and functions of neuron, neuroanatomy of brain and spinal cord.

Books for Study:

1. Essentials of Medical Physiology. K Sembulingam, Prema Sembulingam, 8th edition, Jaypee Publications, 2019.
2. Review of Physiology- Soumen Manna, 4th edition, Jaypee Publications, 2019.
3. Human Physiology – Chatterjee, C.C, Volume I & II. 11th edition, CBS publications, 2018.

Books for Reference:

1. Atlas of Human Anatomy- Frank H Nettar 7th edition, Elsevier, 2019.
2. Review of Medical Physiology, William. F. Ganong, 26th edition, Lange Medical books, 2019.
3. Text Book of Medical Physiology, A.C. Guyton 10th edition, 2015.

SEMESTER V

Course Code	Course Title	L	T	C
U8BI5004	MEDICAL LABORATORY TECHNOLOGY	5	1	5

Instructional Objectives

1. To impart basic knowledge of Biochemistry, Apparatus, Units, Equipments in Clinical Lab, Basic ethics, good laboratory practices including awareness/safety in a Clinical Lab.
2. To understand the process of collection of Urine and faeces and their analysis with clinical interpretation.
3. To understand the importance of Blood cells and their disorders, its lab diagnosis and various types of laboratory tests. Blood grouping, Blood banking, compatibility testing and complications.
4. To understand the basics of Blood collection, CSF, semen, sputum and saliva and their analysis clinical interpretation.
5. To understand the basics of Microbiology and impart knowledge about Media and Equipment used in Microbiology.

Unit-I	**Laboratory care and instrumentation**	**15 Hours**

Good laboratory practices, Code of conduct for laboratory personnel - safety measures in the laboratory-chemical and reagents, labeling, storage and usage. First aid in laboratory accidents - precautions and first aid equipments. Reporting laboratory tests and keeping records. General approach to quality control, quality control of quantitative data

Unit-II	**Urine Analysis & Stool Examination**	**15 Hours**

Composition, collection, preservation, gross examination, interfering factors, chemical examination. Significance of sugar in urine, protein, ketone bodies in urine, bile pigments, hematuria. Creatinine/protein ratio, 24 hour urine. Pregnancy test & interpretation.

Specimen collection - inspection of faeces- odour, pH, Interfering substance. Test for occult blood, faecal fat.

Unit-III	**Clinical Hematology & Blood Banking**	**15 Hours**

Collection of Blood, Anticoagulant, preservation, Estimation of Hb, PCV, WBC, RBC, Platelets, ESR. Clotting time, bleeding time - normal value, clinical interpretation. Anemia, types of anemia- Morphological, Etiological. Blood grouping- ABO system, Rh typing, Blood transfusion, cross matching, blood transfusion and its complications.

Unit-IV	**CSF and Other body fluids**	**15 Hours**

Cerebrospinal fluid and amniotic fluid, semen analysis, sputum examination – Interpretation.

Unit-V	**Medical microbiology**	**15 Hours**

Culturing of organisms from various specimens. Culture media and antibiotic sensitivity test (pus, urine, Stool, sputum, throat swab, gram staining, Zielh –Neilson staining (TB, Lpra bacilli). Safety procedure in microbiological techniques.

Books for Study:

1. Text book of Medical Biochemistry- Dinesh Puri, 4th edition, Jayppe publications, 2018.
2. Medical Laboratory Technology - L. Mukherjee. Vol. I, II, III, 3rd Edition, Tata Mc Graw Hill Publishing Company Limited, 2017.
3. Textbook of Medical Biochemistry- MN Chatterjea, Rana Shinde, 8th edition, Jaypee Brothers Medical Publishers (P) Ltd, 2011.
4. Essentials of Medical Physiology. K Sembulingam, Prema Sembulingam. 8th Edition. Jaypee Publications, 2019.

Books for Reference:

1. Text book of Medical laboratory technology- Ramnik Sood, 2nd edition, Jaypee publications, 2015.
2. Medical laboratory science theory and practice- Ochei J and Kolhatkar A, 3nd Edition, Mc Graw Hill Educations, 2000.
3. Microbiology – L.M. Prescott, J.P. Harley and D.A. Klein, 6th edition, McGraw Hill, 2004.
4. Fundamentals of Clinical Chemistry and Molecular Diagnosis- Teitz, 7th edition, Elsevier, 2007.

SEMESTER V

Course Code	Course Title	P	T	C
U8BIPR51	PRACTICAL V - COLORIMETRIC ANALYSIS AND ELECTROPHORESIS	4	2	2

Instructional Objectives

1. To understand the principles, protocol and calculation of each experiment.
2. They should know the preparation of all the reagents. Estimation should be done individually.

LIST OF EXPERIMENTS

COLORIMETRY

1. Estimation of Creatinine by Jaffe's method.
2. Estimation of Urea by DAM method.
3. Estimation of Protein by Lowry's method.
4. Estimation of Glucose by OT method.
5. Estimation of Glucose by Folin Wu's method.
6. Estimation of Cholesterol by Zak's method.

ELECTROPHORESIS

1. Separation of protein by SDS-PAGE.
2. Separation of DNA by AGE.

AUTOMATION IN BIOCHEMISTRY

1. Estimation of biochemical parameters using fully automated analyser- Demo

Books for Study:

1. Medical Laboratory Technology - L. Mukherjee. Vol. I, II, III, 3rd Edition, Tata Mc Graw Hill Publishing Company Limited, 2017.

Books for Reference:

1. Practical Clinical Biochemistry- H. Varley, 5th edition, WH Medical Books Ltd, 2002.
2. Medical laboratory science theory and practice- Ochei J and Kolhatkar A, 3nd Edition, Mc Graw Hill Educations, 2000.
3. Laboratory Manual in Biochemistry- J. Jayaraman, Wiley Eastern Limited, 1981.

SEMESTER V

Course Code	Course Title	P	T	C
U8BIPR52	MEDICAL LABORATORY TECHNOLOGY PRACTICAL-I	4	2	2

Instructional Objectives

1. To understand the principles, protocol and calculation of each experiment.
2. They should know the preparation of all the reagents. Estimation should be done individually.

LIST OF EXPERIMENTS

HAEMATOLOGY

1. Determination of blood grouping.
2. Estimation of hemoglobin by Shali's method.
3. Determination of total RBC count.
4. Determination of total WBC count.
5. Differential WBC count.
6. Determination of PCV.
7. Determination of haematocrit.
8. Determination of ESR.
9. Determination of clotting time.
10. Determination of bleeding time.

CELL COUNTER

1. Determination of some haematological parameters using cell counter- demonstration.

Books for Study:

1. Medical Laboratory Technology - L. Mukherjee. Vol. I, II, III, 3rd Edition, Tata Mc Graw Hill Publishing Company Limited, 2017.

Books for Reference:

1. Practical Clinical Biochemistry- H. Varley, 5th edition, WH Medical Books Ltd, 2002.
2. Medical laboratory science theory and practice- Ochei J and Kolhatkar A, 3nd Edition, Mc Graw Hill Educations, 2000.
3. Laboratory Manual in Biochemistry- J. Jayaraman, Wiley Eastern Limited, 1981.

SEMESTER V

Course Code	Course Title	L	T	C
U8BISB51	**BIOTECHNOLOGY – I**	**2**	**1**	**1**

Instructional Objectives

1.To understand the tools, and techniques of genetic engineering.

2. To study the applications of genetic engineering

Unit-I	GENETIC ENGENEERING ENZYMOLOGY	6 Hours

Biotechnology- definition and scope: types and branches of biotechnology. Genetic engineering tools – brief account of restriction endo nucleases, exonuclease, SI nucleases, DNA ligases, alkaline phosphatase, reverse transcriptase, DNA polymerase, poly nucleotide kinase, and terminal nucleotide transferase. Uses of linkers and adapters in genetic engineering.

Unit-II	VECTORS	6 Hours

Cloning vectors: Plasmid (PBR322, PUC19), Phage (Phage λ), Cosmid, Yeast artificial chromosome, Shuttle vector and Expression vectors.

Unit-III	GENE TRANSFER METHODS	6 Hours

Methods of gene transfer – calcium chloride transformation, , electroporation, micro injection, Biolistics, Episome fusion

Unit-IV	SCREENING METHODS	6 Hours

Method for screening – insertional inactivation, Blue white selection. Gene amplification by PCR- Application**.**

Unit-V	RECOMBINANT MOLECULE PRODUCTION	6 Hours

Genetic engineering for human welfare – production of insulin, Tissue plasminogen activator (TPA)

Books for Study:

1. Biotechnology – U. Satyanarayana,12th Edition Books and Allied Limited, 2018.

2. A text book of Biotechnology – R. C. Dubey, 4th Edition S. Chand & co, 2006.

3. Elements of Biotechnology - P.K.Gupta 2nd Edition Rastogi publication, New Delhi, 2016.

Books for Reference:

1. Recombinant DNA - James D. Watson, 3rd Edition Freeman W H &Company, 2006.

2. Recombinant DNA – genes and genomes-a short course James D. Watson, Richard M Meyers, Amy A Caudy, Jan A Witkowski, 3rd Edition, Cold Spring Harbor Laboratory Press &Company 2007.

3.Molecular biotechnology – principle and application of recombinant DNA Bernard, R. Glick Jack, J. Pasternak, 5th edition, Library of Congress cataloging in publication data,2013.

SEMESTER VI

Course Code	Course Title	L	T	C
U8BI6001	METABOLISM	5	1	5

Instructional Objectives

1. To understand the various metabolic pathways.
2. To understand metabolism of carbohydrates, lipids, amino acids and nucleotides.

Unit-I	METABOLISM & RESPIRATORY CHAIN	15 Hours

Metabolic pathways, anabolism, catabolism, amphibolism. High energy compounds, structure and role of ATP, cAMP, GTP. Respiratory chain, oxidative phosphorylation and substrate level phosphorylation.

Unit-II	METABOLISM OF CARBOHYDRATES	15 Hours

Glycolysis, oxidation of pyruvate, TCA cycle, Gluconeogenesis, HMP shunt, Glycogenesis, Glycogenolysis (key enzymes and regulation).

Unit-III	METABOLISM OF LIPIDS	15 Hours

Biosynthesis of fatty acids. FAS complex. Biosynthesis of cholesterol & their regulation. Activation of fatty acids for oxidation. Degradation of fatty acids by β-oxidation. Ketogenesis.

Unit-IV	METABOLISM OF AMINO ACIDS	15 Hours

Oxidative & non-oxidative deamination, decarboxylations and transamination of amino acids. Urea cycle, biosynthesis of creatine & creatinine. Disposal of ammonia- Ammonotelic, ureotelic, uricotelic organisms.

Unit-V	METABOLISM OF NUCLEOTIDES	15 Hours

Biosynthesis of purine and pyrimidine nucleotides (both *de novo* and salvage pathways). Degradation of purine and pyrimidine nucleotides.

Books for Study:

1. Harper's Illustrated Biochemistry – RK. Murray, et al, 31st Edition, Mc GrawHill, 2018.
2. Biochemistry- U Satyanarayan and U Chakarapani 5th edition, Books and Allied (P), Ltd. 2019.
3. Textbook of Biochemistry For Medical Students- DM. Vasudevan, S. Sreekumari, 9th edition, Jaypee Brothers Medical Publishers (P) Ltd, 2019.
4. Textbook of Medical Biochemistry- MN Chatterjea, Rana Shinde, 8th edition, Jaypee Brothers Medical Publishers (P) Ltd, 2011.

Books for Reference:

1. Biochemistry- D. Voet, J.G. Voet, 4th edition, John Wiley & Sons.

2. Fundamentals of Biochemistry- D.Voet, J.G.Voet, C.W. Pratt, 5th edition, Wiley 2016.

3. Lehninger Principles of Biochemistry- D.L. Nelson and M.M. Cox, 7th Illustrated edition 2017, Macmillan Worth Publishers.

SEMESTER VI

Course Code	Course Title	L	T	C
U8BI6002	CLINICAL BIOCHEMISTRY	5	1	5

Instructional Objectives

1.To understand the basic concepts of clinical biochemistry, diseases related to metabolism, organ function test and importance of enzymes in diagnosis.

Unit-I	BASIC CONCEPTS OF CLINICAL BIOCHEMISTRY	15 Hours

A brief review of units and abbreviations used in expressing concentrations and standard solutions. Biochemical analytes and their normal ranges. Specimen collection and processing (Blood, urine, faeces). Anti-coagulant preservatives for blood and urine. Transport of specimens.

Unit-II	DISEASES RELATED TO CARBOHYDRATE AND LIPID METABOLISM	15 Hours

Regulation of blood sugar, Glycosuria - types of glycosuria. Oral glucose tolerance test in normal and diabetic condition. HbA_{1C}, Diabetes mellitus and Diabetic insipidus – hypoglycemia hyperglycemia and its treatment. Ketonemia, Ketonuria, diabetic ketosis. Complications, treatment and management of Diabetes mellitus.

Unit-III	INBORN ERRORS OF METABOLISM	15 Hours

Introduction - clinical importance, phenylketonuria, cystinuria, alkaptonuria, Fanconi's syndrome, galactosemia, albinism, tyrosinemia, and hemophilia.

Unit-IV	ORGAN FUNCTION TEST	15 Hours

Renal function test: Clearance test (Urea, Creatinine, Inulin), PAH test, Concentration and dilution test.

Gastric function test: Collection of gastric contents, examination of gastric residuum, FTM, stimulation test, tubeless gastric analysis. Liver function test: jaundice - types, differential diagnosis. Icteric index, Vandenberg test, Plasma protein changes, Prothrombin Time.

Unit-V	CLINICAL ENZYMOLOGY	15 Hours

Functional and non- Functional plasma enzymes. Isoenzymes with examples. Enzyme patterns in acute pancreatitis, liver damage, bone disorder, myocardial infarction and muscle wasting.

Books for Study:

1. Textbook of Biochemistry For Medical Students- DM. Vasudevan, S. Sreekumari, 9th edition, Jaypee Brothers Medical Publishers (P) Ltd, 2019.
2. Textbook of Medical Biochemistry- MN Chatterjea, Rana Shinde, 8th edition, Jaypee Brothers Medical Publishers (P) Ltd, 2011
3. Clinical Chemistry- M.N. Chatterjee & R. Chawla, 2nd edition, Jaypee Brothers Medical Publishers (P) Ltd., 2010.

Books for Reference:

1. Text book of Clinical Biochemistry- Ramnik Sood, 2nd edition, CBS Publishers, 2019.
2. Text book of biochemistry with Clinical correlations, Devlin, 7th edition, A.John Wiley- Liss Inc. 2010.
3. Clinical chemistry in diagnosis and treatment - Philip D. Mayne, 6th edition. ELBS/Arnold, 1994.

SEMESTER VI

Course Code	Course Title	L	T	C
U8BI6003	IMMUNOLOGY	5	1	5

Instructional Objectives

1. To describe the mechanism of innate and acquired immunity.
2. To explain the principles of hypersensitivity and autoimmunity.
3. To enable students to understand how immune system can fight infections and diseases.
4. To describe the molecular basis of immune responses.
5. To describe how immune deficiencies are related to diseases.
6. To explain principles of vaccination and inflammation.

Unit-I	INTRODUCTION & ORGANIZATION OF IMMUNE SYSTEM	15 Hours

Introduction to immunology: Primary and secondary Lymphoid organs, Types of Immunity (Innate and acquired immunity), Innate immunity – mechanical factors, chemical factors, biological factors, and other factors. Cells of immunity – NK cells, LAK, Macrophages, Neutrophils and Eosinophils. Determinants of innate immunity. Acquired immunity – humoral and cell mediated**.**

Unit-II	ANTIGEN & ANTIBODIES	15 Hours

Antigens: Definition, criteria for antigenicity, Epitope, Haptens. Classification of antigen based on chemical nature, mode of action, and antigenic determinant. Antibodies: Paratope, Basic Structure, Classes, Subclasses of Immunoglobins, biological functions.

Unit-III	COMPLEMENT SYSTEM	15 Hours

Complement: Definition, components, activation, pathways of activation – Classical and Alternative pathway. Biological activities of complement components. Deficiency of complement system. Transplantation- graft and its types, mechanism of allograft rejection.

Unit-IV	HYPERSENSITIVITY	15 Hours

Hypersensitivity – types (anaphylactic, antibody dependent cytotoxic, immune complex mediated, cell mediated delayed hypersensitivity) - definitions, mechanisms. Grave's disease.

Unit-V	IMMUNOLOGICAL TEST	15 Hours

Antigen Antibody Reaction, Agglutination, Precipitation, Complement fixation test, immuno assays using labelled reagents- immunofluorescence, ELISA, RIA. Commonly used immunological test – Widal test, VDRL, Hepatitis B, Rheumatoid Arthritis.

Books for Study:

1. Clinical Immunology Principle and practice- Robert R Rich, 5th edition, Elsevier, 2018.
2. Immunology- SR Ramesh, Mc Graw Hill Publications, 2017.
3. Cellular and Molecular Immunology- Abul Abbas, Andrew H. Lichtman, 1st edition, Elsevier, 2017.
4. BIOS Instant notes in Immunology- Lydyard, Whelan, Fanger, 3rd edition, Taylor & Francis, 2011.
5. Immunology- A Short Textbook- Md Akram Hussain, 4th edition, Jaypee Brothers Medical Publishers (P) Ltd., 2008.

Books for Reference:

1. Immunology- Kuby Richard: Jenni Punt, Sharon Stranford, Patricia Jones, 8th edition, W.H. Freeman and Company, New York, 2018.

2. Essential Immunology- SK Gupta, Arya Publishers, 2017.

3. Basic and Clinical Immunology- Stites, Stobo, Fundanberg and Wells, 6th edition, Los Atlas Lange, 1990.

4. Immunology- Janeway, Paul Travels, 4th edition, Black well Scientific Publishers, 1994.

SEMESTER VI

Course Code	Course Title	L	T	C
U8BI6004	**NUTRITIONAL BIOCHEMISTRY & DIETETICS**	**5**	**1**	**5**

Instructional Objectives

1. To understand the importance of food in health
2. To study disease management with help of diet

Unit-I	**INTRODUCTION TO NUTRITION**	**15 Hours**

Definition of foods and nutrition. Functions of food and its relation to nutritional and clinical health, Basic food groups: Energy giving foods, body building foods and protective foods. Essential nutrients, RDA for average Indian, analysis of food composition, food habits, food fads and fallacies.

Unit-II	**NUTRITIVE AND CALORIFIC VALUE OF FOOD**	**15 Hours**

Definition and unit of energy – Kcal. Estimation of energy of food stuffs by Bomb calorimeter, calorific, physiological value and RQ of food stuffs. Body mass index (BMI), Basic metabolic rate (BMR), its measurements and influencing factors, SDA of food. Nutritive value of protein, essential amino acids.

Unit-III	**BALANCED DIET FORMULATION**	**15 Hours**

Assessment of nutritional status. Nutrition at various stages of growth and development: Diets for infants. Children, adolescent, pregnant women, lactating mothers and older persons. RDA for average Indian. Protein nutritional Nitrogen balance, quality of food proteins and requirements. Protein malnutrition (Kwashiorkor) and under nutrition (marasmus) and their preventive, curative measures.

Unit-IV	**DISEASE MANAGEMENT WITH DIET**	**15 Hours**

Nutritional therapy during Obesity, diabetes, anemia, constipation, high blood pressure and atherosclerosis. Vitamin deficiency diseases.

Unit-V	**FOOD HYGIENE AND HEALTH**	**15 Hours**

Food spoilage. Food preservation- methods (freezing, pasteurization, blanching, canning). Food adulteration- Types of adulterants (intentional and incidental). Food additives – preservatives, food colours.

Books for Study:

1. Food Science – B. Srilakshmi, 6th edition, New Age International Publishers, 2018.
2. Essential of Food and Nutrition –M.S. Swaminathan, 2nd edition, Bangalore print and publication, 1985.
2. Food and Nutrition – facts and figures- L.C.Gupta, Kusum Gupta and Abhishek Gupta, 6th edition, Jaypee publishers 2006.
3. Human Nutrition and Dietetics - Davidson and Passamore, Eastwood 8th edition alpha 2 omega books, UK, 1986.

Books for Reference:
1. Food science and Nutrition – Sunetra Roday1st edition,Oxford Publication, 2012.
2. Modern nutrition in health and disease –A.catharine Ross et al., 11th edition, Lippincott publication, 2012.
3. Modern nutrition in health and disease –Maurice. E. Shills et al., 10th edition, Lippincott publication, 2006.
4. Clinical dietetics and nutrition - E.P. Antia.1st edition QUP India Publisher, 1998.
5. Normal and therapeutic nutrition - Corinne H Robinson Marilyn R Lawler et al ., 1st edition Mac Millan USA Publisher, 1990
6. Foundation of normal and therapeutic nutrition –T. Randall Lankford et al., 1st edition Willey Medical publication, 1986.

SEMESTER - VI

Course Code	Course Title	P	T	C
U8BIPR61	PRACTICAL VII - ENZYMOLOGY AND CHROMATOGRAPHY	4	2	2

Instructional Objectives

1. To understand the principles of enzyme assays their clinical significance.
2. To understand the basic principles of paper, thin layer and column chromatography.
3. They should know the preparations of the entire reagent. Estimations should be done individually.

LIST OF EXPERIMENTS

ENZYME ASSAYS

1. Effect of pH on salivary amylase.
2. Effect of temperature on salivary amylase.
3. Effect of substrate concentration on salivary amylase.
4. Assay of activity of alkaline phosphatase in serum.
5. Assay of serum Aspartate Transaminases (SGOT).
6. Assay of serum Alanine Transaminase (SGPT).

CHROMATOGRAPHIC TECHNIQUES

1. Separation and detection of amino acids by Paper chromatography.

2. Separation and detection of sugars by Paper chromatography.

3. Separation of plant pigments by column chromatography.

4. Separation of amino acids by thin layer chromatography.

Books for Study:

1. Medical Laboratory Technology - L. Mukherjee. Vol. I, II, III, 3rd Edition, Tata Mc Graw Hill Publishing Company Limited, 2017.

Books for Reference:

1. Practical Clinical Biochemistry- H. Varley, 5th edition, WH Medical Books Ltd, 2002.
2. Medical laboratory science theory and practice- Ochei J and Kolhatkar A, 3nd Edition, Mc Graw Hill Educations, 2000.
3. Laboratory Manual in Biochemistry- J. Jayaraman, Wiley Eastern Limited, 1981.

SEMESTER - VI

Course Code	Course Title	P	T	C
U8BIPR62	**MEDICAL LABORATORY TECHNOLOGY PRACTICAL-II**	**4**	**2**	**2**

Instructional Objectives

1. To understand the basic concepts related to microbial culture, staining and testing for antibiotic sensitivity.
2. To understand the collection and analysis of urine under normal and pathological conditions.

LIST OF EXPERIMENTS

MICROBIOLOGY

1. Sterilization of media.
2. Microbial culture.
3. Gram staining.
4. Antibiotic sensitivity testing.

URINE ANALYSIS

1. Collection and preservation of urine samples.
2. Qualitative analysis of urine for normal and pathological conditions.

URINE ANALYSER

1. Qualitative analysis of urine for normal and pathological conditions using urine analyser- demonstration.

Books for Study:

1. Medical Laboratory Technology - L. Mukherjee. Vol. I, II, III, 3rd Edition, Tata Mc Graw Hill Publishing Company Limited, 2017.

Books for Reference:

1. Practical Clinical Biochemistry- H. Varley, 5th edition, WH Medical Books Ltd, 2002.
2. Medical laboratory science theory and practice- Ochei J and Kolhatkar A, 3nd Edition, Mc Graw Hill Educations, 2000.
3. Laboratory Manual in Biochemistry- J. Jayaraman, Wiley Eastern Limited, 1981.

SEMESTER VI

Course Code	Course Title	L	T	C
U8BISB61	BIOTECHNOLOGY – II	2	1	1

Instructional Objectives

1. To study about plant and animal tissue culture and its application
2. To understand production and application of transgenic plants and transgenic animals

Unit-I	TISSUE CULTURE EQUIPMENTS	6 Hours

Equipment and requirements for plant & animal cell culture - laminar flow, CO_2 incubator, sterilization of glassware, shakers, fermentors, centrifuge, inverted microscope, culture room.

Risks in tissue culture laboratory and safety regulations.		
Unit-II	**PLANT TISSUE CULTURE**	**6 Hours**
Plant tissue culture – Totipotency, explants, callus, Dedifferentiation, Media, composition, nutrients, growth regulators, initiation. Explants culture, Callus culture, organogenesis, root, shoot culture and suspension culture, somatic embryogenesis, somoclonal variation protoplast culture.		
Unit-III	**MAMMALIAN CELL CULTURE**	**6 Hours**
Mammalian cell culture – cell line, cell viability, media – natural media, pH and buffer system, oxygen, synthetic media, substrate for cell culture, composition of nutrients. Suspension culture, Immobilized culture, somatic cell fusion.		
Unit-IV	**TRANSGENIC PLANTS**	**6 Hours**
Transgenic Plants-Gene transfer method using agro bacterium, Herbicide resistant, virus resistant, insect resistant, stress resistant, disease resistant plant.		
Unit-V	**TRANSGENIC ANIMALS**	**6 Hours**
Transgenic animals –Gene transfer -Transfection method, transgenic sheep, transgenic fish, transgenic cattle, Dolly.		
Books for Study: **1.** Biotechnology – U. Satyanarayana, 12th Edition Books and Allied Limited, 2018. 2. A text book of Biotechnology – R. C. Dubey, 4th Edition S. Chand & co, 2006. 3. Elements of Biotechnology - P.K.Gupta 2nd Edition Rastogi publication, New Delhi, 2016.		
Books for Reference: 1. Recombinant DNA - James D. Watson, 3rd Edition Freeman W H &Company, 2006. **2.** Recombinant DNA – genes and genomes-a short course James D. Watson, Richard M Meyers, Amy A Caudy, Jan A Witkowski, 3rd Edition, Cold Spring Harbor Laboratory Press &Company 2007. **3.**Molecular biotechnology – principle and application of recombinant DNA Bernard, R. Glick Jack, J. Pasternak, 5th edition, Library of Congress cataloging in publication data, 2013.		

DEPARTMENT OF BIOTECHNOLOGY
COURSE OUTCOMES
FOR SEMESTERS V & VI

Semester V	
Course Title	**Course Outcomes**
Industrial Biotechnology	To understand the process and application of biotechnology for the production of bioproducts of commercial importance at industrial scale.
Medical Biotechnology	To impart the knowledge of biotechnological advancement in

	treating infectious and genetic diseases.
r-DNA Technology	To develop the skills of tools and techniques of r-DNA technology to ensure employability in bio industries.
Bioinformatics	To give an insight into the applications of bioinformatics tools in Biotechnology and related fields.
Industrial & Medical Biotechnology Practical V	To gain the knowledge of isolation of plant products and microbial fermentation technique
r-DNA& Bioinformatics Practical VI	To get familiar in DNA sequencing analysis.
Basic Endocrinology	To gain factual knowledge (terminology, classifications and mechanisms of actions of hormones)
Semester VI	
Course Title	**Course Outcomes**
Environmental Biotechnology	To educate the students on types, impacts and control of pollution.
Aquaculture Biotechnology	To acquaint with the state of the art techniques in biotechnology as applied to aquaculture industry.
Animal Biotechnology	To familiarize the cell culture techniques, Gene transfer method, Genetic modification and application.
Plant Biotechnology	To implement the principles and techniques involved in plant tissue culture.
Environmental & Aquaculture Biotechnology Practical VII	To make the students to analysis water quality parameters and also to get training in aquaculture practices.
Plant & Animal Biotechnology Practical VIII	To train the students to culture both plant and animal cells.
Nano Biotechnology	To receive job opportunities in Research organization and industries

SEMESTER V

Course Code	**Course Title**	**L**	**T**	**C**
U8BT5001	**INDUSTRIAL BIOTECHNOLOGY**	**5**	**2**	**5**
Instructional Objectives:				
1. To understand the process and application of biotechnology for the production of bioproducts of commercial importance at industrial scale.				
2. To move science from the laboratory to society				
3. ***To understand risks and regulations of industrially important bioproducts.***				
Unit-I	**Fermentation Technology**		**15 Hours**	

Fermentation process: Definition – Stages of fermentation – Selection of Microorganisms - Microbial strain improvement – Components of Medium – Sterilization - Fermentation products.

Unit-II	Bioreactor and Microbial growth	15 Hours

Types & operation of Bioreactors, physico-chemical standards and its limitations for bioreactors - Introduction of microbial growth, the ways of growing microorganisms, optimization of parameters - Batch, fed-batch and continuous culture – Fundamentals of Upstream and Downstream process.

Unit-III	Industrial Production	15 Hours

Microbial production of alcohol (ethanol), acids (citric acid), solvents (Acetone), antibiotics (Penicillin), amino acids (Glutamic acid), Enzymes (Protease) and Vitamins (B12).

Unit-IV	Microorganisms & Agriculture	15 Hours

Microorganisms in Agriculture - Microbial pesticide, Biofertilizer, SCP, BGA and Mushroom cultivation – Genetically Modified plants - Bt cotton, Bt Brinjal.

Unit-V	Advances in Industrial Biotechnology	15 Hours

Bioethanol – Biodiesel – Biosensors – Biochips – Biogas – Biohydrogen- Pre-biotics – probiotics –Bioleaching – immobilization of enzymes.

Books for Study:

1. Biotechnology, Satyanarayana, U., 2006. Books and Allied (P) Ltd.
2. Industrial Microbiology, Reed C., Prescott and Dann's, 1982. Macmillan publishers.

Books for Reference:

1. Manual of industrial microbiology and Biotechnology, Demain A.L. Solomon, J.J., 1986. ASM press.
2. Fundamentals of Biotechnology, Prave. P. Faust, V. Sitih. W., Sukatsh, DA, 1987.ASM press.
3. AN introduction to Genetic Engineering, Desmond, S.T., Nicholl, 1994.Cambridge press.
4. Principles of Gene Manipulation. 4th edition, Old R.W. and S.B. Primrose, 1994.Blackwell scientific publication London.
5. Fundamentals of Biotechnology, P.Prave, P.Faust, V. Sitting, word sukatasch D., 1987. VCH verlasgetell Schafor MBH, Weinhkeim.

SEMESTER V

Course Code	Course Title	L	T	C
U8BT5002	MEDICAL BIOTECHNOLOGY	5	2	5

Instructional Objectives:

1. ***To impart the knowledge of biotechnological advancement in treating infectious and genetic diseases.***
2. ***To impart the principles involved in preparation of antibodies and vaccines and to understand the various techniques and advancements of biotechnology in the field of***

medicine.

Unit-I	Introduction	15 Hours

Introduction to human physiology - Organ structure and function of Respiratory, Circulatory- Digestive –Excretory-Nervous and Reproductive Systems.

Unit-II	Microbial Diseases and Diagnosis	15 Hours

Infectious diseases caused by microbes- bacterial (TB), viral (AIDS), fungal (Dermatitis) and protozoan (Malaria) disease, diagnosis, control and treatment - molecular diagnosis of infectious diseases (Malaria, TB, AIDS).

Unit-III	Genetic diseases and Diagnosis	15 Hours

Introduction and Molecular diagnosis of Sickle cell Anemia, Alzheimer's disease, Cancer, Diabetes, Obesity – DNA finger printing.

Unit-IV	Monoclonal antibody and Vaccines Production	15 Hours

Hybridoma technology–Production of monoclonal antibodies - Advantage and limitations of monoclonal antibody production - Methods involved in the production of Recombinant vaccines – vaccines for hepatitis B, polio virus, small pox virus, malaria vaccines, Tuberculosis and AIDS.

Unit-V	Hematology	15 Hours

Blood and its composition - ESR - Hb – Anemia and Leukemia - Artificial blood, blood component based therapy.

Books for Study:

1. A text book of biotechnology, Satyanarayana U 2017. 12th Edition.
2. Text book of Biotechnology, R. C. Dubey 2008.
3. Medical biotechnology, S.N Jogdand, Himalaya publishing house, 2005.
4. Trends in Biotechnology, Ramasamy, P.2002. University of Madras, Pearl press.

Books for Reference:

1. Medical microbiology, Mims Play fair Roitt, wekelin Williams 2009.
2. Medical Physiology, Guyton and Hall- 1996.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8BT5003	r - DNA technology	5	2	5

Instructional objectives:

1. ***To demonstrate the basic techniques involved in recombinant DNA manipulations.***
2. ***To list out tools used for gene exploration.***
3. ***To gain the knowledge to create a genomic library.***
4. *To recall about biotechnological applications of r DNA technology.*

Unit-I	Introduction to r-DNA technology:	15 Hours

History, scope and recent developments in Genetic Engineering - Concept and basic steps in Recombinant DNA technology - Isolation of Gene of gene of interest – Amplification Using PCR - Restriction Digestion - DNA purification - Ligation of DNA Molecules – Bacterial Transformation – Screening of recombinants – Down streaming of r-DNA Product.

Unit-II	Tools of r - DNA technology – I	15 Hours

Vectors: Cloning Vectors- Definition and Properties - Plasmid vectors – pBR322 and pUC18 – lambda phage - M13 based vectors – Cosmids - Shuttle vectors – BACs – YACs - MACs - Expression vectors for Prokaryotes & Eukaryotes

Unit-III	Tools of r DNA technology – II	15 Hours

Enzymes: Terminal deoxynucleotidyl transferase - T4 Polynucleotide kinases & Alkaline phosphatases - DNA dependent RNA polymerases - DNA ligases and DNA polymerases - Thermostable DNA polymerases used in PCR - reverse transcriptases - restriction enzymes - exonuclease III - BAL31 - S1 nuclease.

Unit-**IV**	**Gene Transfer technology** and DNA typing	15 Hours

Transformation – transduction – Southern, Northern blotting techniques, Chromosome walking and jumping. DNA fingerprinting by AFLP, RFLP and RAPD.

Unit-**V**	**Biotechnological applications of r-DNA technology**	15 Hours

Therapeutic r-DNA products - insulin, growth hormones, alpha interferon, Hepatitis B vaccine and Factor VIII - Gene therapy - Ex vivo & In vivo.

Books for study:

1. Satyanarayana. U, 2008. Biotechnology, Books and Allied (P) Ltd.
2. Dubey. R.C. A Text Book of Biotechnology. S. Chand & Co Ltd, New Delhi.
3. Abdul Jaffar Ali H (2018). DNA barcoding: Methods and Protocol, New Centaury Book House, Chennai.

Course Code	Course Title	L	T	C
U8BT5004	BIOINFORMATICS	5	2	5

Instructional Objectives:

1. ***To make the learner to understand the basics of Computer and Internet***
2. ***To use the Bioinformatics Search Engine tools.***
3. ***To give an insight into the applications of biological software's in Biotechnology and related fields.***

Unit-I	Introduction to Computers	15 Hours

History of Computer (First, Second, Third, Fourth and Fifth Generation) – Programming Languages, Machine Language, Assembly Language.

Unit-II	Internet	15 Hours

http – www – search engines – data mining – data retrival - IP address - hyperlinks and URLs - Internet access - Internet service providers (ISPs) - Hotspots - Wi-Fi - File Transfer Protocol -Malware.

Unit-III	Computer networking	15 Hours

Network topologies and protocols, Networking gadgets, Data communication (ISDN, DSI, cable modem etc.), Network security (Firewall, Packet filtering etc.) Local Area Network (LAN), Wide Area Network (WAN), Metropolitan Area Network (MAN).

Unit-IV	Bioinformatics	15 Hours

Definition, Scope and applications, Bioinformatics companies, areas of research. Sequence and structure databases: EMBL, DDBJ, GenBank, PIR, SWISSPROT, CSD, PDB, NCBI, EXPASY.

Unit-V	Sequence analysis	15 Hours

Sequence alignment, pairwise and multiple sequence alignment, local and global alignment, BLAST, FASTA, CLUSTALW. Introduction to Medline, Pubmed, OMIM. Genomics and Proteomics-Basic concepts, Data mining, ENTREZ and SRS.

Books for Study:

1. Fundamentals of computers science and Communication Engineering. Alexis Leon & Mathews Leon, Vikas Publishing House Pvt. Ltd., New Delhi
2. Basic Bioinformatics – S.Ignacimuthu (2005). Narosa Publishing House
3. Bioinformatics for Beginners – K.Mani and Vijayaraj (2002). Kalaikathir Achagam
4. Fundamentals of Bioinformatics – Irfan Ali Khan, Atiya Khanum (2003). Ukaaz publications.

Books for Reference:

1. Introduction to Bioinformatics, Arthur Lesk, 2002. Oxford University Press.
2. Bioinformatics Basics. Applications in Biological Science and Medicine by Hooman H. Rashidi and Lukas K.Buehler CAC Press 2000.
3. Introduction to Bioinformatics, Attwood T.K. and Parry Smith D.J. 2002. Pearson Education Asia.
4. J.D. Watson, M. Gilman, J. Witowski and Mark Zoller (1992). *Recombinant DNA.* Scientific American Books
5. Winnacker, E.L. (1987). From Genes to Clones: Introduction to gene technology

P- Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	P	T	C
U8BTPR51	INDUSTRIAL & MEDICAL BIOTECHNOLOGY PRACTICAL V	4	3	2

Instructional Objective:
To provide an opportunity to experimentally verify the theoretical concepts on industrial and Medical Biotechnology.

INDUSTRIAL BIOTECHNOLOGY

1. Determination of bacterial growth curve
2. Immobilization of yeast cells
3. Wine production using Fermentor
4. Compound separation using TLC
5. Isolation of plant pigment by column chromatography (Demo).
6. Industrial visit.

MEDICAL BIOTECHNOLOGY

1. Estimation of blood glucose level
2. WIDAL Test
3. ELISA test
4. PCR based detection of disease (Any one)
5. Hospital visit.

Books for Study:

1. Handbook of Medical Laboratory Technology by V.H. Talib 2008. CBS Publishers.
2. Medical biotechnology- S.N Jogdand, Himalaya publishing house, 2005.

Books for Reference:

1. Medical microbiology by Mims Play fair Roitt, wekelin Williams 2009.
2. Medical Physiology by Guyton and Hall- 1996.

P- Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	P	T	C
U8BTPR52	r - DNA & BIOINFORMATICS PRACTICAL VI	4	2	2

Instructional objectives:

1. *To get familiar in the basic techniques involved in recombinant DNA manipulations.*
2. *To develop skill in application of bioinformatics tools.*

r -DNA TECHNOLOGY

1. PCR Amplification
2. Isolation of plasmid vector
3. Restriction Digestion
4. DNA Ligation
5. SDS PAGE

BIOINFORMATICS

1. File Transformation – Email and upload / Download methods of file compression.
2. Sequence retrieval from NCBI (any gene of interest - insulin)
3. Conversion of gene sequence in FASTA format
4. Pair wise sequence alignment in BLAST
5. Multiple sequence alignment in BLAST
6. RASMOL, FASTA, SWISSPROT

Books for Reference:

1. Judith W. Zyskind and Sanford I. Bernstein, Recombinant DNA Laboratory Manual. Academic Press, 1989.
2. Basic Bioinformatics – S.Ignacimuthu (2005). Narosa Publishing House

P- Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Course Code	Course Title	L	T	C
U8BTSB51	**BASIC ENDOCRINOLOGY**	**2**	**1**	**1**

Instructional Objectives:

1. ***To understand basic reality about endocrine glands.***
2. ***To explain the roles of endocrine system in maintaining homeostasis.***
3. ***To know the mechanism of hormonal action on cells.***
4. ***To gain knowledge about disorders of hormonal secretion.***

Unit-I	Hypothalamus and Pituitary	6 Hours

Introduction – Hormones, classification, Hormonal receptors and mechanism of action. Hypothalamic and pituitary hormones.

Unit-II	Thyroid and Parathyroid	6 Hours

Structure - secretion and metabolic functions of thyroid and parathyroid - hypothyroidism and hyperthyroidism.

Unit-III	Pancreas and Diabetic Mellitus	6 Hours

Anatomy– secretion and metabolic function of pancreas – disorder of insulin - Diabetes mellitus – types and symptoms.

Unit-IV	Adrenal Cortex and Adrenal Medulla	6 Hours

Physiological structure – secretion and metabolic function of adrenal gland - Adrenal medullary hormones. – Disorders.

Unit-V	Reproductive Hormones	6 Hours

Structure of Testis – ovaries - sex hormones. – Role in reproductive activities and hormonal control.

Books for Study:

1. Text book of Endocrinology – R. H. Williams – (2009)
2. Harper's Biochemistry – Murray, Granner, Mayes and Rodwell.
3. Outlines of Animal Physiology – Prof. R. Parameswaran, Dr T N Ananthakrishnan and Dr. KS Ananthasubramantan - S Vishwanathan (Printers and Publishers), pvt ltd Chennai.
4. Text Book of Biochemistry For Medical Students, 2nd edition – Rafi MD, University Press.

Books for Reference:

1.Basic and Clinical Endocrinology – F.S. Greenspan & DG Gardner (2007)

2. Endocrinology; Hormones and Human Health – Prakash Loher (2014)

3.Medical Physiology – Guyton and Hall (2008)

P- Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8BT6001	ENVIRONMENTAL BIOTECHNOLOGY	5	2	5

Instructional Objectives:

1. ***To educate the students on pollution of water, air and soil, impacts of pollution and control measures.***
2. ***To understand science from the laboratory to society.***
3. ***To apply the regulations for betterment environmental pollution free society.***

Unit-I	Introduction to Environmental Biotechnology	15 Hours

Introduction, Scope of Environmental biotechnology. Pollution: types - water, air, soil, noise, Thermal – radiation - impact and control measures.

Unit-II	Bioremediation	15 Hours

Bioremediation oil spills, heavy metals & detergents in soil and water. Phyto and microbial remediation of pesticides & petroleum products.

Unit-III	Waste Water Treatments	15 Hours

Aerobic process: Activated sludge oxidation ponds, trickling filters rotating discs, oxidation ditch. Anaerobic process: Anaerobic digestion, Anaerobic filters, sludge blanket reactors, Treatment of industrial waste of dairy, distillery , tannery and sugar – Reverse Osmosis.

Unit-IV	Environmental Monitoring	15 Hours

Biosensors in environmental monitoring – Environmental significance of GMOs and its products – introduction to Eco management – Environment Impact Assessment – Introduction to Environment Protection Act, 1986.

Unit-V	Solid waste management	15 Hours

Sources, Transport, Disposal and management of biomedical waste. Municipal solid wastes – hazards and disposal.

Books for Study:

1. Murugesan AG and Rajakumari C. (2005). Environmental Science and Biotechnology: theory and Techniques.
2. Sharma PD. (1994). Environmental Biology, Rastogi Publications.
3. Eugenia J.Olguin. (2000). Environmental Biotechnology and cleaner Bioprocesses, Tayloir and Francis.

Books for Reference:

1. William P. Conningham and Mary Ann Conningham. (2003). Principle Environmental Science, Tata McGraw-Hill publishing Company.
2. Agarwall KV. (2005). Environmental Biotechnology, Nidhi Publishers.
3. Chatterji A.K. (2002). Introduction to Environmental Biotechnology, Prentice- Hall of India.
4. Jogdand SN.(2008).Environmental Biotechnology, 4th Edition, Himalaya Publishing House Pvt. Ltd.

5. Atlas and Bhartha. (2005). Microbial Ecology, Pearson Education.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8BT6002	**AQUACULTURE BIOTECHNOLOGY**	5	2	5

Instructional objectives:

1. ***To provide basic idea about the aquaculture and its types.***
2. ***To acquaint with the state of the art¬ techniques in biotechnology as applied to aquaculture industry.***
3. ***To have a basic understanding of live feed culture.***
4. ***To give basic idea about aqua culture and applications of biotechnology in aquaculture so that one can think of establishing aqua culture as a means for their future.***

Unit-I	**Basics of Aquaculture**	15 Hours

Definition, Significance and History of Aquaculture- Present status of Aquaculture at Global and National level - Major cultivable species for aquaculture: freshwater, brackish water and marine - Criteria for the selection of species for culture.

Unit-II	**Types of Aquaculture**	15 Hours

Freshwater, Brackish water and Marine - Concept of Monoculture, Polyculture, Composite culture, Integrated fish farming - Culture practices - extensive, semi-intensive and intensive – Biofloc fish and shrimp farming.

Unit-III	**Nutrition and feeds**	15 Hours

Nutritional requirements of a cultivable fish and shellfish - Natural food and Artificial feeds - Live feed culture technique – Artemia and daphnia - artificial feed formulation. Different types of probiotics. Use of probiotics and biofertilizers in aquaculture. Immunostimulants used in aquaculture

Unit-**IV**	**Fish cell lines**	15 Hours

Introduction to Fish cell culture – fish cell lines (brain, kidney, heart, liver, gill) - development of cell lines and their applications.

Unit-**V**	**Biotechnology applications in Aquaculture**	15 Hours

Chromosomal manipulations: Gynogenesis, androgenesis, polyploidy and Transgenesis.
Application of biotechnology in disease diagnosis using PCR; Gene probes. Use of PCR for the detection of white spot syndrome in shrimp.

Books for study:

1. Pillay TVR.1990. Aquaculture- Principles and Practices, Fishing News Books Ltd., London.
2. Santhanam R et al Coastal aquaculture CBS

Books for reference:

1. Jhingran V.G. 2007. Fish and Fisheries of India. Hindustan Publ. Corporation, India.
2. ICAR. 2006. Hand Book of Fisheries and Aquaculture. ICAR.
3. Bardach, JE et al. 1972. Aquaculture – The farming and husbandry of freshwater and marine organisms, John Wiley & Sons, New York.
4. Rath RK. 2000. Freshwater Aquaculture. Scientific Publ.
   Stickney, R.R., 2000. Encyclopedia of Aquaculture. John Wiley Sons Inc. pp. 1063.

P- Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8BT6003	ANIMAL BIOTECHNOLOGY	5	2	5

Instructional Objectives:

1. ***To familiarize the cell culture techniques, Gene transfer method.***
2. ***To impart the knowledge in production of transgenic animals and applications of animal cell culture.***

Unit-I	Introduction and laboratory requirements for animal cell culture	15 Hours

Structure and organization of animal cell. Culture media, Balance salt solutions and simple growth medium. Physical, chemical and metabolic function of different constituents of culture medium. Role of carbon di-oxide, serum, growth factor, glutamine in cell culture. Serum free defined media and their application. Sterile handling area. Sterilization of different materials used in animal cell culture, Aseptic concepts.

Unit-II	Animal Cell culture technique	15 Hours

Introduction to cell culture. Different types of cell cultures - Continuous cell lines, Suspension culture and organ culture. Development of cell lines, Trypsinization Cell separation, Characterization and maintenance of cell lines, stem cells, Cryopreservation, Common cell culture contaminants.

Unit-III	Gene transfer methods in animals	15 Hours

Microinjection, embryonic stem cell, retro virus. Conservation biology – embryo transfer technique, animal propagation – artificial insemination. Stem cells – basics of stem cell. ASC, ESC – applications. Animal cell bioreactor.

Unit-IV	**Transgenic animals**	**15 Hours**
Introduction - production and application of Transgenic animals –livestock improvement, transgenic animals as model for human disease.		
Unit-V	**Applications of animal cell culture**	**15 Hours**
Gene therapy, types, vectors. Molecular engineering, human genetic engineering, problems and ethics. Application of animal cell culture for *in vitro* testing of drugs; Application of cell culture technology in production of human and animal viral vaccines and pharmaceutical proteins.		
Books for Study: **1.** A text book of biotechnology, Satyanarayana U 2017. 12th Edition. **2.** Animal Biotechnology, Varun Mehta 2009. **3.** Animal Biotechnology, Ranga M M 2007. 3rd Edition. **4.** Animal Biotechnology, Ramadas P 2002. 2nd Edition.		
Books for Reference: **1.** Animal cell culture, Freshney, R.I. 2010. Fifth edition, Wiley Publishers. **2.** Animal Cell culture, Masters J.R.W. 2000. Oxford University Press.		

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8BT6004	PLANT BIOTECHNOLOGY	5	2	5

Instructional Objectives:

1. ***To study the principles and techniques involved in plant tissue culture.***
2. ***To get familiarize the concepts of transformation techniques.***
3. ***To understand the applications plant biotechnology in agricultural sectors.***

Unit-I	Introduction	15 Hours

History of plant tissue culture introduction to plant tissue culture - Types of cultures– Solid and Liquid. – laboratory organization – aseptic techniques – nutritional requirements and culture media.

Unit-II	Micro propagation	15 Hours

Callus induction - somatic embryogenesis – induction of multiple shoots – production and exploitation of haploids and triploid – embryo rescue – protoplast culture, Somaclonal variations, synthetic seeds. Mass production of plantlets – hardening and mist chambers – techniques for maintaining plantlets in the field.

Unit-III	Genetic Engineering in Plants	15 Hours

Molecular biology of Agrobacterium mediated DNA transfer- Ti plasmid Vectors- Technique of hairy root production. Physical method of transfer - Biolistic –Electroporation.

Unit-IV	Marker-Assisted Breeding in Plants	15 Hours

Introduction to molecular breeding – types of markers - Classical markers (Morphological markers, Cytological markers and biochemical markers) - DNA markers (RFLP, RAPD, AFLP, SSR and SNP)

Unit-V	Application of Plant Transformation and transgenic plants	15 Hours

Pest resistance – Virus resistance- fungal and bacterial disease resistance – Herbicide resistance – Tolerant to water deficit stresses – genetic engineering for extended shelf life of fruits – Golden rice, Delayed fruit ripening.

Books for Study:

1. Satyanarayana U., Biotechnology, Books and Allied P.Ltd, Kolkata. (2015).
2. Kalyankumar De.An Introduction to Plant Tissue Culture Techniques. New Central Book Agency, Kolkata. (2007).
3. Bhojwani, S.S. and M.K. Razdan, Plant Tissue culture: theory and practice a revised edition Elsevier science. (2014).

Books for Reference:

1. Bernard R.Glick and Jack J. Pasternak, Molecular Biotechnology, Principles and applications of recombinant DNA technology. ASM Press Washington DC. (2015)
2. Chrispeels, M.J. and D.F. Sadava, Plants-Genes and Agriculture Jones and Bartlett. (1994).
3. Dixon, R.A And R.A. Gonzales. Plant cell culture, IRL press. (2012).
4. Erbisch, F.H and K.M.Maredia, Intellectual property in agricultural Biotechnology, Edited

by, University Press. (2000).
5. Glick and Paster mark Molecular Biotechnology, Panima. (2002).

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	P	T	C
U8BTPR61	**ENVIRONMENTAL & AQUACULTURE BIOTECHNOLOGY PRACTICAL VII**	**4**	**2**	**2**

Instructional objectives:

1. ***To estimate the various water quality parameters in a aqua farm***
2. ***To identify commercially important fin and shell fishes and their diseases***
3. ***To prepare artificial feed for a prawn/fish.***
4. ***To have a basic understanding of fish cell lines.***

ENVIRONMENTAL BIOTECHNOLOGY

Estimation of the following water quality parameters in three different water samples

I. Dissolved oxygen
II. pH.
III. Salinity
IV. Carbon dioxide
V. Chloride
VI. Alkalinity
VII. BOD

AQUACULTURE BIOTECHNOLOGY

1. Identification of commercially important fin fishes (any three).
2. Identification of commercially important shell fishes (any two).
3. Preparation of artificial feed for a prawn/fish (Demonstration).
4. Study on fish cell lines – any five cell lines.
5. PCR for the detection of white spot syndrome in shrimp.

Visit to CETP and Aquafarm

Books for study:

2. A Manual of Fresh Water Aquaculture, R. Santhanam (Author), N. Sukumaran (Author), P. Natarajan (Author), South Asia Books (1 December 1987).
3. Murugesan AG and Rajakumari C. (2005). Environmental Science and Biotechnology: theory and Techniques.

Books for reference:

5. Jhingran V.G. 2007. Fish and Fisheries of India. Hindustan Publ. Corporation, India.
6. ICAR. 2006. Hand Book of Fisheries and Aquaculture. ICAR.
7. Chatterji A.K. (2002). Introduction to Environmental Biotechnology, Prentice- Hall of India.

P- Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	P	T	C
U8BTPR62	PLANT & ANIMAL BIOTECHNOLOGY PRACTICAL VIII	4	2	2

Instructional Objectives:

1. To acquire the knowledge of micro propagation and PTC media preparation
2. To provide an opportunity to experimentally verify the theoretical concepts on animal cell culture.
3. To understand the practical concepts of animal cell culture techniques.

PLANT BIOTECHNOLOGY

1. Plant tissue culture media preparation.
2. Surface sterilization of seed
3. In vitro Seed Germination.
4. Micro propagation- Shoot induction- multiplication- root induction and hardening.
5. Callus induction – leaf and stem

ANIMAL BIOTECHNOLOGY

1. Preparation of culture media and sterilization
2. Preparation of balanced salt solution
3. Sample preparation for cell culture
4. Primary cell culture
5. Passaging of cell line

Visit to PTC and/or ATC laboratory

Books for Study:

1. Kalyankumar De. An Introduction to Plant Tissue Culture Techniques. New Central Book Agency, Kolkata. (2007).
2. Mammalian cell biotechnology. A practical approach by M. Butler 2009. Oxford University press.
3. Animal Cell and Tissue Culture by Shivangi Mathur 2009. Publisher: Agrobios (India). (1st Edition).
4. Animal Cell Culture-A Practical Approach by John R. Masters 2000. Publishers: Oxford University Press (3rd Edition).

Books for Reference:

1. Animal cell culture by Freshney, R.I. 2010. Fifth edition, Wiley Publishers.
2. Animal Cell culture by Masters J.R.W. 2000. Oxford University Press.
3. *In vitro* cultivation of Animal cells by Dr. C.K. Leach, Butterworth and Heinnmamm Ltd.1994.

P- Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER VI

Course Code	Course Title	L	T	C
U8BTSB61	**NANOBIOTECHNOLOGY**	**2**	**1**	**1**

Instructional Objectives:

1. ***To understand the mechanism of Nanoparticle Synthesis.***
2. ***To know the synthesis of Nanoparticle by green chemistry approach.***
3. ***To gain the knowledge on characterization of nanoparticles.***
4. ***To ensure safe application of nanoparticles in medicine.***

Unit-I	An Overview of Nanotechnology	5 Hours

Definition – Nanoscale – Nano meteorology – significance of the Nanoscale – Nanomaterials – Biosynthesis of nanomaterial by microbes.

Unit-II	Characterization using Scattering Imaging Techniques	5 Hours

X – ray diffraction – dynamic light scattering light microscopy – TEM – SEM – AFM.

Unit-III	Characterization using Spectroscopic Technique	5 Hours

Ultraviolet – Visible – infrared, Fourier transform infrared spectroscopy, Raman spectroscopy.

Unit-IV	Physical Properties of Nanostructured Materials	5 Hours

Size effect of Nano materials – size, shape, density, melting point, wet ability and specific surface area. Diffusion properties. Mechanical behaviour – stress, tensile, strength, micro hardness, weak resistance and corrosion resistance behaviour.

Unit-V	Applications of Nanotechnology	5 Hours

Medicine – Drug delivery, Diagnostic techniques– Biosensor (Principle, component, types, applications). Environmental Nano-remediation.

Books for Study:

1. Nanobiotechnology in Molecular diagnostics: current techniques and application, KK Jain, 2006, Horizon Biosciences.
2. Nanobiotechnology Concepts, Applications and perspectives, Niemeyer, C.M and Mirkin, C.A, Wiley – VCH 2004.
3. Introduction to Nanotechnology, Poole, C.P and Owens, F.J John Wiley - 2003

Books for Reference:

1. Nanoparticles from theory to application, G. Cohmidt, Wiley Weinhein – 2004
2. Nanotechnology: Importance and Application, M. H. Fulekar IK international 2010
3. Nanotechnology in Biology and Medicine: Methods, Devices and Application, Tuan VO-Dinh CRC, Press 2007.
4. Nano materials for Biosensors, Challa Kumar, Wiely – Velt – 2007.
5. Hand Book of Nanofabrication

Edited by Gary Wiederrcht, Elsevier, 2010.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER V

Course Code	Course Title	L	T	C
U8CC5001	**DESIGN AND ANALYSIS OFALGORITHMS**	**5**	**2**	**5**

Instructional Objectives

1. To build a solid foundation of the most important fundamental subject in computer science.
2. Creative thinking is essential to algorithm design and mathematical acumen and programming skills.

Course Outcome:

1. ***Analyze algorithms time and space complexity.***
2. Solve problems of recursive nature.
3. Ability to solve problems whose solution is based on sequence of decisions.
4. Generate solutions to problems that are solved in stages.
5 Attempt fault tolerant solutions.
6. Learn to specify algorithms.
7. Enumerate shortest path algorithms.

Unit-I	**INTRODUCTION**	**12 Hours**

What is an Algorithm? - Algorithm Specification - Performance Analysis - Randomized Algorithms. *(Chapter 1 Sections: 1.1 to 1.4)*

Unit-II	**DIVIDE AND CONQUER**	**15 Hours**

General Method - Binary Search - Finding the Maximum and Minimum-Merge Sort - Quick Sort - Selection Sort- Stassen's Matrix Multiplications. *(Chapter 3: Sections 3.1,3.3,3.4,3.5,3.6,3.7,3.8)*

Unit-III	**THE GREEDY METHOD**	**18 Hours**

The General Method - Knapsack Problem – Tree Vertex Splitting - Job Sequencing with Deadlines- Minimum Cost Spanning Trees - Optimal Storage on Tapes - Optimal Merge Pattern - Single Source Shortest Paths.*(Chapter 4: Sections: 4.1,4.3 to 4.9)*

Unit-IV	**DYNAMIC PROGRAMMING**	**15 Hours**

The General Method – Multistage Graphs - All pair shortest path - String Editing - 0/1 Knapsack – Reliability Design - The Traveling Salesperson Problem - *(Chapter 5: Sections 5.1 to 5.3,5.6 to 5.9)*

Unit-V	**TRAVERSAL, SEARCHING & BACKTRACKING**	**15 Hours**

Techniques for Binary Trees- Techniques for Graphs - The General Method - The 8-Queens Problem – Sum of Subsets- Graph Coloring- Hamiltonian Cycles.*(Chapter 6: Sections: 6.1,6.2 Chapter 7:Sections: 7.1 to 7.5)*

Books for Study:

1.Fundamentals of Computer Algorithms, Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2nd Edition, 2015, Universities Press.

Books for Reference:

1.Introduction to Algorithms , Coremen T.H, Leiserson C.E. and Rivest R.L., PHI, 3rd Edition 2009.

2.Introduction to the Design and Analysis of Algorithms,AnanyLevitin, Pearson Education, 3rd Edition 2012.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER V

Course Code	Course Title	L	T	C
U8CC5002	**MICROPROCESSORS AND ITS APPLICATIONS**	**5**	**2**	**5**

Instructional Objectives

1. ***To learn the 8085 architecture, programming, interfacing and rudiments of system design of microprocessors.***
2. ***To learn the 8086 architecture, programming, interfacing and rudiments of system design of microprocessors.***

Course Outcome :

1. Recall and apply a basic concept of digital fundamentals to Microprocessor based personal computer system.
2. Identify a detailed s/w & h/w structure of the Microprocessor.
3. Illustrate how the different peripherals (8255, 8253 etc.) are interfaced with Microprocessor.
4. Distinguish and analyze the properties of Microprocessors & Microcontrollers.
5. Analyze the data transfer information through serial & parallel ports.
6. Train the students practical knowledge through laboratory experiments.
7. Designing public utility systems.

Unit-I	8085 MICROPROCESSOR AND ARCHITECTURE	15 Hours

Microprocessors, Microcomputers and Assembly Language - Introduction to 8085 Assembly Language Program - Microprocessor Architecture and Microcomputer Systems - 8085 Microprocessor Architecture and Memory Interface*(Chapters 1 to 4)*

Unit-II	PROGRAMMING THE 8085	18 Hours

Introduction to 8085 Instructions - Programming Techniques with Additional Instructions - Counter and Time Delays - Stack and Subroutines - Code Conversion, BCD Arithmetic, and 16-Bit Data Operations.*(Chapters 7 to 10)*

Unit-III	INTERFACING PERIPHERALS (I/OS) AND APPLICATIONS	12 Hours

Interrupts - Interfacing Data Converters - Programmable Interface Devices - General Purpose Programming Peripheral Devices - Serial I/O and Data Communication *(Chapters 12,14 to 16)*

Unit-IV	8086 MICROPROCESSOR ARCHITECTURES	15 Hours

8086 Microprocessor Architectures - 8086 Family Assembly Language Programming Introduction *(Chapters 2 and 3)*

Unit-V	8086 ASSEMBLY LANGUAGE PROGRAMS	15 Hours

Implementing Standard Program Structures in 8086 Assembly Language - Strings, Procedures and Macros - 8086 Instructions Descriptions and Assembler Directives *(Chapters 4 to 6)*

Books for Study:

1.Microprocessor Architecture, Programming and Applications with 8085,Ramesh S.Gaonkar, Penram International Publishing (India) Pvt. Ltd. 6th Ed. 2016(Reprint (for Units I,II and V)

2. Microprocessors and Interfacing, Douglas V. Hall, Tata McGraw Hill, 3rdEd. 2013 Third Reprint(for Units III and IV)

Books for Reference:

1. Assembly Language Programming the IBM PC ,Alan R. Miller, SubexInc,
2. Advanced Microprocessors and Peripherals, Ray A K ,Bhurchandi K M , TMH. 3rd Edition,2012

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER V

Course Code	Course Title	L	T	C
U8CC5003	COMPUTER NETWORKS	5	2	5

Instructional Objectives

This course introduces the concepts and theories of networking and applies them to various situations, classifying networks, analyzing performance and implementing new technologies.

Course Outcome :

1. Provide foundation knowledge of Network Hardware and Network Software.
2. Give an in-depth knowledge about ISO/OSI and TCP/IP protocol stacks.
3. Classify type of media and IEEE LAN standards.
4. Present various types of error handling mechanisms.
5. Gain Knowledge on routing algorithms as well as application layer functions.
6. Gain knowledge of server and client servicing.
7. Learn to trouble shooting.

Unit-I	BASIC CONCEPTS OF OSI LAYERS	12 Hours

Data Communication – Networks –Network Types - Internet History - Protocol Layering - TCP/IP Protocol Suite - The OSI Models.*(Chapter 1: Sections: 1.1 to 1.4, Chapter 2: Sections: 2.1 to 2.3)*

Unit-II	PHYSICAL LAYERS	15 Hours

Data and Signals - Periodic Analog Signals - Digital Signals - Transmission Impairment - Data Rate Limits -Performance - Transmission Media Introduction - Guided Media - Un Guided Media: Wireless *(Chapters 3 Sections: 3.1 to 3.6, Chapter 7 Sections 7.1 to 7.3)*		
Unit-III	**SWITCHING & DATA LINK LAYER**	**15 Hours**
Introduction to Circuit Switched Networks - Packet Switching - Structure of a Switch - Introduction Data Link Layer - Link - Layer Addressing *(Chapter 8: Sections: 8.1 to 8.4, Chapter 9 Sections : 9.1 to 9.2)*		
Unit-IV	**ERROR DETECTION AND CORRECTION**	**15 Hours**
Introduction - Block Coding - Cyclic Codes - Checksum - Forward Error Correction - Unicast Routing - Routing Algorithms - Unicast Routing Algorithm *(Chapter 10 Sections : 10.1 to 10.5, Chapter 20 Sections: 20.1 to 20.3)*		
Unit-V	**TRANSPORT LAYER PROTOCOLS AND STANDARD CLIENT SERVER PROTOCOLS & CRYPTOGRAPHY AND NETWORK SECURITY**	**18 Hours**
Introduction - User Datagram Protocols - Transmission Control Protocols - WWW and HTTP - FTP - Electronic Mail - Telnet - Domain Name System – Introduction – Confidentiality – Other Aspects of Security*(Chapter 24 Sections : 24.1 to 24.3, Chapter 26 Sections 26.1 to 26.4, 26.6, Chapter 31 Sections: 31.1 to 31.3)*		
Books for Study: **1.**Data Communication and Networking 5th Edition Behrouz A. Forouzan, McGraw Hill Education Seventh Reprint 2015.		
Books for Reference: **1.**Data and Communication Network, William Stalling PHI 2014. **2**. Computer Networks, Andrew S. Tanenbaum , David J. Wetherall, 5th Edition,Prentice Hall. 2010		

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	L	T	C
U8CC5004	SOFTWARE ENGINEERING	5	2	5

Instructional Objectives

This course introduces the concepts and methods required for the construction of large software intensive systems.

Course Outcome:

1. Know the different approaches of developing an efficient software.
2. Facilitate the knowledge of technological and managerial aspect of incorporating software.
3. Aware the development of process of software.
4. Develop the skills in cost estimation.
5. Learn how to fulfill good software requirements specification.
6. Understand the different validation and verification techniques of software testing.
7. Develop a wholesome approach to define and develope qualitative software.

Unit-I	INTRODUCTION AND SOFTWARE PROCESSES	15 Hours

The Problem Domain- The Software Engineering Challenges -The Software Engineering Approach.Software Process-Desired Characteristics of Software Process-Software Development Process Models-Other Software Processes *(Chapter 1 Sections: 1.1 to 1.3) (Chapter 2: Sections: 2.1 to 2.4)*

Unit-II	SOFTWARE REQUIREMENT ANALYSIS AND SPECIFICATION AND SOFTWARE ARCHITECTURE	15 Hours

Software Requirements-Problem Analysis-Requirement Specification-Functional Specification with Use Cases –Validation-Metrics - Role of Software Architecture-Architecture Views-Component and Connector View *(Chapter 3 Sections : 3.1 to 3.6 Chapter 4: Sections:4.1 to 4.3)*

Unit-III	PLANNING A SOFTWARE PROJECT AND DETAILED DESIGN	15 Hours

Process Planning-Effort Estimation-Project Scheduling and Staffing-Software Consideration Management Plan-Quality Plan-Risk Management-Project Monitoring Plan - Detailed Design and PDL-Verification-Metrics.*(Chapter 5 Sections: 5.1 to 5.7, Chapter 8 Sections: 8.1 to 8.3)*

Unit-IV	FUNCTION-ORIENTED DESIGN AND OBJECT ORIENTED DESIGN	15 Hours

Design Principles-Module Level Concepts-Design Notation and Specification-Structured Design Methodology-Verification-Metrics.-OO Analysis and OO Design-OO Concepts-Design Concepts-Unified Modeling Language- A Design Methodology-Metrics. *(Chapter 6: Sections: 6.1 to 6.6, Chapter 7 Sections:7.1 to 7.6)*

Unit-V	CODING AND TESTING	15 Hours

Programming Principles and Guidelines-Coding Process-Refactoring-Verification-Metrics Testing Fundamentals-Black Box Testing-White Box Testing-Testing Process-Defect Analysis and Prevention-Metrics- (Reliability Estimation) *(Chapter 9 Sections: 9.1 to 9.5, Chapter 10 Sections: 10.1 to 10.6)*
Books for Study: **1.**An Integrated Approach to Software Engineering, PankajJalote, Narosa Publishing - 3rd Edition Reprint 2014
Books for Reference: 1. Software Engineering, Richard Fairley, TMH Publication,2012 2. Software Engineering, Ian Sommerville, Person Education Ltd, 9th Edition, 2011.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SEMESTER V

Course Code	Course Title	P	T	C
U8CCPR51	MICROPROCESSORS LAB	4	2	2

Instructional Objectives

1. ***To learn the 8085 ALP of microprocessors.***
2. ***To learn the 8086 ALP of microprocessors.***

Course Outcome :

1.To write an assembly language program using data transfer instructions and verify it using microprocessor trainer kit.

2. Introduction to 8085 simulator IDE and understand the steps to simulate the program using it.

3. To write an assembly language program using Logical instructions and verify it using microprocessor trainer kit.

4. To write an assembly language program using branching instructions and verify it using microprocessor trainer kit.

5. To demonstrate the assembly language programming for delays & subroutines.

6. To understand the Working of Hardware interrupts.

7. To perform the various applications of 8085 microprocessor.

LIST OF EXPERIMENTS

8085

1. 8-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
2. 16-bit arithmetic (Addition, Subtraction, Multiplication, Division, Square and Square Root.)
3. Block Operations (Sum, Copy, Reverse, Search, Largest/Smallest, Sort ,Fibonacci Series)
4. Code Conversion (BCD/Hex to Binary/ASCII and vice versa).
5. Bit Manipulation (Count Even/odd/Positives/Negatives) and Delay Routines

8086

1. 8/16-bit arithmetic addition, subtraction, Multiplication, Division.
2. Block operations (Sum, Average, Search, Largest/Smallest, Sort)
3. String Manipulation (Display, Case Conversion, Search, Copy, Reverse,Read)
4. BIOS routines (Rename a File, Keyboard input)
5. Lookup Table, Bit Manipulation.

Books for Study:

1.Lab Manual

2. Microprocessor Architecture, Programming and Applications with 8085,Ramesh S.Gaonkar, Penram International Publishing (India) Pvt. Ltd. 6th Ed. 2016(Reprint (for Units I,II and V)

3. Microprocessors and Interfacing, Douglas V. Hall, Tata McGraw Hill, 3rd Ed. 2013 Third Reprint(for Units III and IV)

Books for Reference:

1.Assembly Language Programming the IBM PC ,Alan R. Miller, SubexInc,

P - Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

SYLLABUS
SEMESTER V

Course Code	Course Title	P	T	C
U8CCPR52	COMPUTER NETWORKS LAB	4	2	2

Instructional Objectives

This course introduces the concepts in practical of networking and applies them to various situations, classifying networks, analyzing performance and implementing new technologies.

Course Outcome :

1.Describe the functions of each layer in OSI and TCP/IP model.
2. Explain the functions of Application layer and Presentation layer paradigms and Protocols.
3. Describe the Session layer design issues and Transport layer services.
4. Classify the routing protocols and analyze how to assign the IP addresses for the given network.
5. Describe the functions of data link layer and explain the protocols.
6. Explain the types of transmission media with real time applications.
7. Learn about trouble shooting.

LIST OF EXPERIMENTS

1. Bus, Star, Ring, Mesh and Hybrid Networks
2. Static Routing.
3. Default Routing.
4. Routing Information Protocol – RIP
5. Enhanced Interior Gateway Routing Protocol – EIGRP
6. Open Shortest Path First – OSPF
7. Border Gateway Protocol – BGP
8. Dynamic Host Configuration Protocol – DHCP
9. HTTP and DNS
10. E-mail SMTP, POP3
11. FTP – File Upload/Download
12. DHCP, DNS, HTTP, FTP & Mail – Application Layer
13. Virtual LANs – VLANs
14. Remote Connection – Telnet, SSH
15.Wireless Networking

Books for Study:

1. Lab Manual
2. Data Communication and Networking 5th Edition Behrouz A. Forouzan, McGraw Hill Education Seventh Reprint 2015.

Books for Reference:

1.Data and Communication Network, William Stalling PHI 2014.
2. Computer Networks, Andrew S. Tanenbaum , David J. Wetherall, 5th Edition,Prentice Hall. 2010

T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS
SEMESTER V

Course Code	Course Title	P	T	C
U8CCSBP5	MOBILE APPLICATION DEVELOPMENT LAB	2	2	1

Instructional Objectives

1***. This lab provides a platform to the students for understanding the basic concepts of Android. 2. This practical background will help students to gain confidence in creating /developing Android Applications.***

Course Outcome :

1. Develop Mobile Application based on open source software.
2. Learn to use widgets in linear layout and relative layout.
3. Apply style and theme.
4. Use menu, submenu and shortcut for the menus.
5. Handle Dialog box, toast and status bar.
6. Develope app with security feature.
7. Use database in the App.

LIST OF EXPERIMENTS

1. Simple Calculator
2. Multi Language List View
3. List View
4. Alert Dialogs
5. Intent and Activity.
6. Change Background color using Seek Bars
7. Tab Widgets and Talking Clock.
8. To store data using Shared Preferences
9. To read/write file Internal Storage
10. Implement Tween Animations
11. Splash Screen
12. To display images in Grid View
13. Status Bar Notification.
14. Play an Audio / Video
15. WebView.

Books for Study:

1.Professional Android 4 Application Development, Reto Meier, Wiley-India 2012

Books for Reference:

1. Lab Manual

P - Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A.

SYLLABUS

SEMESTER VI

Course Code	Course Title	L	T	C
U8CC6001	COMPUTER GRAPHICS AND MULTIMEDIA	5	2	5

Instructional Objectives

To equip students to basics of computer drawing and prepare them for computer modeling of objects.

Course Outcome :

1.Will be able to generate basic geometrical structures. 2.Will be able to perform transformations in 2D space.3.Will be able to clip geometrical structures.4.Will be able to perform transformations in 3D space.5.Will be able to identify hidden surfaces of a 3D object.6.Should be able see an object in parallel projection.7.Should be see an object perspectively.

Unit-I	GRAPHIC SYSTEMS AND OUTPUT PRIMITIVES	12 Hours

Video Display Devices : Refresh CRT -Raster scan display-Random scan display- Raster Scan Systems – Random Scan Systems – Output Primitives :DDA line algorithm– Bresenham Line Drawing Algorithms –Bresenham Circle Generating Algorithm – GUI: Logical Classification of Input Devices – Interactive Picture Construction Methods. *(Chapter 2 Sections: 2.1 to 2.3,Chapter 3: Sections: 3.1,3.2,3.5, Chapter 8: Sections: 8.2,8.5)*

Unit-II	2D TRANSFORMATION AND VIEWING	15 Hours

2D Geometric transformations: Translation-Rotation-Scaling - Homogenous Coordinates-Composite Transformation-other Transformation - 2D Viewing : Viewing pipeline- Window to Viewport Co-ordinate Transformation – point clipping-Cohen Sutherland Line Clipping Algorithms – Liang Barsky Line Clipping Algorithm-Sutherland Hodgeman polygon Clipping Algorithm.*(Chapter 5: Sections: 5.1 to 5.4, Chapter 6: Sections: 6.1, 6.3, 6.5 to 6.8)*

Unit-III	3D TRANSFORMATION AND VIEWING	15Hours

3D Geometric Transformation :Translation, Rotation, Scaling-General 3D rotation - 3D viewing: viewing pipeline-viewing coordinates-Projections: parallel projection-perspective projection.*(Chapter 11: Sections: 11.1 to 11.3, Chapter 12: Sections: 12.1 to 12.3)*

Unit-IV	VISIBLE SURFACE DETECTION	15 Hours

Classification- Back Face detection- Depth buffer method- A buffer method- Scan line method-BSP tree method-Area subdivision method-Octree methods – Ray Casting method *(Chapter 13: Sections:13.1 to 13.10)*

Unit-V	MULTIMEDIA	18 Hours

Classification- MM building blocks: Audio-audio editing-MIDI-Text-display design and content design- Images-development- Computer animation classifications-2D animation-3D Animation—3D Animation environment-digital video fundamentals-video broadcasting standards-MM file format.*(Chapter 1, Chapter 5 to 10, Chapter 12 to 16, Appendix A)*

Books for Study:

1. D. Hearn and M.P. Baker – Computer Graphics (C version) with OpenGL – Pearson Education-4th edition- Second Impression - 2016
2. S. Gokul - Multimedia Magic –BPB Publications- 2nd Edition 2008

Books for Reference:

1. W.M. Newman and R.F. Sproull – Principles of Interactive Computer Graphics – McGraw Hill International Edition – 2nd Edition, 2001
2. Tay Vaughan-Multimedia making it work -TMH publication-9th Edition, 2014

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

B.Sc.,(SW)

SYLLABUS

SEMESTER VI

Course Code	Course Title	L	T	C
U8SW6001	SOFTWARE TESTING TECHNIQUES	5	2	5

Instructional Objectives

To discuss techniques that can be effectively for Programmers, Testers, Teachers, Researchers and Developers in practice, present object oriented testing and emphasize testing web applications and automated test data generation techniques.

Course Outcome :

1. Investigate the reason for bugs and analyze the principles in software testing to prevent and remove bugs.
2. Implement various test processes for quality improvement.
3. Design test planning.
4. Manage the test process.
5. Apply the software testing techniques in commercial environment.
6. Use practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques.
7. Requirement test planning.

Unit-I	INTRODUCTION and TAXONOMY OF BUGS	15 Hours

Purpose of Testing-Some Dichotomies- a Modal for Testing-Playing Pool and Consulting Oracles-Is complete Testing Possible? *(Chapter 1)***Taxonomy of Bugs:** The Consequences of Bugs-Taxonomy for Bugs-Some Bug Statistics *(Chapter 2).*

Unit-II	FLOW GRAPHS and PATH TESTING	15 Hours

Path Testing Basics-Predicates, Path Predicates, and Achievable Paths-Path Sensitizing-Path Instrumentation-Implement and Application of Path Testing –Testability Tips *(Chapter 3).*

Unit-III	TRANSACTION FLOW AND DATA FLOW TESTING	15 Hours

Generalizations-Transaction Flows-Transaction Flow Testing Techniques-Implementation Comments *(Chapter 4)***Data-Flow Testing:** Data Flow Testing Basics-Data Flow Testing Strategies-Application, Tools, Effectiveness *(Chapter 5).*

Unit-IV	**DOMAIN TESTING**	**15 Hours**
Domains and Paths-Nice Domains and Ugly Domains-Domain Testing-Domains and Interface Testing-Domains and Testability *(Chapter 6)*.		
Unit-V	**METRICS AND COMPLEXITY**	**15Hours**
Metrics, What and Why-Linguistic Metrics-Structural Metrics-Hybrid Metrics-Metrics Implementation-Testability Tips *(Chapter 7).*		

Books for Study:

1.Software Testing Techniques, Boris Beizer, Published by DreamTech,Second Reprint, 2nd Edition 2014

Books for Reference:

1. Software Testing, Yogesh Singh, Cambridge University Press, 1st Edition, 2013.
2. Software Testing A Craftmans Approach, Paul C Jourgensen, Aueredach Publications, 3rd Edition, 2011.
3. Foundations of Software Testing – Fundamental Algorithms and Techniques, AdithyaP.Mathur, Pearson Education India,2011.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER VI

Course Code	Course Title	L	T	C
U8CC6002	DATABASE MANAGEMENT SYSTEM	5	2	5

Instructional Objectives

To understand the concepts of Database Management System and mastering Structured Query Language

Course Outcome :

1. Educate the students on the essentials of database and database components.
2. The architecture of database and the languages used to maintain DBMS was educated.
3. To find the effective ways of modelling a database.
4. To recognize the importance of relational data models and its operation educated.
5. To acquire the knowledge on relational algebra and relational calculus to know the procedural and declarative ways of manipulating of database.
6. To enrich the students on functional dependencies and the different ways of normalizing a Database.
7. Create awareness the students on effectively protecting the database by giving exposure of on transaction processing, concurring control techniques and database security.

Unit-I	INTRODUCTION AND RELATIONAL DATABASES	15 Hours

Introduction - Relational Databases: Introduction to Relational Model *(Chapter 1 Sections : 1.1 to 1.9, Chapter 2 Section: 2.1 to 2.6)*

Unit-II	INTRODUCTION TO SQL AND ADVANCED SQL	15 Hours

Introduction to SQL - Intermediate SQL - Advanced SQL *(Chapter 3 Sections: 3.1 to 3.9, Chapter 4 Sections:4.1 to 4.6, Chapter 5 Sections: 5.1 to 5.3)*

Unit-III	FORMAL RELATIONAL QUERY LANGUAGES AND DATABASE DESIGN	15 Hours

The Relational Algebra - The Tuple Relational Calculus - The Domain Relational Calculus - Database Design and the ER model *(Chapter 6 Section: 6.1 to 6.3, Chapter 7 Section: 7.1 to 7.10)*

Unit-IV	RELATIONAL DATABASE DESIGN	15Hours

Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition using Functional Dependencies – Functional Dependency Theory - Decomposition using Multivalued Dependencies.(*Chapter8:Sections 8.1to 8.4& 8.6)*

Unit-V	SYSTEM ARCHITECTURE AND DISTRIBUTED DATABASES	15Hours

Centralized and Client - Server Architecture - Server System Architecture - Parallel Systems - Distributed System - Homogeneous and Heterogenous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control in Distributed Databases *(Chapter 17: Sections 17.1 to 17.4, Chapter19:Sections 19.1 to 19.5)*

Books for Study:

1.Database System Concepts , Abraham Silberchatz, Henry F Korth , S.Sudarshan, McGraw-Hill - 6th Edition - 2013.

Books for Reference:

1.Fundamentals of Database Systems, Elmasri and Navathe:, Pearson Education, 7th Edition 2015.

2.Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke: McGraw-Hill, 3rd Edition. 2002.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER VI

Course Code	Course Title	L	T	C
U8CC6003	OPERATING SYSTEMS	5	2	5

Instructional Objectives

To learn the various aspects of the internal operation of modern operating systems such as process management, threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

Course Outcome :

1. Demonstrate understanding of the concepts, Structure and design of operating System.
2. Demonstrate understanding of operating system design and its impact on application system design and performance.3. Demonstrate competence in recognizing and using operating system features.
4. Compare the various algorithms and comment about performance of various algorithms used for management of memory, CPU Scheduling, File handling and I/O Operations.
5. Apply various concept related with Deadlock to solve problems related with resource allocation, after checking system in safe state or not.6. To appreciate role of Process Synchronization towards increasing throughput of system.
7. To familiarize the students with various views and management policies adopted by operating System as pertaining with processes Deadlock, memory, File, and I/O operations.

Unit-I	INTRODUCTION & OPERATING SYSTEM STRUCTURES	12Hours

What Operating Systems do - Computer System Organisation - Computer System Architecture - Operating System Structure - Operating System Operations - Process Management - Memory Management - Storage Management - Protection and Security - System Structures : Operating System Services - System Calls - System Programs *(Chapter 1 Section : 1.1 to 1.9, Chapter 2 Section :2.1,2.3,2.5)*

Unit-II	PROCESS MANAGEMENT, PROCESS SCHEDULING & DEADLOCKS	15 Hours

Process Concept-Process Scheduling-Operations on Processes- Interprocess Communication - Basic Concepts-Scheduling Criteria-Scheduling Algorithms - Deadlock Characterization-Methods for Handling Deadlocks-Deadlock Prevention-Deadlock Avoidance-Deadlock Detection-Recovery from Deadlock *(Chapter 3 Section : 3.1 to 3.4 Chapter 5 Section : 5.1 to 5.3 Chapter 7: Sections 7.2 to 7.7)*

Unit-III	**MEMORY MANAGEMENT**	**15 Hours**

Swapping-Contiguous Memory Allocation-Segmentation - Paging- Demand Paging-Page Replacement (*Chapter 8: Sections 8.2 to 8.5 Chapter 9: Sections 9.2& 9.4)*

Unit-IV	**STORAGE MANAGEMENT**	**18 Hours**

File Concept-Access Methods-Directory and Disc Structure (*Chapter 10 : Sections 10.1 to 10.3)*Allocation Methods-Free Space Management(*Chapter 11 : Sections 11.4& 11.5)* Disk Structure-Disk Scheduling-Disk Management-Disk Attachment(*Chapter 12 : Sections 12.2,12.4,12.5)*

Unit-V	**PROTECTION AND SECURITY**	**15 Hours**

Goals of Protection-Domain of Protection-Access Matrix-Implementation of Access Matrix (*Chapter 14 : Sections 14.1,14.3 to 14.5)* The Security Problem -User Authentication-Program Threats-Cryptography as a Security Tool -Computer Security Classifications *(Chapter 15: Sections 15.1 to 15.5 & 15.8)*

Books for Study:

1.Operating System Concepts, Silbershatz, Galvin, Gange, John Wiley &Sons Inc, 9th Edition, 2016 Reprint.

Books for Reference:

1. Operating Systems – Internals and Design Principles, William Stallings - Pearson, 8th Edition, 2014
2. Operating Systems – A Concept Based Approach- Dhananjay M. Dhamdhere, Tata McGraw – Hill, 3rd Edition, 2012.

L - Lecture, T - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER VI

Course Code	Course Title	L	T	C
U8CC6004	OPEN SOURCE PROGRAMMING	5	2	5

Instructional Objectives

To discuss techniques that can be effectively applied in practice about HTML5, JavaScript, PHP , CSS, R Programming and Python.

Course Outcome :

1 To describe the PHP scripting language, and create basic PHP scripts using proper PHP syntax.2. To create elaborate scripts, write HTML forms, and program PHP to handle the form data.3. How to use PHP to create dynamic Web sites that are responsive to users and can alter content based on differing situations.4. Make the students learn how to write server-side Web applications.5. Explore working with form data using cookies and sessions.6. Exposed to Python programming..7. Exposed to R programming.

Unit-I	INTRODUCTION TO HTML5,JAVA SCRIPT, PHP AND CSS	15 Hours

Introduction to Dynamic Web content- HTTP and HTML- Request and Response Procedure- The Benefits of PHP, JAVA Script, CSS, and HTML5- Introduction to HTML5- The Canvas -The HTML5 Canvas- HTML5 Audio and Video- Introduction to CSS- CSS Rules-Style Types- CSS Selectors- CSS Colors. *(Chapter 1: Page no 1to 6, 7 to 9 , Chapter 19: Page no. 423, 424, 426 to 435 and 447, 448 , Chapter 22: Page no. 509,510,513)*

Unit-II	PHP INCORPORATING PHP WITHIN HTML	15 Hours

The Structure of PHP- Expressions- Operators – Conditionals – Looping – PHP Functions- PHP Objects – PHP Arrays *(Chapter: 3 page no: 48 to 66, Chapter 4: Page No: 73 to 98 , Chapter 5: Page No: 104 to 111, 113 to 118 , Chapter 6: Page No: 131 to 134)*

Unit-III	EXPLORING JAVA SCRIPT	15 Hours

Java Script and HTML Text- Using Comments- Semicolons – Variables- Operators- Functions- Global Variables, Local Variables - Expressions and Control Flow in Java Script : Expressions – Literal and Variables- Operators - Java Script Functions - Java Script Objects - Java Script Arrays: Numeric Arrays – Associative Arrays – Multidimensional Arrays – Using Array Methods *(Chapter 14: Page No:323 to 336) (Chapter 15: Page No: 343 to 347)*

Unit-IV	R PROGRAMMING	15 Hours

Mathematical Operations and Vectors - Assigning Variables - Special Numbers - Logical Vectors - Different Types of Numbers - Other Common Classes - Checking and Changing Classes - Examining Variables - The Workspace - Vectors - Matrices and Arrays - Lists – NULL - Pairlists - Data Frames - Environments - Functions - Strings - Factors - Flow Control - Loops *(Chapter 2 Page No 13 to 20, Chapter 3 Page No 26 to 36, Chapter 4 Page No. 39 to 54, Chapter 5 Page No. 57 to 75, Chapter 6 Page No 79 to 89, Chapter 7 Page No. 93 to 107, Chapter 8 Page No. 111 to 120)*

Unit-V	PYTHON- BEGINNING TO USE PYTHON	15 Hours

Strings- Quotes – Numbers and Operators – Variables – Making Decisions – Functions *(Chapter 1: Page No: 7 to 12, Chapter 2: Page No15 to 25, Chapter 3: Page no 31to 42, Chapter 4: Page No: 51 to 57, Chapter 5: Page No: 71 to 87)*

Books for Study:

1."Learning PHP, MySQL, Java Script, CSS and HTML5", Robin Nixon, O'Reilly Publications, 3rd Edition, 2014. (Unit I,II and III)

2. Learning R, Richard Cotton, O'Reilly Publications, 1st Edition, 2013(Unit IV)

3. Beginning Python, James Payne, Wiley Publication, 1st Edition , 2011. (Unit V)

Books for Reference:

1. Learning JavaScript, Tim Wright, Pearson Education Inc,1st Edition, 2013.
2. Learning JavaScript, Ethan Brown, O'Really Media Inc, 3rd Edition, 2016.
3. Programming PHP ,Rasmus Lerdorf and Levin Tatroe, O'Reilly Publications, 3rd Edition,2013.

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER VI

Course Code	Course Title	P	T	C
U8CCPR61	DBMS Lab	4	2	2

Instructional Objectives:

1. ***The major objective of this lab is to provide a strong formal foundation in database concepts, technology and practice 2.To present SQL and procedural interfaces to SQL comprehensively***

Course Outcome :

1. Explain the features of database management systems and Relational database.2. Design conceptual models of a database using ER modeling for real life applications and also construct queries in Relational Algebra.3. Create and populate a RDBMS for a real life application, with constraints and keys, using SQL.4. Retrieve any type of information from a data base by formulating complex queries in SQL5. Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database. 6. Build indexing mechanisms for efficient retrieval of information from a database. 7. Protecting data bases

LIST OF EXPERIMENTS

1. DML Commands
2. DDL Commands
3. Built in String/Date/Aggregate Functions
4. Single Table Queries
5. Joins
6. Sub Queries
7. Set Operators
8. Multiple Table Queries
9. Programmable Objects (Functions, Procedures, Triggers)
10. Advance Queries using AdventureWorks, Pubs, and NorthWind Databases and SqlReports.

Ex No.	Ex Name	No of Queries
1	World Database	70
2	HR Database	40
3	Publisher Database	25
4	Northwind Database	21
5	Sailor Database	20
6	Sakila Database	35
7	Adventure Works DB	30
8	Functions	6
9	Procedures	5
10	Triggers	3

Books for Study:

1.Lab Manual.
2.Database System Concepts , Abraham Silberchatz, Henry F Korth , S.Sudarshan, McGraw-Hill - 6th Edition - 2013.

Books for Reference:

1.Fundamentals of Database Systems, Elmasri and Navathe:, Pearson Education, 7th Edition 2015.
2.Database Management Systems, Raghu Ramakrishnan and Johannes Gehrke: McGraw-Hill, 3rd Edition. 2002.

P - Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER VI

Course Code	Course Title	P	T	C
U8CCPR62	**UNIX AND OPERATING SYSTEM LAB**	**4**	**2**	**2**

Instructional Objectives

The course familiarises the student with basic knowledge of computer operating systems.

Course Outcome :

1.Identify and use UNIX utilities to create and manage simple file processing operations, organize directory structures with appropriate security.
2. Effectively use the UNIX to accomplish typical personal, office, technical, and software development tasks
3. Monitor system performance and network activities.
4. Effectively use software development tools including libraries, preprocessors, compilers, linkers, and make files.
5. Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines.
6. Collaborate in teams on system tasks.
7. Develop shell scripts to perform more complex tasks.

LIST OF EXPERIMENTS

1. Create process (Child, Zombie,Orphan).
2. Inter Process Communication (Pipes, Message Queues and Semaphores)
3. Shell Programming (loops, patterns, expansions, substitutions, matching, searching)
4. Implement the various process scheduling (First Come First Serve, Shortest Job First, Priority, Round Robin).
5. Implement Memory allocation strategies (FirstFit, BestFit and WorstFit)
6. Implement Page Replacement Algorithms (First In First Out, Least Recently Used, Optimal)
7. Implement Disk Scheduling Algorithms (First In First Out, Shortest Seek Time First and SCAN)

Books for Study:

1. Lab Manual
2. Operating System Concepts, Silbershatz, Galvin, Gange, John Wiley &Sons Inc, 9th Edition, 2016 Reprint.

Books for Reference:

1. Operating Systems – Internals and Design Principles, William Stallings - Pearson, 8th Edition,

2014
2. Operating Systems – A Concept Based Approach- Dhananjay M. Dhamdhere, Tata McGraw – Hill, 3rd Edition, 2012.

P - Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

Common to B.Sc.(CS) / B.C.A. / B.Sc.,(SW)

SYLLABUS

SEMESTER VI

Course Code	Course Title	P	T	C
U8CCSBP6	**OPEN SOURCE PROGRAMMING LAB**	**2**	**2**	**1**

Instructional Objectives

To familiarize students with the various Open source software like HTML, Javascript, PHP, Python and R Programming.The students can understand the purpose of open source tools in real time application development

Course Outcome :

1. Students are able to develop a dynamic webpage by the use of java script and HTML5.
2. Students will be able to write well designed web pages.
3. Students will be able to write a server side application to catch form data sent from client, process it and store it on database using PHP.
4.Student will learn R Programming, Student will learn to write real time applications and medical coding using Python Programming.
5.Interpret, Contrast and compare open source products among themselves.
6.Update and delete operations on DBMS table.

LIST OF EXPERIMENTS

1. HTML (Frames, Links, Tables, ImageMap, Audio/Video and other tags)
2. CSS(inline, external, embedded)
3. JavaScript (Form validation)
4. Random number generation using PHP.
5. Any online application with database access.
6. PHP Program - Arrays Manipulation
7. Reading text files using R Program.
8. Sample web application development in the Open Source Environment.
9. Python Programs- Making Decisions
10. Python Programs- Functions

Books for Study:

1. "Learning PHP, MySQL, Java Script, CSS and HTML5", Robin Nixon, O'Reilly Publications, 3rd Edition, 2014. (Unit I,II and III)
2. Learning R, Richard Cotton, O'Reilly Publications, 1st Edition, 2013(Unit IV)
3. Beginning Python, James Payne, Wiley Publication, 1st Edition , 2011. (Unit V)

Books for Reference:

1. Learning JavaScript, Tim Wright, Pearson Education Inc,1st Edition, 2013.
2. Learning JavaScript, Ethan Brown, O'Really Media Inc, 3rd Edition, 2016.

3. Programming PHP ,Rasmus Lerdorf and Levin Tatroe, O'Reilly Publications, 3rd Edition,2013.

P - Practical, **T** - Tutorial **C** – Credits [Tutorial: Assignments with relevant problems will be provided by the Instructor]

M.Phil Syllabi

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8HI01	

CORE PAPER I	SEMESTER I	Credit	5
		Hrs/ Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8H101	
COURSE OUTCOMES			
CO 1	The scholars acquire skills regarding the different trends and methods in Research and emulate an ethical approach to Research.		
CO 2	The scholars are empowered with the ability to identify and formulate the research problem.		
CO 3	The scholars obtain the ability to collect data from different source repositories		
CO 4	The scholars attain the attributes to effectively analyse the collected in an objective manner.		
CO 5	The scholars get the ability to successfully document their findings.		

Objectives:

1. ***To introduce the scholars to the latest trends of research methodology***
2. ***To promote a spirit of inquiry among the scholars***
3. ***To inform the scholars about various sources and methods of Data Collection***
4. ***To train the scholars to analyse and document the data***

Unit - I: Trends In Methodology: Scientific Method as applied in History- Heuristics Hermeneutics – Quantitative and Qualitative Methods – Textual Analysis – Oral Traditions Semiotics and Studies of Symbols – Inter – Disciplinary Approaches

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

Unit - II: Research Process: Problems in Existing Research – Selection of Topic – Feasibility – Methods of authentication – Research Plan and Working Hypothesis

Unit - III: Data Collection: Sources – Repositories of Sources – Libraries and Archives – Digital Information – Possibilities of field Research – Data Arrangement – Manual Card system – Word Processor – Files and Folders

Unit - IV: Data Analysis: Source Analysis – Content Analysis- Objectivity and Bias reasoning – Fallacies- Generalizations and Explanations – Ordering of the Data – Conceptual Linkages – Method of Explanation - Verification of Hypothesis – Formulation of the final argument

Unit - V: Documentation: Chapterisation – Logical Arrangement of chapters – Citations – Acknowledgement of sources – References and functions of Bibliography –

Use of Tables, Charts and Maps –Analytical Writing – Language – Need for consistency and terminological clarity – Glossary and Index

Books for Study:

1. Kate Turabian: A manual for the writers of term papers, theses and dissertations
2. William Good and Paul Hatt : The methods of Social Research
3. March Bloch: The Historians Craft.

Books for Reference:

1. Roderick Floud, An Introduction to Quantitative Methods for Historians, London,1993
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Malcolm Williams, Science and Social Science: An Introduction, London, New York and Routledge, 2000
4. M.L.A. Hand Book for Researchers Thesis & Assignment Writing Wily Eastern, New Delhi, 1990.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	HISTORIOGRAPHY	Exam Hrs.	3
		MPH8HI02	

CORE PAPER II	SEMESTER I	Credit	5
		Hrs/ Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8H102	
COURSE OUTCOMES			
CO 1	The scholars identify the nature and functions of History		
CO 2	The scholars understand the intimacy of History with other disciplines.		
CO 3	The scholars comprehend the value of History and recognise how History can be misused.		
CO 4	The scholars realise the evolution of Historical Writing from earliest days to medieval period.		
CO 5	The scholars recognise the recent trends in Historical Writing.		

Objectives:

1. ***To introduce the scholars the nature and scope of History***
2. ***To relate the connectivity between History and other disciplines***
3. ***To study the use and abuse of History***
4. ***To study the various trends of Historiography***

Unit - I: Introduction: Definition, Nature, Scope, Functions

Unit - II: History and Allied Disciplines: Economics, Sociology, Geography, Literature and Auxillary Sciences

Unit - III: Value and Subject matter of History: Use and abuse of History, History Art or Science

Unit - IV: Early Trends: Greco-Roman- Ancient Indian-Medieval, Church and Arab-Enlightenment

Unit - V: Modern Trends: Romanticist – Scientific theory-Materialist theory – Structuralism – Poststructuralism-post modernism

Books for Study:

1. E.H. Carr: What is History
2. R.G. Collingwood: The Idea of History

3. B.Sheikh Ali: History its theory and Method

Books for Reference:

1. Harvey kay, The British Marxist Historians (Polity)
2. Stein, Burton, History of India
3. Champakalakshmi, R. Trade, Ideology and Urbanization: South 300 B.C. to A.D 1300

M.PHIL. COMMERCE

Programme Specific Outcomes (PSOs)

PSO1: Conduct a Business Research ethically to identify problems and suggest solutions
PSO2: Develop problem solving and decision making skills necessary to execute their day to day professional & Social responsibilities
PSO3: Able to identify, analyse and think critically to solve complex business problems
PSO4: Obtain an extensive and in-depth knowledge on subject of specialization
PSO5: Able to understand underlying concepts clearly and communicate effectively making them ideal choice for occupying academic positions
PSO6: Identify the problem and formulate Research Questions
PSO7: Search & Extract data required for the research from reliable sources
PSO8: Utilize Descriptive and Inferential Statistical tools for data analysis
PSO9: Appreciate the Significance of Ethics in Research and follow them in Research
PSO10: Able to read Financial Statements and Analyse them for Business Decision Making

Course Outcomes (Cos):

Cos	Sub Code: MPH8CO01	Subject: Research Methodology
CO1	Define Research, Research Objective, Hypothesis, Pilot Study, Sample and Sampling	
CO2	Illustrate the various stages of a Research Process and designing Research Methodology	
CO3	Identify, Read & Understand the Scholarly writings available on the topic	
CO4	Enumerate the Responsibilities of a Researcher and Code of Ethics	
CO5	Apply the Moral Principles and Code of Ethics in every stage of Research especially during Data Collection and report the findings of the Research honestly	
CO6	Identify Research Gap, Define research objectives and formulate Research Questions and Hypotheses	
CO7	Discuss various Research methods, their Suitability and able to identify the best method for Research Problem at hand	
CO8	Discuss various sources of Data & their Collection Methods and identify the best method for the concerned Research	
CO9	Decide the Sampling Size and Sampling Technique to be followed for Research	
CO10	Design a Questionnaire, Conduct a Field Survey and Collect data from Individuals and Business Units	
CO11	Organise the data by Editing for errors followed by Tabulation	
CO12	Present the data in the form of Graphs, Diagrams and Pictures	
CO13	Analyse the data using Descriptive and Inferential Statistical tools	
CO14	Interpret the results to understand and Define Problems or Phenomenon and offer Suggestions and Solutions to the Problems	
CO15	Communicate the Results by drafting a Research Report	

COs	Sub Code: MPH8CO02	Subject: Advanced Financial Management
CO1	Define Financial Management and discuss its Scope, Objectives and Functions	
CO2	Define Capital Budgeting, Short Term Finance, Long Term Finance, Wealth Maximisation and Profit Maximisation, Working Capital	
CO3	Discuss kinds of Capital Investment proposals and the factors affecting them	
CO4	Describe the Sources & Types of Working Capital and its Determinants	
CO5	Compute Profitability, Turnover and Financial Ratios and utilize them to better understand the operations and financial position of a business	
CO6	Discuss various theories on Capital Structure, Compute Cost of Equity, Debentures, Preference Share Capital and use them to make sound decisions on Designing, Altering and Managing the Capital Requirements of a business	
CO7	Conduct Capital Budget Appraisal using various Traditional (Non-Discounted) as well as Modern (Discounted) methods and make Business Decisions in this regard	
CO8	Estimate the required Working Capital and Plan accordingly to raise it through various sources	

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8CO01	

Objective: To infuse research flair among research scholars by developing their research aptitude.

UNIT – I: Introduction (18 Hours)

Meaning of Research and Scope of Research Methodology – Stakeholders of Social Research – Significance of Research in Social Science – Identification of Research Problem – Formulation of Research Questions – Pilot Study – Meaning and Components of Research Design – Review of Literature (Theory only)

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT – II: Hypothesis (18 Hours)

Hypothesis – Meaning and role – Structure – Relationship between variables – Types – Strong and Weak – Sampling Theory – Sampling Methods and Techniques – Sampling size – Sampling error(Theory only)

UNIT – III: Data Collection (18 Hours)

Data Collection – Sources – Primary and Secondary – Data matrix – Unit of data collection – Methods and tools of data collection – Interview and questionnaires and their types – Scaling and Testing Techniques – Reliability and validity of instruments – Uses of Information Technology in data collection (Theory only)

UNIT – IV: Data Analysis (18 Hours)

Data Analysis – Analysis of quantitative data – Descriptive statistics – Test of significance – Parametric tests and non-parametric test – Chi-square Test – ANOVA test – Interpretation – Application of SPSS for Data Analysis (Both Theory & Problems)

UNIT – V: Report Writing (18 Hours)

Report writing – Significance of report writing – Different steps in writing report – Layout of Research Report – Types – Technical report – Popular report – Mechanics of writing a report (Theory only)

Weightage of marks: Theory 50 marks & Problem 25 marks

Reference Books:

1. R. Kothari, Research Methodology, Methods and Techniques, Wiley Eastern Ltd. New Delhi.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. D. Amarchand, Research Methods in Commerce, Emerald Publishers, Chennai.
4. R. L. Anderson., H. D. Berry., M. Poole, Thesis and Assignment Writing, Wiley Eastern Ltd.,New Delhi.
5. H. Bernard Russel, Social Research Methods (London: Sage)
6. S. P. Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED FINANCIAL MANAGEMENT	Exam Hrs.	3
		MPH8CO02	

Objective: To enhance the ability of research scholars in analysing and managing the financial aspects of an organisation.

UNIT – I: Introduction (15 Hours)

Financial Management – Meaning, scope, objectives and functions – Relationship between financial management and other areas of management. (Theory only)

UNIT – II: Accounting Ratios (15 Hours)

Accounting Ratios – Classification of Ratios – Profitability – Turnover – Financial – Advantages and limitations – Interpretation of results – Intra Firm Comparisons. (Both Theory and Problem)

UNIT – III: Capital Structure (15 Hours)

Capital Structure – Meaning – Theories of Capital Structure – Net Income Approach - Net Operating Income Approach – MM Approach and Traditional Approach (Both Theory and Problem)

UNIT – IV: Capital Budgeting (15 Hours)

Capital Budgeting – Meaning, Importance, Kinds of capital investment proposals – Factors affecting capital investment decisions – Capital budget appraisal methods (Both Theory and Problem)

UNIT – V: Working Capital Management (15 Hours)

Working Capital Management – Meaning, need and types of working capital – Sources of working capital – Determinants of working capital needs. (Both Theory and Problem)

Weightage of marks: Theory 50 marks & Problem 25 marks

Reference Books:

1. I.M. Pandey, Financial Management, Vikas Publishing House, New Delhi.
2. S.N. Maheswari, Fundamentals of Financial Management, Sultan Chand & Sons, New Delhi.
3. Prasanna Chandra, Financial Management, Theory and Practice, Tata McGraw Hill Publishing Company, New Delhi.
4. M.Y. Khan and P.K. Jain, Financial Management, Tata McGraw Hill Publishing Company Limited. New Delhi.
5. P.V.Ratnam, Financial Management Theory, Problems and Solutions, Kitab Mahal,New Delhi.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ALGEBRA AND ANALYSIS	Exam Hrs.	3
		MPH8MS01	

COURSE OUT COME

- To learn Moral Justification of Research, Information & communication technology issues and code of ethics.
- To study rings, nilpotent elements, direct sum and tensor product of algebras.
- To acquire the knowledge of ideals in rings of fractions and primary decomposition.
- To understand the concept of measurability and L^pspaces.
- To learn concept of Fourier transforms in various spaces.

UNIT– I :

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

RINGS, IDEAL AND MODULES

Rings and ring homomorphisms – Ideals, Quotient rings – Zero divisors, Nilpotent elements, Units – Prime ideals and maximal ideals – Nilradical and Jacobson radical – Operations on ideals – Extension and contraction – Exercise – Modules and module homomorphisms – Submodules and quotient modules – Operations on submodules – Direct sum and product – Finitely generated modules – Exact sequences – Tensor product of modules – Restriction and extension of scalars – Exactness properties of the tensor product – Algebras – Tensor product of algebras – Exercises.

Chapter 1: (pp. 1 – 10)

Chapter 2: (pp. 17 – 31).

UNIT–II: RINGS, MODULES OF FRACTIONS AND PRIMARY DECOMPOSITION

Local properties – Extended and contracted ideals in rings of fractions – Exercise – Primary Decomposition – Exercise.

Chapter 3: (pp. 36 – 43)

Chapter 4: (pp. 50 – 55).

UNIT–III: CHAIN CONDITIONS, NOETHERIAN RINGS AND ARTIN RINGS

Chain conditions – Exercises – Primary Decomposition in Noetherian rings – Exercises – Artin Rings – Exercises.

Chapter 6: (pp. 74 – 78)

Chapter 7: (pp. 80 – 84)

Chapter 8: (pp. 89 – 91).

UNIT– IV : ABSTRACT INTEGRATION AND L^p SPACE

The concept of measurability – simple functions – Elementary properties of measures integration of positive functions – Integration of complex functions – The role played by sets of measure zero – Convex functions and inequality – L^p spaces.

Chapter 1: (pp. 5 – 31)
Chapter 3: (pp. 61 – 69).

UNIT – V: FOURIER TRANSFORMS AND HOLOMORPHIC FOURIER TRANSFORMS

Formal properties – The Invention Theorem – The Plancheral Theorem – The Banach algebra L^1 – Introduction – Two Theorems of Paley and Wiener Quasi – Analytic classes – The Denjoy – Carleman theorem.

Chapter 9: (pp. 178 – 193)
Chapter 19: (pp. 371 – 383).

Content and Treatment as in:

1. INTRODUCTION TO COMMUTATIVE ALGEBRA, *M.F. Atiyah and I.G. Macdonald*,(1969), Addison – Wesley.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. REAL AND COMPLEX ANALYSIS, (Third Edition), *Walter Rudin*, (1986), McGraw Hill.

References:

1. ABSTRACT ALGEBRA, *R.S. Pierce*, Springer Verlag.
2. REAL ANAYLSIS, *R.G. Bartle*, (1976), John Wiley and Sons.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	TOPOLOGY AND DIFFERENTIAL EQUATIONS	Exam Hrs.	3
		MPH8MS02	

COURSE OUT COME

- To understand concept in algebraic structures of topological spaces.
- To know structure of the fundamental groups of a simplicial complex.
- To acquire the knowledge the stability of the dynamical system using stability manifold theorems.

UNIT – I: FUNDAMENTAL GROUP AND COVERING SPACES

Homotopy – Fundamental group – Covering spaces.

Chapter 3: (pp. 49 – 77)

UNIT – II: SIMPLICIAL COMPLEXES

Geometry of simplicial Complexes – Bary centric subdivisions – simplicial approximation Theorem – Fundamental Group of a simplicial complex.

Chapter 4: (pp. 78 – 108)

UNIT – III: LINEAR SYSTEMS

Uncoupled Linear system – Diagonalization – Exponential operators – The Fundamental Theorem for linear system – Linear system in R^2 – Complex Eigen Values – Multiple Eigen Values – Non Homogeneous Linear System.

Chapter 1: Sections 1.1 to 1.7 and 1.10 (pp. 1 – 39, 60 – 63)

UNIT – IV: NONLINEAR SYSTEMS: LOCAL THEORY

Some preliminary concepts & definitions – The Fundamental Existence – Uniqueness Theorem – Dependence on initial conditions and parameters – The Maximum interval of Existence – The Flow defined by a Differential Equation.

Chapter 2: Sections 2.1 and 2.5 (pp. 65 – 101)

UNIT – V: NONLINEAR SYSTEMS

Linearization – The Stable Manifold Theorem – Dynamical Systems and Global Existence Theorems – Limits Sets and Attractors.

Chapter 2: Sections 2.6 and 2.7 (pp. 101 – 118)

Chapter 3: Sections 3.1 and 3.2 (pp. 181 – 199)

Content and Treatment as in :

1. LECTURE NOTES ON ELEMENTARY TOPOLOGY AND GEOMETRY, *I.M. Singer and J.A. Thorpe*, (1967), Springer Verlag, New York.
2. DIFFERENTIAL EQUATION AND DYNAMICAL SYSTEM, *L. Perko*, (2006), Third Edition, Springer Verlag, New York.

References:

1. INTRODUCTION TO TOPOLOGY AND MODERN ANALYSIS, *G.F. Simmons*, (1963), Mcgraw Hill.
2. COUNTER EXAMPLES IN TOPOLOGY, *L. Sten and J. Subash*, Holt, RineHart and Winston.
3. ADVANCED DIFFERENTIAL EQUATIONS, *M.D. Raisinghania*, (2001), S. Chand & Co., New Delhi.

SEMESTER – I

Elective	**PROBABILITY MODELS AND APPLICATIONS**	
Theory		Hrs/Week
Paper – EC01		Credit

UNIT – I: INTRODUCTION TO PROBABILITY THEORY

Introduction – Sample space and Events – Probability defined on events – Conditional probabilities – Independents – Baye's formula.

RANDOM VARIABLES

Random variables – Discrete and Continuous Random variables – Expectation of a random variable – Limit Theorems – Stochastic Process.

UNIT – II: CONDITIONAL PROBABILITY AND CONDITIONAL EXPECTATION

Introduction – The discrete case – The Continuous case – Computing expectations by conditioning – Computing probabilities by conditioning – Some applications.

THE EXPONNENTIAL DISTRIBUTION AND THE POISSON PROCESS

Introduction – The Exponential distribution – The Poisson process – Generalizations of the Poisson process.

UNIT – III: RENEWAL THEORY AND ITS APPLICATIONS

Introduction – Distribution of N(t) – Limit theorems and their applications – Renewal Reward process – Regenerative process – Computing the renewal function – Application of patters.

UNIT – IV: PARAMETRIC FAMILIES OF DISTRIBUTIONS OF DIRECT IMPORTANCE IN RELIABILITY THEORY

A notation of aging – The exponential distribution – The poisson process – The poisson distribution – Parametric families of the life distributions – with monotone failure rate.

UNIT – V: CLASS OF LIFE DISTRIBUTION BASED O NOTATION OF AGING

Introduction – distribution with IFRA arising from shock models – Preservation of life distribution classes under reliability operations – Partial orderings of life distributions – Reliability bounds – Mean life of series and parallel systems.

Content and treatment as in:

1. INTRODUCTION OF PROBABILITY MODELS, *Sheldon M. Ross*.
2. STATISTICAL THEORY OF RELIABITY AND LIFE TESTING MODELS, To Begin With *R.E. Barlow and F. Proshan*, (1975).

References:

1. PROBABILITY THEORY AND MATHEMATICAL STATISTICS, *M. Fisz*, (1963), John Wiley and Sons, New York.
2. STOCHASTIC PROCESSES, *Sheldon M. Ross*, (2001).

SEMESTER – I

Elective	**BANACH ALGEBRA**	
Theory		Hrs/Week
Paper – EC02		Credit

UNIT – I: FINITE DIMENSIONAL SPECTRAL THEORY:

Matrices – Determinants and the spectrum of an operator – The spectral theorem – A survey of the situation.

Chapter 11: (pp. 278 – 297)

UNIT – II: BANACH ALGEBRA:

The definition and some examples – Regular and singular elements –Topological divisors of zero – The spectrum – The formula for the spectral radius – The radial and semi – simplicity.

Chapter 12: (pp. 301 – 311)

UNIT – III: BANACH ALGEBRA:

The Gelfand mapping – Application of the formula $r(x) = \lim \left\| x^n \right\|^{1/n}$ – Involution in Banach algebras – The Gelfand–Neumark theorem.

Chapter 13: (pp. 318 – 325)

UNIT – IV: COMMUTATIVE BANACH ALGEBRA:

Ideal in $c(x)$ and the Banach stone theorem – The Stone cech compactification (continued) – Commutative C* – Algebra

Chapter 14: (pp. 327 – 332)

Content and Treatment as in :

1. TOPOLOGY AND MODERN ANALYSIS, *G.F. Simmons*, (1963), McGraw Hill.

References:

1. FUNCTIONAL ANALYSIS, *W. Rudin*, (1973), Mcgraw Hill, New Delhi.
2. FUNCTIONAL ANALYSIS, *G. Bauhman and L. Narici*, (1966), Academic press, New Delhi.

SEMESTER – I

Elective	**FUZZY SETS AND THEIR APPLICATIONS**	
Theory		Hrs/Week
Paper – EC01		Credit

UNIT – I : FUZZY SETS

Fuzzy sets – Basic concepts – Characteristics – significance of the paradigm shift – Additional properties of – Cuts.

Chapter 1: Sections 1.3 to 1.5

Chapter 2: Sections 2.1

UNIT – II : FUZZY SETS VERSUS CRISP SETS

Representation of Fuzzy sets – Extension principle of Fuzzy sets – Operation on Fuzzy sets – Types of Operation – Fuzzy complements.

Chapter 2: Sections 2.2 to 2.3

Chapter 3: Sections 3.1 to 3.2

UNIT – III : OPERATIONS ON FUZZY SETS

Fuzzy intersection – t–norms, Fuzzy unions – t–conforms – Combinations of operations –

Aggregation operations.

Chapter 3: Sections 3.3 to 3.6

UNIT – IV : FUZZY ARITHMETIC

Fuzzy numbers – Linguistic Variables – Arithmetic operation on intervals – Lattice of Fuzzy numbers

Chapter 4: Sections 4.1 to 4.4

UNIT – V : CONSTRUCTION FUZZY SETS

An overview – Direct methods with one expert – Direct methods with multiple experts –

Indirect method with multiple experts and one expert – Construction from sample data.

Chapter 10: Sections 10.1 to 10.7

Content and Treatment as in:

FUZZY SETS AND FUZZY LOGIC: THEORY AND APPLICATIONS, *G.J. Klir, and Bo Yuan*, Prentice Hall of India Ltd, New Delhi, 2005.

References:

1. FUZZY SET THEORY AND ITS APPLICATIONS, *H.J. Zimmermann*, Allied Publishers, Chennai, 1996.
2. INTRODUCTION TO THE THEORY OF FUZZY SUBSETS, *A. Kaufman*, Academic Press, New York.
3. FUZZY SETS AND THEIR APPLICATION, *V. Novak*, Adam Hilger, Bristol, 1969.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8PY01	

RESEARCH METHODOLOGY

Course Learning Outcomes:

- research, ethical vetting, and scientific misconduct.
- Develop awareness onethically use, document and integrated sources for logical format of writing thesis, paper and drafting report.

The aim of the course is to provide participants with an introduction to research methods and report writing. Upon successful completion of the course you are expected to

- Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
- Develop skills on qualitative and quantitative research data analysis and presentation.
- Have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Have basic awareness of data analysis-and hypothesis testing procedure.
- know the various funding agencies for research in India.

  acquire an overview of important issues in research ethics, like responsibility for

UNIT – I: RESEARCH METHODOLOGY

Meaning of research – Objectives of research – motivation of research – Types, approaches and significance – Methods versus methodology – Research in scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT – II: RESEARCH DESIGN

Research Problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and feature of good design – Different research design – Basic principles of experimental design.

UNIT – III: DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types – Processing and presentation of data – Techniques of ordering data – Meaning of primary and secondary data – The uses of computers in research – The library and internet – Uses of search engines – virtual libraries - common software for documentation and presentation.

UNIT – IV: DATA AND ERROR ANALYSIS

Statistical analysis of data – standard deviation – Correlation – Comparison of sets of data – Chi squared analysis for data – Characteristics of probability distribution – Binomial, Poisson and normal distribution – Principle of least square fittings – Curve fitting – Measurement of errors – Types and souces of errors – Determination and control errors.

UNIT – V: RESEARCH COMMUNICATION

Meaning of research report – Logical format for writing thesis and paper – Essential of scientific report: abstract, introduction, review of literature, materials and methods and discussion – Write up steps in drafting report – Effective illustrations: tables and figures – Reference styles : Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research Methodology, Methods and techniques – C.R. Kothari – Wishwa Prakasam Publications, II Edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research: An introduction – Robert Ross – Harper and Row Publications.
4. Research Methodology – P.Saravanavel – Kitlab Mahal, Sixth Edition.
5. A Hand book of Methodology of Research – Rajammal P.A.Devadass - Vidyalaya Press.
6. Statistical methods – G.W. Snedecor and W.Cocharan – Oxford and IBH, New Delhi.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED PHYSICS	Exam Hrs.	3
		MPH8PY02	

Course Learning Outcomes:

On completion of the course the student should have the following learning outcomes defined in terms of knowledge, skills and general competence:

- explain the relativistic quantum mechanical equations, namely, Klein-Gordon equation and Dirac equation
- describe second quantization and related concepts.
- explain the formalism of relativistic quantum field theory.
- Understands the quark, the strong nuclear force, and the underlying symmetries
- Students will understand the types of problems that may be solved using Monte Carlo and Molecular Dynamics, and those where these methods are ineffective
- Students will develop insights into typical considerations needed in a computational physics project, including parameter space exploration, estimation of run time, etc
- Classify solid state matter according to their band gaps.
- Understand how electrons and holes behave in semiconductors, and explain how they conduct current.
- Explain and give simple models for Schottky and PN-junctions.
- Impart knowledge on Onsager, Debye equation and calculate dielectric relaxation time and to draw the plane diagram using Cole-Cole, Cole-Davidson plots.
- be able to outline the importance of solid-state physics in the modern society.

UNIT-I: QUANTUM MECHANICS

Second quantization of schrodinger and Klein-Gordon fields- Creation and annihilation operators – Commutation relations – Second quatization of Dirac field – Covariant and anti-commutation relations for Dirac field.

UNIT-II: NUCLEAR AND PARTICLE PHYSICS

Compound nucleus and statistical theory – Experimental evidence – Statistical assumption – Average cross section – Angular distribution – Transmission coefficients – Level density – Decay of the statistical compound nucleus – Emission of charged particles. Symmetries and conservation laws – Gell Mann Nishijima formula – CPT invariance – Quark model.

UNIT-III: NON-LINEAR AND MOLECULAR MECHANICS

Basics of nonlinearity – Linear and nonlinear oscillators – Autonomous and non- autonomous system – Dynamical system.

The energy calculations – Energy minimization – Force field paramertization – Conformation analysis – Solvation – Montecarlo methods – Molecular dynamics – Free energy calculation.

UNIT-IV: SOLID STATE PHYSICS-I

Band structure theory – Band structure for some semiconductors – Semiconductor transport theory – Basics of continuity equation – Theory of generation and recombination – Theory of PN junction – PN junction solar cells – ionic conductivity – Normal and super ionic conductors – Application of super ionic solids: Battery, Fuel cells, Electrochromic display.

UNIT-V: SOLID STATE PHYSICS-II

Basic concepts of dielectrics: Static fields- Time dependent fields- Static dielectric constant: Dipolar interaction - Dipolar molecules in gases and dilute solutions- Onsager equation-Debye equations- Dielectric relaxation and loss-Distribution of relaxation time – Complex plane diagrams-Cole-Cole, Cole-Davidson plots.

REFERENCE BOOKS:

1. Advanced Quantum Mechanics – B.S. Rajput- Pragathi Praksan
2. Physics of the Nucleus – M.A.Preston – Addision – Wesley
3. Elementary particles – D.Griffiths.
4. Nonlinear dynamics – M.Lakshmanan and S.Rajasekar – Springer International.
5. Computational Chemistry – Guy H.Grant and W.Graham Richards –Oxford University press.
6. Semiconductor Devices –S.M.Sze.
7. Electronic properties of materials – Rolf E. Hummel –Springer.
8. Super ionic solids – S.Chandra – North Holland Publishing Company Ltd.

9. Theory of Dielectric – H.Frohlich- Oxford University press.
10. Theory of electric polarization Vol.I and Vol.II – C.J.F. Botcher – Elsevier scientific publication.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8CH01	

COURSE OUTCOME :

CO1: Justifies research and identifies areas of research based on ethical issues.

CO2: Able to design the research work by selecting a suitable problem.

CO3: Learns the methods the data collection and the techniques of data presentation.

CO4: Able to carry out the error analysis and also design methods to control error.

CO5: Learns how to write a research paper and thesis.

UNIT-I: RESEARCH METHODOLOGY

Meaning of research – Objectives of research - motivation of research – Types, approaches and significance – Methods versus methodology – Research in scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT-II: RESEARCH DESIGN

Research Problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design – Needs and features of good design – Different research design – Basic principles of experimental designs.

UNIT-III: DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types – Processing and presentation of data – Techniques of ordering data – Meaning of primary and secondary data – The uses of computers in research – The library and Internet – Uses of search engines – virtual libraries – common software for documentation and presentation.

UNIT-IV: DATA AND ERROR ANALYSIS

Statistical analysis of data – Standard deviation – Correlation – Comparison of set of data – Chi squared analysis for data – Characteristics of probability distribution – Binomial, Poisson and normal distribution – Principle of least square fittings – Curve Fitting – Measurement of errors – Types and sources errors – Determination and Control of errors.

UNIT-V: RESEARCH COMMUNICATION

Meaning of research report – Logical format for writing thesis and paper – Essential of Scientific report: abstract, introduction, review of literature, materials and methods and discussion – Write up steps in drafting report – Effective Illustrations tables and figures – Reference styles: Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research Methodology, Methods and Techniques – C.R Kothari – Wishwa Prakasam Publications, II Edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research: An introduction – Robert Ross – Harper and Row Publications.
4. Research methodology – P. Saravanavel – Kitlab Mahal, Sixth Edition.
5. A Hand book of Methodology of Research – Rajammal P.A. Devadass Vidyalaya Press.
6. Introduction to Computers – N. Subramanian
7. Statistical methods – G.W Snedecor and W. Cocharan – Oxford and IBH, New Delhi.
8. Research Methodology Methods and Statistical Techniques – Santosh Gupta.
9. Statistical Methods – S.P Gupta
10. Scientific social surveys and research – P.Young – Asia Publishers, Bombay.
11. How to write and publish a scientific paper – R.A Day – Cambridge CollegePress.
12. Thesis and Assignment writing – Anderson – Wiley Eastern Ltd.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED CHEMICAL ANALYSIS	Exam Hrs.	3
		MPH8CH02	

COURSE OUTCOME :

CO1: Gains knowledge on the principle and functioning of various instruments used in analytical chemistry.

CO2: Learns the principle of various spectroscopic techniques and apply them in the structural elucidation.

CO3: Gains knowledge on the applications of spectroscopy in chemistry.

CO4: Able to elucidate the structure of Organic and Inorganic molecules by correlating the data from various spectroscopic techniques.

CO5: Learns the application of spectroscopy in stereochemistry.

UNIT-I

Instrumental methods of analysis: Atomic absorption and emission spectroscopy chromatography including GC and HPLC and electro-analytical methods (Colorimetry, cyclic voltammetry, polarography, amperometry, and ion selective electrodes).

UNIT-II

Spectroscopy:

Principle and applications in structure elucidation:

(i) Rotational Diatomic molecules; isotopic substitution and rotational constants.

(ii) Vibrational: Diatomic molecules, linear tritomic molecules, specific frequencies of functional groups in polyatomic molecules.

(iii) Electronic: Singlet and triplet states; n p* and P P* transitions; application to conjugated double bonds and conjugated carbonyls – Woodward-Fieser rules; Change transfer spectra.

(iv) Nuclear Magnetic Resonance (IH NMR): Basic principle; chemical shift and spin-spin interation and coupling constant.

(v) Mass Spectrometry: Parent peak, base peak, metastable peak, Mclafferty rearrangement.

UNIT-III

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of organic molecules.

UNIT-IV

Applications of UV-visible, IR, NMR and Mass spectrometry in the determination of structures of inorganic molecules.

UNIT-V

Symmetry elements: point groups; (ii) optical activity its origin, atomic and conformation asymmetry; (iii) Variation of optical activity with wave length. Optical rotatory dispersion and circular dichroism curves and their application, in determining the configuration and conformation of different compounds (iv) conformational analysis.

REFERENCE BOOKS:

1. H.H. Willand, L.L Merrit and j.A.Dean, Instrumental Methods of Analysis –D. Ven. Nostround Co.
2. H.A. Stobel, Chemical Instrumentalism – Addition – Wesley Publishing Co.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	3
		MPH8BI01	

Code: **MPH8BIO2** Credit: 5

Course outcome:

By the end of the course students will be able to:

COs	Sub Code :**P8BI3001**	Subject:**Molecular Endocrinology**
CO1	Understand the basic principles, types, methods and strategies of isolation, separation, purification and characterization of biological molecules.	
CO2	Correlate various analytical techniques in biochemistry.	
CO3	Acquire problem solving and troubleshooting skills in analytical techniques in biochemistry.	
CO4	Demonstrate methods, instrumentation and applications of chromatographic and electrophoretic methods.	
CO5	Understand the principles, methods, instrumentation and applications of spectroscopic and radio isotopic techniques.	
CO6	Apply immunological techniques for analytical purpose.	

Objectives:

The objective is to educate the students on the basic research, research design, and principle in scientific research, data collection and analysis of significance data.

UNIT - I RESEARCH METHODOLOGY

Meaning of research –Objectives of research –motivation of research- Types, approaches and significance-Methods versus methodology – Research in scientific methods – Research process – Criteria for good research – Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT - II RESEARCH DESIGN

Research problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research design- Needs and features of good design – Different research design- Basic principles of experimental designs.

UNIT III – DATA COLLECTION AND DOCUMENTATION

Data collection methods- Data types- Processing and presentation of data- Techniques of ordering data-Meaning of primary and secondary data-The uses of computers in research- The library and internet-Uses of search engines-virtual libraries – common software for documentation and presentation.

UNIT IV – DATA AND ERROR ANALYSIS

Statistical analysis of data-Standard deviation-Correlation-Comparison of sets of data-Chi square analysis of data-Characteristics of Probability distribution-Binomial, Poisson and normal distribution- Principle of least square fittings- Curve fitting-Measurement of Errors- Types and sources of errors- Determination and control of errors.

UNIT V – RESEARCH COMMUNICATION

Meaning of research report – logical format for writing thesis and paper- Essential of scientific report- Abstract, Introduction, Review of literature. Materials and methods and discussion- Write up steps in drafting report- Effective illustrations; Tables and figures – Reference styles; Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research methodology, Methods and techniques- C.R.Kothari-Vishwapragasam Publications, 2nd edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research ; An introduction – Robert Ross – Harper and Row Publications
4. Research methodology – P.Saravanavel – Kitlab mahal, 6th edition.
5. A hand book of methodology of Research – Rajammal P.A.Devadas-Vidhalaya press.
6. Introduction to computers – N.Subramanian
7. Statistical methods – G.W.Snedecor and W.Cocharan- Oxford and IBH, New Delhi
8. Research methodology methods and statistical techniques –Santhosh gupta.
9. Statistical methods- S.P.Gupta

10. Scientific social survey and research – P.Young –Asia publisher, Bombay.
11. How to write and publish a scientific paper – R.A.Day, Cambridge University Press.
12. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ANALYTICAL METHODS	Exam Hrs.	3
		MPH8BI02	

Course outcome:

By the end of the course students will be able to:

COs	Sub Code :**P8BI3001**	Subject:**Molecular Endocrinology**
CO1	Understand the fundamentals of research, research problems and methodology.	
CO2	Learn the principles of scientific research and research design.	
CO3	Acquire problem solving and troubleshooting skills in analytical techniques in biochemistry.	
CO4	Understand research design and research ethics.	
CO5	Learnresearch data collection, statistical methods and analysis.	
CO6	Develop research writing skills and thesis writing.	

Objectives:

The objective is to educate the students on the basic principles, instrumentation and applications of the analytical tools of biochemistry

UNIT I SEPARATION & CHROMATOGRAPHIC TECHNIQUES

Centrifuge techniques, Prepartive centrifugation,Density gradient, Analysis of subcellular fractions. Determination of molecular weight macromolecules ,Analytical ultra centrifugation.

Absorption chromatography , Partition chromatography , Ion exchange chromatography Exclusion chromatography, Affinity chromatography, HPLC, Application of these techniques.

UNIT II ELECTROPHORETIC & RADIO ISOTOPE TEHCNIQUES

General techniques, High voltage electrophoresis, Disc electrophoresis, Iso electric, focusing, Application of these techniques.

Nature of radio activity Detection and measurements of radioactivity ,Application in biological science, Safety Aspects.

UNIT III SPECTROSCOPIC TECHNIQUES

Basic principle, Spectrophotometry, Fluorometry, Flame photometry, ESR, NMR Mass Spec & Application of these techniques.

UNIT IV MANOMETRIC & IMMUNOLOGICAL TECHNIQUES

Types of manometry, Warburgs constant volume, Oxygen electrode, Applications.

Introduction, Production of antisera and precipitation reaction, Precipitation in free solution, Precipitation in gel immuno diffusion, RIA, ELISA, Immuno fluorescence

UNIT V STATISTICAL METHODS

Basic concepts, Law of chance, probability, mean, SD, binomial expression, hardy Weinberg laws, Test analysis of variance, co-efficient of correlation.

Text Books:

1. Practical Biochemistry by K.Wilson and J.Walker. 5th edition Cambridge Univ 2005.
2. Introductory Practical Biochemistry (Narosa,2000) by K.Shawney & Randhir Singh.
3. Practical Biochemistry by Shawney

Reference:

1. Physical Biochemistry by David Friefielder, W.H.Freeman 2nd edition (1982)
2. Introduction to Medical Laboratory Techniques by Mukherjee, Volume I,II & III
3. Introduction to instrumental analysis by Robert D.Brown, Pharma Book Syndicate(2006)

PROGRAMME OUTCOMES (PO's): M.Phil.

M.Phil. scholars will acquire the following spectrum of knowledge…

PO1 - Develop the understanding of Theory and Research

PO2 - Gain experience in Experimental or Case Study design, Scientific Data Analysis, Writing and communication, Ethical Practices and Effective Collaboration.

PO3 - Communicate effectively with scientific community and with Society at large.

PO4 - Comprehend and write effective report documentation.

PO5 - Effectively disseminate technical information using written progress report, strategic report, scientific communication and operations.

PROGRAMME SPECIFIC OUTCOMES (PSO's): M.Phil. BIOTECHNOLOGY

M.Phil. Biotechnology scholars will be able to

PSO1 - Understand the current state of Biotechnology in their area of specialization.

PSO2 - Formulate a hypothesis and conduct research using appropriate tools and techniques with in their focused area of Study.

PSO3 – Communicate research results in Written and Oral Format.

PSO4 - Effective Teaching and mentor of others.

PSO5 - Recognize the need for the preparation and ability to carry out an independence research in broadest context of Biotechnological relevance.

CO's	Sub Code: MPH8BT01	Subject: **RESEARCH METHODOLOGY**
CO1	Understand the objective and problems encountered by research in India	
CO2	To understand the responsibilities of researchers	
CO3	To study and understand the code of ethics involved in research	
CO4	Design the research problems, techniques and experimental design.	
CO5	Understand the technique of data collection and ordering for documentation and presentation.	
CO6	Apply the research data for statistical analysis	
CO7	Determine the measurement of errors and control of research data	
CO8	Logical format for writing thesis research report	
CO9	Draft reports based on the research data derived and effective illustration by tables and figures.	
CO's	Sub Code: MPH8BT02	Subject: **ADVANCED BIOTECHNOLOGY**
CO1	Strategize protocols for amenable gene transfer, vectors used in gene transfer in plants.	
CO2	Develop and characterize and maintenance of cell lines and production of human animal viral vaccines.	

CO3	Demonstrate, DNA based diseases diagnosis and stem cell biology and regenerative medicines
CO4	Develop the knowledge of production of Bioactive compounds and recombinant vaccine.
CO5	Demonstrate the knowledge of downstream processing of enzyme production
CO6	Describe the biosensors, biofuel, biopolymers and the application of nanotechnology
CO7	Analyse the solutions for industrial effluents, nuclear wastes and bioremediations.

CORE PAPER I	**SEMESTER I**	**Credit**	**5**
		Hrs./Week	**6**
COURSE TITLE	**RESEARCH METHODOLOGY**	**Exam Hrs.**	**3**
		MPH8BT01	

UNIT- I RESEARCH METHODOLOGY

Meaning of research-Objectives of research-motivation of research- Types, approaches and significance-Methods versus methodology- Research in scientific methods- research process- Criteria for good research- Problem encountered by research in India – Funding agencies.

RESEARCH ETHICS

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT - II RESEARCH DESIGN

Research problem: Selecting the problem – Necessity of defining the problem – Techniques involved in defining the problem – Research designs- Needs and features of good design – Different research design – Basic principles of experimental designs.

UNIT- III DATA COLLECTION AND DOCUMENTATION

Data collection methods – Data types- Processing and presenting of data- Techniques of ordering data- Meaning of primary and secondary data- The uses of computers in research- The library and internet – uses of search engines – virtual libraries-common software for documentation and presentation.

UNIT - IV DATA AND ERROR ANALYSIS

Statistical analysis of data-Standard deviation-Correlation-comparison of sets of data- Chi square analysis of data-Characteristics of probability distribution-Binomial, Poisson and normal distribution- Principle of least square fittings- Curve fitting- Measurement of Errors – Types and source of errors- Determination and control of errors.

UNIT - V RESEARCH COMMUNICATION

Meaning of research report- logical format for writing thesis and paper – Essential of scientific report- Abstract, Introduction, Review of literature. Materials and methods and discussion- Write up steps in drafting report- Effective illustrations; Tables and figures - Reference styles; Harvard and Vancouver systems.

REFERENCE BOOKS:

1. Research methodology, Methods and techniques- C.R.Kothari - Vishwapragasam publications,2nd edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Research ; An introduction - Robert Ross – Harper and Row publications
4. Research methodology – P.Saravanavel – Kitlab mahal, 6th edition.
5. A hand book of methodology of research- Rajmmal P.A.Devadas- Vidhalaya press.
6. Introduction to computers – N.Subramanian
7. Statistical methods – G.W.Snedecor and W.Chcharan – Oxford and IBH, New Delhi.
8. Research methodology methods and statistical techniques – Santhosh gupta.
9. Statistical methods – S.P.Gupta.
10. Scientific social survey and research – P.young – Asia publisher, Bombay
11. How to write and publish a scientific paper – R.A.Day, Cambridge University press.
12. Thesis and assignment writing- Anderson- Wiley Eastern Limited.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	ADVANCED BIOTECHNOLOGY	Exam Hrs.	3
		MPH8BT02	

UNIT - I Plant Biotechnology

In-vitro regeneration protocols amenable for gene transfer, Vectors used in gene transfer in plants. Ti plasmids, Biolistic gun. Antisense and RNAi strategies for metaboloic engineering . Transgenic crops for herbicide, pest and abiotic stress resistance. Terminator gene technology. Biosafety issues, IPR and Bioethics.

UNIT – II: Animal Biotechnology

Different cell culture techniques ; Development of cell lines; Characterization and maintenance of cell lines; cryopreservation, Cell cloning and selection; transfection and transformation of cells; Application of animal cell culture for in vitro testing of drugs; Applications of cell culture technology in production of human and animal viral vaccines. Transgenic animal models: gene knock-outs; Cre-lox systems-applications.

UNIT – III: Medical Biotechnology

Human health care, genetic disorder, gene therapy, Infectious diseases, DNA-based disease diagnosis, Stem cell biology: stem cell types- haematopoietic and embryonic- cord blood cells- regenerative medicines. Production of Bioactive Compounds, Drug delivery, Development of recombinant vaccines, Herbal medicine.

UNIT – IV: Industrial Biotechnology

Production of enzymes & organic acids, downstream processing, Solid state fermentation, Bioprocess monitoring, modeling and control, Biocatalysis & Biotransformation, Bioconversion of biomass, Biosensors, Biofuel- bioethanol and biohydrogen, Biopolymers. Principles and applications of Nano biotechnology.

UNIT – V: Environmental Biotechnology

Global environmental issues and biotechnological solutions. Treatment of industrial effluents- solid waste management- Management of nuclear waste. Bioremediation- *in situ*

and *ex situ* bioremediation. Biodegradation of xenobiotics. Biomonitoring. Biodiversity conservation.

REFERENCES:

1. Sathyanarayana. (2010). Biotechnology, India.
2. Slater, A. Scot, N. and Fowler, M. (2007) Plant Biotechnology-the genetic manipulation of plants. Oxford press,
3. Watson,J.D; Gilman, M; Witkowshi,J and M.Zoller, 1992. Recombinant DNA, 2nd edition. Scientific American Books, W.H. Freeman and Co; New york, USA
4. Glick, B.R and J.J. Pasternak. 2005. Molecular Biotechnology- Principles and application of recombinant DNA, 3rd edition. ASM press. Washington, USA
5. Environmental Biotechnology, principles and applications, Bruce Rittman, Perry Mccarty, McGraw- Hill, 2nd edition, 2000.
6. Therapeutic Immunology, K. Frank Austen, Steven J. Burakoff, Fred.S.Rosen (2nd edi.) 2001.

CORE PAPER I	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	RESEARCH METHODOLOGY	Exam Hrs.	6
		MPH8CS01	

COURSE OUTCOME :

CO1: Justifies research and identifies areas of research based on ethical issues.

CO2: Able to design the research work by selecting a suitable problem.

CO3: Learns the methods the data collection and the techniques of data presentation.

CO4: Able to carry out the error analysis and also design methods to control error.

CO5: Learns how to write a research paper and thesis.

UNIT-I

Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process-Problem Identification & Formulation – Research Question – Investigation Question –Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance.

Research Ethics

Ethics and Research Aims - Moral Justifications of Research - Responsibilites of Researchers - Areas of research which raise ethical issues - Ethical issues in the use of information and communication technology - Code of Ethics

UNIT-II

Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches.

UNIT-III

Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio. - Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample

Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size.

UNIT-IV

Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish ? Ethical issues related to publishing, Plagiarism and Self-Plagiarism.

UNIT-V

Use of Encyclopedias, Research Guides, and Handbook: Academic Databases for Computer Science Discipline -Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism.

REFERENCES:

1. Donald Cooper & Pamela Schindler, "Business Research Methods", Tata McGraw Hill, 9th edition.
2. Paul Oliver, The Studnets guaide to research ethics, Mc.Graw Hill Open University Pres, Second Edition, 2010
3. Alan Bryman & Emma Bell, "Business Research Methods", Oxford University Press.
4. C.R. Kothari, "Research Methodology: Methods and Techniques", New Age International Publishers.

CORE PAPER II	SEMESTER I	Credit	5
		Hrs./Week	6
COURSE TITLE	COMPUTER GRAPHICS AND IMAGE PROCESSING	Exam Hrs.	6
		MPH8CS02	

UNIT I

Scan conversion – lines, circles and Ellipses; Filling polygons and clipping algorithms:Scan Converting Lines, Mid-point criteria, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Scan Converting Ellipses, Filling Polygons, edge data structure, Clipping Lines algorithms– Cyrus-Beck, Cohen-Sutherland and Liang-Barsky.

UNIT II

Visible-Surface Determination:Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting)

Illumination and Shading:Illumination and Shading Models for Polygons, Reflectance properties of surfaces, Ambient, Specular and Diffuse reflections, Atmospheric attenutation, Phong's model, Gouraud shading.

UNIT III

Image Enhancement and Image Restoration

Image Enhancement in the Spatial Domain: Basic Gray Level Transformations, HistogramProcessing, Enhancement Using Arithmetic/Logic Operations, SpatialFiltering , Fuzzy sets for spatial filters – Image Enhancement in the Frequency Domain: Frequency Domain Filters – ImageRestoration: Model of Image Degradation/Restoration Process, Noise Models, Linear and non linearimage restoration techniques, Blind Deconvolution

UNIT IV

Multiresolution analysis and Image Compression

Multi Resolution Analysis: Image Pyramids – Multi resolution expansion – Fast Wavelet Transforms,Lifting scheme. Image Compression: Fundamentals – Models – Elements of Information Theory –Error Free Compression – Lossy Compression-wavelet based image compression techniques –Compression standards-JPEG/MPEG, Video compression.

UNIT V

Image Segmentation and Description

Image Segmentation: Detection of Discontinuities, Edge Linking and Boundary Detection,

Thresholding, Region Based Segmentation, Basic Morphological Algorithms, Morphological Water Sheds - Description: Boundary Descriptors, Regional Descriptors.

REFERENCES:

1. J. D. Foley, A. Van Dam, S. K. Feiner and J. F. Hughes, Computer Graphics - Principles and Practice, Second Edition in C, Pearson Education, 2003.
2. Farina Madita Dobrick, Jana Fischer. Lutz M. Hagen (Editors) Research Ethics in the Digital Age: Ethics for the Social Seicne and Humanities in Times of Mediatization and Digitization, Springer, 2018.
3. D. Hearn and M. Pauline Baker, Computer Graphics (C Version), Pearson Education, 2nd Edition, 2004.
4. D. F. Rogers and J. A. Adams, Mathematical Elements for Computer Graphics, 2nd Edition, McGraw-Hill International Edition, 1990.
5. Rafael C.Gonzalez and Richard E.Woods, "Digital Image Processing", Pearson Education, ThirdEdition, 2008.6
6. Anil K.Jain, "Fundamentals of Digital Image Processing", PHI, 2006.
7. Rafael C.Gonzalez, Richard E.Woods, and Eddins, "Digital Image Processing Using MATLAB", Tata McGraw-Hill, Second Edition, 2009