SRI ADI CHUNCHANAGIRI
WOMEN'S COLLEGE
(Accredited by NAAC with 'A' Grade)
(Run by Sri Adi Chunchanagiri Shikshana Trust @ Karnataka)
Permanently Affiliated to Mother Teresa Women's University, Kodaikanal

PO, PSO & CO

2021 onwards

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

B.A. ENGLISH

(CHOICE BASED CREDIT SYSTEM)

(from 2021-2022)

SYLLABUS, REGULATIONS AND SCHEME OF EVALUATION

DEPARTMENT OF ENGLISH

Mother Teresa Women's University, Kodaikanal
Department of English and Foreign Languages
Choice Based Credit System (CBCS)
(2021-2022 onwards)
B.A. English

1. About the Programme

English literature is a wide area of study that is considered a subject that is highly important. It creates a standing connection to various cultural enquiries. It helps to bring together several scopes of culture including film scripts, fiction and poetry. These are the various aspects that are anchored on English literature. BA English Literature is a modern undergraduate degree program that is known to equip students with global ability to deal with both historical and cultural situations. The degree has a well designed curriculum that includes English language and creative writing. The degree is a comprehensive inclusion of modules that form a strong foundation for all students taking the course. The course exposes students to the advanced skills and the analytical capacity to deal with the evaluation of various means of communication in the literal contexts.

There are many opportunities available for students to undertake work placements during BA English Literature coursework. This helps to prepare students for industrial application of their skills and knowledge throughout the world. The course prepares students for modern hospitality matters and other literary issues in the world today. There are many employment opportunities throughout the world now for B.A. English Literature graduates.

2. Programme Educational Objectives (PEOs)

PEO1	To prepare students to understand and use the English language effectively, build vocabulary and introduce them to current ideas and issues as represented in some of the best examples of English writing
PEO2	To educate the student in both the artistry and the utility of the English Language through the study of literature
PEO3	To make the students get a better idea of the subjects and to make them intellectually sharper and innovative.
PEO4	To offer unlimited opportunities to the students in future like research and facing all the competitive examinations.
PEO5	To provide students with the critical faculties necessary in an academic environment, and in the complex and interdependent world.

3. Eligibility

i) Candidates should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Examination, Govt. of Tamil Nadu or any other Examination accepted by the syndicate as equivalent.

ii) Candidate should have secured at least 50% in major subjects.

iii) A relaxation of 10% in the total percentage will be given to SC, ST candidates.

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	10	25	10	25
External	30	75	30	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	A	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	10
2	B	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	20
3	C	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	45
Total Marks			75

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade

(Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance less than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

PROGRAMME OUTCOMES (POs)

On successful completion of B. A. English programme, the students will be able to

PO1	develop intellectual flexibility, creativity, and cultural literacy so that they may engage in lifelong learning
PO2	demonstrate an attitude of service and commitment to social change
PO3	appreciate and admired the master minds of literature and analyze a variety of literary samples to determine the components, organizations, and structure of the academic text
PO4	understand the process of communicating and interpreting human experiences through literary representation using historical contexts and disciplinary methodologies
PO5	identify, analyze, interpret and describe the critical ideas, values, and themes that appear in literary and cultural texts.

PO6	promote their managerial skills to work independently and in groups so that they could transform themselves into job-ready candidates and achieve their career goals
PO7	understand the way the ideas, values, and themes inform and impact culture and society, both now and in the future

PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the end of the programme, the students will be able to

PSO	know and appreciate the location of literature within humanities,establish connections across frontiers of disciplines, critically engage with culture, gender and marginality, become acquainted with narration and representation.
PSO2	distinguish the genres of literature (drama, poetry and prose, fictional and nonfictional) and various approaches to reading literature with acuity and insight (e. g. Realism, Romanticism, Naturalism, Impressionism, Expressionism, Modernism, Post-Modernism, Structuralism, Post-structuralism et al.)
PSO3	demonstrate command of written academic English, including the abilities to a) organize and present material in a cogent fashion, b) formulate and defend original arguments, c) employ effectively the language of their discipline.
PSO4	appreciate the interconnectedness and interdisciplinary of all knowledge and demonstrate curiosity, humility and courage reflecting a commitment to reading and critical inquiry
PSO5	acquire vital employability skills and employment opportunities in the fields like teaching, media, journalism, content writing, free lance writing, film, drama etc.,

BA ENGLISH CURRICULAM

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			L	P	Int	Ext	Total
FIRST SEMESTER							
U21LTA11 U21LFR11	Tamil I / French I	3	6	-	25	75	100
U21LEN11	Communicative English I	3	6	-	25	75	100
U21ENT11	**Core I**- Age of Shakespeare and Milton	4	5	-	25	55	100
U21ENT12	**Core II**- Advanced English Grammar	4	6	-	25	55	100
U21ENA11	**Allied I**- Social History of England	4	5	-	25	75	100
U21EVS11	Environmental Studies	2	2	-	25	75	100
U21PEAS11	Professional English-I	4	6	-	25	75	100
	Total	**24**	**36**				**700**
SECOND SEMESTER							
U21LTA22 / U21LFR22	Tamil II / French II	3	6	-	25	75	100
U21LEN22	Communicative English II	3	6	-	25	75	100
U21ENT21	**Core III**- Age of Dryden and Pope	4	5	-	25	75	100
U21ENT22	**Core IV**- Indian Writing in English	4	6	-	25	75	100
U21ENA22	**Allied II**- History of English Literature	4	5	-	25	75	100
U21VAE21	Value – Education	3	3	-	25	75	100
U21PEAS22	Professional English-II	4	6	-	25	75	100
	Total	**25**	**36**				**700**
THIRD SEMESTER							
U21LTA33/ U21LFR33	Tamil III / French III	3	6	-	25	75	100
U21LEN33	General English-I	3	6	-	25	75	100
U21ENT31	**Core V**- Age of Wordsworth	4	5	-	25	75	100
U21ENA33	**Allied III-** Literary Genres and Terms	4	5	-	25	75	100
U21ENE311/ U21ENE312	**Elective – I-** Journalism and Mass Communication / Travel Writing	3	4	-	25	75	100
U21CSS31	**SBE-1-**Computer Skills for Office Management	2	2	-	25	75	100

	Non Major Elective – I	2	2	-	25	75	100
	Total	**21**	**30**				**700**

FOURTH SEMESTER							
U21LTA44/ U21LFR44	Tamil IV / French IV	3	6	-	25	75	100
U21LEN44	General English-II	3	6	-	25	75	100
U21ENT41	**Core VI**- American Literature	4	4	-	25	75	100
U21ENT42	**Core VII**- Age of Tennyson	4	4	-	25	75	100
U21ENA44	**Allied IV**- Translation: Basic Concepts and Practice	4	4	-	25	75	100
U21ENE421/ U21ENE422	**Elective II**- Comparative Literature/ Children's Literature	3	3	-	25	75	100
U21MSS42	**SBE -II**- Managerial Skills	2	2	-	25	75	100
	Non Major Elective – II	2	2	-	25	75	100
U21PEAS44	Professional English IV	4	6	-	25	75	100
	Total	**25**	**31**				**900**

FIFTH SEMESTER

U21ENT51	**Core VIII**- Introduction to English Language and Phonetics	4	5	-	25	75	100
U21ENT52	**Core IX**- Twentieth Century British Literature	4	5	-	25	75	100
U21ENT53	**Core X**-Women's Writing in English	4	5	-	25	75	100
U21ENT54	**Core XI** Introduction to Literary Criticism	4	5	-	25	75	100
U21ENT55	**Core XII** Shakespeare	4	5	-	25	75	100
U21ENE531/ U21ENE532	**Elective III**- Marginal Writing/ Creative Writing	3	3	-	25	75	100
U21ENS53	**SBE III**- Writing for the Web	2	2	-	25	75	100
	Total	**25**	**30**				**700**

SIXTH SEMESTER

U21ENT61	**Core XIII**- Introduction to World Classics	4	5	-	25	75	100

U21ENT62	**Core XIV**- New Literatures in English	4	5	-	25	75	100
U21ENT63	**Core XV**-Life Writings	4	5	-	25	75	100
U21ENT64	**Core XVI**-English Teaching Methods and Materials	4	5	-	25	75	100
U21ENT65	**Core XVII**- Literatures from Asia	4	4	-	25	75	100
U21ENE641/ U21ENE642	**Elective IV**- Myth and Literature/ Film and Literature	3	4	-	25	75	100
U21ENS64	**SBE IV-** Soft Skills- Life Skills	2	2	-	25	75	100
U21EAS61	NCC/ NSS/ RRC/YRC/Physical Education	3	-	-	100		100
	Total	**28**	**30**				**800**
	Grand Total	**148**	**193**				**4400**

Non Major Elective

The candidates, who have joined the UG Programme, can also undergo Non Major Elective offered by other Departments.

Non Major Elective (NME) offered by the Department of English and Foreign Languages

U21ENN31	NME- I- Computer Assisted Language Learning
U21ENN42	NME-II- Women and Holistic Development

Additional Credit Courses (Two Credit courses)

U21ENO31	Online Course in- III Semester
U21ENI41	Internship – IV Semester
U21ENV51	Value Added Course-Presentation Skills- V Semester

SEMESTER-I

COURSE CODE	U21ENT11	AGE OF SHAKESPEARE AND MILTON	L	T	P	C
CORE1			5	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims at • providing a wide spectrum of literary exuberance of the great masters of both the ages of Shakespeare and Milton for the young minds to revel in the luxury of representative literary pieces in each genre and to be informed and inspired. • helping the students imbibe the abiding human and moral values through the study of great pieces of literature. • developing critical and creative faculties in students.				

UNIT 1 : Prose

Francis Bacon - Of Truth
Francis Bacon – Of Parents and Children
The Bible –Jonah

UNIT 2 : Poetry

John Milton – Paradise Lost Book IV
Edmund Spenser - Epithalamion

UNIT 3: Poetry

Shakespeare – Let Me Not to the Marriage of True Minds.
John Donne - A Valediction: Forbidding Mourning
George Herbert – Easter Wings , The Altar
Henry Vaughan – Retreate, The Shower

UNIT 4: Drama

Thomas Kyd – The Spanish Tragedy
John Webster – The White Devil

UNIT 5 : Fiction
John Bunyan – The Pilgrim's Progress, Part I

Reference:
1. Andrew Sanders., *A Short Oxford History of English Literature* , Clarendon Press, Oxford. **1994**.
2. M.H. Abramseal, ed, *The Norton Anthology of English Literature,* Vols. 1 and 2, Edited
3. F. Kermode and J. Hollander, ed, *The Oxford Anthology of English Literature,* 2 vol., 1973
4. Brijadish Prasad, Hari Priya Ramadoss., *A Background to the study of English Literature:* Revised Edition, January 2016
5. Edward Albert, *History of English Literature*, Fifth Edition. Oxford University Press, January 2018

E- Resources
https://libguides.southernct.edu/c.php?g=721855&p=5148244
http://writersinspire.org/
http://www.literature-study-online.com/resources/
https://www.wwnorton.com/college/english/nael/

Course Outcomes
Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of the classical writers
K1, K2	CO 2	understand the difference between Old English and Middle English
K2, K4	CO 3	be aware of the salient features of aphoristic style
K2, K6,K3	CO 4	discover and to apply the creative power behind art and literature
K4, K6	C05	critically analyze the life and works of great writers and will be able to create literary pieces on their own

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENT12	ADVANCED ENGLISH GRAMMAR	L	T	P	C
CORE II			6	-	-	4
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		**The course aims** • to make students attain writing skills by making them applying the usage of grammar. • to develop fluency among the students. • to assess the experience and fluency in English transforming their personality. • to learn and brighten up their career. • to strengthen the communication skills through exercise and Quiz.				

UNIT I - Explanation and Usage
Types of sentences
Interrogatives
Declarative
Exclamatory, and Imperative

UNIT II- Explanation and Usage
Parts of Speech and Agreement with Sentence
Tense, Number
Degrees of Comparison

UNIT III - Explanation and Usage
Modals
Auxiliaries
Question Tags
Active Voice and Passive Voice

UNIT IV - Explanation and Usage
Direct and Indirect Speech,
Transformation of Sentences
Simple Sentence
Compound
Complex- Independent and Dependent Clause
Semi- Negatives

UNIT V-Explanation and usage
Gerund, Infinitives, Participles
Common errors and Modern English Usage

Reference:

1. Thomson , A. J. and Martin *A Practical English Grammar .Madurai* et: Oxford University Press, 1986.
2. Augustine, A.E , and K.V.Joseph.*Macmillan Grammar- A Hand book.*Chennai: Macmillan India Limited, 2005.

E- Resources

1. http://www.chompchomp.com/menu.htm
2. https://www.fluentu.com/english
3. http://www.5minuteenglish.com/grammar.htm
4. https://learnenglish.britishcouncil.org/en/grammar

Course Outcome

At the end of the course, the students will be able to:

K1, K2	**CO1**	acquire knowledge of linguistic conventions for reading, writing and speaking.
K1, K2	**CO2**	use targeted grammatical structures appropriately in oral and written production.
K5, K4	**CO3**	analyse the grammatical structure of sentences within English texts.
K5, K1	**CO4**	communicate effectively in both spoken and written Standard English.
K6, K3	**CO5**	make inferences and predictions based on comprehension of a text.

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENA11	SOCIAL HISTORY OF ENGLAND	L	T	P	C
ALLIED-I			5	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create				
Learning Objectives		The course aims to • make the students Understand different movements that originated in England. • make them understand the religious, political, literary, and social problems as reflected in the literature of these periods • help students appreciate the seminal works of prominent writers of these periods • introduce the important incidents and movements in English history. • help the students obtain a comprehensive view of the periods in the history of England. • inculcate an interest in understanding literature with the background				

UNIT-1- Renaissance and Reformation
The Renaissance and its Impact on England,
The Reformation - Causes and Effects,

UNIT-2- Social Significance
The Commonwealth of Nations,
The Restoration,
Coffee-houses and their social relevance-

UNIT-3- Revolutions and Movements
Impact of the Industrial, Agrarian and the French Revolutions on the English society,
Humanitarian Movements in England,

UNIT-4- Reform Bills and Education
The Reform Bills and the Spread of Education-
Social impact of the two World Wars

UNIT-5- The Labour Movement

The Welfare State- The Cold War (1985-1991)
The Falkland War (1981)
The Gulf War (1991)

Reference:

Ashok, Padmaja. "The Social History of England", Chennai: Orient Black Swan Pvt. Ltd, 2011.
G. Xavier, The Social History of England, ", Chennai:Ananda Book House, 2017.

E- Resources

https://libguides.southernct.edu/c.php?g=721855&p=5148244
http://writersinspire.org/
http://www.literature-study-online.com/resources/
https://www.wwnorton.com/college/english/nael/

Course Outcomes

Upon completion of this course, the students will be able to

K1, K2	**CO1**	provide a basic knowledge of the political and social history of England.
K1, K2	**CO 2**	understand different movements that originated in England.
K2, K4	**CO 3**	acquaint with the literary movements, favoured genres and the evolution and development of literary forms.
K2, K6,K3	**CO 4**	familiarize with terms, practices and theoretical foundations of the disciplines.
K4, K6	**C05**	analyze texts from these cultures; To gain some understanding of their traditions, historical aspects and values

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

SEMESTER-II

COURSE CODE	U21ENT21	AGE OF DRYDEN AND POPE	L	T	P	C
CORE III			5	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims to • make them understand the religious, political, literary, and social problems as reflected in the literature of these periods • help students appreciate the seminal works of prominent writers of these periods • enable students to understand the characteristics of the Metaphysical poetry • enhance the students' understanding of the literary conventions followed during these periods • highlight the salient features of Comedy of Manners				

UNIT 1: Prose

The Spectator Papers (Addison and Steele) – Female Orators
Sir Roger at Home,
Of the Club

Jonathan Swift – The Battle of the Books
Oliver Goldsmith – A Man in Black

UNIT 2: Poetry

Pope – The Rape of the Lock – Canto 1
Dryden – Alexander's Feast
A Song for St. Cecilia's Day
Collins – Ode to Evening

UNIT 3: Drama

Goldsmith – She Stoops to Conquer
Congreve – The Way of the World

UNIT 4: Fiction

Samuel Richardson - Pamela

UNIT 5: Fiction
Daniel Defoe – Robinson Crusoe

Reference:
1. Andrew Sanders., *A Short Oxford History of English Literature,* Clarendon Press, Oxford. **1994**.
2. M.H. Abramseal, ed, *The Norton Anthology of English Literature,* Vols. 1 and 2, Edited
3. F. Kermode and J. Hollander, ed, *The Oxford Anthology of English Literature,* 2 vol., 1973
4. Brijadish Prasad, Hari Priya Ramadoss., *A Background to the study of English Literature:* Revised Edition, January 2016
5. Edward Albert, *History of English Literature*, Fifth Edition. Oxford University Press, January 2018

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http://writersinspire.org/
http://www.literature-study-online.com/resources/
https://www.wwnorton.com/college/english/nael/

Course Outcomes
Upon completion of this course, the students will be able to

K1, K2	**CO1**	understand the sense of rationalism and sensibility of the writers
K1,K2	**CO2**	recognize and understand the figurative language
K2,K3	**CO3**	apply the technical nuances of Neo-Classical dramas
K5, K2,K3	**CO4**	comprehend the artistic style of the writers and adopt the style in writing
K6, K3	**CO5**	appreciate the intense zeal of the writers and stimulate the creativity of the students

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENT22	INDIAN WRITING IN ENGLISH	L	T	P	C
CORE- IV			6	-	-	4
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims to • enable the students to have an understanding of the historical and political movements in India • enable the students to gain knowledge about Indian cultural ethos and its uniqueness • encourage the students to analyze the cultural traits of Indian English Literature during the colonial and post-colonial periods • motivate the students to compare and contrast the Indian writers' literary acumen with that of the British writers • inspire the students to critically evaluate the merits and demerits of Indian Writing in English				

UNIT 1: Prose
M.K.Gandhi – Stealing and Atonement
Jawaharlal Nehru - A Glory Has Departed
J. Krishna Moorthy – The Rich and the Poor / K.M. Paniker – The Awakening of Women

UNIT 2: Poetry
Sarojini Naidu- Indian Weavers
A.K.Ramanujan – A Small Scale Reflection on a Great House
Kamala Das - My Grand Mother's House
Sujata Bhatt - Don't Call me an Indo Anglian
Nissim Ezekiel – Poet, Lover, Birdwatcher

UNIT 3: Short Story
Anita Desai- The Accompanist
Ruskin Bond- Train Stops at Shamli

UNIT 4: Drama
Rabindranath Tagore - Chandalika
Mahesh Dattani - Tara

UNIT 5: Fiction
Amitav Ghosh – The Shadow Lines
Arundhati Roy- The Ministry of Utmost Happiness

Reference:

1. "An Anthology of CommonWealth Poetry". Ed., C.D. Narasimhaiah. Chennai: Macmillan India Pvt. Ltd., 1990.
2. Iyengar. R.Srinivasa., "Indian Writing in English". New Delhi: Sterling Publishers Private Limited. 1983
3. Naik, M.K, ed. "Aspects of Indian Writing in English". New Delhi: Macmillan India Limited, 1982.
4. Appasamy, S.P, RaoGovinda C.D, ed.. "Representative Selections from Indian Prose". Chennai: Macmillan India. 2003

E- Resources

http://www.mdudde.net/pdf/study_material_DDE/ma/maEnglish/INDIAN%20WRITING%20IN%20ENGLISH

https://www.ukessays.com/essays/english-literature/the-introduction-to-indian-writing-in-english-

http://sahitya-akademi.gov.in/journals/indianliterature.jsp

Course Outcome

At the end of the course, the students will be able to:

K1, K2	**CO1**	understand the social, and political controversies in India during the colonial and post- colonial periods
K1, K2	**CO2**	acquire knowledge about Indian cultural ethos and its uniqueness
K5, K4	**CO3**	evaluate the unique characteristics of Indian writing in English
K5, K1	**CO4**	appreciate the spirit of the Indian writers to preserve the noble values of Indian society
K6, K3	**CO5**	acquire literary acumen for facing the SET/ NET/TET and other competitive examinations with confidence

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENA22	HISTORY OF ENGLISH LITERATURE	L	T	P	C
ALLIED-II			5	-	-	4
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		**The course aims** • to make students attain writing skills by making them applying the usage of grammar. • to develop fluency among the students. • to assess the experience and fluency in English transforming their personality. • to learn and brighten up their career. • to strengthen the communication skills through exercise and quiz.				

UNIT-1- Age of Chaucer
The Renaissance Period (1350 – 1660): An Introduction to Bible Translation - Tyndale, Coverdale,

UNIT-2-Development Drama
The University Wits,
Elizabethan and Jacobean drama, Comedy of Humour

UNIT-3-(1660 - 1800)
The Late Seventeenth and the Eighteenth Centuries(1660 - 1800): Comedy of Manners, Neo-Classicism, Sentimental and Anti-sentimental comedies,

UNIT-4- Pre- Romantics& Romantic Age
Features of Romantic Age
Well made play (Drama of Ideas)
Existential Drama, Comedy of Menace

UNIT-5- Victorian Age
Feature of Victorian Age
Features of Pre- Raphaelites
Twentieth-Century Literature

Reference
1. Andrew Sanders., A Short Oxford History of English Literature, Clarendon Press, Oxford. ***1994***.
2. M.H. Abramseal, ed, The Norton Anthology of English Literature, Vols. 1 and 2, Edited
3. F. Kermode and J. Hollander, ed, The Oxford Anthology of English Literature, 2 vol., 1973

4. Brijadish Prasad, Hari Priya Ramadoss., A Background to the study of English Literature: Revised Edition, January 2016
5. Edward Albert, History of English Literature, Fifth Edition. Oxford University Press, January 2018

E- Resources

https://libguides.southernct.edu/c.php?g=721855&p=5148244
http://writersinspire.org/
http://www.literature-study-online.com/resources/
https://www.wwnorton.com/college/english/nael/

Course Outcome

At the end of the course, the students will be able to:

K1, K2	**CO1**	acquaint with factual contents.
K1, K2	**CO2**	strengthen the aesthetic sense.
K5, K4	**CO3**	develop a critical perspective in students.
K5, K1	**CO4**	express, to find out and analyze the period and the authors in the period they belong to.
K6, K3	**CO5**	realize the influence of writers in creating new trends.

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
sCO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

SEMESTER-III

COURSE CODE	U21ENT31	AGE OF WORDSWORTH	L	T	P	C
CORE V			5	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims to • make them understand the religious, political, literary, and social problems as reflected in the literature of these periods • help students appreciate the seminal works of prominent writers of these periods • enable students to understand the characteristics of the poetry of that age • enhance the students' understanding of the literary conventions followed during these periods • highlight the salient features of Drama and Fictions of the particular literature.				

UNIT 1: Prose
Hazlitt – On Going a Journey
Lamb – Dream Children A Reverie
A Dissertation upon Roast Pig

UNIT 2: Poetry
Wordsworth – Daffodils
Keats – Ode on a Grecian Urn
Shelley – Ode to the West Wind
Coleridge – Frost at Midnight

UNIT 3: Poetry
Coleridge – The Rime of an Ancient Mariner
Wordsworth – Tintern Abbey

UNIT 4: Fiction
Walter Scott : Kennilworth

UNIT 5 : Fiction
Jane Austen – Pride and Prejudice

Reference:

1. Andrew Sanders., *A Short Oxford History of English Literature,* Clarendon Press, Oxford. **1994**.
2. M.H. Abramseal, ed, *The Norton Anthology of English Literature,* Vols. 1 and 2, Edited
3. F. Kermode and J. Hollander, ed, *The Oxford Anthology of English Literature,* 2 vol., 1973
4. Brijadish Prasad, Hari Priya Ramadoss., *A Background to the study of English Literature:* Revised Edition, January 2016
5. Edward Albert, *History of English Literature*, Fifth Edition. Oxford University Press, January 2018

E -Resources

https://libguides.southernct.edu/c.php?g=721855&p=5148244
http://writersinspire.org/
http://www.literature-study-online.com/resources/
https://www.wwnorton.com/college/english/nael/

Course Outcomes

Upon completion of this course, the students will be able to

K1,K2	CO1	understand the sense of rationalism and sensibility of the writers
K1, K2	CO2	recognize and understand the figurative language
K2,K3	CO3	apply the technical nuances of dramas
K5,K2,K3	CO4	comprehend the artistic style of the writers and adopt the style in writing
K6, K3	CO5	appreciate the intense zeal of the writers and stimulate the creativity of the students

Mapping of COs with POs & PSOs:

CO/ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENA33	LITERARY GENRES AND TERMS	L	T	P	C
ALLIED-III			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		By introducing the course, it is intended to: • sensitize students to the language forms of Literature. • enable the students in enjoying the flair of literature through the various forms of classical works • elucidate the students with the knowledge of English Literature • give the students a thorough knowledge of the important literary genres and the sub divisions of the genres • help the students to analyze and evaluate various terms and concepts.				

Unit – 1: PROSE
Essay
Biography
Auto-biography

Unit – 2: POETRY
Ballad
Epic
Sonnet
Lyric
Ode
Elegy

Unit – 3: DRAMA
Revenge play
Comedy
Tragedy
Comedy of Humor
Comedy of Manners
Tragic Comedy
One-Act play
Kitchen-sink drama,
Problem Play,
Didactic
Drama(Propaganda play),
One-act play

Unit – 4: FICTION
Dystopian/ Apocalyptic writing
Short Stories
Novels

Unit – 5: FIGURES OF SPEECH
Simile, Metaphor, Alliteration, Hyperbole, Litotes, Onomatopoeia, Personification, Euphemism, Irony, Oxymoron, Epigram, Symbolism, Antithesis and Pun.
Literary Terms
Anti-Climax, Archetype, Prototype,
Rhetoric, Canon, Caricature, Character,
Characterization, Paradox, Conflict, Crisis,
Freytag's Pyramid, Closure, Dénouement.

Books Recommended:

1. Birjadish Prasad, *A Background to English Literature*, Macmillan. (Rev. Ed.) Macmillan, 2000
2. M.H. Abrams: *A Glossary of Literary Terms* 7th ed. Thomson Pub, 2004
3. J. A. Cuddon, M. A. R. Habib, *The Penguin Dictionary of Literary Terms and Literary Theory:* Fifth Edition, 2015

E- Resources

1. https://uomustansiriyah.edu.iq/media/lectures/8/8_2018_12_19!10_28_26_PM.pdf
2. https://libguides.cca.edu/literature

Course Outcome
Upon completion of this course, the students will be able to

K6, K2, K4	CO1	instigate to have an eminent craves on Literature
K2, K5	CO2	develop an understanding of the forms of literature
K6, K5	CO3	familiarize with the terms of Literature
K3, K2, K5	CO4	get a comprehensive knowledge of the literary works produced all over the world in different languages and different genres
K5, K6	CO5	develop their skills and understands the greatness of Literature.

Mapping of COs with POs & PSOs

CO/ PO	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	M	S	M
CO3	S	S	S	M	S	S	M	S	S	S	M	S
CO4	S	S	S	S	S	M	S	S	M	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) -2 Marks
Weakly Correlating (W) -1 Mark
No Correlation (N) -0 Mark

COURSE CODE	U21ENE311	CHOICE - I	L	T	P	C
ELECTIVE- I		JOURNALISM AND MASS COMMUNICATION	4	-	-	3

Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K4: Evaluate** **K5: Analyze** **K6: Create**
Learning Objectives	By introducing the course, it is intended to: • impart the knowledge of media • expose the significance of Print Media and its features. • prepare the students for Competitive Exams and to become a media person • enable the students speak and write in English fluently on various topics • develop the professional ability to communicate information clearly and effectively in all kinds of environment and contexts

Unit-1: Introduction

Introduction to Journalism
A Short History of Journalism in India
Ethics of Journalism
Basic concepts and types of Communication,
Nature of media, Mass communication in India

Unit-2: The Press

Freedom of Press and Threats to Press Freedom
The Government and the Press
Press Laws: Defamation, Libel, Contempt of Court,
Slander, Copyright Laws, Press Regulation Act, Press
Registration Act, Law of Privileges

Unit-3: Reporting News

Role of the Reporter and the Editor State Integrated Board of Studies – English UG
Types of News Reports – Straight, Interpretive,
Investigative, Scoop, Sting
Headlines - Editorial, Feature Writing, Personal Column,
Reviews, Interviews and Press Conferences
Reporting – News Values, Human Interest, Story Angle,
Obituaries

Unit-4: Layouts, Advertising and News Agencies

The make-up of a newspaper - Editing, Proof-Reading
Photographic Journalism, Cartoons, News Agencies, Press Council of India
Advertisements – Types and Social Responsibility

Unit 5: Electronic and New Media

Electronic Media- Radio, Television
The emergence of New Age Media-Definition & Conceptualization of New Media, Future of New Media

Reference Books:

1. M.V. Kamath –*Professioanal Journalism, 2018*
2. Kumar J Keval – *Mass Communication in India*, 2019

Course Outcomes

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

K1,K2,K4	CO1	demonstrate practical skills of various types of media writing, reviews, reports,
K3,K4,K5	CO2	make programme and discussions.
K2,K4,K3	CO3	demonstrate their familiarity with the new media, its techniques, practices of social media and hypermedia
K1,K2,K3,K4	CO4	critically analyze how the media reflects, represents and influences the contemporary world.
K4,K5, K6	CO5	demonstrate some awareness of the literary influence and literary history.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENE312	CHOICE - II	L	T	P	C
ELECTIVE I		TRAVEL WRITING	4	-	-	3
Cognitive Level		**K1: Recall** **K2: Understand** **K3: Apply** **K4: Evaluate** **K5: Analyze** **K6: Create**				
Learning Objectives		Course aims to • appreciate the distinctive contribution that the study of literature can make. • recognize the historical changeableness of foundational words and ideas such as 'nature,' 'country,' 'environment,' 'animal,' and 'landscape'. • identify some of the main controversies, problems, and priorities in the field of Travel literary studies. • show a detailed knowledge of the set literary texts, and make connections between those texts and the conceptual issues involved in interpreting them. • articulate their understanding of the set texts in an essay and an exam, displaying appropriate competence.				

UNIT I: **The Genre**
The genre of travel literature
History
Surveys
Sites

UNIT II : Techniques and Characteristics
Narrative technique, structure, thematics,
generic variants and characteristics

UNIT III : Gender
The qualities of a good travel writer
Use of vivid language, voice, tone
Readings from published travel writers –the dos and don'ts from professionals
Gender on Travel Writing.

UNIT IV: Model of Travel Writing
ShivyaNath - The Shooting Star
Paulo Coelho The Pilgrimage
Freya Stark- Ionia: a Quest

UNIT V: Practice

Writing practice on Travel
Your journal - presentation Week
Your travel writing - readings and wrap up discussion

Recommended Books:

Hulme, Peter, and Tim Youngs, eds. *The Cambridge Companion to Travel Writing*. Cambridge, UK: Cambridge University Press, 2002.

E - Resources

1. https://www.researchgate.net/publication/274640565_TRAVELOGUES_AN_INNOVATIVE_AND_CREATIVE_GENRE_OF_LITERATURE
2. https://travelwriting2.com/resources/
3. https://www.cambridge.org/core_title/gb

Course Outcomes

Students will be able

K1,K2,K4	CO1	to investigate environmental (in) justice, and ecological crisis through an exciting variety of Travelliterary texts.
K3,K4,K5	CO2	to enjoy reading, and who wants to think about the cultural, artistic, and philosophical issues involved in human beings' relationships with the living things around them.
K2,K4,K3	CO3	to compare travel literary texts with attention to their contexts.
K1,K2,K3,K4	CO4	to consider issues of environmentalism and sustainability from cultural, historical, and ethical perspectives.
K4,K5, K6	CO5	to recognize how the present-day landscapes and cultures have been shaped by reading and practising Travel Writing.

Outcome Mapping

CO/ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

SEMESTER – IV

COURSE CODE	U21ENT41	AMERICAN LITERATURE	L	T	P	C
CORE - VI			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		By introducing the course, it is intended to: • critically analyze American literary texts in the light of several movements in literature. • understand the changing faces of texts with developments in culture. • understand the progression of ideas across genres and times. • get a clear idea of the literary space of America • be sensitized towards cross cutting issues				

Unit 1 – Prose
R.W. Emerson - Illusions
H.D. Thoreau - Where I Lived, and What I Lived For
Martin Luther King Jr. - I Have a Dream

Unit – 2 - Poetry
Robert Frost - Mending Wall, Home Burial
Walt Whitman - Song of Myself
Maya Angelou - Still I Rise
Edgar Allan Poe - The Raven
Robinson E A – Reuben Bright
Allen Ginsberg - Howl

UNIT 3- Drama
Tennessee Williams - The Glass Menagerie
Arthur Miller - The Death of a Salesman
Amiri Baraka - The Slave

UNIT 4 -Fiction
Nathaniel Hawthorne -The Scarlet Letter
UNIT 5–Fiction
Earnest Hemingway - The Old Man and the Sea

Reference Books:

- Norton's Anthology of American Literature, 2016.
- American Literature: Studies on Emerson, Thoreau, Hawthrone, Melville and Whitman, SujataGurudev, Atlantic, 2011, 1st Edition.
- Studies in American Literature, Edited by Mohit K. Ray, Atlantic, 2011, 1st Edition.
- Hoffman Daniel, Harvard Guide to Contemporary American Writing: Oxford University Press, 1979.

E- Resources:

https://libguides.southernct.edu/c.php?g=721855&p=5148245
https://fordham.libguides.com/EnglishAmericanLiterature/Internet
https://www.english.cam.ac.uk/research/american/?page_id=2

Course Outcome

Upon completion of this course the students will be able to

K6,K2, K4	**CO1**	learn the literary works & culture of the Americans
K2, K5	**CO2**	understand the literary activities of the writers of American descent
K6,K5	**CO3**	gain a perception of literary trends set by the American writers
K3,K2,K5	**CO4**	understand the character, flavor and ethos of the American literature
K5,K6	**CO5**	appreciate the positive approaches of the American writers towards equality and emancipation and enable them to practice and to be an instructor.

Mapping of COs with POs & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	M	S	M
CO3	S	S	S	M	S	S	M	S	S	S	M	S
CO4	S	S	S	S	S	M	S	S	M	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S	S	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENT42	AGE OF TENNYSON	L	T	P	C
CORE -VII			4	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create				
Learning Objectives		The course aims at • providing a wide spectrum of literary exuberance of the great masters of the age of Tennyson for the young minds to revel in the luxury of representative literary pieces in each genre and to be informed and inspired. • helping the students imbibe the abiding human and moral values through the study of great pieces of literature. • developing critical and creative faculties in students.				

Unit 1: Prose
Ruskin – Of Queen's Gardens
Carlyle – Hero as a Poet

Unit 2: Poetry
Tennyson - Tithonus
Arnold –To Marguerite Continued
Browning – FraLippo Lippi
D.G. Rosetti – The Blessed Damozel

Unit 3: Drama
Oscar Wilde – Lady Windermere's Fan

Unit 4: Fiction
Dickens – The Tale of Two Cities
George Eliot – Silas Marner

Unit 5: Fiction
Stevenson - Kidnapped

References:

1. Jeremy, Hawthorn(ed) The Nineteenth-Century British Novel. London: Edward Arnold, 1986
2. Lubboch, Percy. The Craft of Fiction. New Delhi B.I. Publications, 1973
3. Boulton, Marjorie. The anatomy of the Novel. London: Routledge and Kegan Paul, Print.1984.
4. Andrew Sanders., A Short Oxford History of English Literature, Clarendon Press, Oxford. ***1994***.
5. M.H. Abramseal, ed, The Norton Anthology of English Literature, Vols. 1 and 2, Edited F. Kermode and J. Hollander, ed, The Oxford Anthology of English Literature, 2 vol., 1973

6. Brijadish Prasad, Hari Priya Ramadoss., A Background to the study of English Literature: Revised Edition, January 2016
7. Edward Albert, History of English Literature, Fifth Edition. Oxford University Press, January 2018

E -Resources

1. https://libguides.southernct.edu/c.php?g=721855&p=5148244
2. http://writersinspire.org/
3. http://www.literature-study-online.com/resources/
4. https://www.wwnorton.com/college/english/nael/

Course Outcomes

Upon completion of this course the students will be able to

K1,K2	**CO1**	understand the sense of rationalism and sensibility of the writers
K1, K2	**CO2**	recognize and understand the figurative language
K2,K3	**CO3**	apply the technical nuances of dramas
K5,K2,K3	**CO4**	comprehend the artistic style of the writers and adopt the style in writing
K6, K3	**CO5**	appreciate the intense zeal of the writers and stimulate the creativity of the students

Mapping of COs with POs & PSOs:

CO/ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENA44	TRANSLATION: BASIC CONCEPTS AND PRACTICE	L	T	P	C
ALLIED-IV			4	-	-	4
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		By introducing the course, it is intended to: • introduce the students to the different theories of translation • enable the students to understand the significance of translationstudies in general • encourage the students to acknowledge the importance of translationin a multilingual country like India • familiarize them with the theories of translation and the current practices • inspire the students to critically evaluate and appreciate the translated genres.				

UNIT I: The Notion of Translation
Meaning and definition;
Nature, Characteristics and Functions of Translation.

UNIT II: Notion of Equivalence
Translating prose and Poetry
Fiction and Non-Fiction
Critical and Scientific
Literary and Non-Literary Material

UNIT 1II: Poetry
A.K. Ramanujan - What She Said (Kuruntokai 3, 290)
Thiruvalluvar – Tirukural (Chapter 11,30)
Rabindranath Tagore – Gitanjali (35, 48)

UNIT IV: Prose &- Fiction
Puthumaipithan - "GulabjaanKaadhal" (Love for Gulabjamun)
Bhama - Sangati (Tamil)

UNIT V:Translation Practice
Translation of Statements
Proverbs, Headlines
Translation of Paragraphs
Translation of Official Letter, Articles ,& Editorials

Reference Books

- Natarajan, Nalini and Emmanuel Sampath Nelson Handbook of Twentieth-Century Literatures of India Greenwood Publishing Group 1996
- Swami, Indu Exploring North-East Indian Writings in English -2 Vols. SaujanyaBooks, Delhi 2011-2012
- Kumar, T.Vijay, MeenakshiMukherjee, HarishTrivedi and Vijayasree. C Focus India: Postcolonial Narratives of the Nation. SaujanyaBooks, Delhi 2007.
- Bama, Sangati, OUP: 2008.
- Chandra, N.D.R Multicultural Literature in India.Vol.1 Saujanya Books, Delhi 2009.
- Bassnett, Susan, Translation Studies, London and New York, 1980 (revised edition 1991)
- Routledge Bell, Roger T. Translation and Translating, Theory and Practice, Longman, 1991.
- Callow, Kathleen, Man and Message: A Guide to Meaning-Based Text Analysis, 1998.
- Cumulative Index of United Nations Legal Materials Produced and Applied in Kosovo 1999-2004.
- Central European and Euroasian Law Institute, USAID Duff, Alan, Translation, OUP, 1997 Gërmizaj, Shykrane, Translation Theory in the Classroom, Prishtina, 2005.

E-Resources

- https://www.teachthought.com/technology/100-free-online-resources-for-students/
- https://nptel.ac.in/Translation/
- http://osou.ac.in/eresources/CIT-01-Unit-01-Meaning,%20Nature%20and%20Scope%20of%20Translation.pdf

Course Outcome

Upon completion of this course, the students will be able to

K6, K2, K4	**CO1**	analyze and evaluate the works for content, style, the structure of Indian writers.
K2, K5	**CO2**	have a broad knowledge of the regional Indian writers, understand the variety of regional writings and understand the cultural diversity reflected in them.
K6,K5	**CO3**	evaluate the unique characteristics of Indian writing in English
K3,K2,K5	**CO4**	appreciate the spirit of the Indian writers to preserve the noble values of Indian society
K5,K6	**CO5**	identify and describe the unique literary tendencies evident in the different translated texts from the different regions of India.

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21ENE421	CHOICE - I	L	T	P	C
ELECTIVE II		COMPARATIVE LITERATURE	3	-	-	3

Cognitive Level	K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create
Learning Objectives	The course aims to • introduce compare and contrast in different kinds of literature. • expose different schools of Literature and terms. • introduce students to a comparative methodology of reading • introduce an overview of the literary genre from a comparative perspective, including texts • deepen knowledge in English literature for higher studies

Unit 1

Definition and Scope
National Literature
Comparative Literature
General Literature

Unit 2

World Literature
The French and American Schools of Comparative Literature

Unit 3

Influence and Imitation
Periodization – Epoch
School, and Movement

Unit 4

Genre Studies
Thematology

Unit 5

Literature and other Discipline
Literature and other Arts

Reference:

1. SusanBassnet - An Introduction to Comparative Literature
2. Padma Srinivasa, Dr G.R. Balakrishnan, Dr Subramanian – Introduction to Comparative Literature – Theory and Practice
3. Rene Wellek and Austen Warren – Theory of Literature

Reference:

https://guides.libraries.uc.edu/englit
https://docs.lib.purdue.edu/clcweb/
https://www.bachelorstudies.com/BA/Comparative-Literature/

Course Outcomes

Upon completion of this course the students will be able to

K1,K2	CO1	equip the students with literary concepts with special reference to Comparative Literature
K1, K2	CO2	help them prepare for various competitive exams
K2,K3	CO3	keep and updates them with the increasing demand for English
K5,K2,K3	CO4	develop their overall confidence and personality
K6, K3	CO5	expand the knowledge of the students about the development of Comparative Literature

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENE422	CHOICE - II	L	T	P	C
ELECTIVE II		CHILDREN'S LITERATURE	3	-	-	3
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4 : Analyze K5 : Evaluate K6 : Create				
Learning Objectives		The course aims to • analyze writing for children in terms of literary and artistic elements and standards. • apply knowledge of genres of writing for children. • evaluate works written for children. • plan, share, and evaluate the presentation of literature to/ with children • demonstrate knowledge of diverse cultures and value systems				

Unit-1- Tales

Fairy Tales and their Permutations
Cinderella
Beauty and the Beast
Animal Fable
Rudyard Kipling: Just So Stories

Unit 2: Poetry

Tennyson - "The Brook"
Felicia Hermann -"Casablanca"
Toi Derricote - "A Place in the Country"

Unit 3 : Legends and Fantasy

J. R. R. Tolkien --The Hobbit
William Golding- Lord of the Flies

Unit 5: Fiction

Lewis Carroll - Alice in Wonderland
Ruskin Bond - The Blue Umbrella

Resources:

https://iasl-online.org/resource/childrenslit.html/
https://www.childlitassn.org/resources
https://www.springer.com/journal/10583

https://libguides.reading.ac.uk/english-literature/e-resources

Course Outcome

Upon completion of this course the students will be able to

K1,K2,K4	CO1	display working knowledge of classic and contemporary children's literature
K3,K4,K5	CO2	identify and describe distinct literary characteristics of literature, including techniques of illustration and format of children's books
K2,K4,K3	CO3	analyze literary works from various genres for their structure and meaning, using correct terminology
K1,K2,K3,K4	CO4	write analytically about children's literature using MLA guidelines
K4,K5, K6	CO5	effectively communicate ideas related to the literary works during class and group activities

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

SEMESTER –V

COURSE CODE	U21ENT51	INTRODUCTION TO ENGLISH LANGUAGE AND PHONETICS	L	T	P	C
CORE VIII			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluat K6: Create				
Learning Objectives		By introducing the course, it is intended to: • enable the student recognize the need for learning correct (RP) pronunciation • make the student familiar with the different stages of speech production • help the student know the criteria for the description of English vowels and consonants • familiarize the student with the use supra-segmental features • analyze the Growth and development of English and Its structural, grammatical and functional aspects				

Unit 1:
History of English Language
Human Language and Animal Language
Theories of Language Origin
Speech and Writing
Origin of the writing Systems

Unit 2:
Language and Regional Variation
Language, and Social Variation
Language and Culture

Unit 3:
The Sounds of English Language
The Sound Patterns of English Language

Unit 4:
Syllable- Word Accent& Rhythm in Connected Speech -Stress and Intonation

Unit 5:
Phonetics Transcription

Books for Reference

1. F.T.Wood, An Outline History of English Language: Paperback Publishers 1994.
2. J.D.O'Connor Better English Pronunciation (Second Edition): Cambridge University Press, 2013.
3. John Lyons, Introduction to Theoretical Linguistics: Cambridge University Press, 1971.
4. T.Balasubramaniam, A Textbook of English Phonetics for Indian Students (2nd Edition):
5. Macmillan Publishers, 2013.
6. N.Krishnaswamy, Modern Applied Linguistics: Macmillan Publishers,1992.

E-Resources:

https://busyteacher.org/15081-esl-pronunciation-practice-9-best-online-resources.html
https://www.fluentu.com/blog/educator/computer-assisted-language-learning/

Course Outcome

Upon completion of this course the students will be able to

K6,K2, K4	**CO1**	comment on linguistic choices in writing for specific audiences, purposes, contexts and cultures
K2, K5	**CO2**	develop an understanding of language issues and debates, and respond critically to these issues
K6,K5	**CO3**	analyze the theories and remember the concepts in speech sounds
K3,K2,K5	**CO4**	comprehend and evaluate various theories, concepts of language and linguistics
K5,K6	**CO5**	develop their skills as interpreters and producers of meaning

Mapping of COs with POs & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	M	S	M
CO3	S	S	S	M	S	S	M	S	S	S	M	S
CO4	S	S	S	S	S	M	S	S	M	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 Marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21ENT52	TWENTIETH CENTURY BRITISH LITERATURE	L	T	P	C
CORE IX			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		By introducing the course, students: • acquire knowledge about modern and post-modern trends • increase the analytical ability of students in evaluating and assessing the literary works • develop critical thinking capabilities • becomesefficient in English for global competency • improve the communication strategies • will be placed in good jobs				

Unit 1: Prose

Bernard Shaw - How I became a public Speaker
Virginia Woolf - A Room of One's Own (Chapter I)

Unit 2: Poetry

W.B. Yeats - The Lake Isle of Innisfree
T.S. Eliot – A Love Song for Alfred J. Prufrock
G.M. Hopkins – God's Grandeur
Ted Hughes - Hawk Roosting
Philip Larkin - Aubade

Unit 3: Drama

John Galsworthy - Justice
T.S. Eliot - The Family Reunion

Unit 4: Fiction

Joseph Conrad - Lord Jim

Unit 5: Fiction

Kazuo Ishiguru - The Remains of the Day

Reference Books:

1. Ashley Dawson, The Routledge Concise History of Twentieth-Century British Literature, Routledge, 2012.
2. G.R. Taneja, 20th Century British Literature, Prestige Books (1 January 2013)

E- Resources

1. https://uomustansiriyah.edu.iq/media/lectures/8/8_2018_12_19!10_28_26_PM.pdf
2. https://libguides.cca.edu/literature
3. http://www.mdudde.net/pdf/study_material_DDE/ma/maEnglish/INDIAN%20WRITING%20IN%20E ENGLISH
4. https://www.ukessays.com/essays/english-literature/the-introduction-to-indian-writing-in-english-
5. http://sahitya-akademi.gov.in/journals/indianliterature.jsp

Course Outcome

Upon completion of this course, the students can

K6,K2, K4	CO1	strengthen the knowledge of Twentieth-Century Writers
K2, K5	CO2	familiarize with the contemporary writers
K6,K5	CO3	develop critical perspective
K3,K2,K5	CO4	analyse the periods of the authors
K5,K6	CO5	acquaint with the important aspects and movements of the respective period

Mapping of COs with POs & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	M	S	M
CO3	S	S	S	M	S	S	M	S	S	S	M	S
CO4	S	S	S	S	S	M	S	S	M	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENT53	WOMEN'S WRITING IN ENGLISH	L	T	P	C
CORE X			5	-	-	4
Cognitive Level		**K1: Knowledge** **K2: Understand** **K3: Apply** **K4: Analyze** **K5: Evaluate** **K6: Create**				
Learning Objectives		**The Course aims to** • understand Gender and Women's Studies as an academic field of study • be familiar with its major concepts, history, assumptions, and theories/theorists, and recognize its epistemological and methodological diversity and character. • analyze the ways in which societal institutions and power structures impact the material realities of women's lives. • evaluate information derived from various women's writing. • interpret information from a variety of sources including print and electronic media, film, video, and other information technologies and Cater to the needs of women in Society proactively.				

Unit 1: (Prose)
Elaine Showalter- Towards a Feminist Poetics
Maya Angelo - I Know Why the Caged Birds Sings

Unit 2: (Poetry)
Sylvia Plath- Lady Lazarus
Margaret Atwood- Morning in the Burned House
Kamala Das- a) An Introduction b) The Looking Glass

Unit 3: (Drama)
Lorainne Hansberry- A Raisin in the Sun

Unit 4:(Fiction)
K.R.Meera- Hangwoman

Unit 5: (Fiction)
Bharathi Mukherjee- Wife

Reference Books:

1. Riley Catherine, Feminism and Women's Writing, Edinburgh University Press, 2015
2. Patricia Demers, Women's Writing In English, University of Toronto Press, Scholarly Publishing Division; 2nd ed. edition (March 21, 2005)

E- Resources:

https://www.tandfonline.com/toc/rwow20/current
https://guides.library.harvard.edu/schlesinger_womens_history_databases

Course Outcome

On successful completion of the course, the students will be able to

K1,K2	**CO1**	learn how and on what grounds women's writings can be considered as a separate genre.
K1,K2	**CO2**	read and understand canonical texts written by Women writers across different ages.
K3,K4	**CO3**	differentiate between sex and gender and how the latter is a social construction.
K4,K5	**CO4**	be aware of the issues and concerns of the women writers of the developed, developing and under-developed countries
K3,K6	**CO5**	demonstrate awareness of cultural and intercultural concerns relating to women's writing

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**
CO3	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**
CO5	**S**	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**S**

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENT54	INTRODUCTION TO LITERARY CRITICISM	L	T	P	C
CORE XI			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The Course aims to • have an overview of major critical tools available to understand a text contextually • attain the skill of attempting a close reading of the text and to analyze and interpret facts • show an appreciation of the relevance and value of theoretical models in literary study • demonstrate an understanding of important theoretical methodologies by summarizing key concepts or arguments. • apply these concepts or arguments successfully in a close reading of a literary text.				

Unit 1:
Introduction to Classical Humanism: From Plato's Theory of imitation to Aristotle's Theory of Mimesis and Catharsis

Unit 2:
Introduction to Biographical and Historical Criticism

Unit 3:
Introduction to early 20th literary Criticism- Modernism, Formalism, New Criticism, Structuralism

Unit 4:
Introduction to late 20th century Literary criticism –
Postmodernism, Post structuralism, Post colonialism, Eco criticism, Gender Studies

Unit 5:
Literary Interpretation- Close Reading Techniques

Reference Books:

1. Manfred John (Editor), Marie- Laure, The Routledge Encylopedia of Narrative Theory,2005.
2. Johns Hophiks, Michael Groden,ed. Guide to Literary Theories and Criticism,), 2004.

E- Resources

1. **https://haywood.libguides.com/c.php?g=146425&p=961064**
2. **https://www.thrall.org/litcrit/**
3. **https://www.gale.com/literature-criticism**

Course Outcome

Upon completion of this course the students will be able to

K6,K1,K2	**CO1**	provide a critical understanding of the developments in literary criticism from the beginning to the end of the 19th century
K2,K1,K3	**CO2**	familiarize selected texts/critics which are prescribed for the detailed study whose contribution to this area constitutes a significant benchmark in each era.
K6,K1,K2,K4	**CO3**	provide a conceptual framework for developing an understanding of the function and practice of traditional modes of literary criticism
K3,K4,K5,K6	**CO4**	learn the history of literary criticism and various literary theories. Apply critical and technical theory and vocabulary to describe and analyze, and formulate an argument about literary and other texts.
K5,K4,K5,K6	**CO5**	think about the non-fixity of the meaning of literacy texts. develop skill in applying various literary theories in interpreting a specific text.

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	M	M	S	S	S	S	M	M	S
CO2	S	S	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	M	M	S	S	S	S	M	M	S
CO4	S	S	S	M	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	M	M	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENT55	SHAKESPEARE	L	T	P	C
CORE XII			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		By introducing the course, it is intended to • enable the students to appreciate the genius of Shakespeare that has made him a classic of eternal value • enable them to know the historical and present day value of Shakespeare, the poet- dramatist • make the students understand the aesthetics of Shakespeare • understand the social, historical, and cultural content of Shakespearean works • enable the students analyze the strengths and weaknesses of • the characters • enable the students appreciate Shakespeare's skill of characterization, plot construction, use of humour and wit,and song and music				

Unit 1:Introduction
Theatre and Audience
Fools in Shakespeare Plays
Villains in Shakespeare Plays
Women in Shakespeare Plays
Songs and Music in Shakespeare Plays

Unit 2: (Shakespearean Comedy)
As You Like It

Unit 3: (Shakespearean Tragedy)
King Lear

Unit 4: (Shakespearean Historical Play)
Henry IV Part I

Unit 5: Shakespearean Criticism
Shakespearean Criticism and Shakespearean Adaptation

Reference Books:

1. Charles Boyce, Shakespeare A to Z: The Essential Reference to His Plays, His Poems, His Life and Times, 1991
2. Micheal Dobson, Stanley Wells, *The Oxford Companion to* Shakespeare, Oxford University Press. 2001.

Resources:

1. https://morningside.libguides.com/shakespeare/online
2. https://it.pearson.com/aree-disciplinari/english/literature/best-shakespeare-resources.html

Course Outcomes

On successful completion of the course, the students will be able to

K1,K2,K4	**CO1**	understand the magnitude of the Shakespearean world
K3,K4,K5	**CO2**	introspect the complexities of Shakespeare's plays
K2,K4,K3	**CO3**	attain a comprehensive knowledge of the plays of Shakespeare
K1,K2,K3,K4	**CO4**	analyze the stylistic features of Shakespeare
K4,K5, K6	**CO5**	relish the sublimity of Shakespearean language and expression through creative writing

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENE531	MARGINAL WRITING	L	T	P	C
ELECTIVE III			3	-	-	3
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Upon completion of this course the students will be able to • have a wider knowledge of the trials and tribulations endured by downtrodden people • enhance their ability to read text analytically to understand the social discrimination • cultivate ability to analyze the elements and strategies of various genres • comprehend literary writing as a platform for recording the voice of the voiceless • evaluate the power of creative writing as a means to recover and to redeem one to get better job.				

Unit 1: Important Personalities

Bama, Oprah Winfrey, Maria Campbell, Louise Gluck -their contributions to Literature
Aboriginals and other suppressed class, Racism, Sexism, Dalits

UNIT 2: Prose

Sharankumar Limbale: Towards Aesthetics of Dalit Literature

Unit 3:**Poetry**

Govindaiah: "In the Soil of Tears"
Maya Angelou: "Phenomenal Woman", "Men"

Unit 4: Drama

Gurucharan Das: Larins Sahib (Drama)

Unit 5; Fiction

U. Pillai: Chammeen (Fiction)
T. Sivagami – The Grip of Change

Reference Books:

1. Sarangi, C. Ghosal, *Marginal Writings in English*, 2013.
2. Jaydeep Sarangi, *Marginal Writings In English,* Author's Press, 2013

Resources:

1. **https://libguides.reading.ac.uk/english-literature/e-resources**
2. **http://www.ideunom.ac.in/syllabus/ma_english.pdf**

Course Outcomes

On successful completion of the course, the students will be able to

K1,K2,K4	**CO1**	understand the concept of Marginal Writings with a positive perspective
K3,K4,K5	**CO2**	gain insight into the key ideas of Marginal Writings
K2,K4,K3	**CO3**	recognize Marginal Writings as a social and cultural construct
K1,K2,K3,K4	**CO4**	analyze societal representations of Marginal Writings at moral, social, and political levels
K4,K5, K6	**CO5**	recognize contributions of Marginal Writings in the literary world

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENE532	CREATIVE WRITING	L	T	P	C
ELECTIVE III			3	-	-	3
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		• students will acquire experience writing creatively. • they also hone their skills writing about the great works of literature they encounter as English majors. • it will develop the ability of the students to write with wit and grace. • it will train them to tell compelling stories. • students who study English and Creative Writing will develop strong research, reading and writing skills. • skills that easily translate into careers in fiction writing, journalism, academia, marketing, advertising, and technical writing, as well as government, law and business.				

Unit 1:Types
Descriptive Writing
Narrative Writing

Unit 2: Writing Components
Analysis of the Creative Writing Components (Poem, Novel, Short Story, Drama, Diary) Craft of poetry: subject matter, theme.

Unit 3: writing for Media
Writing for various media
Editing & Proofreading

Unit 4: Fundamental Norms of Writing
Feature Writing
Composing poetry/ Short Story
Writing for Radio, Theatre, Television and Films
Writing scripts for Publishers and Copy Writing.

Unit 5:Assignment in Creative Writing:
Poetry
Short Story

Fiction / Drama

Reference Books:

1. Julia Bell Paul Magrs, *The Creative Writing Coursebook*. 2001
2. Dev Anjana Neira, *Creative Writing*, Pearson Education India, 2008

Resources:

1. https://www.aspenwords.org/6198-2/
2. https://guides.library.ucla.edu/c.php?g=180834&p=1189338
3. https://research.pugetsound.edu/c.php?g=304227&p=2029021

Course Outcomes

On successful completion of the course, the students will be able to

K1,K2,K4	**CO1**	closely read both canonical and modern/postmodern prose narratives and poems.
K3,K4,K5	**CO2**	demonstrate an understanding of various forms and structures of fiction and poetry.
K2,K4,K3	**CO3**	demonstrate familiarity with a variety of professional writers' styles and voices in fiction and poetry to develop his or her style.
K1,K2,K3,K4	**CO4**	demonstrate some awareness of the literary influence and literary history.
K4,K5, K6	**CO5**	exhibit knowledge of editing and revision techniques, the world of publishing, and other career-related aspects of writing.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENS53	WRITING FOR THE WEB	L	T	P	C
SKILL BASED III			2	-	-	2
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims to • create and edit well-designed and technically sound e-news pages using industry standard software. • create and maintain all aspects of a daily, Internet-based, multimedia publication. • participate as an effective member of a team. • manage and lead a team of journalism professionals • instill acumen in the field of journalism and media • develop portfolio that demonstrates creative and professional skills and abilities in journalism.				

Unit 1: Web
Knowing the Web and its domain: Messages,
Audience, Blogs, personal sites, portfolio sites, technical and
corporate web writing

Unit 2: Practices
Best Practices for writing for the web

Unit 3 :Content Writing
Style, Linear/Non-linear
Interactive stories, Good Grammar, Revising,

Unit 4: Images and Sounds
Working with Images
Sounds
collaborating

Unit 5 :Introduction to Information Security
Overview of Information Security, Internet Governance – Challenges and Constraints, Threats. Need for Security, Business Needs, Attacks, Legal, Ethical and Professional Issues -An Overview of Computer Security –Integrity policies and Hybrid policies.

Recommended Text:

1. Lynda Felder, Writing for the Web: Creating Compelling Web Content Using Words, Pictures and Sound. New Riders Publisher, 2011.

2. Crawford Kilian, Writing for the Web, Self-Counsel Press; Fifth Edition, Fifth edition August 15, 2015

E-Resources

1. https://www.emergingedtech.com/2018/08/tips-online-resources-help-students-improve-their-writing/
2. http://www.bu.edu/erc/writingassistance/online-writing-resources/
3. https://advice.writing.utoronto.ca/researching/research-using-internet/
4. https://www.ef.com/wwen/blog/teacherzone/self-study-resources-for-students/
5. Introduction to Cyber Security available at http://uou.ac.in/foundation-course.
6. Fundamentals of Information Security http://uou.ac.in/progdetail?pid=CEGCS-17

Course Outcome

On successful completion of the course, the students will be able to

K2,K3,K4	**CO1**	demonstrate their ability to observe events, gather information, write news reports and news releases and report on events
K3,K2,K5	**CO2**	gain first-hand experience in designing the News Letters.
K4,K2,K3	**CO3**	understand the difference between communication and media theories and would have gained the expertise to handle this area in their profession
K5,K4,K6	**CO4**	grasp the complex relationship between communication/media theories and a diverse set of individual, social, and professional practices
K6,K2,K3	**CO5**	know the processes and practice of writing for the media and to have placement in Media

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

SEMESTER-VI

COURSE CODE	U21ENT61	INTRODUCTION TO WORLD CLASSICS	L	T	P	C
CORE XIII			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims to • display working knowledge of the historical and cultural contexts of world classic literature • identify and describe distinct literary characteristics of world literature from the beginning. • analyze literary works for their structure and meaning • write analytically about literature using MLA guidelines • effectively communicate ideas related to the literary works during class and group activities				

Unit 1: Prose
The Bible – Book of Esther
Guy de Maupassant- Two Friends (Short Story)
Fyodor Dostoyevsky- A little Hero
Vivekananda- Birth of Religion.

Unit 2: Poetry:
Homer--- The Odyssey, Book-1, Lines 1-20
Dante – Inferno, Canto- 1
Constantine Petrou Cavafy--Ithaca
Bertolt Brecht- Alabama
Rabindranath Tagore. - Let me not Forget.

Unit 3: Drama
Sophocles- Oedepus Rex

Unit 4: Fiction
Tolstoy- Anna Karenina
Unit 5: Fiction
Alexander Dumas- The Count of Monte Cristo

Reference Books:

Arthur Morrison, Peter Miles**,** *Oxford World's Classics*, Oxford University Press, 2014

E- Resources:

https://classics.williams.edu/resources/online-resources-2/
https://global.oup.com/academic/content/series/o/oxford-worlds-classics-owc/

Course Outcomes

The main aim of the course is to

K1,K2,K4	**CO1**	introduce the Background of World literature
K3,K4,K5	**CO2**	inculcate interests to focus on Contemporary literature
K2,K4,K3	**CO3**	deepen the knowledge of contemporary world culture through literature
K1,K2,K3,K4	**CO4**	enhance the aesthetic sense through admiring the beauty of life and literature
K4,K5, K6	**CO5**	ignite the minds to compare the glory of Indian Writings

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENT62	NEW LITERATURES IN ENGLISH	L	T	P	C
CORE XIV			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course • Introduces the elements of Post-colonial literature. • Introduces the creative writing in English from countries formerly colonised by Britain. • Makes the students understand the texts in relation to postcolonial theory. • Offers the ideas of nuances which handled by the authors of different region. • Provides the picture of different landscapes.				

Unit 1: Prose
Zadie Smith- Speaking in Tongues
BinyavangaWainaina How to Write about Africa

Unit 2: Poetry
FunomMakama- Wake up Oh Africa
Alice Walker- a) The Tree of Life Has Fallen b) Desire

Unit 3: Short Story
Margaret Atwood - Happy Endings
Alice Munro- Boys and Girls

Unit 4: Drama
Betty Roland- The Touch of Silk
Riwia Brown- Roimata

Unit 5: Fiction
Wilson Harris- The Palace of the Peacock

Reference Books:

1. Janatha Kumari, Chitra Thrivikraman Nair, *Perspectives on New Literatures: Postcolonial Responses*, 2015
2. K Sarkowsky, *The* New Literatures *in English*, Lexington Books, 2007.

E- Resources

1. https://guides.library.unt.edu/c.php?g=531524&p=3999016
2. https://postcolonial.net/postcolonial-resources/academic-journal

Course Outcomes

Upon completion of this course the student will be ablt to

K2, K1	**CO1**	possess the knowledge of Post-colonial Literature.
K3,K4	**CO2**	understand the ideas of colonized writers.
K4,K2	**CO3**	figure out the importance of knowing Postcolonial theory.
K5,K4	**CO4**	demonstrate the nuances of the authors of the different region and apply in their analysis.
K6,K5	**CO5**	gather the ideas of different landscapes and the culture.

Mapping of COs with POs & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENT63	LIFE WRITINGS	L	T	P	C
CORE XV			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		• Be acquainted with major trends and key works in biographical thinking and writing. • Be familiar with some of the main constructs related to biography and life writing. • Be supposed to have developed abilities to assimilate, asses and synthesise information • in a coherent way. • Be familiar with some key primary sources for understanding biography writing from a global perspective.				

Unit 1: Definition and Concept
Life Writing Definition and Concept
Boundaries of fiction and non-fiction

Unit 2:Autobiography
Anne Frank- The diary of a Young Girl
Biography: Andrew Wilson –Mad Girl's Love Song

Unit 3: **Autobiography**
Ruskin Bond- Scenes from the Writer's Life
Memoir: MalalaYousafzai: I am Malala

Unit 4: **Literary Journalism**
George Orwell- Animal Form

Unit 5:Creative Nonfiction
Jon Krakauer- Into the Wild

Narrative Nonfiction
A. Revathy- The Truth about Me: A Hijra Life Story

Resources:

1. **https://libguides.reading.ac.uk/english-literature/e-resources**
2. **https://www.lifehack.org/articles/lifestyle/20-online-resources-for-free-books.html**

Course Outcomes

On successful completion of the course, the students will be able to

K1,K2,K4	**CO1**	expose to a range of contexts where the language is used to meet a variety of real-life communication
K3,K4,K5	**CO2**	equip with the practical, emotional and creative aspects of language through biography and autobiography.
K2,K4,K3	**CO3**	enhance practice in objective and subjective writing.
K1,K2,K3,K4	**CO4**	offer a platform to express creativity and talent.
K4,K5, K6	**CO5**	learn the elements of fiction and non-fiction.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENT64	ENGLISH TEACHING METHODS AND MATERIALS	L	T	P	C
CORE XVI			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims to • expose to a range of contexts where the language is used to meet a variety of real-life communication • equip with the practical, emotional and creative aspects of language through biography and autobiography. • enhance practice in objective and subjective writing. • offer a platform to express creativity and talent. • learn the elements of teaching and learning.				

Unit 1: Language:
Describing Language;
Language Acquisition and Development

Unit 2: Methodologies
English Language teaching methodologies
The Direct Method
Grammar-translation
Audio-lingual
The structural approach
Communicative language teaching (CLT)
TPR
The Silent Way
Immersion
Task-Based, Natural, Lexical.

Unit 3: Techniques
Teaching Techniques- Blended learning, flipped Learning, Participatory learning, Experiential learning

Unit 4: Methods
Collaborative Learning, Spaced Learning,
Self- Learning, Gamification and VAK Learning

Unit 5: Instructional Materials

Types of Instructional Materials, Evaluation
Learning materials- Print-Audio- Visual Materials, Computers and Internet

Reference Books:

1. Dhanavel S P English Language Teaching in India: The Shifting Paradigms - The Shifting Paradigms McGraw Hill Education India, 2018
2. Francis, English Language Teaching Guide, EFL Ltd; 9th Revised edition (1 August 2004).

Resources :

https://www.ihteachenglish.com/resource/11-useful-online-resources-elt-teachers
https://www.fluentu.com/blog/educator-english/esl-teaching-resources/
https://www.britishcouncil.org.br/en/programmes/english/resources-teachers

Course Outcomes

On successful completion of the course, the students will be able to

K1,K2,K4	**CO1**	have confidence in facing English speaking environment would have progressed.
K3,K4,K5	**CO2**	gain confidence and be assertive with the skilful acquisition of language and communication skills.
K2,K4,K3	**CO3**	overcome the fear of learning a second language or a foreign language and equip themselves
K1,K2,K3,K4	**CO4**	demonstrate how technology can be used for learning the language.
K4,K5, K6	**CO5**	identify and classify strategies to teach language.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENT65	LITERATURES FROM ASIA	L	T	P	C
CORE XVII			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims • to introduce students to a selection of literatures from Asia. • to equip students to study the similarities between the literatures and culture of this region. • to equip students to identify issues related to the intersection of gender, caste, class, language, religion and politics. • to enable students to develop a fervor for world culture and values • to encourage students to extend their knowledge of this region to understand larger global concerns.				

Unit 1: Prose

Aung San Suu Kyi	Nobel Lecture (Myanmar)
Zong Pu	Melody in Dreams (China)
Jean Arasanayagam	All is Burning (Sri Lanka)
Rokeya Sakhawat Hossain	Sultana's Dream (Bangladesh)

Unit 2: Poetry

Mirza Ghalib	The Ghazals (Indian)
Edwin Thamboo	Ulysses by the Merlion; (Malaysia)
Fadwa Tuqan	Longing: Inspired by the Law of Gravity (Palestine)

Unit 3: Drama

Seami *Astumori*	(NOH play) (Japan)
Ernest MacIntyre	*He Still Comes from Jaffna* (Sri Lanka/ Australia)

Unit 4: Fiction

Yasunari Kawabata	*Beauty and Sadness* (Japan)
Meira Chand	*A Different Sky* (Singapore)

Unit 5: Cultural Readings
Features and Scope

Recommended Reading:

1. Holden , Philip and Rajeev Shridhar Patke .The Routledge Concise History of South East Asian Writing in English. Routledge, 2010.
2. Smith, David . Ed. The Cannon in South East Asian Literatures. Psychology Press, 2000.
3. Kratz, E. Ulrich. South East Asian Languages and Literatures. I.B. Tauris, 1996.
4. ThamSeong Chee, Ed., Essays in literature and society in South-East Asia. NUS Press, 1981.
5. Obeyesekere, Ranjini. The Sri Lankan Theatre in the Past Two Decades. Marga Institute, 2001.

Journals:
SARE: Southeast Asian Review of English
International Journal of Asian Studies (IJAS)
Asian Theatre Journal

E-Learning Resources:
Ghalib -

1. http://www.columbia.edu/itc/mealac/pritchett/00urduhindilinks/abdulqadir/02ghalibprose.pdf
2. https://www.youtube.com/watch?v=XqduRPl5PBw
3. Ulysses by the Merlion; Evening by Batok Town -
4. https://pdfs.semanticscholar.org/f441/af9e241641b7e26ac25fa17cfb9810bfb3a1.pdf
5. The Case of Literature - https://www.youtube.com/watch?v=-jffgZDVBSc
6. NOH play- https://www.youtube.com/watch?v=-6msFSM1d9A
7. https://www.youtube.com/watch?v=wr-USxFyuYU
8. YasunariKawabata- https://youtu.be/5RBxq3esrKs

Course Outcome:
On successful completion of the course, the students will be able to

CO 1 critically read representative literary texts from these regions as cultural texts.
CO 2 dentify the similarities and differences among Asian literatures to appreciate difference
CO 3 demonstrate an understanding of the universal factors of social realities of this Region
CO 4 relate to cultural and social values of a variety of cultures
CO 5 extend their knowledge of this region to discuss larger global concerns with culture.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENE641	MYTH AND LITERATURE	L	T	P	C
ELECTIVE IV			4	-	-	3
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims • to identify and describe the difference between cinematic and literary images • to examine different theories of adaptation and link them to contexts of expression and reception • to help them to understand the major themes and literary trends. • to discuss the problem of language in film and Literature. • to create an interest in students to appreciate literary pieces.				

Unit-1: Greek Mythology
The Three Sisters of Fate
Pandora's Box

Unit-2: Roman Mythology
Hercules (Atlas and Hercules)
The Story of Romulus and Remus
The Story of Dido, Queen of Carthage
The Story of Cupid & Psyche
The Story of Echo & Narcissus

Unit-3: Celtic Mythology
Oisin in the Land of Eternal Youth

Unit-4: Legends
Arthurian Cycle (The Holy Grail)
Robin Hood Cycle

Unit-5: Indian Mythology
• Stories from Ramayana
The Burning of Lanka
• Stories from Mahabharatha
Kurukshetra - The Battle &The Deception of Bheema
The Story of Nala and Damayanthi

Recommended Text

1. Linda H. Peterson, John C. Brereton, ed. The Norton Reader, August 2008
2. Antonia Barber, · D'Aulaire's ,. **Mythology** Collections · Apollo and Daphne: Masterpieces of **Mythology**, 2019.·
3. D'Aulaire's **Book** of Greek **Myths**, 2019
4. Roshani Chokshi, Indian mythological-fiction books, **The Pandava series, 2019.**

E- Resources

1. **https://guides.nyu.edu/fairytales/digital**
2. **https://guides.lib.uw.edu/c.php?g=403912&p=2749152**
3. **https://guides.stlcc.edu/c.php?g=154584&p=1014999**

Course Outcomes

On successful completion of the course, the students will be able to

K1,K2,K4	**CO1**	evaluate the power of Myth as a means to recover and to redeem one
K3,K4,K5	**CO2**	master the current trends in Myth and Literature
K2,K4,K3	**CO3**	comprehend the context of Myth and Literature
K1,K2,K3,K4	**CO4**	assess a wide range of Mythology.
K4,K5, K6	**CO5**	acquaint themselves with the knowledge of Myth and Literature

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

COURSE CODE	U21ENE642	FILM AND LITERATURE	L	T	P	C
ELECTIVE IV			4	-	-	3
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims • to identify and describe the difference between cinematic and literary images • to examine different theories of adaptation and link them to contexts of expression and reception • to help them to understand the major themes and literary trends. • to discuss the problem of language in film and Literature. • to create an interest in students to appreciate literary pieces.				

Unit-1: Adaptation
The Concept of Film Form: genre / sub-genre
narrative film , avant-garde film, film noir, documentary.
Themes -tropes - cue - suspense - themes - functions -
motif - parallelism - development - unity / disunity .

Unit-2: Adaptation of Contemporary Indian English Fiction
Danny Boyle - Slum Dog Millionaire (2008)

Unit-3: Adaptation of Fantasy / Science Fiction
Steven Spielberg - War of the Worlds (2005)

Unit-4: Adaptation of British Literature in Films
Ang Lee- Sense and Sensibility (1995)
Rajiv Menon–KandukondainKandukondain (2000) (Tamil)

Unit-5: Components of a Film Review
Plot, Genre, Role of actors, Background
information, condensed synopsis, argument/analysis.

Recommended Text:
Linda, *A Theory of Adaptation*, 2006.
Hutcheon, - "*Beginning to Theorize Adaptation*"2014

E- Resource:
https://libguides.reading.ac.uk/english-literature/e-resources

COURSE OUTCOMES
On successful completion of the course, the students will be able to

K1,K2,K4	**CO1**	assess a wide range of Film and Literary texts
K3,K4,K5	**CO2**	demonstrate a systematic and historically-grounded knowledge of literature and cinema
K2,K4,K3	**CO3**	present a coherent view of the relationship between written and cinematic texts
K1,K2,K3,K4	**CO4**	identify and illustrate the distinction between literary and cinematic arts of storytelling
K4,K5, K6	**CO5**	organize different sets of activities to identify and make use of skills that distinguish the medium of cinema from that of literature

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**
CO2	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**M**	**S**	**M**
CO3	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**S**	**M**	**M**
CO4	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**M**	**M**	**S**
CO5	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**	**S**

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENS64	SOFT SKILLS AND LIFE SKILLS	L	T	P	C
SBE- IV			2	-	-	2

Course Objectives:

Course aims to

- describe the process and types of communication
- explain the types, modes and barriers in listening
- inculcate a deep sense of respect for oneself and others for a holistic living.
- build self-confidence with a focus on personal development and self- awareness.

Unit 1:Soft Skills

Definition, and Types of Soft Skills
Communication, Team Work and Interpersonal Skills
Keys to Improve Soft Skills

Unit 2: Interpersonal Skills

Adaptability, Problem Solving and Creativity

Unit 3: Ethics

Work Ethics and Time Management

Unit 4: **Self-management skills**

Self-awareness, Self-confidence, Self- Reflection, Stress management, Perseverance, Resilience, Mind mapping

Unit 5:. **Body language**

Gestures, postures, Tone of Voice, Eye contact
The Importance of Body Language
The Possitive and the Negative Body Language Signs

Reference Books:.

1. Sasikumar, V, et al. A Course in Listening & Speaking I. Foundation Books,2005.
2. Eastwood, John. Oxford Practice Grammar. Oxford University Press, 1999.
3. Prasad, Hari Mohan. A Handbook of Spotting Errors. Mcgraw Hill Education, 2010.
4. Johnson, Spencer , Who Moved My Cheese?: An Amazing Way to Deal with Change in Your Work and in Your Life. RHUK, 1999.
5. Sharma, Robin, The Monk Who Sold His Ferrari. Harper Collins, 2013.

Earning Resources:

1. www.youtube.com/watch?v=cR75B7CVuZA (What is Attitude?)
2. youtu.be/dhuabY4DmEo (Some tips to improve self- esteem)
3. www.youtube.com/watch?v=-ki9-oaPwHs (How to believe in yourself)
4. Zhu, Jessie. “What is Self Awareness and Why is it Important?,
5. https://positivepsychology.com/self-awareness-matters-how-you-can-be-more-self-aware/

COURSE CODE	U21ENN31	COMPUTER ASSISTED LANGUAGE LEARNING	L	T	P	C
NME - I			2	-	-	2
CognitiveLevel		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		By introducing the course, • students will utilize language learning environments equipped with technology to develop learner autonomy. • students will be aware of the indicators of autonomy by using language learning strategies • students will be motivated to a high level to learn the English language; • They will take responsibility for one's own learning; • students will continue English language study outside the classroom.				

Unit 1:**English Language Teaching (ELT**)

English as Foreign Language (EFL)
English as Second Language (ESL)
English for Specific Purpose (ESP)

Unit 2:Computer-Assisted Language Learning (CALL)

Introduction to the History of CALL
Behaviouristic CALL
Communicative CALL
Integrated CALL

Unit 3:**Creating and Using Blogs in Teaching**

Online Groups-Google Groups, Yahoo Groups
Online Classroom/conference,

Unit 4: 3D Virtual worlds

Interactive webpage- Funbrain, Scholastic Teachable and Read Write Think
Digital storytelling—Story creator, Story Dice, Tell about this

Unit 5: Classroom Management

Student Diversity and Classroom Management
Teacher as Facilitator or Mentor

Reference Books:

1. Mike Levy, Françoise Blin, Claire Bradin Siskin, Osamu Takeuchi, ed. International Perspectives on Computer Assisted Language Learning, 2014
2. Glen Stockwell, ed, Computer Assisted Language Learning, Cambridge University Press, 2012

E- Resources

1. https://elt.fandom.com/wiki/Computer_assisted_language_learning
2. https://www.fluentu.com/blog/educator/computer-assisted-language-learning/

Course Outcome

On successful completion of the course, the students will be able to

K6,K2, K4	**CO1**	equip students with a thorough general awareness of computer hardware and software
K2, K5	**CO2**	incorporate extensively researched web source
K6,K5	**CO3**	enhance good practical skill in performing common basic tasks with the computer.
K3,K2,K5	**CO4**	enhance teaching and learning processes.
K5,K6	**CO5**	create PowerPoint presentations on any topic in literature

Mapping of COs with POs & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**	**M**
CO3	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**
CO4	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**M**	**S**	**S**	**M**
CO5	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**	**S**	**S**	**S**	**S**

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21ENN42	WOMEN AND HOLISTIC DEVELOPMENT	L	T	P	C
NME - II			2	-	-	2
CognitiveLevel		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		Course aims to • know the role of women in society • develop insight into the process of protection of women health and environment . • know the National Policy and constitutional Protection for Women Empowerment. • identify opportunities for women empowerment and women leadership • sensatize women towards gender equality.				

Unit 1: Women and Technology

Modernization – Industrialization – Liberalization, Privatization, Globalization (LPG) – Impact on Women & Family-case History of Women Achievers in Scientific and Professional field

Unit 2: Changing Roles of Women in the Society

Role of education and attitudinal changes of women-Family- Workplace- Society Environment-Complicated and Complex Roles in the Professional, Leadership and Managerial Positions- -Changing values and women- Moral Vision-Professional Decision-Bridging the Gap of Gender equality-Equity – Cultural impact -Awareness of women's position- Gender Discrimination-Changes in the attainment of Goals.

Unit – 3: Women's Health at Different Stages

Definition of Health Disparity- Gender Disparities in Health- Forms of Gender Disparities – Holistic Approach to Women's Health- Health issues at Different Stages of Women(Adolescents, During Menstruation, Trimesters Pregnancy, Child Birth, Breast Feeding, Marriage, Menopause and Old age)-Common Diseases of Women (Heart attacks cancer- Stroke- Chronic Obstructive Pulmonary Disease (COPD)- Alzheimer's – Disease - Diabetes- Influenza and Pneumonia- Morbidity-Mortality-Anaemia–Life Expectancy- MMRNMR- Kidney Failure -Tumours-Diseases of Bones Joints and Mind, Obesity-Healthy Diets for Women

Unit – 4: Women and Entrepreneurship

Concept of women entrepreneurship-Women and Entrepreneurship –Entrepreneurial decision process-Growth of Women entrepreneurship in India; Entrepreneurial motivation; Factors affecting entrepreneurial growth; strategies for entrepreneurial development.

Unit-5: Women and Laws

Violence Against Women (CEDAW)- Laws relating to Eve Testing, Wife battering Rape, Abduction, Adultery, Murder and Kidnapping. Constitutional Provisions with special reference to Women - Women & Family Laws : (1) Marriage (2) Child Marriage (3) Widow Remarriage (4) Divorce (5) Maintenance (6) Inheritance and Succession (7) Dowry Prohibition - National Commission for Women Act, 1990 - Protection of Women from Domestic Violence Act 2005

References:

Kapur, Ratna and Crossman, Brenda, Subversive Sites: Feminist Engagements with Law in India, Sage Publications, New Delhi, 1996.

Anil Kumar (2007), Women Entrepreneurship in India, Regal Publications, New Delhi.

ChetanaKal (ed) Women and Development Discovery Publishing Home, New Delhi, 1991.

JyotsnaAgnihotri Gupta (2000) New Reproductive Technologies, Women's Health and Autonomy: Freedom or Dependency?, Sage Publications, New Delhi

. Mohan Rao (ed) (2004) The Unheard Scream: Reproductive Health and Women's Lives in India, Zubaan, An Associate of Kali for Women, New Delhi.

Neill Mckee, Jane T. Bertrand and Antje Becker-Benton (2004) Strategic Communication in the HIV/AIDS Epidemic, Sage Publications, New Delhi.

U21ENV51-VALUE ADDED COURSES -2021 June onwards

Duration	Minimum 30 Hours	
Mode	Concurrent	
Eligibility	+2 onwards	
No. of Papers	1	
Maximum Marks for each paper	100	
Evaluation	Internal	External
	25Marks	75 Marks
Total Marks	100	
Passing Minimum	50%	
Question Pattern: **External**	Part A: 10 Multiple Choice Questions	10x2 =20
	Part B: 5 out of 7 questions	5x5 =25
	Part C: 2 out of 4 questions	2x15 =30
Internal	25 Assignment-(10) and Quiz-(15)	

COURSE CODE	U21ENV51	PRESENTATION SKILLS	Total Hours	C
VAP-1			30	2

Objectives:
Course aims

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

Unit 1: Organizing Speech
Planning and Preparation
Developing Main Points, Supporting Ideas
Beginning and Ending Speech

Unit 2: Modes of Delivery
Reading the Manuscript
Speaking Extemporaneously
Impromptu
Speaking from memory
Speaker's Voice- Non- Verbal Communication

UNIT 3: Speech Etiquette
Avoiding Bad Habits
Developing Good Ones

Unit 3: Speech for Special Occasions
Welcome Speech
Introduction Speech- Felicitation Speech
Vote of Thanks

Unit 4: Speeches that Changed the World
Sample- Speeches of Jawaharlal Nehru and Mother Teresa

Course Text:
1. Krishna Mohan & N.P Singh – Speaking English Effectively New Delhi Macmillan, 1995

Reference books:
1. Stephen E. Lucas- The Art of Public speaking Chennai: McGraw Hill.
2. Richard Denny- Speak for yourself, New Delhi: UBS, 1995 27

MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL-624102

B.COM. (CHOICE BASED CREDIT SYSTEM)

(Full-time)

SYLLABUS, REGULATION AND SCHEME OF EVALUATION

(From 2021-2022 onwards)

Mother Teresa Women's University, Kodaikanal

Department of Commerce
Choice Based Credit System (CBCS)
(2021-2022 onwards)
Bachelor of Commerce

1. About the Programme:

The Revised syllabus for B.Com. Programme is recommended from the academic year 2021– 2022 onwards. Regulations scheme of examinations and syllabus for B.Com. is based on UGC/TANSCHE guidelines under Choice Based Credit System (CBCS).The Bachelor's Degree in B.Com. is awarded to the student on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes, and values) and academic criteria expected of graduates at the end of the Programme. Therefore, the learning outcomes of this particular Programme are aimed at facilitating the students to acquire these attributes, keeping in view of the changes in the current socio-economic environment. The Learning Outcomes-based Curriculum Framework (LOCF) of B.Com. has been designed keeping in view of the graduate attributes, qualification descriptors, Programme Learning Outcomes, and Course Learning Outcomes.

2. Program Educational Objectives (PEOs)

PEO1	Students will able to understand the concepts of Commerce.
PEO2	Students will develop comprehensive professional skills in the field of Commerce.
PEO3	Students will develop an understanding of various commerce functions such as finance, accounting, financial analysis, project evaluation, and cost accounting.
PEO4	Students will be able to prove the proficiency with the ability to complete exams like C.A, C.S and CMA.
PEO5	Students can do Commerce oriented research and consequence of this, they canbecome Professors in Colleges and Universities.

3. Eligibility

Candidate should have passed the Higher Secondary Examination or CBSE Examination from the school.

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	**10**	**25**	**10**	**25**
External	**30**	**75**	**30**	**75**

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade

(Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction

70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

9. Program Outcomes (POs)

On successful completion of the B.COM Program, students will be able to	
PO1	build the wide range of knowledge in the areas of accounting concepts and techniques to meet the current and future requirement of the industry.
PO2	develop the strong knowledge in the areas such as finance, taxation and laws relating to commerce helps to relate the conceptual with the analytical skills in thefield of auditing, finance etc.
PO3	nurture the skills in personal, interpersonal, intellectual skills to develop their professional career and growth.
PO4	disseminate knowledge in developing decision making and problem solving skills to undertake their own venture as a feasible career option.
PO5	develop the needed knowledge in business and academics to develop their employability

10. Program Specific Outcomes (PSOs)

After the successful completion of B.COM Program, the students are expected to	
PSO1	have strong base on the course relevant to the area of commerce whichhelps to choose their career
PSO2	acquire knowledge and skills which build confidence to identify their career opportunities in multiple dimensions.
PSO3	nurture intellectual, personal, interpersonal and social skills with afocus on relevant professional career particularly, to maximize professional growth.
PSO4	empower necessary competencies and decision making skills to foster the innovative thinking to become an entrepreneur.
PSO5	become expert in the field of communication withethical consciousness.
PSO6	equip with the practical skills to work as accountants, audit assistants, tax consultants, and computer operators as well as other financial supporting services.
PSO7	develop advanced accounting career skills, applying both quantitative and qualitative knowledge to their future careers in Business.
PSO8	get placement in Higher Education Institutions and can make research in the field of Finance, Banking and Commerce.

B.COM. CURRICULUM

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			L	P	CIA	EIA	Total
FIRST SEMESTER							
U21LTA11	Part I-TAMIL I	3	6	-	25	75	100
U21LEN11	Part II- ENGLISH I	3	6	-	25	75	100
U21COT11	CORE I – Financial Accounting –I	4	6	-	25	75	100
U21COT12	CORE II – Business Organization and Management	4	5	-	25	75	100
U21COA11	ALLIED I –Business Economics	4	5	-	25	75	100
U21EVS11	Environmental Studies	2	2	-	25	75	100
U21PECM11	PROFESSIONAL ENGLISH I	4	6	-	25	75	100
	Total	**24**	**36**		**-**	**-**	**700**
SECOND SEMESTER							
U21LTA22	Part I-TAMIL II	3	6	-	25	75	100
U21LEN22	Part II -ENGLISH II	3	6	-	25	75	100
U21COT21	CORE III- Financial Accounting-II	4	5	-	25	75	100
U21COT22	CORE IV – Principles of Marketing	4	5	-	25	75	100
U21COA22	**ALLIED-II**-Business Communication	4	5	-	25	75	100
U21VAE21	Value Education	3	3	-	25	75	100
U21PECM22	PROFESSIONAL ENGLISH II	4	6	-	25	75	100
	Total	**25**	**36**		**-**	**-**	**700**
THIRD SEMESTER							
U21LTA33	Part I-TAMIL III	3	6	-	25	75	100
U21LEN33	Part II -ENGLISH III	3	6	-	25	75	100
U21COT31	CORE V – Business statistics	4	5	-	25	75	100
U21COA33	**ALLIED III**- Principles of Insurance	4	5	-	25	75	100
U21COE311/ U21COE312	**ELECTIVE –I** 1.Human Resource Management 2. Training and Development	3	4	-	25	75	100
U21CSS31	**SBE-1**-Computer Skills for Office Management	2	2	-	40	60	100
	Non-Major Elective – I	2	2	-	25	75	100
	Total	**21**	**30**		**-**	**-**	700
FOURTH SEMESTER							
U21LTA44	Part I-TAMIL IV	3	6	-	25	75	100
U21LEN44	Part II-ENGLISH IV	3	6	-	25	75	100
U21COT41	CORE VI- Cost Accounting	4	4	-	25	75	100
U21COT42	CORE VII- Business Environment	4	4	-	25	75	100

U21COA44	**ALLIED IV**-Business Mathematics	4	4	-	25	75	100
U21COE421/ U21COE422	**Elective II** – 1.Elements of E-Commerce 2.Digital Marketing	3	3	-	25	75	100
U21MSS42	**SBE II-** Managerial Skills	2	2		40	60	100
	Non -Major Elective II	2	2	-	25	75	100
	Total	**25**	**31**				**800**
FIFTH SEMESTER							
U21COT51	CORE VIII- Management Accounting	4	5	-	25	75	100
U21COT52	CORE IX -Auditing	4	5	-	25	75	100
U21COT53	CORE X-Income Tax Law and Practice	4	5	-	25	75	100
U21COT54	CORE XI-Entrepreneurial Development	4	5	-	25	75	100
U21COT55	CORE XII- Banking Theory, Law and Practice	4	5	-	25	75	100
U21COE531/ U21COE532	**ELECTIVE-III** 1.Fundamentals of Investment 2.Artificial Intelligence For Business	3	3	-	25	75	100
U21COS53	**SBE –III** Company Law	2	2	-	25	75	100
	Total	**25**	**30**		**-**	**-**	**700**
SIXTH SEMESTER							
U21COT61	CORE XIII- Corporate Accounting	4	6	-	25	75	100
U21COT62	CORE XVI- Business Taxation	4	6	-	25	75	100
U21COT63	CORE XV – Financial Markets and Institutions	4	5	-	25	75	100
U21COT64	CORE-XVI - Financial Management	4	4		25	75	100
U21COT65	CORE XVII- Financial Services	4	4		25	75	100
U21COE641/ U21COE642	**ELECTIVE –IV**-1. Business Law 2.Corporate Governance	3	3	-	25	75	100
U21COS64	**SBE- IV**-Personal Selling and Salesmanship	2	2		25	75	100
U21EAS61	Extension Activities	3	-	-	-	-	100
	Total	**28**	**30**		**-**	**-**	**800**
	Grand Total	**148**	**193**				**4400**

Non Major Elective

1. NME- I - **U21CON31**- Personal Finance and Planning (Practical)
2. NME –II - **U21CON42**- Commerce (Practical)

Additional Two Credit Courses

1. U21COO31-Online Course – III Semester,
2. U21COI41-Internship – IV Semester,
3. U21COV51-Value added course – V Semester

SEMESTER-I

COURSE CODE	U21COT11	FINANCIAL ACCOUNTING-I	L	T	P	C
CORE I			6	-	-	4

Course Objectives:

The main objectives of this course are:

1. To enable the students to learn basic Financial Accounting.
2. To make the students skillfully to prepare and present the final accounts of sole trader.
3. To learn about various types of errors and calculation of depreciation in accounts.
4. To understand about Bill of Exchange and accounting for professionals.
5. To understand about the various accounts in Non-Trading Concern.

Unit 1 : **Introduction to Accountancy**

Accounting-Introduction-Meaning and Definition-Meaning and Scope of Accounting-Types of Accounting-Accounting concepts and Conventions- Functions of Accounting -Objectives of accounting-Book-keeping and accounting-Double entry system- Accounting Rules- Journal-ledger-Subsidiary Books- Preparation of Trial Balance -Advantages and disadvantages of Accounting.

Unit 2 : Errors rectification and Final Accounts

Average Due date – Account Current. Classification of errors – Rectification of errors – Preparation of Suspense Account. Bank Reconciliation Statement. Final accounts with adjustments – closing stock, outstanding expenses, unexpired or prepaid expense, accrued income, income received in advance, depreciation, additional bad debts, provision for doubtful debts, provide for a discount on debtors, interest on capital, interest in drawing, discount on creditors and creation of various reserves

Unit 3: Methods of Depreciation

Accounting for depreciation – Need for and significance of depreciation, Depreciation, Reserves and Provisions - Depreciation, Depletion and Amortization - Objectives of providing depreciation - causes of depreciation - methods of recording depreciation - straight line method - Diminishing Balance Method - Changes in method of depreciation - Machine Hour Rate Method - Depletion Method - Revaluation Method.

Unit 4 : Bills of Exchange

Bill of exchange – Types of Bill of Exchange-Promissory Note-Importance of Promissory note in Bill of Exchange- Accounting Treatment of Bill of Exchange-Bill Is Discounted With the Bank-Accommodation bills – Average due date – Account current.

Unit 5: Receipts and Payments

Receipt and Payment Account -Features of Receipt and Payment Accounts-Concept. Accounts of Non – Profitable Concerns- Receipts and Payments - Income and Expenditure Account and Balance Sheet.

Note: **Question Paper shall cover 40% Theory and 60% Problem**

Text books:

1. S.P. Jain & K.L. Narang, " Advanced Accounting", Kalyani publishers New Delhi, Delhi, Volume – I, 18th Revised Edition, 2014.
2. T.S.Reddy and A.Murthy, " Financial Accounting", Margam publications, Chennai – 600 017, 7th revised edition 2015.
3. R.L. Gupta and Radhasamy, "Advanced accounting" S.Chand & company ltd., New Delhi, edition 2013.

Reference books:

1. Dr. M.A. Arulanandam & Dr. K.S. Raman, "Advanced Accountancy" Himalaya publications, New Delhi, 1st edition 2015.
2. M.C. Shukla, T.S. Grewal & S.C. Gupta, "Advanced accounts", Sultan & chand publications, New Delhi 2013.
3. P.L. Nagarajan N.Vinayagam, Mani.P.L "Principles of Accountancy", S.Chand & company ltd, New Delhi – 2013.
4. T.S. Grewal," Introduction to Accountancy", S.Chand & company ltd, New Delhi – 2014. 5. P.L. Tulsian – Advanced Accountancy – Tata MC Grow Hill companies.

Course outcomes: At the end of the course, students would be able to:

1	recall Accounting Concepts and Conventions and use Accounting rules to record business transactions in the form of Journal, Ledger, subsidiary books and preparation of Trial Balance.	K1
2	understand the steps involved in locating errors and prepare them to understand the to preparation of final accounts for sole traders.	K2
3	outline the concepts of Bills of exchange, Average due date and Account Current	K2
4	examine the concepts of consignment and joint venture.	K4
5	analyze the bank reconciliation statement, Receipts and payments, Income and expenditure and Balance sheet and accounting for professionals to enhance the knowledge.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping Outcomes- POs and PSOs

	PO					PSO								Means Score of COS
	1	2	3	4	5	1	2	3	4	5	6	7	8	
CO-1	4	4	4	4	3	3	3	3	4	3	4	3	4	43/13=3.30
CO-2	4	3	4	3	3	3	3	4	4	3	3	3	4	44/13=3.38
CO-3	3	3	4	3	3	4	4	4	4	3	4	3	3	46/13=3.53
CO-4	4	3	4	3	4	4	3	4	3	4	3	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	3	3	4	3	4	45/13=3.46 **17.28/5=3.456**

COURSE CODE	U21COT12	BUSINESS ORGANIZATION AND MANAGEMENT	L	T	P	C
CORE II			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To understand different forms of organization
2. To understand various factors affecting business organization and functioning of stock exchange
3. To provide insight about office functioning, data processing system and EDP

Unit 1: Concept If Business and Organization

Concepts of Business, Trade, Industry and Commerce- Objectives and functions of Business– Social Responsibility of a business, Responsible Business, Ethical Conduct & Human Values. Forms of Business Organization-Meaning, Characteristics, Advantages and Disadvantages of Sole Proprietorship – Meaning, Characteristics, Advantages and Disadvantages of Partnership - Kinds of Partners - Partnership Deed - Concept of Limited liability partnership – Meaning, Characteristics, Advantages and Disadvantages of Hindu Undivided Family – Meaning, Advantages and Disadvantages of Co-operative Organization.

Unit 2: Company Clauses and Articles of Association

Joint Stock Company- Meaning, Definition, Characteristics - Advantages and Disadvantages, Code of Business Ethics. Kinds of Companies - Promotion - Stages of Promotion - Promoter - Characteristics - Kinds - Preparation of Important Documents - Memorandum of Association - Clauses - Articles of Association - Contents –Prospectus - Contents – Red herring Prospectus- Statement In lieu of Prospectus (as per Companies Act, 2013).

Unit 3: **Functions of Management**

Management - Meaning - Characteristics - Fayol's 14 Principles of Management. Functions of Management - Levels of Management – Skills of Management- Scientific Management - meaning, objectives, relevance and criticism.

Unit 4: Process of Organization

Planning -Meaning, Characteristics, Types of Plans, Advantages and Disadvantages – Approaches to Planning - Management by Objectives (MBO) - Steps in MBO - Benefits –Weaknesses. Organizing - Process of Organizing; Principles of Organization - Formal and Informal Organization - Line, Staff Organizations, Line and Staff Conflicts. Functional Organization, Span of Management - Meaning - Determining Span - Factors influencing the Span of Supervision.

Unit 5: Steps in Management Process

Meaning of Authority, Power, responsibility and accountability - Delegation of Authority Decentralization of Authority - Definition, importance, process, and principles of Coordination techniques of Effective Coordination. Control-Meaning, Relationship between planning and control, Steps in Control – Types (post, current, and pre-control). Requirements for effective control.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Basu, C. R. (1998). Business Organization and Management. New Delhi: McGraw Hill Publishing India. Chhabra, T. N. (2011).
2. Business Organization and Management. New Delhi: Sun India Publications. Gupta, C. B. (2011).

Reference Books:

1. Modern Business Organization. New Delhi: Mayur Paperbacks. Kaul, V. K. (2012).
2. Business Organization and Management, Text and Cases. New Delhi: Pearson Education. Koontz, H., & Weihrich, H. (2008).
3. Essentials of Management. New York: McGraw Hill Education. Singh, B. P., & Singh, A. K. (2002).

Course outcomes: At the end of the course, students would be able to:

1	understand the concepts of business and its forms of organizations involved insole trader, partnership firms, companies and co-operative societies and public enterprise.	K2
2	analyze the business factors which are involved in sources of finance.	K4
3	explain the functioning of stock exchanges SEBI, DEMAT of shares.	K2
4	remember office functions, layout and accommodation.	K1
5	outline office equipments and EDP.	K2
	K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create	

Mapping Outcomes- POs and PSOs

	PO					PSO								
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Means Score of COS**
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	42/13=3.23
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	44/13=3.38
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.83/5=3.366**

COURSE CODE	U21COA11	BUSINESS ECONOMICS	L	T	P	C
ALLIED- I			5	-	-	4

Course Objectives:

The main objectives of the course are

1. To make an economic analysis, with particular application to decision-making in business, and the effects of policy on the broader economic environment in which business decisions must be made.
2. To learn and understand these concepts and principles and to apply them to a variety of economic situations.
3. To understand the Demand and Supply functions and its Law
4. To analyse the cost and production function.
5. To understand the perfect and imperfect completion in an Business Environment.

Unit 1: Introduction of Economics

Introduction to Managerial Economics Business Economics: Definitions, scope, role in Business decisions- Economics systems – theories of economics -Interdependence of Micro and Macro Economics – theory of firm - Production Possibility Curve - Opportunity Cost – consumer preference- utility analysis and Types of Utility -Introduction to Cardinal and Ordinal Approaches- indifference curve analysis - roles of business economist.

Unit 2: Law of Function

Production Laws and Functions Production Concept - Importance and Factors of Production- Theory Production Function: Meaning, Concept of productivity and technology – production laws- Short Run and long run production function - Introduction to Iso-quants.

Unit 3: Demand and Supply

Demand and Supply laws Demand and its Determination: Demand function - Determinants of demand - Demand elasticity, degrees and methods – Price, Income and cross elasticity - Use of elasticity for analyzing demand - Demand forecasting: Introduction and techniques – supply law – elasticity of supply.

Unit 4: Cost Output Relationship in Short and Long Run

Cost Output Relationship Cost analysis: Cost concepts and classification, cost-output relationship Determinants of cost - short run and long run cost theory - Modern Theory of Cost - Relationship between cost and production function - cost control and cost reduction - Concept of Revenue - Different Types of Revenues- scale of economies.

Unit 5: Market and Competition

Market Structure Market structure - Perfect competition: features, Assumptions -Equilibrium of the firm and the industry in the short and the long runs - imperfect competitions: Monopoly: features - Short-run and long-run equilibrium of monopoly firm -Price discrimination -Monopolistic Competition: features Assumption; Short – run and Long run Equilibriums - Oligopoly: features Causes for the existence of oligopolistic firms in the market rather than perfect Competition - difference between perfect and Imperfect competitions.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. S.Shankaran, Business Economics - Margham Publications - Ch -17
2. P.L. Mehta, Managerial Economics - Analysis, Problems & Cases ,Sultan Chand & Sons. New Delhi– 02.
3. C.M.Chaudhary, Business Economics - RBSA Publishers - Jaipur - 03.

Reference Books:

1. Francis Cherunilam, Business Environment - Himalaya Publishing House Mumbai – 04.
2. Peter Mitchelson and Andrew Mann, Economics for Business - Thomas Nelson Australia
3. H.L. Ahuja, Business Economics – Micro & Macro - Sultan Chand & Sons – New Delhi – 55.
4. Yogesh Maheswari, Managerial Economics, PHI Learning, Newdelhi, 2005 Gupta G.S.,
5. Managerial Economics, Tata Mcgraw-Hill, New Delhi Moyer &Harris,
6. Geetika, Ghosh & Choudhury, Managerial Economics, Cengage Learning, New Delhi, 2005.
7. Managerial Economics, Tata Mcgraw Hill, New Delhi, 2011.

Course outcomes: At the end of the course, students would be able to:

1	understand the Business systems, the reason for existence of Firms, consumer preference and application of utility analysis and knowing role of business economist.	K1, K2,K3
2	understand and estimate production function, stages of production and forms of production function and laws	K1, K2,K3
3	understand basic concepts of demand and supply and its determinants, the determinants of elasticity and applications of different forecasting techniques.	K1, K2,K3
4	understand cost function, Analysis cost and concepts of relevant costs and revenues**.**	K1, K2,K3
5	compare and contrast four basic market types, concepts of monopolistic and oligopoly competition and its effect of non-price factors on products and services.	K1, K2,K3
	K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create	

Mapping Outcomes- POs and PSOs

	PO					**PSO**								**Means Score of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	44/13=3.38
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	43/13=3.30
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.90/5=3.38**

SEMESTER II

COURSE CODE	U21COT21	FINANCIAL ACCOUNTING-II	L	T	P	C
CORE-III			4	1	-	4

Course objectives:

The main objectives of this course are :

1. To explore various types of partnership accounts
2. To understand the basic concepts of Partnership accounts
3. To offer an idea about insolvency of partnership accounts
4. To promote knowledge about department and branch accounting
5. To facilitate knowledge about hire purchase and installment system of accounting

Unit 1: Hire Purchase System

Hire-purchase and installment purchase system; Meaning of hire-purchase contract; Legal provision regarding hire-purchase contract; Accounting records for goods of substantial sale values, and accounting records for goods of small values; Installment purchase system; After sales service-Accounting procedure – Calculation of interest - Default and Repossession – Installment Purchase System:

Unit 2: Branch and Departmental accounts

Introduction – Meaning – Objectives – Types of Branches - Dependent Branches – Features – Supply of Goods at Cost Price - Invoice Price – Branch Account in the books of Head Office (Debtors System Only)-Goods and cash-in-transit **–** Inter branch transactions. Departmental accounts **–** Allocation of expenses **–** Inter departmental branches.

Unit 3: Partnership firms

Partnership Accounts: Essential characteristics of partnership; Partnership deed; Final accounts; Adjustments after closing the accounts; Fixed and fluctuating capital; Goodwill; Joint Life Policy; Change in Profit Sharing Ratio. Reconstitution of a partnership firm -Amalgamation of partnership firms; Dissolution of a partnership firm -Modes of dissolution of a firm; Accounting entries;

Unit 4: Revaluation of assets and liabilities

Retirement of partner – Calculation of New ratio and gaining ratio – Revaluation of assets and liabilities – Treatment of goodwill – Adjustment of goodwill through capital A/c only – Settlements of accounts-Admission of new partner-Accounting treatment-Adjustment entries. Death of a partner; Accounting treatment-Adjustment entries.

Unit 5: Dissolution and Insolvency of partner

Partnership Accounts - Dissolution of firm - Settlement of accounts - accounting treatment for goodwill and unrecorded assets and liabilities - Insolvency of a partner - Garner vs Murray - Fixed and Fluctuating -Capital - all partners insolvency - Gradual realization and Piecemeal distribution - proportionate Capital Method - Maximum loss Method.

Note: **Question Paper shall cover 20% Theory and 80% Problem**

Text books:

1. S.P. Jain & K.L. Narang, " Advanced Accounting", Kalyani publishers New Delhi, Delhi, Volume – I, 18th Revised Edition, 2014.
2. T.S.Reddy and A.Murthy, " Financial Accounting", Margam publications, Chennai – 600 017, 7th revised edition 2015.
3. S.P. Jain & K.L. Narang, " Patnership Accounting", Kalyani publishers New Delhi

Reference books:

1. Dr. M.A. Arulanandam & Dr. K.S. Raman, "Advanced Accountancy" Himalaya publications, New Delhi, 1st edition 2015.
2. M.C. Shukla, T.S. Grewal & S.C. Gupta, "Advanced accounts", Sultan & chand publications, New Delhi 2013.
3. R.L. Gupta and Radhasamy, "Advanced accounting" S.Chand & company ltd., New Delhi, edition 2013**.**
4. T.S. Grewal," Introduction to Accountancy", S.Chand & company Ltd, New Delhi – 2014.
5. P.L. Tulsian – Advanced Accountancy – Tata MC Grow Hill companies.

Course outcomes: At the end of the course, students would be able to:

1	describe the concepts based on depreciation and its methods in books of accounts.	K1
2	outline about the nature of Investment and Royal excluding Sublease.	K2
3	identify the essential characteristics of single entry system.	K3
4	apply the basic concepts of departmental and branch accounting.	K4
5	familiarize the procedure relating to hire purchase and installment in books of accounts	K2
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

	POS					**PSOS**								**Means Score of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	4	3	4	3	4	43/13=3.30
CO-2	4	3	4	3	3	3	3	4	4	3	3	3	4	44/13=3.38
CO-3	3	3	4	3	3	4	4	4	4	3	4	3	3	46/13=3.53
CO-4	4	3	4	3	4	4	3	4	3	4	3	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	3	3	4	3	4	45/13=3.46 **17.28/5=3.456**

COURSE CODE	U21COT22	PRINCIPLES OF MARKETING	L	T	P	C
CORE-IV			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To conceptualize an idea about marketing and related terms
2. To provide insight about various forms and types of marketing
3. To analyze various components of marketing channels
4. To understand various concepts relating to consumer behavior
5. To introduce the components of marketing mix

Unit 1: Marketing Concepts

Marketing – Definition of market and marketing – Importance of Marketing – Modern marketing concept – Global marketing – E-marketing and Tele marketing – Meaning and concepts – Marketing ethics – Career opportunities in marketing- Green marketing- Online marketing- Neuro marketing.

Unit 2: Marketing Functions

Marketing functions-Buying -Selling -Transportation -Storage - Financing -Risk Bearing - Standardization - Market Information. Segmentation, Targeting and Positioning: Introduction, Concept of Market Segmentation, Benefits of Market Segmentation, Requisites of Effective Market Segmentation, The Process of Market Segmentation, Bases for Segmenting Consumer Markets, Targeting (T), Market Positioning (P)

Unit 3: Consumer Behaviour and Personal Selling

Consumer behaviour – Meaning – Need for studying consumer behaviour – Factors influencing Consumer behaviour – Market segmentation – Customer relations marketing. Personal selling: Concept and features, classification of sales jobs, qualities and functions of a sales person, prospecting, personal selling process; Functions of a sales manager.

Unit 4: Marketing Mix

Marketing mix – Product mix – Meaning of product – Product life cycle – Branding – Labeling – Price mix – Importance – Pricing objectives – Pricing strategies – Personal selling and sales promotion – Advertising –Place mix – Importance of channels of distribution – Functions of middleman – Importance of retailing in today's context.

Unit 5: CRM and Consumer protection

Customer Relationship Management- Definitions of Customer Relationship Management (CRM),Reasons Behind Losing Customers by Organizations, Significance of Customer Relationship Management, Social Actions Affecting Buyer-Seller Relationships,---Marketing and government – Agricultural marketing – Problems – Remedial measures – Bureau of Indian standards – AGMARK – Consumerism – Consumer protection – Rights of consumers..

Note: Question Paper shall cover 100% Theory

Text Books:

1. R.S.N.Pillai and Bhagavathi, Marketing, S.Chand & Co Ltd, 2009 edition & 2011 reprint, New Delhi.
2. Rajan Nair, Marketing, Sultan Chand & Sons, New Delhi 2005 Edition.
3. Dr.L.Natarajan, Margham, Marketing, Publications, Chennai.

Reference Books:

1. K. Sundar, Essentials of Marketing, Vijay Nicole Imprints Pvt Ltd, Chennai-91.
2. J.Jayasankar, Marketing, Margham Publications, Chennai.
3. Sonatakki, Principles of Marketing, Kalyani Publishers, New Delhi.
4. William J Stanton, Fundamentals of Marketing, Mc Graw Hill Publishing Company Ltd, New Delhi.
5. Philip Kotler & Gary Armstrong, Principles of Marketing, 6th Edition, 2012, Prentice Hall of India Pvt. Ltd, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	define the various concepts and terms related to marketing	K1
2	explain about various marketing functions	K2
3	understand terms of consumer behaviour and examined about different concepts related to consumers.	K2
4	identify the marketing mix and its elements	K1
5	understand different provisions related to trends in emerging markets.	K2
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping- POs and PSOs

	POS					PSOS								Means Score of COS
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	44/13=3.38
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	43/13=3.30
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.90/5=3.38**

COURSE CODE	U21COA22	BUSINESS COMMUNICATION	L	T	P	C
ALLIED - II			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To provide information on effective business communication and techniques to respond tobusiness queries.
2. To provide knowledge about banking correspondence and company secretarial correspondence.

Unit 1: Business Communication Concepts

Business Communication: Meaning – Objectives – Media – Barriers - Importance of Effective Business Communication- Modern Communication Methods - Business Letters: Need - Functions - Kinds - Essentials of Effective Business Letters - Layout-Barriers to Communication, the Importance of Communication in the Workplace.

Unit 2: Business Correspondence

Business Correspondence : Enquiries - Replies - offers and quotations - Orders and their Execution - Credit and Status Enquiries - Meaning - Trade and bank references - Acknowledgment letters.- Sales letters.-Complaints and Adjustments - Collection Letters - How to write effective Collection letters - Sales Letters - Circular Letters.

Unit 3: Banking Correspondence

Banking Correspondence - Introduction - correspondence with customer, Head office – Insurance Correspondence –Life insurance- Fire insurance - Marine insurance - Agency Correspondence. Letters exchanged between two individual banks-Credit, Financial or Status Inquiries

Unit 4: Company Secretarial Correspondence

Company Secretarial Correspondence - With the Directors-With the Shareholders-With the Office Staff -With the Registrar of companies Agenda, Minutes and Report Writing- Types- Characteristics of good Report- Report of individuals.

Unit 5: Methods of Communication

Application for Jobs: Preparation of resume- Interviews- Meaning- types of Interview- Candidates preparing for an interview- guidelines to be observed during an interview- Business Report Presentations. Strategic Importance of E-Communication. Email, Text Messaging, Slide or Visual Presentation - Internet - Video conferencing - Group Discussion – Social Networking.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1.Rajendra Pal, J.S. Korahilli, Essentials of Business Communication, Sultan Chand & Sons, New Delhi.
2. N.S.Raghunathan & B.Santhanam, Business Communication, Margham Publications, Chennai.
3. R.S.N.Pillai and Bhagavathi.S, Commercial Correspondence, Chand Publications, New Delhi.

Reference Books:

1. M.S. Ramesh and R.Pattenshetty, Effective Business English and Correspondence, S.Chand & Co, Publishers, New Delhi-2.
2.V.R. Palanivelu & N. Subburaj, Business Communication, Himalaya Publishing Pvt. Ltd, Mumbai.
3. Sathya Swaroop Debasish, Bhagaban Das, Business Communication, PHI Learning Pvt. Ltd., New Delhi, 2010 Edition.
4. Communication conquer: Pushpalatha & Kumar, A Handbook of group discussion and Job Interview, PHI Learning Publisher.
5.Lesikar, R.V. & Flatley, M.E. Basic Business Communication Skills for Empowering Internet Generation, Tata Mc Graw Hill Publishing Company Ltd, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	Outline the importance of effective business communication	K2
2	Understand the intricacies of responding to business related queries	K2
3	Categorize effective correspondence with banks, insurance and agencies	K3
4	Examine effective response to company secretarial correspondence	K4
5	Analyze new innovative and effective ideas for business communication	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping Outcomes POs and PSOs

	POS					**PSOS**								**Means Score of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	4	3	4	3	3	4	4	4	48/13=3.69
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.29
CO-3	4	3	4	4	4	3	4	4	4	3	4	4	3	48/13=3.69
CO-4	4	3	4	4	3	4	3	3	3	4	4	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **17.81/5=3.562**

SEMESTER -III

COURSE CODE	U21COT31	BUSINESS STATISTICS	L	T	P	C
CORE –V			3	2	-	4

Course Objectives:

The main objectives of the course are:

1. To promote the skill of applying statistical techniques in business by enabling the students to apply the statistical tools in analysis and interpretation of data.
2. To understand the various measures of dispersion as Range, Quartile deviation and skewness.
3. To understand the practical knowledge on Correlation and Regression.

Unit 1: Introduction and Measures of Central Tendency

Introduction and Measures of Central Tendency: Introduction – Collection and Tabulation of Statistical data – Frequency Distribution – Measure of Central Tendency – Mean, Median, Mode, Harmonic Mean and Geometric Mean, Combined Mean.

Unit 2: Measures of Dispersion

Measures of Dispersion: Measures of Dispersion – Range – Quartile Deviation – Mean Deviation – Standard Deviation and their Co-efficient. Measure of Skewness – Karl Pearson and Bowley's Co-efficient of skewness.

Unit 3: Correlation and Regression

Correlation and Regression: Correlation – Types of Correlation – Measures of Correlation - Karl Pearson's Co-efficient of Correlation – Spearman Rank Correlation Co-efficient. Simple regression analysis – Regression equation, Fitting of Regression lines – Relationship between Regression Co-efficient and Correlation Co-efficient.

Unit 4: Index Numbers

Index Numbers: Index Number, Definition of Index Numbers, Uses – Problems in the construction of index numbers, Simple and Weighted index numbers. Chain and Fixed base index – Cost of living index numbers.

Unit 5: Analysis of Time Series

Analysis of Time Series: Analysis of Time Series – Definition – Components of Time Series, Uses, Measures of Secular Trend, Measure of Seasonal Variation. Method of simple average only. Indian Statistics – Birth and Death rates – Crude, Correlated and Standardized – Methods of Economic survey, preparation of schedules and questionnaires.

Note: **Question Paper shall cover 20% Theory and 80% Problem**

Text Books:

1. P.A. Navaneethan, Business Statistics, Jai Publishers, Trichy-21.
2. Wilson. M, Business Statistics, Himalaya Publishing House Pvt Ltd., Mumbai.
3. Pillai, RSN and V. Bagavathi, Statistics, S. Chand & Company Ltd., New Delhi, 2010**.**

Reference Books:

1. S.P.Gupta, Statistical Methods, Sultan Chand & Sons, New Delhi.
2. S.P. Rajagopalan & Sattanathan, Business Statistics, Vijay Nicole Imprints Pvt. Ltd, Chennai-91.
3. D.C.Sanchati and V.K.Kapoor, Statistics, Sultan Chand & Sons, New Delhi.
4. S.C. Gupta & V.K.Kapoor, Fundamentals of Mathematical Statistics, S.Chand & Sons, New Delhi, 2009.
5. S.P.Gupta & M.P.Gupta, Business Statistics, Sultan Chand & Sons, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	acquire knowledge about averages to be used in Business Research	K1, K2,K3
2	gain knowledge about Standard Deviation, Skewness.	K1, K2,K3
3	gain knowledge about the application of Correlation and Regression	K1, K2,K3
4	get an in depth knowledge about Index Numbers	K1, K2,K3
5	acquire knowledge in Measures of Trend and its application in Business Research.	K1, K2,K3 , K6

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

Mapping POs and PSOs

	POS						**PSOS**							**Means Score of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	3	4	3	3	3	4	4	3	3	4	4	46/13=3.53
CO-2	4	3	4	4	3	3	4	4	3	3	3	3	4	48/13=3.69
CO-3	4	3	4	4	4	4	4	4	4	3	4	4	3	49/13=3.76
CO-4	4	3	4	4	4	4	3	3	4	4	4	4	4	49/13=3.76
CO-5	4	4	3	3	4	4	4	3	3	4	3	4	3	46/13=3.53 **18.27/5=3.654**

COURSE CODE	U21COA33	PRINCIPLES OF INSURANCE	L	T	P	C
ALLIED-III			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To understand the basic concepts of insurance
2. To familiarize with the concept of working of agency
3. To understand various forms of underwriting
4. To provide knowledge about the formation of insurance companies
5. To acquaint with the basic principles of different types of insurance

Unit1: Insurance an Introduction

Life Insurance Organization : Important Activities, The Indian Context, Internal Organization, The Distribution, System, Appointment of Agent, Functions of Agents, Remuneration of Agents, Trends in Distribution Channels; Plans of Life Insurance : Annuities : Nature of Annuities, Types.- Importance of Insurance to Society, Individuals, Business and Government.

Unit 2: Life Insurance

Life Insurance - Meaning and Features of Life Insurance Contract – Classification of policies – Annuities – Selection of risk – Measurement of risk – Calculation of premium – Investment of funds – Surrender Value - Policy conditions –Life Insurance for the Under Privileged. Plans of Life Insurance: Need Levels, Basic Elements, Some Popular Plans, Limited Payment Plans, Participating Policies, Convertible Plans, Riders, For the Handicapped;

Unit 3: Fire Insurance

Fire Insurance – Meaning, Nature and Use of Fire Insurance- Characteristics of Fire Insurance - Fire Insurance Contract- Kinds of policies – Policy conditions – Payment of claim – Reinsurance – Double insurance- Progress of Fire Insurance-Inclusions under Fire Insurance -Exclusions under Fire Insurance.

Unit 4: Marine Insurance

Marine Insurance - Meaning and Nature of Marine Insurance – Classification of policies – Insurance Functions-Eligibility Criteria-Policy conditions – Premium calculation – Marine Losses – Payment of Claims- Progress of Marine Insurance Business in India-Difference between Fire Insurance & Marine Insurance-Inclusions under Marine Insurance -Exclusions under Marine Insurance .

Unit 5: Personal Accident Insurance

Personal Accident Insurance – Motor Insurance – Burglary Insurance – Miscellaneous Forms of Insurance including Social Insurance – Rural Insurance and Prospects of Agriculture Insurance in India – Health Insurance – Liability Insurance - Bancassurance-Inclusions under Personal Accident -Exclusions under Personal Accident.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1.Mishra. M. N & Mishra. S.B - Insurance - Principles and Practice, S. Chand & Company Ltd. , New Delhi, 22nd Edition, 2016

2. Krishnaswamy. G - A Textbook on Principles and Practice of Life Insurance, Excel Books, New Delhi, First Edition- 2012.

3. Periasamy. P - Principles and Practice of Life Insurance, Himalaya Publishing House, 2017**.**

Reference Books:

1. Bodla B.S., Garg M.C. & Singh K.P., Insurance Fundamentals, Environment and Procedure, Deep & Deep Publications Pvt. Ltd., New Delhi, 2004

2. Ganguly Anand, Insurance Management, New Age International Publishers, New Delhi

3. Hargovind Dayal.,The Fundamentals of Insurance – Theories, Principles and Practices., Notion Press., Chennai., 2017.

4. Taxmann : Insurance Manual, Taxmann Publication Private Limited

5. M. N. Srinivasan : Principles of Insurance Law, Wadhwa & Co.

6. K.C. Mishra and G.E. Thomas, General Insurance - Principles and Practice, Cengage Learning: New Delhi.

Web Resource: https://www.insuranceinstituteofindia.com/

Course outcomes: At the end of the course, students would be able to:

1	Recall the different concepts of insurance and its working	K1
2	Explain the concept of agent and its working system	K2
3	Evaluate the functions of agents and various forms of underwriting	K5
4	Analyze The Various Actuarial Aspects Relating To Insurance Companies	K4
5	List the basic principles of insurance and various types of it.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping Outcomes POs and PSOs

	POS					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	4	3	4	3	3	4	4	4	48/13=3.69
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.29
CO-3	4	3	4	4	4	3	4	4	4	3	4	4	3	48/13=3.69
CO-4	4	3	4	4	3	4	3	3	3	4	4	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **17.81/5=3.562**

COURSE CODE	U21COE311	CHOICE - I	L	T	P	C
ELECTIVE –I		HUMAN RESOURCE MANAGEMENT	4	-	-	3

Course Objectives:

The objectives of the course are

1. to discuss the role of human resource management in relation to organizational requirements

2. to acquaint students with the techniques and principles to manage human resource of an organization.

3. to understand the various processes of Human Resource Planning

Unit 1: HRM Concept and Functions

Introduction to Human Resource Management HRM Concept and Functions, Role, Status and competencies of HR Manager - HR Policies - Evolution of HRM - HRM vs HRD - Evolution of HRM - Emerging Challenges of Human Resource Management - Workforce diversity; Empowerment - Human Resource Information System.

Unit 2: Human Resource Planning

Acquisition of Human Resource Human Resource Planning- Quantitative and Qualitative Dimensions - job analysis – job description and job specification - Recruitment And Selection – meaning – process of requirement – sources and techniques of Recruitment – Meaning and Process of Selection – Selection Tests And Interviews – placement, induction, socialization and Retention. Retention strategy.

Unit 3: Training and Development

Training and Development Concept and Importance -Training and development methods – Identifying Training and Development Needs - Designing Training Programmes - Role Specific and Competency Based Training - Evaluating Training Effectiveness - Training Process Outsourcing - Management Development - Career Development.

Unit 4: Performance Appraisal

Performance Appraisal Nature, objectives and importance - Modern Methods and techniques of performance appraisal - potential appraisal and employee counselling - job changes - transfers and promotions -Problems in Performance Appraisal – Essentials of Effective Appraisal System – Job Evaluation – Concepts, Process and Objectives – Advantages and Limitations – Methods.

Unit5: Compensation and Maintenance

Compensation and Maintenance Compensation - Concept and policies- wage and Salary administration Methods of wage payments and incentive plans - Fringe benefits - Performance linked compensation - Employee health, welfare and safety social security - Employer-Employee relations- grievance handling and redressal - Grievance handling and redressal.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. K. Aswathappa : Human Resource Management Text and Cases: Tata McGraw Hill, New Delhi.
2. George W Bohlander and Scott A Snell: Principles of Human resource Management: Cengage Learning, New Delhi.
3.P.G.Aqinas: Human Resource Management Principles and Practice: Vikas Publishing House Pvt. Ltd., New Delhi

Reference Books:

1. Gary Dessler. A Framework for Human Resource Management. Pearson Education.
2. DeCenzo, D.A. and S.P. Robbins, Personnel/Human Resource Management, Pearson Education.
3. Bohlendar and Snell, Principles of Human Resource Management, Cengage Learning.
4. Ivancevich, John M. Human Resource Management. McGraw Hill.
5. Wreather and Davis. Human Resource Management. Pearson Education.
6. Robert L. Mathis and John H. Jackson. Human Resource Management. Cengage Learning.
7. TN Chhabra, Human Resource Management, Dhanpat Rai & Co., Delhi.
8. Biswajeet Patttanayak, Human Resource Management, PHI Learning.
9. Khurana Ashok, Human Resource Management, V.K. Publications.
10. Sankalp Gaurav, Human Resource Management, Sahitya Bhawan Publications.
11. Human Resource Management by Kalyani Publishers.

Course outcomes: At the end of the course, students would be able to:

1	understand the recent HRM concepts and its challenges	K1, K2,K3
2	know the job analysis for placing the suitable person at the suitable place	K1, K2,K3
3	gain the benefits of training and development to the employees of an organisation with a view to attaining goals of the organization	K1, K2,K3
4	gain basic knowledge of assessing and techniques of performance appraisal	K1, K2,K3
5	understand Compensation and Maintenance of Compensation system	K1, K2,K3

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

Mapping POs and PSOs

	POS					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	3	4	3	3	3	4	4	3	3	4	4	46/13=3.53
CO-2	4	3	4	4	3	3	4	4	3	3	3	3	4	48/13=3.69
CO-3	4	3	4	4	4	4	4	4	4	3	4	4	3	49/13=3.76
CO-4	4	3	4	4	4	4	3	3	4	4	4	4	4	49/13=3.76
CO-5	4	4	3	3	4	4	4	3	3	4	3	4	3	46/13=3.53 **18.27/5=3.654**

COURSE CODE	U21COE312	CHOICE - II	L	T	P	C
ELECTIVE –I		TRAINING AND DEVELOPMENT	4	-	-	3

Course Objectives:

The main objectives are

1. To equip the learners with the concept and practice of Training and Development in the modern organizational setting through the pedagogy of case discussions and recent experiences.
2. To understand the concepts and various types of analysis in Training
3. To understand the various evaluation techniques in Training and Development

Unit 1: Introduction to Training and Development

Introduction Concepts and Rationale of Training and Development; overview of training and development systems; organizing training department; training and development policies; linking training and development to company's strategy; Requisites of Effective Training; Role of External agencies in Training and Development.

Unit 2: **Training Need Analysis**

Training Need Analysis (TNA) Meaning and purpose of TNA, TNA at different levels, Approaches for TNA, output of TNA, methods used in TNA.

Unit 3: **Training and Development Methodologies**

Training and Development Methodologies Overview of Training Methodologies- Skills of an Effective Trainer; Use of Audio-Visual Aids in training; Computer Aided Instructions- Distance Learning, Open Learning, E- Learning; Technologies Convergence and Multimedia Environment. Development Techniques for enhancing decision–making and interpersonal skills, Demonstration and Practice Monitoring; Coaching; Self Diagnostic Skills, Experience Learning, Discovery Learning, Brainstorming, Counselling, Position Rotation, Team Building, and Sensitivity Training.

Unit 4: Designing Training & Development Programme

Designing Training & Development Programme Organization of Training and Development programmes, Training design, kinds of training and development programmes- competence based and role-based training; orientation and socialization; diversity training, choice of training and development methods, Preparation of trainers; developing training materials; E-learning environment; Flexible learning modules; Self development; Training process outsourcing.

Unit 5: Evaluation of Training and Development

Evaluation of Training and Development Reasons for evaluating Training and development programmes, Problems in evaluation; Evaluation planning and data collection, different evaluation frameworks, Problems of Measurement and Evaluation; Costing of training, measuring costs and benefits of training programmes, obtaining feedback of trainees; Methods of evaluating effectiveness of Training Efforts; Kirkpatrick Model of Training Effectiveness; Training issues resulting from the external environment and internal needs of the company.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Sharma, D., & Kaushik, S. (2019). Training & Development. New Delhi: JSR Publishing House.

Reference Books:

1. Blanchard, N. P., & Thacker, J. W. (2012). Effective Training: Systems, Strategies and Practices, 4 th Edition. New York: Pearson Education.
2. Noe, R. A., & Kodwani, A. D. (2018). Employee Training and Development, 7th Edition. New York: McGraw Hill Education.
3. Lynton, R. P., & Pareek, U. (2011). Training for Development. New Delhi: SAGE India.
4. Phillips, J. J., & Phillips, P. P. (2016). Handbook of Training Evaluation and Measurement Methods. Houston: Gulf Publishing Co.
5. Prior, J. (1991). Handbook of Training and Development. Mumbai: Jaico Publishing House.

Course outcomes: At the end of the course, students would be able to:

1	analyse the training strategies adopted by companies in real situations	K1, K2,K3
2	identify training needs of an individual by conducting Training Need Analysis	K1, K2,K3
3	differentiate between the applicability of various training strategies and select a strategy based upon the result of TNA	K1, K2,K3
4	develop a training and development module	K1, K2,K3
5	evaluate and assess the cost and benefits of a training and development programme.	K1, K2,K3

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

Mapping POs and PSOs

	POS					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	44/13=3.38
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	43/13=3.30
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.90/5=3.38**

SEMESTER IV

COURSE CODE	U21COT41	COST ACCOUNTING	L	T	P	C
CORE-VI			3	1	-	4

Course Objectives:

The main objectives of this course are :

1. To understand the concept and various components of costing
2. To assist preparation of accounts under process costing
3. To familiarize with the techniques of operating costing

Unit 1: Cost accounting Concept

Meaning, Objectives, Importance and Uses of Cost Accounting, Functions of Cost Accounting Department in an Organization, Difference between Cost Accounting and Financial Accounting; Various Elements of Cost and Classification of Cost; Cost object, Cost unit, Cost driver, Cost reduction and Cost control; Limitations of Cost Accounting; **Cost Sheet:** Meaning and Cost heads in a Cost Sheet, Presentation of Cost Information in Cost Sheet / Statement - Problems on Cost Sheet, Tenders and Quotations

Unit 2: Material Control

Procedure for procurement of materials and documentation involved in procurement of materials – **(**Bill of materials, Material requisition note, Purchase requisition note, Purchase order, Goods received note); Inventory Control: Inventory control techniques and determination of various stock levels – Problems on level setting and computation of EOQ; ABC Analysis, FSN Inventory, VED Inventory, HML Inventory, Physical Control- KANBAN, JIT Inventory Management Technique, Perpetual Inventory system (Concepts only)

Unit 3: Labour Costing

Labour: System of wage payment – Idle time – Control over idle time – Labour turnover. Overhead – classification of overhead – allocation and absorption of overhead. Labour Cost: Meaning, Components, Classification and Importance of Employee (Labour) Cost in Organization; Methods of Remuneration (Payment of Wages and Incentives) Labour Turnover – Meaning, Reasons and Effects of LTO/ETO.

Unit 4: Process costing

Process costing – Features of process costing –Distinction between job costing and process costing - process losses, wastage, scrap, normal process loss – abnormal loss, abnormal gain. (Excluding inter process profits and equivalent production).-Valuation of Work-in-progress

Unit 5: Operating Costing

Operating Costing – Contract costing – Reconciliation of Cost and Financial accounts-Contract Costing: Contract Costing - Definition, Features, Work Certified and Un certified - Incomplete Contact - Escalation Clause - Cost Plus Contract - Contract Account.

Note : Question Paper shall cover 20% Theory and 80% Problem

Text books:

1. S. . Jain and K.L. Narang, "Cost Accounting", Kalyani publications. New Delhi. Edn. 2011
2. R S.N. Pillai and V. Bhagavathi, "Cost Accounting", S chand and company ltd., New Delhi. E n. 2004.
3. T S. Reddy and Dr. Y. Hari prasad reddy, "Costl Accounting", Margam publications,Chennai – 6 0 017, 7th Revised Edition 2009.

Ref rence books:

1. S. . Iyyangar, "Cost Accounting principles and practice", Sultan chand, New Delhi. 2005 2. V. .Saxena & C.D. Vashist, "Cost Accounting", Sultan chand, New Delhi 2005
3. M N. Arora, "Cost Accounting", Sultan chand, New Delhi.2005.
4. B.S. Kanna, I.M. Pandey, G.K. Ahuja, M.N. A rora, Practical costing, sultan chand & sons. E ition 2009.
5. Bhattacharya "Principles and practices of Cost Accounting" PHI Publications, Third Edition – 20 0.

Cou se outcomes: At the end of the course, students would be able to:

1	recall various concepts of costing and costing methods	K1
2	analyze the various elements of costing	K4
3	explain the labour wage payment system	K2
4	outline the cost under process costing system	K2
5	examine about operational costing, contract costing and Reconciliation of Cost and Financial Statements.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Map ing POs and PSOs

	POS					PSOS								Mean Scores of COS
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	4	3	4	3	4	43/13=3.30
CO-2	4	3	4	3	3	3	3	4	4	3	3	3	4	44/13=3.38
CO-3	3	3	4	3	3	4	4	4	4	3	4	3	3	46/13=3.53
CO-4	4	3	4	3	4	4	3	4	3	4	3	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	3	3	4	3	4	45/13=3.46 **17.28/5=3.456**

COURSE CODE	U21COT42	BUSINESS ENVIRONMENT	L	T	P	C
CORE-VII			4	-	-	4

Course Objectives:

The objectives of the course are

1. To provide an overview of Business Environment in India

2. To know the impact of environmental factors on the Business Policies

3. To formulate Decisions and to understand the concept of Corporate Governance, Social Responsibility of Business and Business Ethics.

Unit 1: Introduction to Business Environment

Introduction to Business Environment - Nature and Scope of Business - Concept and Characteristics of Business - Scope of Business - Nature, Objectives and Uses of Study of Business Environment - Types of Business Environment - Micro Environment - Macro Environment - Environmental Analysis - Managing Diversity - Nature and scope of business

Unit 2: The Constitutional Environment

The Constitutional Environment - Functions and Role of the State - Legal Environment -Functions of state, economic roles of government, government and legal environment. The constitutional environment, rationale and extent of state intervention.

Unit 3: Demographic Environment and Socio-Cultural Environment

Demographic Environment - Culture & Business - Business and Society - Social Responsibilities of Business - Business Ethics & Values - Corporate Governance -Nature and impact of culture on business, culture and globalization, social responsibilities of business, social audit, business ethics and corporate governance, Demographic environment population size, migration and ethnic aspects, birth rate, death rate and age structure

Unit 4: Economic Systems

Economic Systems - Economic Planning - Economic Parameters - Economic Policies - Consumer Protection Act and Competition Act, 2008 - Liberalization, Privatization and Globalization of Indian Economy.-New industrial policy, FEMA, Monetary and fiscal policies. Consumer Protection Act and Competition Law. Liberalization, Privatization and Globalization of Indian Economy, Trends and Issues

Unit 5: Natural Environment

Natural Environment: Meaning and Components of Natural Environment - Impact of Natural Environment on Business - Guidelines for Development of Natural Resources - Sustainable Development - Green Index. Technological Environment: Meaning, Factors Governed and Impact of Technological Environment - Indicators of Technological Progress - Technology as a Source of Competitive Advantage - Sources of Technological Dynamics - Time Lags in Technology Introduction - Impact of Technology on Globalization.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Gupta C.B., Essentials of Business Environment, Sultan & Chand Publications, New Delhi. First Edition, 2018.
2. Dhanabhakiyam. M & Kavitha. M., Business Environment, Vijay Nicole Imprints Private Ltd., Chennai., 2014. 3. Sankaran, Business Environment, Margham Publications. Chennai

References Books:

1. Cherunilam, F. (2013). Business Environment: Text and cases. New Delhi: Himalaya Publishing House Pvt. Ltd.
2. Sloman, J. & Sutcliffe, M. (2004). Economics for Business (3rd Edition.). New Delhi: Pearson Education.
3. Dhingra, I. C. & Dhingra, N. (2014). Concise Business Environment (1st Ed.). New Delhi: Book Age Publications.
4. Bosch, F. & Man, A. (1994). Government's Impact on the Business Environment and Strategic Management. Journal of General Management, Vol. 19 No. 3
5. Fernando, A. C. (2011). Business Environment. New Delhi, Pearson Education.

Web Sources:

http://www.financialeconomics.cf/2011/04/economic-environment-kinds-ofeconomic.html
http://www.answers.com/Q/Impact_of_economic_environment_on_business
http://www.ehow.com/print/info_8127368_four-aspects-between-governmentbusiness.html.
http://www.shareyouressays.com/93732/role-of-indian-government-insahping-businessenvironment
http://www.saylor.org/course/econ305.
http://planningcommission.gov.in/aboutus/history/index.php?about=aboutbdy.html
http://www.brainyquote.com/quotes/quotes/f/franklind139327.html#QzGg6f 6x8H22LDbv.99

Course outcomes: At the end of the course, students would be able to:

1	understand the concept, significance and changing dimensions of Business Environment	K1, K2,K3
2	appreciate the importance and impact of changing laws and regulations on a business firm	K1, K2,K3
3	learn about emerging dimensions in socio-cultural environment and its relevance for a business firm.	K1, K2,K3
4	gain insights on role of economic systems, economic planning, government policies, public sector and development banks, economic reforms, liberalization and its impact on business.	K1, K2,K3
5	gain insights on patent laws, policy on research and development and new technological developments in Business Environment	K1, K2,K3

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

Mapping POs and PSOs

	POS					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	42/13=3.23
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	44/13=3.38
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.83/5=3.366**

COURSE CODE	U21COA44	BUSINESS MATHEMATICS	L	T	P	C
ALLIED - IV			2	2	-	4

Course Objectives:

The main objective of the course is

1. To acquaint students with the familiarity of Business Mathematics and on particular emphasis is laid on the foundation aspects of business mathematics.
2. To understand the theory of sets, Indices and surds
3. To understand the various methods of Depreciation and annuities.

Unit 1: Development of number system

Operations on Numbers – Development of number system – Natural number – Integers – Rational and Irrational numbers – Imaginary numbers – Complex numbers – Greatest Common divisor – Least Common multiple**.**

Unit 2:Theory of Sets

Theory of Sets – Definition – Types – Union, Intersection, Difference and Complement of Sets – De Morgan's Law – Venn Diagram – Simple set applications – Numbers of elements in a finite set.

Unit 3: Indices and Surds

Indices and Surds – Positive indices – Laws of indices – Zero and Unity index – Fractional index – Miscellaneous illustrations – Surds – Definition – Types of Surds – Similar Surds – Conjugate Surds – Rationalizing factors – Properties of Bi-quadratic surds – Square root of a surds – Square root of trinomial quadratic surd.

Unit 4: Depreciation and Annuities

Interest, Depreciation and Annuities – Simple Interest – Compound Interest – Depreciation – Annuities – Types of Annuities – Definite integral – Simple applications – Finding total and average cost function – Producer surplus and consumer surplus.

Unit 5: Probability and Matrices

Probability and Matrices – Terminology – Probability measure – Classical or priori probability – Types of approach and Mathematical expectation – Matrices – definition – Types – Addition, Subtraction, Multiplication of Matrices – Inverse matrix – Solving a system of simultaneous linear equations using matrix inversion technique – rank of a matrix.

Note: **Question Paper shall cover 20% Theory and 80% Problem**

Text Books:

1. Business Mathematics – V.Sundaresan and S.D.Jeyaseelan.
2. Business Mathematics – M.Manoharan and C.Elango, Palani Paramount Publications.

Reference Books:

1. Business Mathematics – J.K.Singh, Himalaya Publishing House.
2. Business Mathematics – R.S.Soni, Arneet Kaur Soni, Himalaya Publishing House.
3. Business Mathematics – M.L.Bhargara, Dr.Ashok Saini, Dr.Dalip Singh, Jeevansons Publication.

Course outcomes: At the end of the course, students would be able to:

1	understand the number system	K1, K2,K3
2	understand the set theory	K1, K2,K3
3	Know the calculations of indices and surds	K1, K2,K3
4	Understand the calculations of interest , annuities and depreciation	K1, K2,K3
5	Know the applications of probability distributions and matrices	K1, K2,K3

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

Mapping Outcomes - POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	4	3	4	3	4	43/13=3.30
CO-2	4	3	4	3	3	3	3	4	4	3	3	3	4	44/13=3.38
CO-3	3	3	4	3	3	4	4	4	4	3	4	3	3	46/13=3.53
CO-4	4	3	4	3	4	4	3	4	3	4	3	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	3	3	4	3	4	45/13=3.46 **17.28/5=3.456**

COURSE CODE	U21COE421	CHOICE -I	L	T	P	C
ELECTIVE – III		ELEMENTS OF E-COMMERCE	3	-	-	3

Course Objectives:

The objectives of the course are

1. To enable the students to gain basic knowledge of Electronic-Commerce in the area of Business and Financing decisions
2. To understand the components of E-Commerce
3. To understand the Client Server Network Security

Unit 1: E-Commerce an Introduction

Electronic Commerce Framework -Traditional vs. Electronic Business Applications - The Anatomy of E-Commerce Applications -Overview of developments in Information Technology and Defining E-Commerce: The scope of E commerce, Electronic Market, Electronic Data Interchange, Internet Commerce, Benefits and limitations of E-Commerce.

Unit 2: E-Commerce Components

Network Infrastructure for E-Commerce Components of the I-way-Global Information Distribution Networks – Public Policy Issues Shaping the I-way. The Internet as a Network Infrastructure. The Business of the Internet Commercialization.-E-Retailing: Traditional retailing and e retailing, Benefits of e retailing, Key success factors.

Unit 3: Client Server Network Security

Models of e retailing, Features of e retailing. E services: Categories of e-services, Web-enabled services, matchmaking services, Information-selling on the web, e entertainment, Auctions and other specialized services. Business to Business Electronic Commerce-Network Security and Firewalls – Client Server Network Security – Firewalls and Network Security – Data and Message Security – Encrypted Documents and Electronic -Mail.

Unit 4: Business to Business Communication

Electronic Commerce and World-Wide-Web, Consumer Oriented E-Commerce, Electronic Payment Systems, Electronic Data Interchange (EDI), EDI Applications in Business, EDI and E-Commerce – EDI Implementation. -Produce a generic framework for E-Commerce, Architectural framework of Electronic Commerce, Web based E Commerce Architecture.

Unit 5: Multimedia and Digital video

Multimedia and Digital video- key multimedia concepts, Digital Video and Electronic Commerce-Desktop Video processing – Desktop Video conferencing-Digital video compression/decompression-Types of desktop video conferencing.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Kalakota, R and Winston, AB 2002 Frontiers of Electronic Commerce, Addison Westey
2. David Kosiur, 2002 Understanding Electronic Commerce, Microsoft Press,

3. Saily Chan & John Wiley 2000Electronic Commerce Management, Tata McGraw Hill, New Delhi.

Reference Books:

1.Parag Diwan& Sunil Sharma 2000 E-Commerce A Managerial guide to EBusiness Deep & Deep Pub.,Delhi

2. Agarwal Kamalesh N & Agarwal Deeksha _2000 Business On the Net – Introduction to the Electronic Commerce, Mc Millan India Pub, New Delhi

3. Soka, From EDI to Electronic Commerce,2002 Tata McGraw Hill, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	understand basic concepts on e-commerce	K1, K2,K3
2	understand various methods on Architectural aspect of e-Commerce**.**	K1, K2,K3
3	gain essential knowledge on security aspect of e-commerce	K1, K2,K3
4	gain application knowledge on ecommerce in business.	K1, K2,K3
5	gain conceptual knowledge on multimedia in e-commerce	K1, K2,K3

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

Mapping outcomes - POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	44/13=3.38
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	43/13=3.30
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.90/5=3.38**

COURSE CODE	U21COE422	CHOICE -II	L	T	P	C
ELLECTIVE - III		DIGITAL MARKETING	3	-	-	3

Learning Objectives:

The objectives of the course are

1. To provide knowledge about the concepts, tools, techniques, and relevance of digital marketing in the present changing scenario.
2. To understand the various components of Digital Marketing Management
3. To understand the various basic concepts on online marketing, Interactive Marketing and Artificial Intelligence in Marketing.

Unit 1: Concept of Digital Marketing

Concept, scope, and importance of digital marketing. Traditional marketing versus digital marketing. Challenges and opportunities for digital marketing. Digital penetration in the Indian market. Benefits to the customer; Digital marketing landscape: an overview. Ethical issues and legal challenges in digital marketing. Regulatory framework for digital marketing in India.

Unit 2: Digital Marketing Management

Digital-marketing mix. Segmentation, Targeting, Differentiation, and Positioning: Concept, levels, and strategies in a digital environment; Digital technology and customer-relationship management. Digital consumers and their buying decision process.

Unit 3: Digital Marketing Presence

Concept and role of Internet in marketing. Online marketing domains. The P.O.E.M framework. Website design and Domain name branding. Search engine optimization: stages, types of traffic, tactics. Online advertising: types, formats, requisites of a good online advertisement. Buying models. Online public relation management. Direct marketing: scope and growth. Email marketing, Facebook marketing, YouTube and Video marketing, Twitter Marketing, Instagram Marketing: types and strategies.

Unit 4: Interactive Marketing

Interactive marketing: concept and options. Social media marketing: concept and tools. Online communities and social networks. Blogging: types and role. Video marketing: tools and techniques. Mobile marketing tools. PPC marketing. Payment options.

Unit 5: Artificial Intelligence in Marketing

Introduction of Artificial Intelligence in Marketing, How does AI Work, Benefit of AI in Marketing Automation, Content creation with AI, AI Tools available for Digital marketing

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Gupta, S. (2018). Digital Marketing. Delhi: Tata McGraw Hill Education.

Reference Books:

1. Chaffey, D., Chadwick, F. E., Johnston, K., & Mayer, R. (2008). Internet Marketing: Strategy, Implementation, and Practice. New Jersey: Pearson Hall.
2. Frost, R. D., Fox, A., & Strauss, J. (2018). E- Marketing. Abingdon: Routledge.
3. Kapoor, N. (2018). Fundamentals of E-Marketing. Delhi: Pinnacle India.
4. Kotler, P., Kartajaya, H., & Setiawan, I. (2017). Digital Marketing: 4.0 Moving from Traditional to Digital.
5. New Jersey: John Wiley & Sons. Ryan, D., & Calvin, J. (2016). Understanding Digital Marketing: Marketing Strategies for engaging the Digital Generation.
6. London: Kogan page. Blanchard, O. A. (2011). Social Media ROI: Managing and Measuring Social Media Efforts in Your Organisation. Indianapolis: Que Publishing.
7. Charlesworth, A. (2018). Digital Marketing: A Practical Approach. Abingdon: Routledge.
8. Gay, R., Charlesworth, A., & Esen, R. (2007). Online Marketing: A Customer-led Approach. Oxford: Oxford University Press.
9. Tasner, M. (2015). Marketing in the Moment: The Digital Marketing Guide to generating more sales and reaching your customer first. London: Pearson.

Note: Learners are advised to use latest edition of text books.

Course outcomes: At the end of the course, students would be able to:

1	identify and assess the impact of digital technology in transforming the business environment and also the customer journey;	K1, K2,K3
2	explain the way marketers think, conceptualize, test continuously to optimize their product search on digital platforms;	K1, K2,K3
3	illustrate the measurement of effectiveness of a digital marketing campaign;	K1, K2,K3
4	demonstrate their skills in digital marketing tools such as SEO, Social media, and Blogging for engaging the digital generation;	K1, K2,K3
5	understand the concept of AI in Digital Marketing;	K1, K2,K3

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

Mapping outcomes - POs and PSOs

	POS					**PSOS**								
COS	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean Scores of COS**
CO-1	4	4	4	4	3	4	3	4	3	3	4	4	4	48/13=3.69
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.29
CO-3	4	3	4	4	4	3	4	4	4	3	4	4	3	48/13=3.69
CO-4	4	3	4	4	3	4	3	3	3	4	4	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **17.81/5=3.562**

SEMESTER - V

COURSE CODE	U21COT51	MANAGEMENT ACCOUNTING	L	T	P	C
CORE-VIII			5	-	-	4

Course Objectives:

The main objectives of this course are to:

1. To understand the various components of management accounting and related terms
2. To understand analysis using ratio, working capital management and marginal costing
3. To familiarize with budget preparation and budgetary control tools

Unit 1: Management accounting Concepts

Management accounting – Definition – Objectives – Nature – Scope – Merits and limitations – Differences between management accounting and financial accounting – Financial statement analysis – Comparative statement – Common size statement – Trend percentage – Ratio analysis – Meaning – Classification – Liquidity, solvency, turnover and profitability ratios.

Unit 2: Fund Flow and Cash Flow Statement

Fund flow statement – Meaning – Preparation – Schedule of changes in working capital – Funds from operation – Sources and applications – Cash flow statement – Meaning – Difference between fund flow statement and cash flow statement – Preparation of cash flow statement as per AS3.

Unit 3: Budget and Budgetary control

Budget and Budgetary control – Meaning – importance and its Advantages -Essential Of Successful Budgetary Control – Preparation of Budgets – purchase, Sales Budget – Production Budget – Materials Budget – Cash Budget – Flexible Budget- overhead cost Budget.

Unit 4: Standard Costing

Standard costing – Meaning, Advantages and its Limitations. Variance analysis – Significance - Computation of variances (Material and Labour variance only) - Marginal costing – CVP analysis – Break even analysis – BEP - Managerial applications – Margin of safety – Profit planning.

Unit 5: Capital Budgeting

Capital Budgeting – Meaning – Importance – Appraisal methods – Payback period — Accounting rate of return - Discounted cash flow – Net present value – Profitability index – Internal rate of return.

Note: **Question Paper shall cover 20% Theory and 80% Problem**

Text Books (Latest revised edition only)

1. Management accounting by S.N.Maheswari – Sultan Chand & sons publications, New Delhi
2. Management accounting by Sharma and Guptha, Kalyani Publishers, Chennai.
3. Management accounting by R.Ramachandran and R.Srinivasan – Sriram publication, Trichy

Reference Books (Latest revised edition only)

1. Management Accounting by R.S.N.Pillai&V.Baghavathi – S.Chand& Co, Mumbai.
2. Management Accounting by E.Gordon, P.Jeyaram, N.Sundaram & R. Jayachandran, Himalaya Publishing House, Mumbai.
3. Management Accounting by Reddy.T.S & Hari Prasath.Y, Margham Publications, Chennai.
4. Management accounting by A. Murthi and S. Gurusamy, Vijay Nicole Publications, Chennai.
5. Management accounting by Hingorani&Ramanthan – S.Chand& Co, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	outline the various concepts relating to management accounting	K2
2	analyze financial statements using ratio analysis	K4
3	evaluate the working capital management of companies	K5
4	comparing various alternatives using marginal costing and decision making	K2
5	analyze new budget and budgetary control for organizations	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	4	3	4	3	3	4	4	4	48/13=3.69
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.29
CO-3	4	3	4	4	4	3	4	4	4	3	4	4	3	48/13=3.69
CO-4	4	3	4	4	3	4	3	3	3	4	4	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **17.81/5=3.562**

COURSE CODE	U21COT52	AUDITING	L	T	P	C
CORE-IX			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To understand the various concepts of auditing and the procedure for the conduct of internalaudit
2. To familiarize with the process of valuing assets and liabilities
3. To understand the process of auditing the joint stock companies and investigation mechanism

Unit 1: Auditing an Introduction

Introduction – Meaning – Features – Objectives – Advantages of Auditing – Materiality in Auditing – Classifications or various types of Audit – Techniques of Auditing – Audit Evidence – Criteria for Selection of Audit Evidence – Process of gathering Evidence**.**

Unit 2: Audit Programme

Audit Programme – Audit Note Book – Working Paper – Audit Planning - Engagement of an Auditor for Audit Work – Internal Control – Objectives of Internal Control – Forms of Internal Control – Merits and drawback of Internal Control – Internal Audit – Features – Objectives – Advantages of Internal Audit – Distinction Between Internal Control and Internal audit.

Unit 3: Vouching of Trade Transactions

Meaning – Definition – Objective – Requisites of a Valid Voucher – Types of Vouching – Vouching of Cash Transaction – Vouching of Trade Transactions- Verification – Objects of Verification – Principles of Verification – Verification and Valuation of Assets – Verification of Liabilities.

Unit 4: Auditors Appointment and Removal

Auditors of a Company – Appointment – Removal – Remuneration – Qualification and Disqualification of Auditor – Rights, Duties and Powers of Auditor, Liabilities of Auditor – Audit Report – Types of Audit Report – Statutory Report – Matters to be included in the Audit Report.

Unit 5: Cost Audit and Management Audit

Cost Audit - Management Audit – Process of Management Audit – Human Resource Audit – Environment Audit – Social Audit - Forensic Audit- Computerised Audit – Benefits – Deficiencies – Role of Auditor in Computerised Environment – Audit of Government Accounts – Features of Government Audit – Functions of Comptroller and Audit General of India – Duties of Accountant General – Various authorities role in auditing.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Tandon B.N 2015 Practical Auditing, S.Chand & Co, New Delhi
2. Sundar K. and Paari, 2016 Auditing Vijay Nicole, Imprints Private Ltd, Chennai, 2015
3. Saxena, R.G. 2016 Principles of Auditing, Himalaya Publishing House, New Delhi.

Reference Books:

1. Natarajan, L. 2013. Auditing Chennai: Margham Publications.Chennai
2. Pagar, D. 2016. Principles and Practice of Auditing (14 ed.).: Sultan Chand & Sons.
3. Tandon, B.N & Sudharsanam, S. 2016. A Handbook of Practical Auditing : S Chand & Company Pvt. Ltd. New Delhi
4. Kamal Gupta, 2015 Contemporary Auditing Tata McGraw Hill, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	define the important concept and rules relating to auditing	K1
2	outline the techniques and applicability of internal audit	K2
3	analyze the valuation of assets and liabilities in business	K4
4	analyze the accounts and auditing the joint stock companies	K4
5	examine about investigation and auditing of computerized accounts	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping- POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	3	4	3	3	3	4	4	3	3	4	4	46/13=3.53
CO-2	4	3	4	4	3	3	4	4	3	3	3	3	4	48/13=3.69
CO-3	4	3	4	4	4	4	4	4	4	3	4	4	3	49/13=3.76
CO-4	4	3	4	4	4	4	3	3	4	4	4	4	4	49/13=3.76
CO-5	4	4	3	3	4	4	4	3	3	4	3	4	3	46/13=3.53 **18.27/5=3.654**

COURSE CODE	U21COT53	INCOME TAX LAW AND PRACTICE	L	T	P	C
CORE-X			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To understand the various concepts of income tax and related terminologies
2. To familiarize with calculation if income under different heads
3. To enable the students to know the provisions of the income tax law.
4. To understand the process of set off and carry forward of losses while computing total income

Unit 1: Income tax-Basic concepts

Income tax-Basic concepts – Definition – Previous year – Assessment year – Person – Assessee – Income – Total Income – Casual income – Capital and Revenue – Residential status and incidence of tax incomes exempt under Section – 10

Unit 2: Computation Of Taxable Salary

Salary – Basis of charge – Different forms of salary – allowances – gratuity – pension – perquisites and their valuation – deduction from salary – computation of taxable salary .

Unit 3: Computation Of House Property Income

House property – basis of charge – determination of GAV and NAV – income from let – out property – deductions – computation of House property income**.**

Unit 4: Profits And Gains Of Business And Profession

Profits and gains of business and profession – basis of charge – methods of accounting – deductions – allowable expenses and disallowable expenses – computation of taxable income.Income from Capital Gains – Income from other sources.

Unit 5: Income Of Other Persons Included In Assesses Total Income

Income of other persons included in assesses total income – Aggregation of income; Set – off or carry forward and set off of losses – Deductions from gross total income – Computation of total income and tax payable; Rebates and relief's – Provisions concerning advance tax and tax deducted at source – Provisions for filing of return of income.

Note: **Question Paper shall cover 40% Theory and 60% Problem**

Text Books:

1. Dr.Vinod K.Singhania, Taxmen's Direct Taxed Law & Practice. Taxman Publications, New Delhi.
2. Dr. A. Murthy, Income Tax Law and Practice - Vijay Nichole Publications, Chennai.
3. Dr. T.S. Reddy & Dr. Hariprasad, Income tax law and practice, Margam publications, Chennai.

Books for Reference:

1. Gaur and Narang, " Income Tax Law and Practice" Kalyani Publishers, New Delhi.
2. Dr. H. C.Mehrotra, " Income Tax Law and Accounts" Sahithya Bhavan publishers, Agra.
3. R. G. Shaha, Income Tax Law and Practice (Direct Tax) Himalaya Publications, Mumbai.
4. Dinkar Pagare, Direct Tax – Sultan Chand publishers, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	outline the various terminologies related to income tax	K1
2	understand the method of calculating and levying tax	K2
3	apply the various tax laws and available provisions in tax computations	K3
4	evaluate the set off and carry forward of losses while calculating personal income	K5
5	analyze self-assessment of income and tax computation	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	42/13=3.23
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	44/13=3.38
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.83/5=3.366**

COURSE CODE	U21COT54	ENTREPRENEURIAL DEVELOPMENT	L	T	P	C
CORE-XI			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To understand the basic concepts of entrepreneurship and related initiatives
2. To provide insights about the setting up of startups
3. To familiarize with the institutional services to entrepreneur
4. To provide knowledge about various financial support available to the entrepreneurs
5. To provide knowledge about various subsidies and incentives available for entrepreneurs

Unit 1: Concept of Entrepreneurship

Entrepreneur - Entrepreneurship – Women Entrepreneurship – Rural Entrepreneurship – Factors affecting Entrepreneurial Growth - Entrepreneurial Motivation - Entrepreneurial Competencies - Entrepreneurial Mobility – Challenges to Entrepreneurship- Ethics and Entrepreneurship – Social Responsibility in Entrepreneurship - Entrepreneurial Development Programmes.

Unit 2: Business Modelling

Opportunity Analysis – Ideation Techniques – Ideation Catalysts and Inhibitors – Idea to Opportunity Maps – Evaluation of Idea to Opportunity Maps – Business Model – Functions of a Business Model - Business Modelling – Benefits of Business Modelling - Business Models to Business Plans**.**

Unit 3: Project Appraisal

Small Enterprises: An Introductory Framework – Project Identification and Selection – Project Formulation – Project Appraisal – Legal, Regulatory and Statutory Body – Clearance Approvals and NOC – Compliance – Financing of Enterprise - Boot Strapping - Ownership Structures.

Unit 4: Institutional Finance

Institutional Finance to Entrepreneurs – Lease Financing and Hire-Purchase – Institutional Support to Entrepreneurs – Taxation Benefits to Small-Scale Industries – Government Policy for Small-Scale Enterprises.

Unit 5: Accounting for Enterprises

Accounting for Enterprises - Break-Even Analysis – Elements of Financial Statements- Growth Strategies – Intellectual Property – Innovation – Knowledge Management – Leadership and Governance – Sickness and Rehabilitation – Application of Electronic Commerce.

Note: Question Paper shall cover 100% Theory

Text Books:

1. Khanka . S.S., Entrepreneurial Development, S.Chand & Co. Ltd., New Delhi. 2017
2. Raj Shankar., Essentials of Entrepreneurship, Vijay Nicole Imprints Private Ltd., Chennai. 2013.
3. Gupta. C.B. & Khanka S.S., Entrepreneurship and Small Business Management, Sultan Chand

& Sons, 7th Revised Edition- 2017**.**

Reference Books:

1. Weihrich Heinz, Canice Mark V and Koontz Harold, Management – A Global and Entrepreneurial Perspective, Tata McGraw Hill Education Pvt. Ltd., 3rd Edition, 2011.
2. Desai Vasant, Entrepreneurial Development and Management, Himalaya Publishing House, 2007.
3. Bruce R. Barringer, R. Duane Ireland, Entrepreneurship – Successfully Launching New Ventures, Pearson Education, 2008.
4. Gupta C. B., Srinivasan N P, Entrepreneurial Development, Sultan Chand and Sons.
5. Barringer Bruce R., Ireland R. Duane, Entrepreneurship - Successfully Launching New Ventures, Pearson Education, 2008.

Web Resources:

www.ediindia.org,
www.internationalentrepreneurship.com,
www.startupdunia.com,
www.yuvaentrepreneurs.com,
www.indiastat.com,
www.entrepreneur.com

Course outcomes: At the end of the course, students would be able to:

1	recall the importance and role of entrepreneurship as an economic activity	K1
2	explain the various process of setting up a startup	K2
3	outline the various institutional services to entrepreneur	K2
4	analyze the various financial institution available to support entrepreneurs	K4
5	list the various subsidies and incentives available for entrepreneurs	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	4	3	4	3	4	43/13=3.30
CO-2	4	3	4	3	3	3	3	4	4	3	3	3	4	44/13=3.38
CO-3	3	3	4	3	3	4	4	4	4	3	4	3	3	46/13=3.53
CO-4	4	3	4	3	4	4	3	4	3	4	3	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	3	3	4	3	4	45/13=3.46 **17.28/5=3.456**

COURSE CODE	U21COT55	BANKING THEORY, LAW AND PRACTICE	L	T	P	C
CORE-XII			5	-	-	4

Course Objectives:

The objectives of the course are

1. To gain an insight on the nature of current banking law and to know the practices of banking in India
2. To understand the Banking Regulations
3. To understand the various types of accounts

Unit 1: Banking Legislation

Banking Legislation – Provisions of Banking Regulations – Definition of Banker – Relationship between Banker and Customer – General Relationship between Banker and Customer – Obligations of Banker – Rights of Banker – Right of Appropriation Clay ton's Rule – Pass Book – Legal Implications of Entries in Pass Book.

Unit 2: Types of Bank Accounts

Types of Bank Accounts – Fixed Deposit Account – Savings – Current and Recurring Account – Features – Benefits - Account Opening Formalities - KYC Norms – Fixed Deposit Receipts – Non Residence Deposit Account – Currency (Domestic) Account – Senior Citizen Deposit Account – Flexi Deposit Account. Bank Customer: Bank Customer – Partnership Firm, Club – Joint Stock Company – Joint Hindu Family – Trust – Societies.

Unit 3: Negotiable Instruments

Definition of negotiable instruments – Essential Features – Types – Comparison Between Cheque, Bills and Pro Note – Cheque – Crossing – Types – Endorsement – Types of Endorsement – Holder in due Course Privileges – Holder for Value – Acceptance for Honour - Account – Reasons for Dishonour a Cheque**.**

Unit 4: Collection of Bank

Precaution before Paying a Cheque – Payment in Due Course – Statutory Protection to Paying Banker – Material Alterations - Closing of an Account – Collecting Bank – Statutory Profession to Collecting Banker – Negligence Liability of Collecting Banker – Duties of Collecting Banker.

Unit 5: Management of Finance and Advances

Principles of good Lending – Forms of Unsecured Advances and Secured Advances – Advance Against Securities like Stock Exchange Securities, Document of title to Goods, Trust Receipts , Life Policy, Supply Bills – Fixed Deposit Receipt Mortgage – Types of Mortgage – Hypothecation – Pledge - Non Performing Assets - Causes - Remedial Measures - Management of NPA - Debt Recovery Tribunal.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Gorden Nataraj, 2016 Banking Himalaya Publication, New Delhi

2. Tannan, ML 2015 Banking Law & Practice in India, Indian Law House, New Delhi
3. Panikar, KK 2015 Banking –Theory System, S.Chand & Co., New Delhi.

Reference Books:

1. Radhaswami,M & Basudevan 2015 A Text Book of Banking, S.Chand & Co., New Delhi.
2. Khubchandran, BS 2015 Practice and Law of Banking, MacMillan Pub., New Delhi
3. Dr.S.Subba Rao and P.L Khanna 2015 Principles & Practice of Bank Management, Himalya Publishing House, Mumbai.
4. Gurusamy S 2017 Banking Theory Law & Practice, Tata McGraw Hill, Uttarpradesh
5.Murali S.and Subbakrishna , 2015 Bank and Credit Management, Himalaya Publishing House, New Delhi.

Course outcomes: At the end of the course, students would be able to:

1	understand the banking legislations and relationship between banker and customer.	K1, K2,K3
2	know the various types of bank accounts.	K1, K2,K3
3	gain knowledge of negotiable instruments used in banks.	K1, K2,K3
4	know the statutory provisions of the banker.	K1, K2,K3
5	know the principles and various forms of lending by the banks.	K1, K2,K3

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

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	3	4	3	3	3	4	4	3	3	4	4	46/13=3.53
CO-2	4	3	4	4	3	3	4	4	3	3	3	3	4	48/13=3.69
CO-3	4	3	4	4	4	4	4	4	4	3	4	4	3	49/13=3.76
CO-4	4	3	4	4	4	4	3	3	4	4	4	4	4	49/13=3.76
CO-5	4	4	3	3	4	4	4	3	3	4	3	4	3	46/13=3.53 **18.27/5=3.654**

COURSE CODE	U21COE531	CHOICE -I	L	T	P	C
ELECTIVE –III		FUNDAMENTALS OF INVESTMENT	3	-	-	3

Course objectives:

The objectives of the course are

1. To familiarize the students with different investment alternatives introduce them to the framework of their analysis and valuation and highlight the role of investor protection.
2. To understand the various types of fixed income securities and various approaches of equity analysis
3. To understand the different types of portfolio analysis

Unit 1: Investment an Introduction

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

Unit 2: Fixed Income Securities

Overview of Fixed Income Securities -Bond features, types of bonds, estimating bond yields, Bond Valuation types of bond risks, default risk and credit rating-Bond Values and the Passage of Time / Forward Contracts-Forward Rates / Contracts-Risk Measurement-Modeling Credit Risk, including the Merton Model- Illiquidity in Bond Markets

Unit 3: Approaches to Equity Analysis

Introductions to Fundamental Analysis, Technical Analysis -comparative analysis-and Efficient Market Hypothesis, dividend capitalization models, and price-earnings multiple approach to equity valuation.

Unit 4: Portfolio Analysis and Financial Derivatives

Portfolio and Diversification, Portfolio Risk and Return; Mutual Funds; Introduction to Financial Derivatives;- CAPM and the inputs required for applying CAPM and the limitations of this Model- CAPM and the inputs required for applying CAPM and the limitations of this Model- Financial Derivatives Markets in India

Unit 5: Investor Protection

Role of SEBI and stock exchanges in investor protection; Investor grievances and their redressal system, insider trading, investors' awareness and activism-Role of SEBI in investor Protection-Securities Ombudsman-Investors' Awareness-Investors' Activism.

Note: **Question Paper shall cover 100% Theory**

Text Book:

1. Prasanna Chandra, Investment Analysis and Portfolio Management, McGraw Hill Education

Reference Books:

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

Course outcomes: At the end of the course, students would be able to:

1	explain the basics of investment environment and different investment avenues available.	K1, K2,K3
2	analyse the types of fixed income securities	K1, K2,K3
3	assess the approaches to equity analysis	K1, K2,K3
4	apply the techniques portfolio analysis and financial derivatives.	K1, K2,K3
5	advise how to protect the investors.	K1, K2,K3

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

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	4	3	4	3	3	4	4	4	48/13=3.69
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.29
CO-3	4	3	4	4	4	3	4	4	4	3	4	4	3	48/13=3.69
CO-4	4	3	4	4	3	4	3	3	3	4	4	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **17.81/5=3.562**

COURSE CODE	U21COE532	CHOICE -II	L	T	P	C
ELECTIVE –III		ARTIFICIAL INTELLIGENCE FOR BUSINESS	3	-	-	3

Course Objective:

This course aims

1. To equip the learners with the basic ideas and techniques underlying the usage of Artificial Intelligence in Business.

Unit 1: Artificial Intelligence-Concept

Introduction Artificial Intelligence: Concept, benefits, and scope. Differences between AI, Machine Learning (ML) and Deep Learning (DL) - AI applications, capabilities and competitive advantage; Industry drivers; AI strategy for the enterprise - Considerations for an AI strategy, AI & Startups. Internet of Things (IoT), Introduction to mobile computing and Cloud computing.

Unit 2: Strategic Interventions Algorithm

AI led strategic interventions Algorithm: New member in the boardroom, Accelerated decision making with real time analytics, AI in operational models in an organization, AI: future of AI in HR, Talent sciences, Algorithms & Talent Acquisitions (TA), AI & transformation in Finance & Accounting, CFO of tomorrow, Changing role of Chief Information Officer (CIO): Industry 4.0.

Unit 3: Banking & Insurance

AI in Banking & Insurance Redefined banking industry – adoption of Analytics, AI powered financial services, Fraud mitigation in banks with AI, Reorienting customer retention, Risk management with AI, AI driven transformation in Insurance, Digital based insurance model.

Unit 4: **AI interventions in Retail Outlets**

AI in Retail -AI interventions in Retail Outlets. Emergence of smart customers, ad content predictions, Evolution of smart retailers, Omni channel experience, AI in consumer packaged goods, Fluid supply chain transformation with AI. AI-Led marketing transformations, Data to Clusters - Ad content prediction - AI based Ad buy and CPC optimization, AI driven campaign management. AI for Sales: Data to Classes - Insides Sales Rep workflow automation - Improved Lead, Opportunity Ranking and Reminder.

Unit 5: **Exponential Technologies For Business**

Exponential Technologies Beating cyber-attacks with Analytics, AI in automotive industry: driverless cars and drones, IoT Analytics: extracting value and transforming business, Real time streaming analytics, Cryptocurrency Analytics, AI for customer service-data to scores, AI for Portfolio Management, Chatbots, Call center rep automation.

Note: **Question Paper shall cover 100% Theory**

Text Book:

1. Dhanrajani, S. (2018). AI & Analytics: Accelerating Business Decisions. New Jersey: Wiley.

Reference Books:

1. Russell, S. J., & Norvig, P. (2019). Artificial Intelligence: A Modern Approach, 3rd Edition. New Jersey: Prentice Hall.
2. Akerkar, R. (2018). Artificial Intelligence for Business. Basingstoke: Springer Nature
3. Altemeyer, B. (2019). Making the business case for AI in HR: two case studies. Strategic HR Review, 18(2), 66-70. Retrieved from https://www.emerald.com/insight/content/doi/10.1108/SHR-12-2018-0101/full/html

Note: * Learners are advised to use web sources too.

Course outcomes: At the end of the course, students would be able to:

1	identify how the AI is being leveraged by start-ups as a success tool	K1, K2,K3
2	analyse and interpret the applicability of AI in HR functions	K1, K2,K3
3	explain how algorithms is changing the board room landscape	K1, K2,K3
4	discuss the customer services provided by various banks using AI	K1, K2,K3
5	demonstrate the role of AI in transforming the retail sector	K1, K2,K3

K1- Remembering **K2 –** Understanding **K3 –** Applying

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	3	4	3	3	3	4	4	3	3	4	4	46/13=3.53
CO-2	4	3	4	4	3	3	4	4	3	3	3	3	4	48/13=3.69
CO-3	4	3	4	4	4	4	4	4	4	3	4	4	3	49/13=3.76
CO-4	4	3	4	4	4	4	3	3	4	4	4	4	4	49/13=3.76
CO-5	4	4	3	3	4	4	4	3	3	4	3	4	3	46/13=3.53 **18.27/5=3.65 4**

COURSE CODE	U21COS53	COMPANY LAW	L	T	P	C
SBE I			2	-	-	2

Course Objectives:

The main objectives of this course are to:

1. develop a strong foundation regarding corporate laws and provisions
2. enlighten the students on the Provisions governing the Company Law. (After 2013) and the recent amendments to Companies Act.

Unit 1: Company-Concept

Meaning of joint stock company - Kinds of Companies (Special Provisions with respect to Private Company, Public Company, One Person Company, Small Company, Dormant Company) - Formation - Memorandum of Association - Contents - Restriction on "Other Objects" - Doctrine of Ultra Vires - Articles of Association - Contents - Prospectus - Contents - Types (Statement in Lieu of Prospectus, shelf Prospectus, Red Herring Prospectus) - Underwriting - Book Building Process - Green Shoe Option - E-Filing - Dematerialization.

Unit 2: Kinds of Shares

Shares - Meaning, Types of Shares and Transfer of shares-Share Capital, Meaning, Kinds, Alternation, Reduction and Voting Rights-Debenture - Meaning, Types, Charge-Fixed and Floating, Crytalisation of Floating charge-Borrowing Powers - Effective of unauthorized borrwoings.

Unit 3: Directors In A Company

Appointment, Reappointment, Resignation, Removal and Varying Terms of Appointment/Re-appointment-Payment of Remuneration to Directors-Appointment, Resignation and Removal-Directors - Women Directors - Independent Directors - Director Identification Number - Other Key Managerial Personnel - Related Party Transactions**.**

Unit 4: Statutory Regulations

Meeting - Statutory Meeting - Annual General Meeting - Extraordinary General Meeting - Notice of Meeting - Quorum - Proxy - Board of Directors Meeting - Committee - Types of Committee - Audit Committee - Stake Holders Relationship Committee - Corporate Social Responsibility Committee. Resolutions - Ordinary Resolution - Special Resolution - Resolution requiring special notice**.**

Unit 5: Winding Up Of A Company

Modes of Winding up - Winding up by the Court - Voluntary Winding up - Types – Members. Voluntary Winding up - Creditors Voluntary Winding up. National Company Law Appellate Tribunal-Merger and Demerger of Company-Amalgamation, Compromise and Arrangement-Role of Official Liquidator, Court and National Company Law Tribunal.

Note: **Question Paper shall cover 100% Theory**

Text Books:
1. Avatar Singh, Company Law, Eastern Book Company
2. Shukla, M.C. & Gulshan, S.S., Principles of Company Law

Reference Books:
1. Badri Alam, S & Saravanavel, Company Law, Himalaya Publications
2. Gogna, P.P.S., Text Book of Company Law, S. Chand & Co.
3. Gaffor & Thothadri, Company Law, Vijay Nicole Imprints Pvt. Ltd. Chennai

E-Resources:
www.mca.gov.in
www.companyliquidator.gov.in
www.companyformationinindia.co.in
www.iepf.gov.in

Course outcomes: At the end of the course, students would be able to:

1.	know the basic concepts of joint stock companies	K1, K2,K3
2.	understand various types of shares of companies	K1, K2,K3
3.	know the provisions applicable to directors of a company	K1, K2,K3
4.	understand the various types of meetings conducted in a company	K1, K2,K3
5.	understand the provisions applicable for winding up of companies	K1, K2,K3

K1- Remembering **K2 –** Understanding **K3 –** Applying

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	44/13=3.38
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	43/13=3.30
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.90/5=3.38**

SEMESTER VI

COURSE CODE	U21COT61	CORPORATE ACCOUNTING	L	T	P	C
CORE-XIII			6	-	-	4

Course Objectives:

The main objectives of this course are :

1. To provide basic understanding about the accounts relating to shares and debentures
2. To analyze the final accounts of companies
3. To explore various methods for the valuation of goodwill
4. To assist preparation of books of Amalgamation and Absorption.

Unit 1: Accounting Procedure for Shares

Share Capital: Subdivision of Share Capital; Issue of Shares, Pricing of Public Issue – Fixed Price Offer Method, Book-building Method; Journal entries for Issue of Shares - when payable fully on application and when payable in installments - if shares are issued at par, at premium and at discount. Calls-in-arrears and Calls-in-advance. Forfeiture and Re-issue of Shares.

Unit 2: Meaning of Underwriting – SEBI regulations regarding underwriting;

Underwriting commission. Types of underwriting agreement – conditional and firm; Determination of Liability in respect of underwriting contract – when fully underwritten and partially underwritten – with and without firm underwriting.

Unit 3: Valuation of Assets

Valuation of Goodwill: Meaning – Circumstances of Valuation of Goodwill – Factors influencing the value of Goodwill – Methods of Valuation of Goodwill: Average Profit Method, Super Profit Method, and Capitalization of average Profit Method, Capitalization of Super Profit Method, and Annuity Method - Problems. Valuation of Shares: Meaning – Need for Valuation – Factors Affecting Valuation – Methods of Valuation: Intrinsic Value Method, Fair Value Method and Yield Method - Problems.

Unit4: Acquisition of Business

Acquisition of business- Profit prior to incorporation –preparation of financial accounts-requirements as per schedule IV part I and II.-Accounting for Group companies – Holding Companies – Definition – Accounts Consolidation – Preparation of Consolidated Balance Sheet – Minority Interest – Pre-acquisition or Capital Profits – Cost of Control or Goodwill – Inter-company Balance – Unrealized Inter-company profits – Revaluation of assets and liabilities – Bonus Shares – Treatment of Dividend.

Unit 5: Amalgamation and Absorption

Purchase Consideration – Methods – Amalgamation in the Nature of Merger and Purchase – Polling-Interest Method-Purchase Method-Lumsum Method-Net Asset and payment Method-Intrinsic Value Method- Absorption – ASI4 – Alteration of Share Capital – Reduction of Share Capital (Scheme of Capital Reduction is Excluded) .

Note: **Question Paper shall cover 25% Theory and 75% Problem**

Text Book:

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

Reference Book:

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

Course outcomes: At the end of the course, students would be able to:

1	develop the skill of preparing entries for issue of shares	K1, K2,K3
2	know the accounting entries for underwriting of shares and redemption of preference shares	K1, K2,K3
3	knowledge in calculation and valuation of shares and goodwill of companies	K1, K2,K3
4	understand the provisions of acquisition of the business	K1, K2,K3
5	gain the knowledge in internal and external reconstruction in companies	K1, K2,K3

K1- Remembering **K2 –** Understanding **K3 –** Applying

Mapping POs and PSOs

COS	**POS**					**PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	42/13=3.23
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	44/13=3.38
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.83/5=3.366**

COURSE CODE	U21COT62	BUSINESS TAXATION	L	T	P	C
CORE-XVI			6	-	-	4

Course Objectives:

The main objectives of this course are to:

1. understand the applicability of indirect taxes in India
2. familiarize with the calculation and execution of goods and service tax in India
3. understand the working of custom law in India

Unit 1: Indirect Taxes Concept

Indirect taxes – Meaning and Nature - Special features of Indirect Taxes- Contribution to government revenues - Taxation under the Constitution - Advantages and Disadvantages of Indirect Taxes.

Unit 2: GST In Trade And Commerce

Good and Service Tax Introduction – Meaning - Need for GST - Advantages of GST - Structure of GST in India – Dual concepts - SGST-CGST-IGST-UTGST- Types of Rates under GST – Taxes subsumed under State Goods and Services Tax Act 2017- Taxes subsumed under Central Goods and Services Tax Act 2017. Meaning of important terms: Goods, services, supplier, business, manufacture, casual taxable person, aggregate turnover, input tax and output tax.

Unit 3: Concept of Supply under GST

Levy and Collection under SGST/CGST Acts - Concept of supply - Composite and Mixed supplies - Composition Levy - Time of supply of goods and services - Value of Taxable supply. Input Tax credit - Eligibility and conditions for taking input credit- Reverse charge under the GST- Registration procedure under GST- Concept of e-way Bill - Filing of Returns.

Unit4: Supply of Goods or Services under GST

Levy and Collection under The Integrated Goods and Services Tax Act 2017- Meaning of important terms: Integrated tax, intermediary, location of the recipient and supplier of services, output tax. Levy and Collection of Tax- Determination of nature of Supply- Inter-State supply and Intra- State supply Place of Supply of Goods or Services - zero-rated supply.

Unit 5: Customs Laws in India

Introduction to Customs Laws in India – The Customs Act 1962 - The Customs Tariff Act 1975- Levy and Exemption from Custom duty - Taxable event - Charge of Custom duty- Exemptions from duty – Customs procedures for import and export - Meaning of Classification of goods - Methods of valuation of imported goods - Abatement of duty in damaged or deteriorated goods - Remission on duty on lost, destroyed or abandoned goods - Customs duty draw back.

Note: **Question Paper shall cover 100% Theory**

Text Book

1. Indirect Taxes- V.S.Datey. Taxmann Publication(p) Ltd.New Delhi
2. Indirect Taxes:GST and Customs Laws - R.Parameswaran and P.Viswanathan -Kavin Publications-

Coimbatore

Reference:

1. Glimpse of Goods and service tax -Sathpal Puliana
2. Handbook of GST -Law and practice-Gaurav Gupta
3. GST Law and Practice-SS Gupta 6. Indirect Taxation - V.Balachandran. Sultan Chand & Co. New Delhi

Course outcomes: At the end of the course, students would be able to:

1	recall various concepts relating to Indirect tax regime in India	K1
2	analyze the concept and applicability of GST in businesses	K4
3	compare the GST regime with other indirect tax laws prior to it	K2
4	illustrate GST system in own business and other prototypes	K2
5	examine the custom law and related duties and taxes	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

Course Outcomes COS	**Programme Outcomes POS**					**Programme Specific Outcomes PSOS**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	4	3	4	3	4	43/13=3.30
CO-2	4	3	4	3	3	3	3	4	4	3	3	3	4	44/13=3.38
CO-3	3	3	4	3	3	4	4	4	4	3	4	3	3	46/13=3.53
CO-4	4	3	4	3	4	4	3	4	3	4	3	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	3	3	4	3	4	45/13=3.46 **17.28/5=3.456**

COURSE CODE	U21COT63	FINANCIAL MARKETS AND INSTITUTIONS	L	T	P	C
CORE-XV			5	-	-	4

Course Objectives:

The main objectives of this course are :

1. To understand the basic concepts of financial market
2. To analyze the working and components of corporate securities market
3. To evaluate the functioning of stock exchanges in India
4. To evaluate the role of banks and intermediaries in financial market
5. To provide insights about the new models and innovative trends in financing

Unit 1: Money Market -Concept

Overview of Financial systems In India – Structure, Regulation Role And Functions Of Financial Systems – Financial Instruments – Financial Markets – Capital Markets & Money Markets – Interlink Between Money Market & Capital Market – Characteristics Of Financial Markets – Introduction To Forex- Treasury Bills Market -Commercial Bills Market - Markets for Commercial paper and Certificates of Deposits - The Discount Market - Market for Financial Guarantee - Government (Gilt-edged) Securities Market.

Unit 2: New Issue Market

New Issue Market – Meaning and Advantages– General Guidelines for New Issue – Problems of New Issues Market – IPO's – Investor protection in primary market – Recent trends in primary market – SEBI measures for primary market-Methods of Floating – Players – Recent Trends-Primary market and Secondary Market – SEBI- IRDA, Financial Conglomerates.

Unit 3: Stock Exchanges and its Functions

Stock Exchanges - Features-Objectives-Functions – Role of Securities and Exchange Board of India – Reforms in Secondary Market – Efficient Market Theory- SEBI guidelines.

Unit 4: **Financial Institutions**

Financial Institutions Depository and non-depository institutions, Commercial banking-introduction, its role in project finance and working capital finance. Development Financial Institutions (DFIs)-An overview and role in Indian economy. Life and non-life insurance companies in India; Mutual Funds- Introduction and their role in capital market development.

Unit 5: Other Financial Institutions

Non-banking financial companies (NBFCs). Regional Rural Banks. Urban Cooperative Banks, Rural Cooperative Credit Institutions, Pension Fund Regulatory and Development Authority.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. BholeL.M2016Financial Institutions and Markets, , Tata McGraw Hill Publishing Company Limited, New Delhi.
2. NaliniPravaTripathy2015Financial Instruments and Services, , Prentice Hall of India, New Delhi.
3. Gurusamy S 2015 Financial Markets and Institutions, S. Vijay Nicole Imprints (P) Ltd Chennai.
4. Gordon and Natarajan, 2011 Financial Markets and Services, Himalaya Publishing House. Mumbai.

Reference Books:

1. Jeff Madura, 2011 Financial Markets and Institutions, 5th Ed., SouthWestern College Publishing.
2.Khan, M.Y, 2012 Financial Services, Tata McGraw Hill. Publishing Company Limited, New Delhi.
3. Gupta S.P 2012 Statistical Methods, Sultan Chand Publication, New Delhi.
4. Kothari C.R2016 Research Methodology Methods and Techniques, New Age International Publications, New Delhi.

Course outcomes: At the end of the course, students would be able:

1	define the basic concepts of financial market	K1
2	analyze the working and components of corporate securities market	K4
3	explain the functioning of stock exchanges in India	K4
4	explain the role of banks and intermediaries in financial market	K4
5	apply various trends and new modes in financing	K3
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping- POs and PSOs

Course Outcomes (COS)	**Programme Outcomes (POS)**					**Programme Specific Outcomes (PSOS)**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	44/13=3.38
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	43/13=3.30
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.90/5=3.38**

COURSE CODE	U21COT64	FINANCIAL MANAGEMENT	L	T	P	C
CORE- XVI			4	-	-	4

Course Objectives:

The main objectives of this course are :

1. To understand the various concept relating to finance
2. To familiarize with the basics of financial planning
3. To analyze various sources and forms of finance
4. To understand the various dimensions of capital market and their components
5. To provide knowledge about capitalization and related theories

Unit 1: Financial Management- Concept

Financial Management: Meaning and scope – Objectives: Profit maximization, Wealth maximization – Functions – Financial decisions – Time value of money: Present value and Compound value – Cost of capital – Cost of debt – Cost of preference share capital – Cost of Equity – Cost of retained earnings – Weighted average cost of capital.

Unit 2: Capital structure-Concept

Capital structure – Meaning and features – Factors determining capital structure – EBITEPS relationship – Indifference point of EBIT – Theories of capital structure: Net income approach, Net operating income approach, MM approach and Traditional approach.

Unit 3: Leverage and Dividend Policy

Leverage – Meaning, significance and types – Operating leverage - Financial leverage – Combined leverage – Dividend policy – Determinants of dividend policy – Theories: relevance and irrelevance with value of firm – Forms of dividend – Stock dividend – Bonus issue – Stable dividend**.**

Unit 4: Working capital management in Business

Working capital management – Determinants of working capital – Forecasting of working capital requirements – Cash management – Motives of holding cash – Stages in cash management: Cash planning, Collection and disbursement of cash, Optimum cash balance – Boumul model – Investment of surplus cash.

Unit 5: Receivables management

Receivables management – Objectives – Factors influencing size of receivables – Credit policy – Credit standard – Credit term – Collection policy – Incremental analysis – Inventory management – Meaning – Types of inventory – Purpose of holding inventory – Excess or inadequate inventory – EOQ – Levels of stock: reorder level, minimum level and maximum level – Techniques – ABC, VED, FSN and HML analysis.

Note: **Question Paper shall cover 25% Theory and 75% Problem**

Text Books:

1. Van Home J.C: Financial Management and Policy; Prentice Hall of India, New Delhi.
2. Van Home J.C: Fundamentals of Financial Management; Prentice Hall of India, New Delhi.
3. Khan M.Y.and Jain P.K: Financial Management, Text and Problems; Tata McGraw Hill, New Delhi.
4. Prasanna Chandra: Financial Management Theory and Practice; Tata McGraw Hill, New Delhi.

R**eference Books:**

1. Pandey I.M: Financial Management: Vikas Publishing House, New Delhi.
2. Brigham E.F, Gapenski L.C., and Ehrhardt M.C: Financial Management -Theory and Practice; Harcourt College Publishers, Singapore.
3. Bhalla V.K.: Modern Working Capital Management, Anmol Pub, Delhi.

Course outcomes: At the end of the course, students would be able to:

1	outline various concepts relating to finance	K2
2	list the various techniques of financial planning	K2
3	analyze various sources and forms of finance	K4
4	examine the various dimensions of capital market and their components	K4
5	list the capitalization concept and related theories for decision making	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

Course Outcomes (COS)	**Programme Outcomes (POS)**					**Programme Specific Outcomes (PSOS)**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	42/13=3.23
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	44/13=3.38
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.83/5=3.366**

COURSE CODE	U21COT65	FINANCIAL SERVICES	L	T	P	C
CORE- XVII			4	-	-	4

Course Objectives:

The objectives of the course are

1. To understand the nature and types of financial services.
2. To understand the various concepts of Hire Purchase system and Mutual Funds
3. To know the various process of Venture Capital Investment.

Unit :1 Financial services-Concept

Financial services – Meaning – Classification – Financial products and services – Challenges facing the financial service sector – Merchant banking– Meaning – Functions – SEBI Guidelines – Scope of merchant banking in India. NBFCs – RBI guidelines.

Unit 2: Hire purchase System

Hire purchase – Meaning – Features – Process – Hire purchase and credit sales – Hire purchase vs Instalment purchase – Banks and hire purchase business – Hire purchase and transport industry – Leasing – Concept – Steps involved in leasing – Lease vs Hire purchase – Types of lease – Problems and prospects of leasing in India.

Unit 3: Mutual funds and Concept

Mutual funds – Meaning – Types – Functions – Advantages – Institutions involved – UTI, LIC, Commercial banks – Entry of private sector – Growth of mutual funds in India – SEBI Guidelines – Asset Management Companies.

Unit 4: Venture Capital Investment Process

Venture capital – Meaning – Features – Methods of venture capital financing – Modes of venture financing – Venture capital investment process – Factors determining venture investment – Exit mechanism – Advantages of venture capital – Issues of Indian venture capital industry.

Unit 5: Factoring – Concepts

Factoring – Concepts – Significance – Types – Factoring mechanism – Factoring vs bills discounting – Factoring in India – Forfeiting – Meaning – Forfeiting vs Export factoring – Problems of Forfeiting/ factoring.

Text Books

1. Financial markets & services by E.Gordon and K.Natarajan – Himalaya publishing house, New Delhi.
2. Financial services by E.Dharmaraj – S.Chand & Co., New Delhi

Reference Books (Latest revised edition only)

1. Financial Services by S.Mohan and R.Elangovan – Deep and Deep Publications, New Delhi.
2. Financial Services by S. Gurusamy – Vijay Nicole Imprints (P) Ltd, Chennai.
3. Lease Financing and Hire Purchase by Vinod Kothari – Wadhaw and Co., Nagpur.

Course outcomes: At the end of the course, students would be able to:

1	To give an idea about fundamentals of financial services and players in financial sectors	K2
2	To create an awareness about merchant banking, issue management, capital markets and role of SEBI	K2
3	To provide knowledge about leasing and hire purchase concepts	K4
4	To make them understand about different types of insurance and IRDA Act.	K4
5	To provide knowledge about mutual funds and various funding models.	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

Course Outcomes (COS)	**Programme Outcomes (POS)**					**Programme Specific Outcomes (PSOS)**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	42/13=3.23
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	44/13=3.38
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.83/5=3.366**

COURSE CODE	U21COE641	CHOICE - I	L	T	P	C
ELECTIVE - IV		BUSINESS LAW	3	-	-	3

Course Objectives:

The main objectives of this course are :

1. To provide knowledge about basics of business contract
2. To create knowledge about the regulations of agency system
3. To understand the rules of indemnity and guarantee
4. To offer knowledge about the sale and transfer of goods and the applicable laws and regulations.

Unit 1: Contract -Concept

Indian Contract Act - Formation - Nature and Elements of Contract - Classification of Contracts - Contract Vs Agreement. Offer - Definition - Forms of Offer - Requirements of a Valid Offer. Acceptance – Meaning - Legal rules as to a Valid Acceptance.

Unit 2: Consideration in Business Contract

Consideration - Definition - Types - Essentials. Capacity of Parties - Definition - Persons Competent to contract. Free consent – Coercion - Undue Influence - Fraud - Misrepresentation - Mistake. Legality of object - Void agreements - Unlawful Agreements

Unit 3: Performance of Contracts

Performance of Contracts - Actual Performance - Attempted Performance - Tender. Quasi Contract - Definition and Essentials. Discharge of Contract - Modes of Discharge - Breach of Contract - Remedies available for Breach of Contract.

Unit 4: Negotiable Instrument

Negotiable Instrument Act 1881; - Characteristics of negotiable instruments- Kinds of negotiable instruments- Promissory Note, Bill of Exchange and Cheque; Definition and Nature, Parties to a Negotiable instrument, material alterations- Meaning of Holder and Holder in Due Course, Rights and privileges of holder in due course- Transfer of Negotiable Instruments.

Unit 5: Sale and Contract of Sale

Sale - Contract of Sale - Sale Vs Agreement to Sell - Meaning of Goods - Conditions and Warranty - Caveat Emptor - Exceptions of Caveat Emptor - Buyer and Seller of Goods - Unpaid Seller - Definition - Rights of an Unpaid Seller.

Note: **Question Paper shall cover 100% Theory**

Text Books:

1. Balachandran. V & Thothadri.S, Business Law, Vijay Nicole Imprints Pvt. Ltd. Chennai
2. Kapoor, N.D. Business Laws, Sultan Chand and Sons.

Reference Books:

1. Sreenivasan, M.R. Business Laws, Margam Publications.
2. Dhandapani, M.V. Business Laws, Sultan Chand and Sons.
3. Badre Alam, S. & Saravanavel, P. Mercantile Law
4. Pillai, R.S.N. & Chand, S, Business Law, S Chand & Co, Delhi
5. Ramaswamy, K.N., Business Law, S Chand & Co, Delhi 8. Shukla, M.C, Business Law, S. Chand & Co.

E-Resources:

www.cramerz.com
www.digitalbusinesslawgroup.com
http://swcu.libguides.com/buslaw
http://libguides.slu.edu/businesslaw

Course outcomes: At the end of the course, students would be able to:

1	assess the various elements related business law and contract	K5
2	interprete different type of contract and its features	K2
3	explain about the agency system related to creation and termination of agency	K5
4	compare between rights and duties of indemnity , guarantee	K5
5	examine the distinct between sale and agreement to sell and its features	K4
K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create		

Mapping POs and PSOs

Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS
	1	2	3	4	5	1	2	3	4	5	6	7	8	
CO-1	4	4	4	4	3	3	3	3	4	3	4	3	4	43/13=3.30
CO-2	4	3	4	3	3	3	3	4	4	3	3	3	4	44/13=3.38
CO-3	3	3	4	3	3	4	4	4	4	3	4	3	3	46/13=3.53
CO-4	4	3	4	3	4	4	3	4	3	4	3	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	3	3	4	3	4	45/13=3.46 **17.28/5=3.456**

COURSE CODE	U21COE642	CHOICE - II	L	T	P	C
ELLECTIVE - IV		CORPORATE GOVERNANCE	3	-	-	3

Course Objectives

The objectives of the course are

1. To provide knowledge of corporate governance, procedures, and techniques in accordance with current legal requirements and professional standards.
2. To understand the powers and duties of Directors and Shareholders.
3. To understand the framework of Corporate Governance
4. To know the concept of Business Ethics and the Corporate Social Responsibility

Unit 1: **Corporate Governance-Concept**

Introduction Corporate Governance - Meaning, significance and principles, Management and corporate governance; Theories and Models of corporate governance; Agency theory and separation of ownership and contract; ownership structure and firm performance; Whistle blowing, Class Action; Role of Institutional investors. Codes and Standards on Corporate Governance- Sir Adrian Cadbury Committee 1992 (UK), OECD Principles of Corporate Governance, and Sarbanes Oxley (SOX) Act, 2002 (USA).

Unit 2: Directors, Shareholders Powers and Duties

Directors and Shareholders Powers of directors; Duties of directors; Non-executive directors and their duties; Relationship between board and shareholder; Board structure and Independent director, board committees and their functions. Shareholder expectations; Regulatory requirements for shareholder involvement shareholder activism and proxy advisory firms. Role of rating agencies.

Unit 3: Corporate Governance Failures

Major Corporate Governance Failures and International Codes BCCI (UK), Maxwell Communication (UK), Enron (USA), World.Com (USA), Andersen, Worldwide (USA), Vivendi (France), Satyam Computer Services Ltd, Lehman Brothers, Kingfisher Airlines, PNB Heist and IL&FS Group Crisis; Common Governance Problems noticed in various Corporate Failures.

Unit 4: **Corporate Governance Framework**

Corporate Governance Framework in India Initiatives and reforms- Confederation of Indian Industry (CII) (1997), Kumar Mangalam Birla (1999), NR Narayana Murthy Committee (2005) and Uday Kotak Committee (2017). Regulatory framework: Relevant provisions of the Companies Act, 2013, SEBI: Listing Obligations and Disclosure Requirements Regulations (LODR), 2015. Corporate Governance in the public sector, banking, non- banking financial institutions.

Unit 5: **Business Ethics and Corporate Social Responsibility**

Business Ethics and Corporate Social Responsibility (CSR) Business Ethics and Values; Importance of Ethics; Corporate Governance and Ethics; Ethical theories; Code of Ethics and ethics committee. Concept of Corporate Social Responsibility; CSR and Corporate Sustainability, CSR and Business Ethics, CSR and Corporate Governance, CSR and Corporate Philanthropy; Environmental Aspect of CSR, Models and benefits of CSR, Drivers of CSR; CSR in India.

Note: **Question Paper shall cover 100% Theory**

Text Books

1. Gupta, K., & Arora, A. (2015). Fundamentals of Auditing. New Delhi: Tata Mc-Graw Hill Publishing Co. Ltd.
2. Kumar A., Gupta L., & Arora, R. J. (2016). Auditing and Corporate Governance. Delhi: Taxmann Pvt. Ltd. Mallin, C. A. (2018). Corporate Governance. New Delhi: Oxford University Press.

Reference Books:

1. Rani, G. D., & Mishra, R. K. (2017). Corporate Governance-Theory and Practice. New Delhi: Excel Books.
2. Sharma, J. P. (2016). Corporate Governance, Business Ethics, and CSR. New Delhi: Ane Books Pvt. Ltd.
3. Tricker, B.(2015). Corporate Governance-Principles, Policies, and Practice (Indian Edition). NewDelhi: Oxford University Press.
4. Institute of Chartered Accountants of India, Auditing and Assurance Standards. New Delhi : ICAI. www.icai.org

Note: Latest edition of readings may be used.

Course outcomes: At the end of the course, students would be able to :

1	explain the concept and importance of corporate governance in a business setup;	K1, K2,K3
2	explain the concept of corporate governance in organisations and its essence for management;	K1, K2,K3
3	analyse the role of board of directors and shareholders in corporate management;	K1, K2,K3
4	assess the problems in corporate governance on the basis of major corporate governance failures;	K1, K2,K3
5	describe corporate governance framework in India;	K1, K2,K3

K1- Remembering **K2 –** Understanding **K3 –** Applying

Mapping POs and PSOs

Course Outcomes (COS)	Programme Outcomes (POS)					Programme Specific Outcomes (PSOS)								Mean Scores of COS
	1	2	3	4	5	1	2	3	4	5	6	7	8	
CO-1	4	4	4	4	3	3	3	3	3	3	4	3	4	42/13=3.23
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.23
CO-3	3	3	4	3	3	3	4	3	4	3	4	3	3	44/13=3.38
CO-4	4	3	4	3	3	4	3	3	3	4	3	4	4	45/13=3.46
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **16.83/5=3.366**

COURSE CODE	U21COS61	PERSONAL SELLING AND SALESMANSHIP	L	T	P	C
SBE - II			2	-	-	2

Course Objective:

The purpose of this course is to

- familiarize the students with the fundamentals of personal selling and the selling process.

Unit 1: Introduction to Personal Selling

Nature and importance of personal selling, Difference between Personal Selling, Salesmanship and Sales Management, Myths of selling, Relationship Marketing and Role of Personal Selling. Characteristics of a good salesman, Types of selling situations, Types of salespersons; Career opportunities in selling,Measures for making selling an attractive career.

Unit 2: Theories of Selling

Traditional and Modern: AIDAS Model of Selling, Problem Solving Approach, Right Set of Circumstances Theory and Modern Sales Approaches-Sales force objectives-Sales force strategy-Sales force Structure- Sales force size-Sales force compensation.

Unit 3: Buying Motives

Concept of motivation, Maslow's theory of need hierarchy; Right set of circumstances theory-Buying formula theory-Partnering-Team selling-Value added selling-Problem solving approach-Dynamic nature of motivation; Buyingmotives and their uses in personal selling.

Unit 4: Selling Process

Prospecting and qualifying; Pre-approach; Approach; Presentation and demonstration; handling of objections and complaints; Closing the sale; techniques for closing the sale; Customer Relations, Followup and Dealing customer concerns and complaints.

Unit 5: Sales Planning and Control

Recruiting and Training the Sales Force- Sales person personality and Motivation-Territory design and Routing-Sales Communication-Sales Forecasting, Sales Budget, Sales Territories, Sales quota, Ethical aspects of Selling.

Text Book :

1. Spiro, Stanton, and Rich, Management of the Sales force, McGraw Hill.
2. Rusell, F. A. Beach and Richard H. Buskirk, *Selling: Principles and Practices*, McGraw Hill
3. Futrell, Charles, *Sales Management: Behaviour, Practices and Cases,* The Dryden Press.

Reference :

1. Still, Richard R., Edward W. Cundiff and Norman A. P. Govoni, Sales Management: Decision Strategies and Cases, Prentice Hall of India Ltd., New Delhi,

2. Johnson, Kurtz and Schueing, Sales Management, McGraw Hill
3. Pedesson, Charles A. Wright, Milburn d. And Weitz, Barton A., Selling: Principles and Methods, Richard, Irvin.
4. Kapoor Neeru, Advertising and personal Selling, Pinnacle, New Delhi.

Note: Latest edition of text books may be used.

Course outcomes: At the end of the course, students would be able to :

1	explain the fundamental concepts Personal Selling :	K1, K2,K3
2	understand the concepts of theories of selling	K1, K2,K3
3	understand the various Concepts in buying motives	K1, K2,K3
4	have thorough Knowledge in selling process	K1, K2,K3
5	understand the Procedure in sales planning and control	K1, K2,K3

Mapping POs and PSOs

Course Outcomes (COS)	**Programme Outcomes (POS)**					**Programme Specific Outcomes (PSOS)**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	4	3	4	3	3	4	4	4	48/13=3.69
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.29
CO-3	4	3	4	4	4	3	4	4	4	3	4	4	3	48/13=3.69
CO-4	4	3	4	4	3	4	3	3	3	4	4	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **17.81/5=3.562**

NON MAJOR ELECTIVE

COURSE CODE	U21CON31	PERSONAL AND FINANCE PLANNING	L	T	P	C
SEMESTER - III			2	-	-	2

Course Objectives:

The course aims to

- familiarize learners with different aspects of financial planning like savings, investment, taxation, insurance, and retirement planning and
- develop the necessary knowledge and skills for effective financial planning.

Unit 1: Introduction to Financial Planning

Financial goals, Time value of money, steps in financial planning, personal finance/loans, education loan, car loan & home loan schemes. Introduction to savings, benefits of savings, management of spending & financial discipline, Net banking and UPI, digital wallets, security and precautions against Ponzi schemes and online frauds such as phishing, credit card cloning, skimming.

Unit 2: Investment Planning

Process and objectives of investment, Concept and measurement of return & risk for various assets class, Measurement of portfolio risk and return, Diversification & Portfolio formation. Gold Bond; Real estate; Investment in Greenfield and brownfield Projects; Investment in fixed income instruments- financial derivatives & Commodity market in India. Mutual fund schemes including SIP; International investment avenues**.**

Unit 3: Personal Tax Planning

Tax Structure in India for personal taxation, Scope of Personal tax planning, Exemptions and deductions available to individuals under different heads of income and gross total income, Special provision u/s 115BAC vis-à-vis General provisions of the Income-tax Act, 1961. Tax avoidance versus tax evasion.

Unit 4: Insurance Planning

Need for Protection planning. Risk of mortality, health, disability and property. Importance of Insurance: life and non-life insurance schemes. Deductions available under the Income-tax Act for premium paid for differentpolicies.

Unit 5: Retirement Benefits Planning

Retirement Planning Goals, Process of retirement planning, Pension plans available in India, Reverse mortgage, New Pension Scheme. Exemption available under the Income-tax Act, 1961 for retirement benefits.

Practical Exercises:

The learners are required to:

1. Perform electronic fund transfer though net-banking and UPI.
2. Identify certain Ponzi schemes in the market during last few selected years.
3. Prepare tax planning of a hypothetical individual.

Suggested Readings:

1. Indian Institute of Banking & Finance. (2017). Introduction to Financial Planning. New Delhi: TaxmannPublication.
2. Pandit, A. (2014). The Only Financial Planning Book that You Will Ever Need. Mumbai: Network 18 PublicationsLtd.
3. Sinha, M. (2008). Financial Planning: A Ready Reckoner. New York: McGraw Hill Education.
4. Halan, M. (2018). Let's Talk Money: You've Worked Hard for It, Now Make It Work for You. New York:HarperCollins Publishers.
5. Tripathi, V. (2017). Fundamentals of Investment. New Delhi: Taxmann Publication.

Note: Latest edition of text books may be used.

Course Outcomes: After completion of this course, learners will be able to:

1	explain the meaning and appreciate the relevance of Financial Planning;	K1, K2,K3
2	familiarize with regard to the concept of Investment Planning and its methods;	K1, K2,K3
3	examine the scope and ways of Personal Tax Planning;	K1, K2,K3
4	analyze Insurance Planning and its relevance;	K1, K2,K3
5	develop an insight in to retirement planning and its relevance.	K1, K2,K3

Mapping POs and PSOs

Course Outcomes (COS)	**Programme Outcomes (POS)**					**Programme Specific Outcomes (PSOS)**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	3	4	3	3	3	4	4	3	3	4	4	46/13=3.53
CO-2	4	3	4	4	3	3	4	4	3	3	3	3	4	48/13=3.69
CO-3	4	3	4	4	4	4	4	4	4	3	4	4	3	49/13=3.76
CO-4	4	3	4	4	4	4	3	3	4	4	4	4	4	49/13=3.76
CO-5	4	4	3	3	4	4	4	3	3	4	3	4	3	46/13=3.53 **18.27/5=3.654**

COURSE CODE	U21CON42	COMMERCE (PRACTICAL)	L	T	P	C
SEMESTER – IV			-	-	2	2

Course Objectives

To objectives of the course are

- To Gain knowledge in e-banking transactions
- To Learn the principles of Co-operation for conducting general body meetings
- To Gain knowledge in computer billing and formation of MSME through SHGs

Unit 1 : Banking Practice

E-Banking- Steps in conversion of personal account into online Account- ATM operations -NEFT and RTGS transactions.

Unit 2: Taxation Practice

Income tax and GST- Preparation of E-Statements-E-Filing of Income Tax and GST.

Unit 3: Practice of Online Trading

Technical Analysis – Important Jargons in Online trading

Unit 4: Practice of Computer Application in Business

Computer Billing in a business organization(Recommended Departmental stores- Bakeries-Hotels)Purchasing goods online through any one Apps (Amazon or E-bay or Flipkart)

Unit 5:Entrepreneurial Practices

Formation of an MSME through Self Help Groups within a class-MOCK procedure for borrowings for MSME- Filling up of application for approval from District Industrial Centre for a new startup

Note: 100% practical

Practical Exercises:

Text Book :

1. Subramani, M. Murugesan, D. Anbalagan, V. Ganesan,E-Banking and E-Commerce: Emerging issues in India,978-81-89886-40-0.

Reference

1. Author: Dr. R.K. Jain,Taxation Theory & Practice With GST 25th Revised Edition (Paperback, Dr. R.K. Jain),Publisher: SBPD Publications.
2. Computer Applications in Business (CBCS) by Hem Chand Jain & H.N Tiwari Paperback – 1 January 2017

Course Outcomes: After completion of this course, learners will be able to:

1	explain the fundamental concepts of banking	K1, K2,K3
2	knowledge in taxation practice.	K1, K2,K3
3	knowledge in practice in online trading.	K1, K2,K3
4	practice of computer applications in business.	K1, K2,K3
5	knowledge in entrepreneurial practice.	K1, K2,K3

Mapping POs and PSOs

Course Outcomes (COS)	**Programme Outcomes (POS)**					**Programme Specific Outcomes (PSOS)**								**Mean Scores of COS**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO-1	4	4	4	4	3	4	3	4	3	3	4	4	4	48/13=3.69
CO-2	4	3	4	3	3	3	3	4	3	3	3	3	4	42/13=3.29
CO-3	4	3	4	4	4	3	4	4	4	3	4	4	3	48/13=3.69
CO-4	4	3	4	4	3	4	3	3	3	4	4	4	4	47/13=3.61
CO-5	3	4	3	4	3	4	4	3	4	3	4	3	4	46/13=3.53 **17.81/5=3.562**

VALUE ADDED COURSE

COURSE CODE	U21CBV51	PROJECT FINANCE	L	T	P	C
Value Added			2	-	-	2

Objectives:

To enable the students to understand concepts of Project Finance by taking them through allstages of a Project Finance transaction, so that they can apply the techniques of Project Finance

Unit I: Project Management and Planning

Introduction_ Project Management- Skill required by a project manager- The Project Cycle_ Project planning, Identifying strategic project variables, Strategy in project management, Planning cycle, Project Feasibility analysis

Unit II: Financing of Projects

Capital Structure –Equity capital - preference capital - internal accruals - Term loans – Debentures – Working Capital Advance – Miscellaneous Sources – Raising Venture capital - Raising capital in International Markets

Unit III Financial Estimate and Projections

Cost of Project, Means of Finance, Estimation of sales and Productions, Cost of Production, Working capital requirement and its financing. Estimation of Fixed capital, Profitability Projections, Projected cash flow statement, projected balance sheet, Multiyear Projections.

Unit IV Risk Analysis

Measures and Perspective of Risk – Single investment: Sensitivity Analysis, Scenario Analysis, Break Even Analysis, Decision Tree Analysis, Project Selection under risk and Risk analysis in Practice

Unit V Project Financing in India

Means of Finance - Norms and Policies of Financial Institutions- SEBI Guidelines - Sample Financing Plans Structure of Financial Institutions in India - Schemes of Assistance - Term loans Procedures – Project appraisal by financial Institutions

Text Books:

1. Prasana Chandra: Projects-Planning Analysis, Selection, Implementation &Review, TataMcGraw Hill, New Delhi
2. M C. Choudhury : Project Management, Tata McGraw Hill, New Delhi – 1995

Reference Books

1. Machiraju, HR Introduction to Project Finance, New Delhi, Vikas Publication-(2009)
2. Vasant Desai Project Management, New Delhi, Himalaya Publishing House. (2008)

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MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

DEPARTMENT OF BIOTECHNOLOGY

B.Sc. BIOCHEMISTRY

SYLLABUS TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2021-2022

(CHOICE BASED CREDIT SYSTEM)

Mother Teresa Women's University, Kodaikanal
Department of Biotechnology
Choice Based Credit System (CBCS)
(2021-2022 onwards)
B.Sc. BIOCHEMISTRY

1. About the Programme

B.Sc. Biochemistry is a 3-year Undergraduate Programme and the duration of the Programme divided into six semesters. Biochemistry deals with the study of structure and function of cellular components such as proteins, carbohydrates, lipids, nucleic acids and other bio-molecules involved in biological processes such as growth, metabolism, reproduction as well as laboratory-based science that unite Biology along with Chemistry using chemical knowledge and bio-techniques. The Programme is career oriented and opens up many bright job prospects for them. After completing the Programme, the graduates can join medical industries, research labs, agriculture, pharmaceutical companies, or any academic institutions as well.

2. Programme Educational Objectives (PEOs)

PEO1	To encourage the students to take up and shape a successful career in Biochemistry.
PEO2	To equip the students with fundamental knowledge to solve socio-economic challenges in the field of biochemistry.
PEO3	To emphasize the need for responsible and eminent biochemists in the society.
PEO4	To develop skills to meet the ever-evolving professional demands in the field of biochemistry.
PEO5	To motivate the students to pursue higher studies and research to contribute scientifically to the society.

3. Eligibility

i. Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Examination, Govt. of Tamil Nadu or any other Examination accepted by the syndicate as equivalent there to with at least one of the following subject Biology/Botany/Zoology
ii. Candidate should have secured at least 55% in the above subject and above in the aggregate.
iii. A relaxation of 10% in the total percentage will be given to SC, ST candidates.

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	10	25	10	25
External	30	75	30	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions (MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5: one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade
(Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above-mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

PROGRAMME OUTCOMES (PO)

On completion of B.Sc. Biochemistry Programme, students will be able to

PO1	comprehend the fundamental concepts and principles of Biochemistry.
PO2	utilize the knowledge of bio-techniques to make scientific queries and understand recent advancements in biochemistry.
PO3	ascertain extensive knowledge about molecular mechanisms, diagnostic tools and techniques.
PO4	gain expertise in different areas of basic biochemistry.
PO5	study principles of biochemistry and enhance the knowledge about the reactions within a living system.
PO6	apply the theoretical and practical knowledge in securing a successful career.
PO7	utilize the scientific skills acquired to develop a sustainable environment.
PO8	use the scientific knowledge obtained to develop and support the Indian economy.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of B.Sc. Biochemistry Programme, the students will be able to

PSO1	acquire knowledge in the basic concepts and principles of Biochemistry.
PSO2	enrich the theoretical and practical knowledge for securing successful careers.
PSO3	develop the knowledge attained from the programme to work as biochemists in emerging modern clinical laboratories
PSO4	interact appropriately and effectively with people in the field of Biochemistry and other allied backgrounds.
PSO5	get hands on experience through practical sessions which will enable them to pursue higher studies and research.

MOTHER TERESA WOMEN'S UNIVERSITY,
KODAIKANAL
B.Sc. BIOCHEMISTRY SYLLABUS
2021-2022

Paper No.	Paper Code	Course Title	Credits	Hours		(CIA)	(ESE)	Total
				T	P			
Semester I								
1	U21LTA11	Tamil I- Part – I	3	6	-	25	75	100
2	U21LEN11	English I-Part- II	3	6	-	25	75	100
3	U21BCT11	**Core I**- Bio-molecules	4	5	-	25	75	100
4	U21BCP11	**Core II- Practical**- Bio-molecules	4	-	6	25	75	100
5	U21PHA11	**Allied I**- Physics for Biology	4	5	-	25	75	100
6	U21EVS11	Environmental Studies	2	2	-	25	75	100
7	U21PELS11	Professional English - I	4	6	-	25	75	100
		Total	**24**	**36**				**700**
Semester II								
8	U21LTA22	Tamil II -Part- I	3	6	-	25	75	100
9	U21LEN22	English II-Part- II	3	6	-	25	75	100
10	U21BCT21	**Core III**- Fundamentals of Cell Biology	4	5	-	25	75	100
11	U21BCT22	**Core IV** -Nutritional Biochemistry	4	5	-	25	75	100
12	U21BCA22	**Allied II** – Statistics for Biology	4	5	-	25	75	100
13	U21VAE21	Value Education	3	3	-	25	75	100
14	U21PELS22	Professional English - II	4	6	-	25	75	100
		Total	**25**	**36**				**700**
Semester III								
15	U21LTA33	Tamil III- Part I	3	6	-	25	75	100
16	U21LEN33	English III -Part –II	3	6	-	25	75	100
17	U21BCT31	**Core V**- Plant Physiology and Biochemistry	4	5	-	25	75	100
18	U21CHA33	**Allied III**- Chemistry	4	5	-	25	75	100
19	U21BCE311/ U21BCE312	**Elective I**-Human Physiology / Bio-molecules and Diseases	3	4	-	25	75	100
20	U21MSS311	**Skill Based Elective I**- Managerial Skills	2	2	-	25	75	100
21		**Non-Major Elective I**	2	2	-	25	75	100
		Total	**21**	**31**				**700**

Semester IV								
22	U21LTA44	Tamil IV-Part –I	3	6	-	25	75	100
23	U21LEN44	English IV-Part –II	3	6	-	25	75	100
24	U21BCT41	**Core VI** - Intermediary Metabolism	4	4	-	25	75	100
25	U21BCP42	**Core VII** - Practical - Biochemical Techniques	4	-	4	25	75	100
26	U21CHA44	**Allied IV** – **Practical** Chemistry	4	-	4	25	75	100
27	U21BCE421/ U21BCE422	**Elective II:** Nano-materials / Plant Therapeutics	3	3	-	25	75	100
28	U21CSS42	**Skill Based Elective II-** Computer Skills for Office Management	2	2	-	25	75	100
29		**Non Major Elective course II**	2	2	-	25	75	100
		Total	**25**	**31**				**800**
Semester V								
30	U21BCT51	**Core VIII**- General Microbiology	4	5	-	25	75	100
31	U21BCT52	**Core IX** - Immunology	4	5	-	25	75	100
32	U21BCT53	**Core X**- Pharmacology	4	5	-	25	75	100
33	U21BCT54	**Core XI** – Fundamentals of Molecular Biology	4	5	-	25	75	100
34	U21BCP53	**Core XII** - Practical - General Microbiology & Immunology	4	-	5	25	75	100
35	U21BCE531/ U21BCE532	**Elective III** –Bioinformatics / Cancer Biology	3	3	-	25	75	100
36	U21BCS531/ U21BCS532	**Skill Based Elective III**- Food Processing Technology/Molecular modeling & Drug discovery	2	2	-	25	75	100
		Total	**25**	**30**				**700**
Semester VI								
37	U21BCT61	**Core XIII** – Principles of Enzyme Technology	4	5	-	25	75	100
38	U21BCT62	**Core XIV** - Medical Biochemistry	4	5	-	25	75	100
39	U21BCT63	**Core XV** – Bioprocess Technology	4	5	-	25	75	100

40	U21BCT64	**Core XVI** - Bioinstrumentation	4	5	-	25	75	100
41	U21BCP64	**Core XVII- Practical-** Principles of Enzyme Technology & Medical Biochemistry	4	-	5	25	75	100
42	U21BCE641/ U21BCE642	**Elective IV** – Hormones & Neurochemistry/Plant Pathology	3	3	-	25	75	100
43	U21BCS641/ U21BCS642	**Skill Based Elective IV-** Medical Coding / Bio-safety & IPR	2	2	-	25	75	100
44	U21EAS61	Extension Activity (NSS/NCC/YRC/Physical Education)	3	-	-	100		100
		Total	**28**	**30**				**800**
Grand Total			**148**	**193**				**4400**

Extra Credit Course:
U21BCO31 - Online Course – 3rd Semester
U21BCI41- Internship – 4th Semester
U21BCV51 - Value added course – 5th Semester (Single Cell Protein)
Each carries 2 Credits to be included as additional credit courses

Non-Major Elective

U21BCN311	NME I –First Aid and Emergency Care
U21BCN421	NME II - Phyto chemistry

SEMESTER I

Course Code	U21BCT11	BIOMOLECULES	L	T	P	C
Core	I		5	-	-	4

Cognitive Level	K1: Recall K2: Understand K3: Apply
Learning objective	• To understand the basic fundamentals of biochemistry. • To learn about the general properties of carbohydrates, proteins and lipids its role in the living beings. • To understand the major role of nucleic acids in life processes. • To understand the chemistry of biomolecules and its significance
Unit I	**Cellular and chemical foundations of life**
Historical background of the origin and development of Biochemistry. Carbohydrates - basic structure, properties and biologically importance of monosaccharide (Structure of Glucose), Disaccharides (Lactose, Sucrose), Trisaccharides (Raffinose). Polysaccharides – structural polysaccharide (Cellulose) and storage polysaccharides (Starch and Glycogen) - other polysaccharides (Insulin and Chitin).	
Unit II	**Amino acids and Proteins**
Classification amino acids, physical properties of amino acids - Solubility, electrochemical properties, fundamental role of proteins in life - Composition of proteins - General properties of proteins - Rudimentary treatment of structure, classification of the proteins on the basis of their biological functions- Criteria for the purity of proteins.	
Unit III	**Lipids**
Fatty acids - Classification, Hydroxy and keto derivatives and cyclic fatty acids - physical properties of fatty Acids - solubility, boiling point, absorption, spectro chemical properties of fatty acids - Salts, detergents and wetting agents, esters - reactions of unsaturated fatty acids - hydrogenation, halogenations and oxidation. Fats - Fatty acids esters of glycerol - Chemical structures. Physical and chemical properties of fats – Waxes, phospholipids, non-phosphorylated lipids and steroids.	
Unit IV	**Nucleic Acids**
Fundamental role of nucleic acids in life processes- DNA and its types, RNA – types, functions. Structure of bases, nucleosides and nucleotides - bond linking the various bases. Isolation, separation and purification of DNA and RNA.	
Unit V	**Vitamins**
Discovery and Physico- chemical properties of vitamins, fat-soluble vitamins, vitamin A, D, E and K - Water soluble vitamins, vitamin B complex, vitamin C – Brief mention of source and physiological role.	
Text Books	1. T. Devasena, Biomolecules by MJP Publishers,2011 2. Arihant, Experts Handbook of Chemistry, Arihant Publications,2020 3. P.K.Gupta , Biomolecules and cell Biology, Rastogi Publication, 2018
References	1. Lehninger, A.L , Biochemistry, 6th edition, Kalyani publisher, 2012.

<table>
<tr><td></td><td>2. Lubert Stryer, Biochemistry, 7th edition, W.H. Freeman and Company, New York, 2012
3. J.M. Berg, J.L. Tymoczko and L. Stryer, Biochemistry, W.H. Freeman, 2015
4. Mohan P Arora, Biomolecules, Himalaya publishing House, 2012
5. S. Azhagu Madhavan, P. Vinotha, V. Uma, Chemistry of Biomolecules, Notion Press, 2020</td></tr>
<tr><td>E-References Link</td><td>1. https://www.mdpi.com/journal/biomolecules
2. https://ncert.nic.in/textbook/pdf/lech205.pdf
3. https://www2.nau.edu/lrm22/lessons/biomolecules/biomolecules.html
4. https://opentextbc.ca/biology/chapter/2-3-biological-molecules/</td></tr>
<tr><td>Course outcome</td><td>Upon completion of this course, the students will be able to
<table>
<tr><th>CO</th><th>Course Outcomes</th><th>Knowledge Level</th></tr>
<tr><td>CO1</td><td>understand the foundation of life and structure and functions of carbohydrates</td><td>K1, K2</td></tr>
<tr><td>CO2</td><td>attain knowledge in structure, properties, role and classification of amino acids and proteins</td><td>K1, K2, K3</td></tr>
<tr><td>CO3</td><td>know the structure, properties, role and classification of Lipids and fatty acids</td><td>K1, K2, K3</td></tr>
<tr><td>CO4</td><td>learn the types of nucleic acids and its structure and biological importance.</td><td>K1, K2, K3</td></tr>
<tr><td>CO5</td><td>gain knowledge on various types, functions, requirements and deficiency diseases of vitamins</td><td>K1, K2, K3</td></tr>
</table></td></tr>
</table>

Mapping of CO with PO & PSO:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	S	M	M	S	S	S	M	S
CO2	S	M	S	S	S	S	M	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCP11	BIOMOLECULES (Practical)	L	T	P	C
Core	II		-	-	6	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To qualitatively identify carbohydrates, amino acids, proteins, lipids and nucleic acids • To quantitatively identify carbohydrates, amino acids, proteins, lipids and nucleic acids • To learn the principles and operation of basic instruments in the laboratory • To learn to operate the pH meter and colorimeter					
Experiments in Biomolecules	1. Qualitative analysis of Bio-organic Compounds i. Carbohydrates ii. Amino acids iii. Proteins iv. Lipids and cholesterol v. Nucleic acids 2. Quantitative analysis of Bio-organic Compounds i. Starch(potato) ii. Lactose(milk) iii. Casein(milk) 3. pH meter- preparation of Buffer. 4. Verification of Beer Lamberts law using colorimeter. i. Determination of the extinction co-efficient of given colored compound. ii. Determination of the concentration of given colored compound using a standard graph.					
Text Books	1. J. Jayaraman, Practical bio-chemistry, Jaypee Brothers medical, 2013.					
References	1. Keith Wilson and John Walker, Principle and Techniques of Biochemistry and Molecular Biology, Cambridge University Press, 2011. 2. Shivaraja Shankara. Y. M, Laboratory Manual for Practical Biochemistry, Jaypee Brothers Medical Publishers, 2nd Edition, 2013. 3. Pattabiraman, Laboratory manual in bio-chemistry, Pineapple research station, 2015. 4. S. Rajan, R. Selvi christy, Experimental Procedures in Life sciences, CBS, 2019 5. Soundravally Rajendiran, Pooja Dhiman, Biochemistry Practical Manual, Elsevier, 2019.					
E-	1. http://www.chem.boun.edu.tr/wp-content/uploads/2014/04/Chem-415-					

References Link	Experiment-1.pdf 2. http://www.chem.boun.edu.tr/wp-content/uploads/2014/04/Chem-415-Experiment-2.pdf 3. https://drinc.ucdavis.edu/dairy-food-sciences/procedures-oxidized-milk-problems
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	identify qualitatively both carbohydrates and amino acids	K1, K2
CO2	understand about the analysis of lipids and nucleic acids	K1, K2, K3
CO3	gain knowledge on quantitative analysis of biomolecules	K1, K2, K3
CO4	use the pH meter and understand the Beer Lamert's Law	K1, K2, K3
CO5	analyze the Beer – Lambert's Law by experiments	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	M	S	S	S	S	M	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks Weakly Correlating (W) - 1 mark
Moderately Correlating (M) - 2 marks No Correlation (N) - 0 mark

Course Code	U21PHA11	PHYSICS FOR BIOLOGY	L	T	P	C
Allied	I		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the principles and applications of Spectroscopy • To learn the principles of thermodynamics and their applications. • To attain knowledge on types of radioisotopes used in biology					
Unit I	**Spectroscopy**					
Absorption spectroscopy – principle, instrumentation and applications of atomic absorption, UV visible spectroscopy, Infrared spectroscopy, Nuclear Magnetic Resonance Spectroscopy, NOSY, COSY and ROSY techniques. Electron Spin resonance.						
Unit II	**Emission spectroscopy**					
Principle, method and application of Flame photometry. Fluorimetry – principle, instrumentation and application. Mass spectroscopy – principle, instrumentation and application. Light scattering Raman Spectroscopy; principles, method, application with reference to biological macromolecules such as proteins and nucleic acids.						
Unit III	**Principles of thermodynamics and their applications**					
Introduction, thermodynamics system, thermodynamic state functions, first and second laws of thermodynamics, concept of free energy, standard free energy, determination of G for a reaction, relation between equilibrium constant and standard free energy change, biological standard state and standard free energy change in coupled reactions.						
Unit IV	**Radioisotopes**					
Types of radioisotopes used in biology, units of radioactivity measurements, techniques used to measure radioactivity (gas ionization and liquid scintillation counting), nuclear emulsions used in biological studies (pre-mounted liquid and stripping).						
Unit V	**Isotopes**					
Isotopes commonly used in biochemical studies – 32P, 35S, 14C and 3H. Autoradiography, Biological hazards of radiation and safety measures in handling radioisotopes – Biological applications.						
Text Books	1. L. Veerakumari, Bioinstrumentation, MJP Publisher, 2019. 2. John G. Webster, Bioinstrumentation , Wiley ,2018.					
References	1. M. J. Reilly, Bioinstrumentation, CBS Publishers & Distributers, 2016. 2. Keith Wilson and John Wilson, Practical Biochemistry, Cambridge University Press, 2018. 3. M.H. Fulekar & Bhawana Pandey, Bioinstrumentation, I. K. International Publishing House Pvt. Ltd., 2014.					
E-References Link	1. https://is.muni.cz/www/384/30618506/koncepty/PhysicsinBiologyandMedicine3rdEdition.pdf 2. https://ibsen.com/applications/spectroscopy/absorption-spectroscopy/ 3. https://education.seattlepi.com/examples-radioisotopes-biology-6678.html 4. https://www.cpp.edu/~pbsiegel/bio431/texnotes/sep1.pdf					

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	analyze and understand the techniques of spectroscopy.	K1, K2
	CO2	understand the basic principle of emission spectroscopy and mass spectroscopy.	K1, K2, K3
	CO3	recognize the principles of thermodynamics.	K1, K2, K3
	CO4	realize and learn the various types of radioisotopes	K1, K2, K3
	CO5	gather the knowledge on biological hazards of radiation and safety.	K1, K2, K3

Mapping of CO with PO & PSO

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	M	S	S	M	S	S	M	S	M	S
CO2	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	M	S	M	S	S	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	M	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER II

Course Code	U21BCT21	FUNDAMENTALS OF CELL BIOLOGY	L	T	P	C
Core	III		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To know about the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles • To understand how the cellular components are used to generate and utilize energy in cells • To understand the cellular components underlying mitotic cell division.					
Unit I	**Cell Structure**					
Prokaryotic and Eukaryotic (Plant and animal cells: structural features and a brief comparative account). Plasma Membrane: Chemistry and Structure, Fluid mosaic model and functions of plasma membrane. Protoplasm: Chemistry and organization, microtubules and microfilaments.						
Unit II	**Membrane Bound Organelles**					
Structure and Function, Golgi complex, chloroplast, endoplasmic reticulum, mitochondria and ribosomes. Nucleus: Structure, Chromatin: Eu and heterochromatin, nucleic acids, nucleosomes. Chromosomes: Kinds, structure, Polytene chromosomes, bacterial chromosomes. Nucleolus: structure and function.						
Unit III	**Cell cycle**					
Mitosis and meiosis. Cell growth: normal and cancerous. Oncology: formation of cancer, malignant and non-malignant tumors, carcinogenic substances.						
Unit IV	**Cell Communication**					
Regulation of hematopoiesis, general principles of cell communication, cell adhesion and roles of different adhesion molecules, gap junction, extracellular matrix, integrins, neurotransmission and its regulation.						
Unit V	**Cancer**					
Oncogens, tumor suppressor genes, virus-induced cancer, metastasis, interaction of cancer cells with normal cells, apoptosis.						
Text Books	1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K. and Walter P. Molecular Biology of the Cell. Garland Science, 2014 2. De Robertis, E.D.P. and De Robertis, Jr.E.M.E. 2009. Essentials of cell Karp, G. Cell Biology. Wiley, 2013.					
References	1. Gerald Karp, Cell and Molecular Biology, John Wiley and Sons, 2013. 2. Bruce Alberts, Essential Cell Biology, Taylor and Francis Group, 2014. 3. George Plopper, Principles Cell Biology, Jones & Bartlett publishers, 2016.					
E-References link	1. www.sc.chula.ac.th/courseware/2303101j/VIII-Cell.pdf 2. http://www.frontiersin.org/Cellular_Biochemistry					

	3. https://www.omicsonline.org/scholarly/cellular-biochemistry-journals-articles-ppts-list.php		
Course outcomes	Upon completion of this course, the students will be		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	acquire knowledge on structure and functions of cell organelles	K1, K2
	CO2	understands membrane organelles, nucleus and chromosomes	K1, K2, K3
	CO3	gain knowledge on cell cycle	K1, K2, K3
	CO4	understand the cell communication and its regulation	K1, K2, K3
	CO5	understand the stages in cancer and learn about apoptosis	K1, K2, K3

Mapping of CO with PO & PSO:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	M	S	S	M	S	S	M	S	M	S
CO2	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	S	M	S	S	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	M	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCT22	NUTRITIONAL BIOCHEMISTRY	L	T	P	C
Core	IV		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To know the value and nutritional components of food. • To understand the sources of nutrients such as carbohydrates, proteins, fibers and fats for good health. • To know about the disorders caused due to deficiency of protein, vitamin deficiency and minerals					
Unit I	**Introduction of nutrition**					
Functions of food and its relation to nutritional and clinical health, essential nutrients, analysis of food composition, food groups, ICMR five-food groups, food pyramids						
Unit II	**Carbohydrates**					
Types, functions, food sources. Fat - types, functions, food sources, essential fatty acids, and cholesterol. Proteins - types, Function, food source, complete and incomplete protein. Nitrogen balance, quality of food proteins and requirements, protein deficiency disorders						
Unit III	**Vitamins**					
Definition, Classification, Sources, distribution, function, abnormalities, minimum requirements and optimum allowances. Mineral Nutrition: Essential-micro and macro mineral nutrients, distribution, sources, function and abnormalities						
Unit IV	**Energy**					
Basal metabolism, measurement of BMR,RDA,BMI, factors affecting BMR, regulation of body temperature, energy needs, and total energy requirement estimation of energy requirements and energy value of foods, Obesity- Definition, Causes, Risk factors and Precautions. Balanced diet formulation- Assessment of nutritional status. Nutrition at various stages of growth and development, diets of infants, children, adolescents, pregnant women, lactating mothers and old age.						
Unit V	**Nutritional Challenges of the future**					
Food production and food storages, future foods, new protein foods, new fat foods and changing food habits Food adulterations.						
Text Books	1. M. Raheena Begum, A Textbook Of Foods, Nutrition And Dietetics, 2019. 2. Sharma DC, Nutritional Biochemistry, CBS Publication, 2014. 3. Venkatraman, Dandekar, Nutrition & Biochemistry for Nurses, Elsevier, 3rd Edition, 2020					
References	1. B.Srilakshmi, Food science, Third edition, New age international, 2018 2. Sunil Natha Mhaske, Essentials of Nutrition, CBS Publication,2015					

3. Shantaramman juala, Biochemistry and Nutrition, Jaypee Brothers Medical Publishers, 2011.
4. Dickson JK, Food Nutrition, CBS publishers and Distributors, 2020

E-References Link

1. https://www.omicsonline.org/biochemistry-and-analytical-biochemistry/nutritional-biochemistry-journal.php
2. https://www.routledge.com/Nutritional-Biochemistry-Current-Topics-in-Nutrition-Research/Cox/p/book/9781774635612
3. https://www.nutritionalconference.com/events-list/nutritional-biochemistry

Course outcomes

Upon completion of this course, the students will be able to

CO	Course Outcomes	Knowledge Level
CO1	explain the functions, groups of food and its analysis	K1, K2
CO2	discuss the binomial classification, functions and requirements of the carbohydrates, proteins	K1, K2, K3
CO3	describe the classification and features of vitamins and minerals	K1, K2, K3
CO4	recognize the concepts of BMR, RDA, energy and its requirements, know about the balanced diet formulation.	K1, K2, K3
CO5	acquire knowledge on the nutritional challenges of the future and food adulterations	K1, K2, K3

Mapping of CO with PO & PSO:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	M	S	S	M	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	M	S	S	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

<table>
<tr><td>Course Code</td><td>U21BCA22</td><td colspan="3">STATISTICS FOR BIOLOGY</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>Allied</td><td>II</td><td colspan="3"></td><td>5</td><td>-</td><td>-</td><td>4</td></tr>
<tr><td>Cognitive Level</td><td colspan="8">K1: Recall K2: Understand K3: Apply</td></tr>
<tr><td>Learning Objective</td><td colspan="8">• To understand collection and representation of data
• To learn measures of central tendency.
• To understand symmetry, correlation and regression.
• To acquire knowledge on tests of significance.</td></tr>
<tr><td rowspan="7">Course outcomes</td><td colspan="8">Upon completion of this course, the students will be able to</td></tr>
<tr><td>CO</td><td colspan="5">Course Outcomes</td><td colspan="2">Knowledge Level</td></tr>
<tr><td>CO1</td><td colspan="5">acquire information on collection of data and representation in diagram and graph</td><td colspan="2">K1, K2</td></tr>
<tr><td>CO2</td><td colspan="5">understand the problems in measures of central tendency and distribution</td><td colspan="2">K1, K2, K3</td></tr>
<tr><td>CO3</td><td colspan="5">recognize the measures of symmetry</td><td colspan="2">K1, K2, K3</td></tr>
<tr><td>CO4</td><td colspan="5">familiarize on correlation and regression.</td><td colspan="2">K1, K2, K3</td></tr>
<tr><td>CO5</td><td colspan="5">receive elaborate knowledge on tests of statistical significance.</td><td colspan="2">K1, K2, K3</td></tr>
<tr><td>Unit I</td><td colspan="8">Statistics</td></tr>
<tr><td colspan="9">Definition. Collection and organization of data. Representation of data. Sampling and Sampling Design. Tabulation, Diagrammatic and graphical representation</td></tr>
<tr><td>Unit II</td><td colspan="8">Measures of Central Tendency</td></tr>
<tr><td colspan="9">Mean, Median, Mode. Measures of Dispersion – Range, Mean Deviation, Standard Deviation and Variance – Problems and explanation. Probability – Distribution – Binomial, Poison and normal</td></tr>
<tr><td>Unit III</td><td colspan="8">Measures of symmetry</td></tr>
<tr><td colspan="9">Skewness; Kurtosis a brief explanation - Measures of Skewness and Kurtosis. (Problems not necessary)</td></tr>
<tr><td>Unit IV</td><td colspan="8">Correlation and regression:</td></tr>
<tr><td colspan="9">Explanation – Types of correlation – Positive and negative correlation – Methods of studying Correlation using Karl Pearsons Coefficient of correlation (Simple problems related to correlation and regression)</td></tr>
<tr><td>Unit V</td><td colspan="8">Tests of statistical significance</td></tr>
<tr><td colspan="9">Analysis of Variance (One way,Two Way Classification) – Chi square test.</td></tr>
<tr><td>Text Books</td><td colspan="8">1. Veer Bala rastogi, Biostatistics, Medtech publishers, 2015.
2. Dr.B.Annadurai, A Textbook of Biostatistics, New age international</td></tr>
</table>

<table>
<tr><td></td><td>publishers , 2017.
3. Belavendra Antonisamy, Prasanna S Preamkumar, Principles and practices of Biostatistics, Elsevier Publishers, 2017.
4. K.L.A.P Sarma, B,Ravindra Reddy, Biostatistics, Daya Publishing House, 2013.</td></tr>
<tr><td>References</td><td>1.AP Kulkarni ,Basics of Biostatistics, CBS publishers,2020.
2.K. Balaji, A.V.S. Raghavaiah & K. N. Jayaveera, Biostatistics, Wiley Publishers, 2020.
3.Veer Bala rastogi, Biostatistics , Medtech publishers , 2015.
4.Wayne W. Daniel & Chad L. Cross, Biostatistics, Wiley Publishers, 2014.
5.B.Annadurai, A Textbook of Biostatistics, New Age International Publishers,2017.</td></tr>
<tr><td>E-References Link</td><td>1. http://www.biostathandbook.com/HandbookBioStatThird.pdf
2. http://web.stanford.edu/class/bios221/book/introduction.html
3. https://www.nature.com/collections/qghhqm/</td></tr>
<tr><td>Course outcomes</td><td>Upon completion of this course, the students will be able to</td></tr>
</table>

	CO	**Course Outcomes**	**Knowledge Level**
	CO1	acquire information on collection of data and representation in diagram and graph	K1, K2
	CO2	understand the problems in measures of central tendency and distribution	K1, K2, K3
	CO3	recognize the measures of symmetry	K1, K2, K3
	CO4	familiarize on correlation and regression.	K1, K2, K3
	CO5	receive elaborate knowledge on tests of statistical significance.	K1, K2, K3

Mapping of CO with PO & PSO:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S	M	S	S
CO4	S	M	S	M	S	S	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER III

Course Code	U21BCT31	PLANT PHYSIOLOGY AND BIOCHEMISTRY	L	T	P	C
Core	V		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the photosynthesis process in plants. • To gain knowledge on plant nutrition, nitrogen fixation, the function of mineral, sulphur and nitrate metabolism in the plants. • To understand about the plant physiology of physiology and its secondary metabolites					
Unit I	**Photosynthesis**					
Photosynthesis apparatus and photosynthesis pigments, light and dark reactions of photosynthesis, C_3 C_4 and CAM plants, factors affecting photosynthesis, photorespiration.						
Unit II	**Plant growth regulators**:					
Biosynthesis, physiological role Auxins, Gibberllin, Cytokinins, Ethylene and ABA, synthetic growth hormones.						
Unit III	**Plant nutrition**:					
Essential mineral nutrients, absorption, translocation and function and deficiency, N_2, cycle, N_2 fixation, symbiotic and asymbioticN_2fixation: Mechanism of nitrogen fixation, sulphur metabolism.						
Unit IV	**Physiology and reproduction**:					
Brief account on physiology of Seed germination, Seed dormancy, photoperiodism, vernalization., Circadian Rhymes						
Unit V	**Secondary metabolites**					
Their physiological, biochemical and pharmacological properties. Terpenes, terpenoids Saponin and alkaloids (structural elucidation not necessary).						
Text Books	1. V. K. Jain, Fundamentals of Plant Physiology,S Chand Publishing, 2017. 2. Jurgen kleine –Vehn,Plant hormones, Humana press.2017.					
References	1. Hans- Walterheldt, Plant Biochemistry, Academic press 4th Ed, 2011. 2. Srivastava H.S, Plant Physiology and Biochemistry, Rastogi Publication 7th Ed, 2018. 3. Dey P.M, Plant Biochemistry, Elsevier science, 2013. 4. Mehrotra, Fundamentals of plant pathology, MC Graw Hill,2013.					
E-References Link	1. www.esalq.usp.br/lepse/imgs/conteudo_thumb/Plant-Biochemistry-by-Heldt-2005-.pdf 2. http://priede.bf.lu.lv/grozs/AuguFiziologijas/Augu_biokimija/Plant%20Biochemistry%204.pdf					

	3. https://www.internetchemistry.com/chemistry/plant-biochemistry.php		
Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	explain photosynthetic cycles and its factors	K1, K2
	CO2	understand the hormones of plant and their biological importance	K1, K2, K3
	CO3	illustrate the concept of plants nutrition and it's deficiency	K1, K2, K3
	CO4	recognize the physiology and reproduction of plants	K1, K2, K3
	CO5	discuss the tissue culture and secondary metabolites	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	M	S	M	S	M	S	M	S	M	S
CO2	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	S	S	S	S	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	M	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21CHA33	CHEMISTRY	L	T	P	C
Allied	III		5	0	0	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the handling of chemicals and errors in chemical analysis • To get knowledge in chemical bonding and hybridization • To acquire knowledge in volumetric analysis • To understand the basic concept of Biomolecules					
Unit I	**Handling of chemicals and Data analysis :**					
	a) Storage and handling of chemicals: Handling of acids, ethers, toxic and poisonous chemicals. Antidotes, threshold vapour concentration and first aid procedure. b) Errors in chemical analysis: Accuracy, precision. Types of error-absolute and relative errors. Methods of eliminating and minimizing errors. c) Separation techniques – Solvent extraction. Principle of adsorption and partition chromatography, column chromatography, thin layer chromatography (TLC), paper chromatography and their applications.					
Unit II	**Chemical bonding**					
a) Ionic Bond: Nature of Ionic bond. Structure of NaCl, KCl and CsCl. Factors influencing the formation of ionic bond. b) Covalent Bond: Nature of covalent bond. Structure of CH_4, NH_3, H_2O based on hybridization. c) Coordinate Bond: Nature of coordinate bond. Coordination complexes. Werner's theory. Geometrical and optical isomerism in square planar and octahedral complexes. Mention of structure and functions of chlorophyll and hemoglobin d) Hydrogen Bond: Theory and importance of hydrogen bonding. Types of hydrogen bonding. Hydrogen bonding in carboxylic acids, alcohol, amides, polyamides, DNA and RNA. e) Vander Waal's forces: Dipole – dipole and dipole - induced dipole interactions.					
Unit III	**Volumetric analysis :**					
a) Methods of expressing concentration: normality, molality, ppm. b) Primary and secondary standards: preparation of standard solutions c) Principle of volumetric analysis: end point and equivalence points. d) Strong and weak acids and bases - Ionic product of water, pH, pKa, pKb. Buffer solutions - pH of buffer solutions. Mention of Henderson equation & its significance.						
Unit IV	**Chemical Kinetics:**					
a) Chemical Kinetics: Rate, rate law, order and molecularity. Derivation of rate expressions for I and II order reactions. b) Catalysis-Homogeneous and heterogeneous catalysis. Enzyme catalysis, enzymes in biological system and in industry.						
Unit V	**Chemistry of Biomolecules:**					
a) Fats – Occurrence and composition. Hydrolysis of fats. b) Vitamins – Source, provitamin, properties and classification. Structure and function of vitamin A, C, D, K and E c)Hormones – Thyroxin, adrenaline and sex hormones (structure and functions only)						

Text Books	1. R. Gopalan, S. Sundaram, Allied Chemistry, Sultan Chand and Sons, 1995.
Reference	1. U. Sathyanarayana, Biochemistry, Books and allied (p) Ltd, 1999. 2. B.R.Puri and L.R.Sharma, Principles of physical chemistry, Shoban Lal Nagin Chand and Co. 33rd ed., 1992.
Course Outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	gain the knowledge on the handling of chemicals and errors in chemical analysis,	K1, K2
CO2	understand about the chemical bonding and hybridization	K1, K2
CO3	learn the calculations of preparing standard solutions	K1, K2
CO4	discuss and appreciate the advanced concepts and rate equations in chemical kinetics.	K1, K2, K3
CO5	know the importance of Biomolecules in chemistry	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S		S	S	M	S	S1

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCE311	HUMAN PHYSIOLOGY	L	T	P	C
Elective	I		4	-	-	3
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To learn fundamentals of anatomical structures and physiology of body organs. • To know about the structure and functions of the blood & blood vessels • To understand how the nervous system controls the body parts. • To understand the structure and functions liver and pancreas, respiratory organs, urinary System, endocrine System					
Unit I	**General Anatomy**					
Digestion in the mouth, stomach and intestines. Movements of the intestine; Role of Liver and Pancreas – Structure and Functions.						
Unit II	**Respiratory System**					
Structure of Respiratory organs; Sub – divisions of lung air; Chemistry of Respiration. Physiology of the Urinary System- Structure of kidney and nephron; Formation of urine, Skin – Structure and functions, Regulations of body temperature						
Unit III	**Endocrine System**					
Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of langerhans of pancreas. Reproductive System – anatomy of the male and female reproductive organs; menstrual cycle; mammary glands; Fertilization; Development of Embryo; Pregnancy and parturition						
Unit IV	**Nervous System**					
General classification of nervous system: Structure of nerve cell and Spinal cord; Basic Knowledge of different parts of the brain – anatomy and functions of cerebrum, cerebellum and medulla oblongata. Structure and function of eye and ear; taste, smell and cutaneous sensations.						
Unit V	**Blood**					
Composition and Functions of blood; White Blood Cells – Types and function; Red Blood Cells – Structure and functions; Haemoglobin –Structure and functions, Blood coagulation, Blood group – ABO, Rh. Structure of heart and blood vessels; Properties of cardiac muscle; cardiac cycle; origin and conduction of heart beat; measurement of arterial blood pressure.						
Text Books	1.Chatterjee C.C .Human Physiology Volume II.CBS publishers, 2020.					
References	1. Sembulingam, K. Essentials of Medical Physiology. 8th ed. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi; 2019. 2. Best and Taylor. The Physiological Basis for Medical Practice, Wolters Kluwer India Pvt Ltd; 2011.					
E-References Link	1. https://www.researchgate.net/publication/311934098_introduction_to_human_physiology 2. https://www.wiley.com/enn/Lecture+Notes:+Human+Physiology,+5th+Edition-p-9781405136518					

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	understand the function of digestive system and the role of liver and pancreas.	K1, K2
	CO2	learn about respiratory organs and its regulation.	K1, K2, K3
	CO3	acquire knowledge on the importance of endocrine system.	K1, K2, K3
	CO4	explain structure and function of nervous system.	K1, K2, K3
	CO5	learn the composition and functions of blood.	K1, K2, K3

Mapping of CO with PO & PSO:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	M	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCE312	BIOMOLECULES AND DISEASES	L	T	P	C
Elective	II		4	-	-	3
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the lifestyle disease due to imbalance of metabolism • To know the fundamental principles and disease causing by hormonal imbalance and nutritional deficiency					
Unit I	**Inborn errors of metabolism**					
Alkaptonuria, Phenylketonuria, Glycogen and Lipid storage diseases, SCID, Clotting disorders						
Unit II	**Nutritional deficiency:**					
Nutritional deficiency based diseases Kwashiorkor, Marasmus, Beri-beri, Scurvy, Pellagra, Anaemia, Night blindeness, Rickets, Osteomalacia, Osteoporosis, Wilson's disease.						
Unit III	**Lifestyles disease:**					
Obesity, Cardiovascular diseases, Atherosclerosis, Diabetes mellitus-II. Inflammatory Bowel Disease (IBD).						
Unit IV	**Hormonal Imbalances:**					
Outline of hormone action and imbalances leading to disease - precocious puberty, hyper and hypopituitarism. Hyper and hypothyroidism.						
Unit V	**Diseases caused due to misfolded proteins:**					
Alzheimer's, Huntington's disease, Kuru, Creutzfeldt-Jakob disease, Sickle cell anaemia, Thalessemia.						
Text Books	1. K. Ramadevi, Ambika Shanmugam, Fundamentals of Biochemistry for Medical students 8th Edition, Wolters kluwer India Pvt Ltd, 2016. 2. U. Satyanarayana & U. Charapani. Essentials of Biochemistry, Books & Allied Pvt Ltd. 2019.					
References	1. Nanda Maheswari, Clinical Biochemistry Jaypee Brothers Medical Publishers, 2016. 2. John. E. Hall, Guyton & Hall Text book of Medical Physiology, Elsevier, Health, 2017. 3. Rajinder Chawla, Tarek. H. E, Metwally Sucherda sahu, Text book of Medical Biochemistry Wolters Kluwer India, Pvt, Ltd, 2nd Edition, 2017. 4. Allan Gaw, Clinical chemistry, Churchill Living Stone, 2018. 5. Michael Murphy, Rajeer Srivastava, Kevin Deans, Clinical Biochemistry, Elsevier, 2018.					
E-References Link	1. https://pubmed.ncbi.nlm.nih.gov/11843698/ 2. https://www.nature.com/articles/gim200166					

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	understand the inborn errors of metabolism.	K1, K2
	CO2	acquire information on nutritionally deficiency disease and its importance.	K1, K2, K3
	CO3	learn the importance of diet in lifestyle disease.	K1, K2, K3
	CO4	understand the disorders related to hormonal imbalance.	K1, K2, K3
	CO5	acquire knowledge on genetics disease and its inheritance.	K1, K2, K3

Mapping of CO with PO & PSO

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	M	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	M	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCN311	FIRST AID AND EMERGENCY CARE	L	T	P	C
NME			2	-	-	2
Cognitive Level	K1:Recall K2:Understand K3:Apply					
Learning Objective	• To understand the basic fundamentals of First aid • To learn about the types of first aids on different emergency situations. • To understand the major role of first aid in life processes. • To understand the techniques of first id and its significance					
Unit I	**First Aid:** Important Rules of First Aid, First Aid Box. Injuries (Head, Spinal, Eye, Ear), Sprains and Strains. Cuts and Abrasions, Bleeding, Fractures, Dislocations of bones, Burns, Amputations, Nose bleeds, Electric Shock, Radiation burns.					
Unit II	**Poisoning, bites & stings :** Types of poisons, Swallowed poisons, Drug poisoning, Alcohol poisoning, Animal and human bites, Insect sting, Tick bite Other bites and stings, Snake bite, Stings from sea creatures, Marine puncture wound.					
Unit III	**Techniques and Equipment:** Removing clothing, Removing headgear, Casualty handling, First aid materials, Dressings, Cold compresses, Principles of bandaging, Roller bandages, Tubular gauze bandages, square knots, hand and foot cover, Arm sling, Elevation sling, improvised slings.					
Unit IV	**Common medical emergencies**: First aid during Chest pain, Stroke, Seizures, Breathing difficulties, Epilepsy. First aid during Diabetic emergencies, Choking, Fainting, and Heart attack, Low Blood Pressure.					
Unit V	**Emergency First Aid :** Action in an emergency, CPR for an adult, chest compression only CPR, CPR for an infant, child, Community emergencies such as fire explosions, earth quakes, flood and famine					
Text Books	1. Sura Arya , First Aid and Emergency Management, Atlas Publishers, 2016. 2. Lc Gupta and Abhitabh Gupta,Manual of First Aid, Jaypee Publications, 2012					
References	1. Paarvesh Saini , First Aid and Emergency Management , Lotus Publishers,second Edition, 2015. 2. Paolo, Jose de Luna , Basic First Aid Management, Createspare Independent Publication, 2015. 3. St. Andrew's , First Aid Manual, 10 th edition, DK Publishers, 2016 4. S N Chugh, Ashima Chugh , Emergency Medicine for Students and Practioners, , CBS Publisher, 2019 5. KPP. Abhilash , Emergency Medicine, Jaypee Publishers, 2018					
E-Reference Link	1. https://www.actualfirstaid.com/uploads/1/0/4/9/104966051/first_aid_notes_2019.pdf 2. https://nhcps.com/lesson/cpr-first-aid-first-aid-basics/ 3. https://www.medicalnewstoday.com/articles/153849					

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	understand the important rules of First aid	K1, K2
	CO2	learn the types of poisoning and stings	K1, K2, K3
	CO3	know the techniques and equipments used for first aid process	K1, K2, K3
	CO4	understand the types of common medical emergencies	K1, K2
	CO5	know the Emergency First aid procedure	K1, K2

Mapping of CO with PO & PSO:

CO	**PO**					**PSO**				
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	M	S	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks ; Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark; No Correlation (N) - 0 mark

SEMESTER IV

<table>
<tr><td>Course Code</td><td>U21BCT41</td><td colspan="2" rowspan="2">INTERMEDIARY METABOLISM</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>Core</td><td>VI</td><td>4</td><td>-</td><td>-</td><td>4</td></tr>
<tr><td>Cognitive Level</td><td colspan="7">K1: Recall K2: Understand K3: Apply</td></tr>
<tr><td>Learning Objective</td><td colspan="7">• To learn the metabolic pathways involved in the physiological processes
• To understand the concept of bioenergetics, carbohydrate and amino acid metabolism
• To acquire knowledge on lipid and nucleotide metabolism</td></tr>
<tr><td>Unit I</td><td colspan="7">Metabolism:</td></tr>
<tr><td colspan="8">Definition, importance, Division of metabolism. Bioenergetics: high energy and low energy phosphates, Electron Transport Chain, Oxidative phosphorylation</td></tr>
<tr><td>Unit II</td><td colspan="7">Carbohydrate metabolism:</td></tr>
<tr><td colspan="8">Glycolysis, TCA cycle, HMP Shunt, glycogenolysis, glycogenesis, gluconeogenesis</td></tr>
<tr><td>Unit III</td><td colspan="7">Amino acid metabolism:</td></tr>
<tr><td colspan="8">A brief account of amino acid metabolism of glycine,cysteine, proline, homoserine, phenylalanine, (other amino acids excludes), urea cycle, a brief account on protein biosynthesis.</td></tr>
<tr><td>Unit IV</td><td colspan="7">Lipid metabolism:</td></tr>
<tr><td colspan="8">Oxidation of fatty acids, energetics of oxidation, ketone body metabolism, glycerol metabolism. Biosynthesis of fatty acids, biosynthesis of triglycerides, phospholipids, cholesterol metabolism</td></tr>
<tr><td>Unit V</td><td colspan="7">Nucleotide metabolism:</td></tr>
<tr><td colspan="8">Purine and pyrimidine bases, De novo synthesis and Salvage pathway, catabolism of nucleic acids.</td></tr>
<tr><td>Text Books</td><td colspan="7">1. Biochemistry, Victor Rodwell , David Bender , Kathleen Botham , Peter Kennelly,2018</td></tr>
<tr><td>Reference</td><td colspan="7">1. Nelson, D. L. & Cox, M. M. Lehninger, Principles of Biochemistry. Freeman, 2013
2. Mathews, C. K. & Van Holde, K. E. & Ahern, K. G. Biochemistry. Addison Wesley, 2012.
3. Hames, B. D. et al. Instant Notes in Biochemistry. Bios, 4th edition, 2011.
4. J.M. Berg, J.L. Tymoczko and L. Stryer, Biochemistry, W.H. Freeman, 2015.
5. D. Voet and J.G. Voet, Biochemistry, Wiley, 2011.</td></tr>
<tr><td>E-References Link</td><td colspan="7">1. https://www.ncbi.nlm.nih.gov/books/NBK116085/
2. https://link.springer.com/chapter/10.1007/978-1-4613-8081-8_22
3. http://allduniv.ac.in/old/images/course/syllabus/biochem/msc2.pdf</td></tr>
<tr><td>Course outcomes</td><td colspan="7">Upon completion of this course, the students will be able to</td></tr>
<tr><td></td><td colspan="7"><table>
<tr><th>CO</th><th>Course Outcomes</th><th>Knowledge Level</th></tr>
<tr><td>CO1</td><td>define the concepts of metabolism and energetics</td><td>K1, K2</td></tr>
<tr><td>CO2</td><td>gain knowledge on various cycles of carbohydrate metabolism and their energetics</td><td>K1, K2, K3</td></tr>
<tr><td>CO3</td><td>recognize the amino acid metabolism cycles and their energetic</td><td>K1, K2, K3</td></tr>
</table></td></tr>
</table>

	CO4	know and understand Lipid metabolism cycles and their energetics.	K1, K2, K3
	CO5	illustrate the key concepts in metabolism of Nucleic acids	K1, K2, K3

Mapping of CO with POs & PSOs

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	M	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	M	S	S	M	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

<table>
<tr><td>Course Code</td><td>U21BCP42</td><td rowspan="2">BIOCHEMICAL TECHNIQUES</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>Core</td><td>VII</td><td>-</td><td>-</td><td>4</td><td>4</td></tr>
<tr><td>Cognitive Level</td><td colspan="6">K1: Recall K2: Understand K3: Apply</td></tr>
<tr><td>Learning Objective</td><td colspan="6">• To know the fundamental aspects in biological techniques
• To develop the skills in identifying the various biomolecules
• To develop the skills of quantifying the various biomolecules</td></tr>
<tr><td>Experiments in Biochemistry</td><td colspan="6">❖ Estimation of total sugar concentration by Anthrone method
❖ Estimation of reducing sugar concentration by DNSA Method.
❖ Estimation of protein concentration by
○ Biuret method b) Lowry method.
❖ Determination of total amino acid concentration by Ninhydrin methods
❖ Estimation of DNA and RNA
❖ Estimation of DNA by diphenyl amine methods.
❖ Estimation of RNA by orcinol method.
❖ Estimation of Iodine Number
❖ Determination of Acid Number
❖ Determination of Saponification Number</td></tr>
<tr><td>Text Books</td><td colspan="6">1. J. Jayaraman, Practical bio-chemistry, Jaypee Brothers medical, 2013.
2. Pattabiraman, Laboratory manual in bio-chemistry, Pineapple research station, 2015.</td></tr>
<tr><td>References</td><td colspan="6">1. Keith Wilson and John Walker, Principle and Techniques of Biochemistry and Molecular Biology, Cambridge University Press, 2011.
2. Shivaraja Shankara. Y.M, Laboratory Manual for Practical Biochemistry, Jaypee Brothers Medical Publishers, 2nd Edition, 2013.
3. S. Rajan, R. Selvi christy, Experimental Procedures in Lifesciences, CBS, 2019.
4. Soundravally Rajendiran, Pooja Dhiman, Biochemistry Practical Manual, Elsevier, 2019.</td></tr>
<tr><td>E-References Link</td><td colspan="6">1. https://www.britannica.com/science/biochemistry/Methods-in-biochemistry
2. https://link.springer.com/book/10.1007/978-1-4939-9861-6
3. https://www4.unifr.ch/biochem/assets/files/dreyer/cours/BC_0009-ModMethods-JLD-part_2.pdf</td></tr>
<tr><td>Course outcomes</td><td colspan="6">Upon completion of this course, the students will be able to</td></tr>
<tr><td></td><td colspan="5"><table>
<tr><th>CO</th><th>Course Outcomes</th><th>Knowledge Level</th></tr>
<tr><td>CO1</td><td>explain the procedure for estimating carbohydrates</td><td>K1, K2</td></tr>
<tr><td>CO2</td><td>learn the estimation of protein and amino acid</td><td>K1, K2, K3</td></tr>
<tr><td>CO3</td><td>illustrate the protocol for the identification of nucleic acids</td><td>K1, K2, K3</td></tr>
<tr><td>CO4</td><td>perform the estimation of Iodine number</td><td>K1, K2, K3</td></tr>
<tr><td>CO5</td><td>determine acid number and saponification number</td><td>K1, K2, K3</td></tr>
</table></td></tr>
</table>

Mapping of CO with PO & PSO

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	M	M	S	S	M	M	S	S
CO2	S	S	S	M	M	S	M	M	S	M	M	S	S
CO3	M	M	S	M	S	S	M	S	S	S	S	S	M
CO4	M	M	S	S	S	S	S	S	M	S	S	M	M
CO5	S	S	S	S	S	S	S	S	M	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

<table>
<tr><td>Course Code</td><td>U21CHA44</td><td rowspan="2">PRACTICAL-CHEMISTRY</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>Allied</td><td>IV</td><td>-</td><td>-</td><td>4</td><td>4</td></tr>
<tr><td>Cognitive Level</td><td colspan="6">K1: Recall K2: Understand K3: Apply</td></tr>
<tr><td>Learning Objective</td><td colspan="6">• To understand basics and gain knowledge on laboratory reagents and their uses in volumetric analysis.
• To enable the students to acquire knowledge in Organic Estimation
• To understand basics and gain knowledge in organic analysis
• At the end of the course, the students should be able to plan experimental projects and execute them.</td></tr>
<tr><td>Experiments in Chemistry</td><td colspan="6">Acidimetry and alkalimetry:
Titration acids used: hydrochloric acid, sulphuric Standard solutions prepared: sodium carbonate, sodium bicarbonate, oxalic acid.

Oxidation and reduction titration:
Oxidising agents: Potassium permanganate (permanganimetry) Reducing agents: Ferrous sulphate, ferrous ammonium Sulphate, oxalic acid

Standard solutions prepared:
Ferrous Sulphate, ferrous ammonium Sulphate and oxalic acid.

Iodometry titrations:
Titrations of liberated iodine against sodium thiosulphate using acidified potassium permanganate, potassium dichromate and copper Sulphate solutions.

Standard solutions: potassium dichromate, copper sulphate.</td></tr>
<tr><td>Text Books</td><td colspan="6">1.Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 1996.
2. B.S. Furniss, A.J. Hannaford, P.W. G. Smith, A.R. Tatchell, Vogel’s Text Book of Practical Organic Chemistry. 5th Edn., Pearson Education, 2005.</td></tr>
<tr><td>References</td><td colspan="6">1. N.S. Gnanapragasam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.
2. Practical Chemistry by A.O. Thomas, Scientific Book Centre, Cannanore, 2003.
3. Basic Principles of Practical Chemistry, V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu, Sultan Chand & Sons, New Delhi, 2nd Edn., 2004.</td></tr>
<tr><td>Course outcomes</td><td colspan="6">Upon completion of this course, the students will be able to</td></tr>
<tr><td></td><td colspan="5"><table>
<tr><th>CO</th><th>Course Outcomes</th><th>Knowledge Level</th></tr>
<tr><td>CO1</td><td>understand the basic concepts in titration</td><td>K1, K2</td></tr>
<tr><td>CO2</td><td>understand the acidimetry and alkalimetry titrations</td><td>K1, K2, K3</td></tr>
<tr><td>CO3</td><td>explain the preparation of standard solutions</td><td>K1, K2, K3</td></tr>
</table></td></tr>
</table>

	CO4	learn the calculations of molarity, molality and normality of the solutions	K1, K2, K3
	CO5	discuss the concept of Iodometry titrations	K1, K2, K3

Mapping of CO with PO & PSO

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCE421	NANOMATERIALS	L	T	P	C
Elective	II		3	-	-	3
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To gain knowledge on nanobiotechnology • To understand the basics of nanomaterials • To acquire knowledge about the structure and bonding in nanomaterials • To learn the different methods to synthesize nanomaterials					
Unit I	**Nanotechnology**					
Introduction to nanotechnology, scope and definitions of bionanotechnology, Historical development of nanomaterials, Classification of nanomaterials. Fundamentals of nanomaterials: Size & Scale Units Scaling Atoms, Molecules, Clusters and Supramolecules						
Unit II	**Structure and Bonding in Nanomaterials**					
Chemical Bonds (types and strength), Intermolecular Forces, Molecular and Crystalline Structures, Hierarchical Structures, Bulk to Surface transition, surface reconstruction. Properties and Size dependence of properties: Chemical Optical, vibrational, thermal, Electrical, Magnetic, Mechanical.						
Unit III	**Nanomaterial Synthesis**					
Chemical routes Electrochemical methods Vapor growth Thin films methods: chemical vapor deposition, physical vapor deposition (sputtering, laser ablation), Langmuir-Blodgett growth Mechanical methods: ball milling, mechanical attrition Sol-gel methods Special nanomaterials: carbon nanotubes, fullerenes, nanowires, porous silicon Bio-inspired synthesis Nanocomposite fabrication Nanolithography						
Unit IV	**Nanomaterial characterization techniques**					
Scanning and Transmission Electron Microscopy Scanning Probe Microscopies: Atomic Force, scanning tunneling microscopy Diffraction and scattering techniques Vibrational spectroscopy Surface techniques						
Unit V	**Applications of Nanotechnology:**					
Nano-electronics Nano optics Nanoscale chemical- and bio-sensing Biological/bio-medical applications Photovoltaic, fuel cells, batteries and energy-related applications High strength nanocomposites Nanoenergetic materials						
Text Books	1. Sunipa Roy, Chandan Kumar Ghosh, Chandan Kumar Sarkar, Nanotechnology: Synthesis to Applications, Publisher CRC Press,2018 2. Ann-Marie Broome, Cancer Nanotechnology, Academic Press. 2018					
References	1. Sanyog Jain Kaisar Raza Ashish Kumar Agrawal Ankur Vaidya 1st Ed, Nanotechnology Applications for Cancer Chemotherapy, Elsevier. 2020 2. Sulabha K. Kulkarni, Nanotechnology: Principles and Practices, Publisher Springer Nature,2014					

E-Reference Link	1. http://home.iitk.ac.in/~anandh/MSE694/Introduction_to_Nanomaterials-3.pdf 2. https://onlinelibrary.wiley.com/doi/pdf/10.1002/9783527673919.oth1 3. https://application.wiley-vch.de/books/sample/3527340998_c01.pdf 4. https://arxiv.org/ftp/arxiv/papers/0801/0801.3280.pdf 5. https://www.centropiaggio.unipi.it/sites/default/files/course/material/nanomaterials.pdf
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	learn the fundamentals and classifications of nanomaterials	K1
CO2	understand the structure and bonding in nanomaterials	K2
CO3	gain knowledge on the synthesis of nanomaterials from different sources	K1,K2
CO4	learn the techniques to characterize nanomaterials	K3
CO5	acquire knowledge on the applications of nanomaterials	K2

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	M	M	M	M	M	S	S	S	M	M	M
CO2	S	S	M	M	M	M	M	S	S	S	M	M	S
CO3	S	S	M	S	M	S	S	S	S	S	S	S	M
CO4	S	S	M	M	S	M	M	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCE422	PLANT THERAPEUTICS	L	T	P	C
Elective	II		3	-	-	3

Cognitive Level	K1: Recall K2: Understand K3: Apply
Learning Objective	• To learn about the bioactive compounds in plants and their therapeutic properties • To gain knowledge on plant metabolites and their importance • To acquire knowledge on different medicinal plants and their composition • To understand the scope of plant therapeutics in medical industry • To gain knowledge on development of plant therapeutic products
Unit I	**Plant therapeutics**
Introduction to plant therapeutics, Bioactive principles in herbs, plants with hepatoprotective , nephroprotective, hypoglycemic, anticancer, antibacterial, antiviral and antimalarial ,anti-inflammatory properties.	
Unit II	**Free radicals:**
Types, sources, importance, production, free radicals induced damages, lipidperoxidation, measurement of free radicals, disease caused by radicals, reactive oxygen species, antioxidant defence system, enzymic and nom-enzymic antioxidants, role of antioxidants in prevention of diseases, phytochemicals as antioxidants.	
Unit III	**Metabolites**:
Alkaloids, flavanoids, terpenoids, phenols-Occurrence, distribution & functions, Production of secondary metabolite in plants, stages of secondary metabolite production, uses of tissue culture techniques, elicitation, biotransformation- production of pharmaceutical compounds.	
Unit IV	**Herbal extracts and their standardization:**
Physical, chemical, spectral and toxicologicals standardization, qualitative and quantitative estimations exemplified by the methods of preparation of at least two standardized extracts. Stability studies for extracts. Predictable chemical and galenical changes	
Unit V	**Development of plant therapeutics:**
Preparation of liquid orals, tablets, capsules , ointments ,creams and cosmetics. Methods involved in monoherbal and polyherbal formulation with their merits and demerits. Excipeints used in herbal formulation. Compatibility studies. Stability studies. Bioavability & Pharmacokinetic aspects for herbal drugs with examples of well-known documented, clinically used herbal drugs.	
Text Books	1. Khan,I.A and Khanum.A 2004. Role of Biotechnology in medicinal & aromatic plants,Vol 1and Vol 10, Ukkaz Publications ,Hyderabad. 2. Singh.M.P and Panda .H 2005.Medicinal Herbs with their formulations, Daya Publishing House,Delhi

References	1. Swamy M.K, Patra J.K, Rudramurthy G.R. 2019, Medicinal PlantsChemistry, Pharmacology, and Therapeutic Applications, 1 st edition, CRC Press 2. Marta C.T. D, Rai. M. 2016, Therapeutic medicinal plants, 1 tt edition, CRC Press 3. Alamgir, A.N.M. 2017. Therapeutic Use of Medicinal Plants and Their Extracts: Volume 1, Springer International Publishing
E-Reference Link	1. http://informahealthcare.com/doi/pdf/10.1517/13543776.13.4.489 2. https://www.longdom.org/open-access/free-radicals-and-oxidative-stress-jbb.10000e13.pdf 3. https://www.weizmann.ac.il/plants/aharoni/sites/plants.aharoni/files/uploads/may022007.pdf 4. https://media.neliti.com/media/publications/278981-standardization-and-evaluation-of-herbal-ce0e9f33.pdf 5. https://sustainabledevelopment.un.org/content/documents/6544118_Pesic_Development%20of%20natural%20product%20drugs%20in%20a%20%20sustainable%20manner.pdf
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	attain knowledge on the therapeutics properties of bioactive compounds in plants	K1
CO2	understand the mechanism behind free radical scavenging and the antioxidant properties of plants	K1,K2
CO3	gain knowledge on plant secondary metabolites and their functions	K2
CO4	learn how to standardize and stabilize herbal preparations	K3
CO5	acquire knowledge on development of plant therapeutics for commercial use	K2

Mapping of CO with PO & PSO

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	M	M	S	M	S	S	S	S	M	S
CO2	S	M	S	S	S	M	M	S	S	S	M	M	S
CO3	S	M	M	S	M	S	S	M	S	M	S	S	M
CO4	S	M	S	S	M	M	S	S	M	S	M	M	S
CO5	S	S	S	M	M	S	S	S	M	M	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCN421	PHYTOCHEMISTRY	L	T	P	C
NME	II		2	-	-	2
Cognitive Level	K1:Recall	K2:Understand	K3:Apply			
Learning Objective	• To learn about the phyto chemicals in plants • To learn the biological and toxicological properties of plant. • To know about the separation techniques and structure elucidation • To provide knowledge on secondary metabolities					
Unit I	**Herbal drugs**					
Phyto chemicals and their Classification–Qualitative and Quantitative Screening of Phyto compounds. (Carbohydrate, Tannin, Saponin, Alkaloids, Flavonoids, Glycosides, Quinones, Phenols, Terpenoids, Anthocyanin)						
Unit II	**Phytocompounds**					
Plant extract used to Bacterial, Fungal and Parasitic infection - Biological and Toxicology Properties of plant extract –Anti-MRSA (Methicillin -resistant *Staphylococcus aureus*) and Anti- VRE (vancomycin- resistant entero cocci) activities of Phyto alexins and Phytoncides–Anti microbial and targeted screening of Plantextract–Plant derived compound against drug resistant microorganisms– Anti oxidant and antitumor Plant metabolites (fruits and vegetables) – Bioactive compounds as Food.						
Unit III	**Medicinal Plants and its Use**					
Medicinal Plants and Their Use in Primary Health Care– immune stimulants and adaptation from Plants– Poly phenols for Atherosclerosis and Ischemic Heart disease– Cancer Chemo preventive agents –Lipid oxidation nitrogen Radicals– Phyto chemicals in oil seeds– Flavonoids in Cardio vascular disease– Bio engineering and Breeding approaches in improving phyto chemical content of plants.						
Unit IV	**Separation techniques and structure elucidation**					
Thin layer chromatography–HPLC – Column chromatography – GC – MS – LC – MS – Partition chromatography – Gaschromatography – FTIR – UV – NMR – X-ray diffraction QSAR (Quantitative structure–activity relationship).						
Unit V	**Secondary metabolites and their Production**					
Hairy root induction– Methods of gene transfer – Chemical methods– PEG– dextran – Physical method -Electroporation– Microinjection – Lipofection delivery for herbal therapeutics – Quality Control– Germplasm improvement						
Text books	1. Neeru Mathur, Medicinal Plants of India, RBSA Publisher, 2010. 2. M.C.Joshi, Handbook of Indian Medicinal Plants, Scientific publishers ,2019.					

References	1.Joshi SG, Medicinal Plants, Oxford and IBH publishing, 2018. 2.L.D Kapoor, Handbook of Ayurvedic Medicinal Plants, CRC Press ,2011.
E-references	1.http://6e.plantphys.net/PlantPhys6e-appendix04.pdf 2.https://www.intechopen.com/books/secondary-metabolites-sources-and-applications/an-introductory-chapter-secondary-metabolites 3.https://edu.rsc.org/resources/chromatography-techniques/4010255.article 4.https://www.weizmann.ac.il/plants/aharoni/sites/plants.aharoni/files/uploads/may022007.p
Course outcomes	Up on completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	learn about the classification and phytochemical analysis of herbs	K1, K2, K3
CO2	explain about phytocompounds and their uses in microbial infection	K1, K2,
CO3	describe role of phyto medicine in various diseases	K1, K2,
CO4	learn about the separation techniques and structure elucidation of phyto compounds	K1, K2, K3
CO5	know about the production of Secondary metabolites	K1, K2, K3

Mapping of CO with PO & PSO

CO	**Pos**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	M	S	S	M	S	M	S	S	M
CO4	S	M	S	S	S	M	S	S	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER V

Course Code	U21BCT51	GENERAL MICROBIOLOGY	L	T	P	C
Core	VIII		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the basics of microbiology, classification and general characteristics of microbes. • To gain knowledge on structural organization and morphological features of microorganisms. • To know the growth, reproduction and metabolism of bacteria.					
Unit I	**Introduction to Microbiology**					
History of microbiology, Microscopes (light &electron), natural distribution of microorganism, general classification of microorganisms (Bacteria, Yeast, Fungi) and their characteristics						
Unit II	**Organization and structure of Microorganisms**					
Prokaryotic organization, cytoplasm membranes and their function, mesosomes, cell wall – gram positive and gram negative reactions, capsule and slime layers, flagella and cilia, bacterial chromosome, plasmids, ribosomes, reserved food and endospore.						
Unit III	**Bacterial nutrition**					
Growth and reproduction, autotrophic and heterotrophic nutrition, bacterial photosynthesis, chemolithotropy, bacterial metabolism, fermentation, homo fermentative and hetero conjugation, transformation, transduction, speculation, kinetics of bacterial growth, normal growth curve						
Unit IV	**Food Microbiology**					
Food spoilage, food poisoning, food borne infections and disease causing microorganisms, Medical Microbiology: Pathogenesis and prevention of air and water borne diseases – Typhoid, Cholera, Dysentry, Diarrhea, hepatitis, amoebiosis, tuberculosis, pox diseases, diphtheria and poliomyelitis.						
Unit V	**Industrial Microbiology**					
Use of microbes in industries, ethanol production, organic acid (penicillin and streptomycin) production. Microorganisms and milk: Sources of microorganisms, fermentation of milk and characteristic, Transmission of disease through milk, determining the wholesomeness of mild, frozen dairy products						
Text Books	1. C. P. Baveja, Textbook of Microbiology 6 th Edition, Arya Publications, 2021. 2. N. Arumugam, A. Mani, A. M. Selvaraj, L. M. Narayanan, Microbiology, Saras Publication, 2014. 3. R. C. Dubey, D. K. Maheshwari, A Text book of Microbiology, S. Chand, 2013.					
References	1. Ananthanarayan and Paniker's, Microbiology, University press, 2020. 2. Harsh Mohan, f Pathology with Pathology Quick Review and MCQs-					

English, jaypee brothers, medical publishers 2018 .
3. Subhash Chandra Parija, Microbiology and Immunology,Elsiever India Publication, 2016 .
4. Jeffrey C, Pommerville, Fundamentals of Microbiology Jones and Bartlett publisher, 2017.
5. D.K.Sharma, Microbiology, Alpha science International limited,2013.

E-References Link

1. https://open.oregonstate.education/generalmicrobiology/
2. https://fac.ksu.edu.sa/sites/default/files/140_mbio-final_notes.pdf
3. https://www.classcentral.com/course/swayam-general-microbiology-14088

Course outcomes

Upon completion of this course, the students will be able to

CO	Course Outcomes	Knowledge Level
CO1	explain basics of microorganisms and microscope and its types	K1, K2
CO2	gain knowledge on various cell organelles of micro-organisms and its structure	K1, K2, K3
CO3	describe the nutrition, photosynthesis, metabolism of bacteria	K1, K2, K3
CO4	illustrate the factors involved in spoilage, poisoning of food and food borne diseases	K1, K2, K3
CO5	know the methods of fermentation and applications of microbes in industry	K1, K2, K3

Mapping of CO with PO & PSO

CO	PO								PSO				
	1	2	3	4	5	6	7	8	1	2	3	4	5
CO1	S	M	S	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	M	S	S	M
CO4	M	S	S	S	S	M	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCT52	IMMUNOLOGY	L	T	P	C
Core	VIII		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To learn the basics of immunology and function of immune system against infections. • To know the properties and functions of antigens and antibody types. • To acquire knowledge about hypersensitivity caused by immunological action and autoimmune disorders.					
Unit I	**Development of immunology**					
Immunity – types –Organs of immune system – Hematopoiesis – Cells of immune system – blood grouping ABO and Rh systems – Blood transfusion.						
Unit II	**Antigens**					
Properties and types – Haptens and adjuvants. Antibodies: structure, classes and biological functions- Generation of antibody diversity, Immunogenicity, Hybridoma and monoclonal						
Unit III	**Antigen antibody reaction**					
Host response – humoral and cell mediated immunity – complement pathways of complement activation, MHC.						
Unit IV	**Hypersensitivity**					
Types (Immediate &Delayed), immune tolerance – transplantation immunity – auto immune diseases. Immunological techniques (RIA, Immunodiffusion (Single and Double)Immunoblotting- ELISA						
Unit V	**Immunodeficiency:**					
Immunology of infectious diseases –microbial infection bacterial, protozoan, viral infection – toxoid. Vaccines – types and vaccine development.						
Text Books	1. Jenny Punt, Sharon stranford, Patrica jones, Judith A Owen, Immunology, WH Freeman publisher , 2010. 2. Abul Abbas and Andrew H Lichtman and Shiv Pillai, Basic immunology Elsevier Publication, 2019.					
References	1. Dr. S. K. Gupta, Essentials of Immunology ,Publisher APC Books,2011. 2. Peter J Delves, Roitts Essential Immunology , John Wiley publishers,2017. 3. C. V. Rao, Immunology, Good reads,2020.					
E-References Link	1. http://www.sacema.org/uploads/Introduction-to-Medical-Immunology.pdf 2. http://dl.mehrsys.ir/pdfbooks/Roitt_s%20Essential%20Immunology%20Thirteenth%20Edition(www.myuptodate.com).pdf					

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	understand the history and development of immunology and contributions of various scientist	K1, K2
	CO2	define antigens and antibodies	K1, K2, K3
	CO3	illustrate antigen-antibody reaction	K1, K2, K3
	CO4	define hypersensitivity and explain its types.	K1, K2, K3
	CO5	explain the concepts of immunodeficiency	K1, K2, K3

Mapping of CO with POs & PSOs

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	M	S	S	M	S	S	M	S	M	S
CO2	S	M	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	S	S	S	S	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCT53	PHARMACOLOGY	L	T	P	C
Core	VIII		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the drug receptors, principles and phases of drug metabolism and pharmacological activity. • To learn the principles and methods of chemotherapy for cancer and mode of anticancer drugs. • To acquire knowledge about the adverse effect of drugs and metabolism of Xenobiotics.					
Unit I	**Drugs**					
Definition, classification of drugs, routes of drug administration, absorption of drugs, factors influencing absorption of drugs. Drug distribution: role of kidney in drug interaction with biomolecules, binding of drugs to plasma proteins.						
Unit II	**Drug receptors**					
Drug receptor interaction G-protein coupled receptors, Transmembrane Receptors, Intracellular receptors.						
Unit III	**Drug metabolism**					
Effects of drug metabolism, principles of phase I& II reactions, microsomal metabolism of drugs, role of cytochrome p450, enzyme induction and pharmacological activity.						
Unit IV	**Chemotherapy**					
Principles of cancer chemotherapy, target sites for cancer chemotherapeutic agents. Mode of action of anticancer drugs: antibiotics, antimetabolites, alkylating agents, hormones and other agents. Mode of action of sulphonamides, antiviral substances, antimalarials and cancer chemotherapy.						
Unit V	**Drug tolerance**					
Unusual, adverse response to drugs, drug tolerance and intolerance, drug induced diseases, commonly abused drugs and their biological effects. Metabolism of xenobiotics and their biomedical importance						
Textbooks	1. Arthur.J, Principles of clinical pharmacology, Academic press,2011. 2. Satoskar R.S , Pharmacology and Pharmaco Therapeutics, Popular Prakashan Bombay, 2015.					
References	1. Shargel.L, Applied Biopharmaceutics and pharmacokinetics Mc Gram- Hill Medical, 2015. 2. Eric .J. Nestler, molecular Neuropharmacology, Access Biomedical science, 2015. 3. Karen Whalen, Pharmacology, LWW Health Library, 2019.					

E-References Link	1. https://www.osmosis.org/library/foundational-sciences/pharmacology 2. https://www.karger.com/Journal/Home/224274		
Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	know about the basics of pharmacology	K1, K2
	CO2	understand the drug receptors and its mechanisms	K1, K2, K3
	CO3	acquire knowledge on the metabolism of drugs	K1, K2, K3
	CO4	understand chemotherapy and drug's mechanism	K1, K2, K3
	CO5	discuss drug abuse and its adverse effects	K1, K2, K3

Mapping of CO with PO & PSO

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	M	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	M	S	S	S	M	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks Weakly Correlating (W) - 1 mark
Moderately Correlating (M) - 2 marks No Correlation (N) - 0 mark

Course Code	U21BCT54	FUNDAMENTALS OF MOLECULAR BIOLOGY	L	T	P	C
Core	XI		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To study about the genetic material, mutation, and DNA repair mechanism. • To understand the mechanism and types of DNA replication in prokaryote and eukaryote. • To obtain knowledge of bacterial genetic exchange, genetic maps and linkage.					
Unit I	**Structure of nucleic acids**:					
Watson and Crick's double helix structure, types of DNA, Structure of mRNA, t-RNA and r-RNA – Nucleic acid as genetic material, Experimental evidence, mutation – types, introns, exons, probes, complementation of gene function. Genetic code: codon, Wobble hypothesis.						
Unit II	**Replication**:					
Types and mechanism of replication, difference between prokaryotic and eukaryotic replication, DNA polymerases. Transcription: mechanism, RNA polymerase. Translation						
Unit III	**Genetic exchange in bacteria**:					
Transformation, transduction, and conjugation. genetic maps, linkages, Hfr strain						
Unit IV	**Regulation of Gene expression:**					
Organization of operon, positive and negative operon, lac and Ara operon. Chemical mutagen: NTG, HNO_2, physical mutagen: UV and biological mutagen.						
Unit V	**Extra chromosomal inheritance**:					
Plasmids, types; Transposons: structure and functions; DNA damage and repair mechanism						
Text Books	1. S.C.Rastogi, Cell and Molecular Biology – New Age International Publishers, 2012. 2. Pragya Khanna, Cell and Molecular Biology, I.K.International Pvt. Ltd., 2010.					
References	1. Wilson, K. & Walker, J. Principles and Techniques of Biochemistry and Molecular Biology. 7th Edition, Publisher CUP, 2010. 2. H. Lodish, Molecular Cell Biology, W.H. Freeman, 2012. 3. Watson, J. D, Molecular Biology of the Gene, Benjamin Cummings, 2013. 4. B. Alberts, Molecular Biology of the Cell, Garland, 2014.					
E-References Link	1. https://www.news-medical.net/life-sciences/What-is-Molecular-Biology.aspx					

	2. https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/molecular-biology		
Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	know and understand the structure of nucleic acids, genetic code, wobble hypothesis and mutation and their types	K1, K2
	CO2	describe about the central dogma of life	K1, K2, K3
	CO3	explain the gene exchange methods	K1, K2, K3
	CO4	discuss about operon and its types	K1, K2, K3
	CO5	gain knowledge on transposons as mutagenic agent, DNA damage and repair mechanisms.	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	M	S	S	M	S	S	M
CO4	S	M	S	S	S	S	S	M	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCP53	GENERAL MICROBIOLOGY AND IMMUNOLOGY	L	T	P	C
Core	XII		-	-	5	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To learn the blood grouping and method to estimate haemoglobin level in blood. • To know the diagnostic methods in laboratory level. • To know the isolation and identification of microbes from various samples.					
	1) Blood grouping 2) Estimation of Hemoglobin 3) Precipitation method i. Immuno-diffusion ii. Immuno-electrophoresis 4) WIDAL test 5) ELISA 6) VDRL test 7) CRP test 8) RA test 9) ASO test 10) Aseptic Techniques – Sterilization 11) Serial Dilution, Pour Plate and Spread Plate& streak plate method 12) Staining – Simple and Gram's Staining 13) Antibiotic sensitivity test (Disc diffusion method)					
Text Books	1. Atlas, M. Ronald, Alfred E. Brown. And Lawrence C. Parks, Gram stain, Experimental Microbiology, 2010 2. Handbook of Microbiological Media – HI Media. 2012					
References	1. Cappuccino, G. James and Natalie Sherman, Gram stain, Microbiology A Lab. Manual, 2014. 2. Atlas, M. Ronald, Alfred E. Brown and Lawrence C. Parks, Gram stain, Experimental Microbiology. Practical Immunology A Laboratory Manual, 2017 3. Weir, Hand book of experimental Immunology. Vol I & II. Blackwell scientific publishing. 2011 4. Hudson L & Hay H.C. Techniques in clinical immunology –Blackwell scientific publishing. 2015					
E-References Link	1. https://www.healthline.com/health/elisa 2. https://www.mybiosource.com/learn/ELISA 3. https://microbenotes.com/spread-plate-technique/ 4. https://asm.org/getattachment/2594ce26-bd44-47f6-8287-0657aa9185ad/Kirby-Bauer-Disk-Diffusion-Susceptibility-Test-Protocol-pdf.pdf 5. https://vlab.amrita.edu/?sub=3&brch=73&sim=1628&cnt=1					
Course outcomes	Upon completion of this course, the students will be able to					

	CO	Course Outcomes	Knowledge Level
	CO1	understand hematology and blood grouping methods.	K1, K2
	CO2	empathize on various immunological techniques	K1, K2, K3
	CO3	gain expertise in aseptic technique	K1, K2, K3
	CO4	learn different staining techniques	K1, K2, K3
	CO5	acquire knowledge in various plating techniques	K1, K2, K3

Mapping of CO with PO & PSO

CO	POs								PSOs				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	M	S	S	M	S	S	M
CO4	S	M	S	S	S	S	S	M	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCE531	BIOINFORMATICS	L	T	P	C
Elective	III		3	-	-	3

Cognitive Level	K1: Recall K2: Understand K3: Apply
Learning Objective	• To learn the concepts and applications of bioinformatics • To learn basic tools on bioinformatics and biological databases • To understand the construction Phylogenetic trees for evolutionary analysis and apply theoretical skill to practical application
Unit I	**Bioinformatics**
Definition, application and significance of bioinformatics in life sciences. Database-introduction, types and classification, internet, World Wide Web.	
Unit II	**Nucleic acid sequence database**
Genbank, EMBL, DDBJ - Protein sequence database - PIR, SWISS PROT, protein structural database – PDB.	
Unit III	**Sequence analysis**
Need and importance – pairwise alignment – dynamic programming – Global (Needleman – Wunsch) and Local (Smith Waterman) Alignment concepts – Database searching tools – Entrez, BLAST, FASTA – multiple alignment – Clustal – Construction of Phylogenetic trees.	
Unit IV	**Use of nucleic acid and protein data banks**
NCBI, EMBL, DDBJ, SWISSPORT. 3D structural analysis of biomolecules – molecular visualization tools – RasMol.	
Unit V	**Evolutionary analysis**
Distance – Clustering methods – Rooted and Unrooted tree representation – phylogenetic tree. Bootstrapping strategies. Neural Networks	
Textbooks	1. S.C.Rastogi, N.Meniratta, “Bioinformatics Methods and Applications”, Prentice Hall India Learning Private Limited, 2013. 2. Harsha, “Fundamentals of Bioinformatics”, S. Wiley Publishers ,2019. 3. Jeremy Ramdass, “Bioinformatics, An Introduction”, Springer publishers ,2015. 4. T.K.Atwood, “Introduction to Bioinformatics”, Pearson Publishers, 2017.
References	1.Zhumur Ghosh & Bibekanand Mallick, Bioinformatics Principles and applications , OUP Publishers ,2018. 2.Ruchi Singh, “Bioinformatics, Proteomics and Genomics”,Vikas publishing House, 2014.
E-References Link	1. https://www.bioinformatics.org/ 2. https://pubmed.ncbi.nlm.nih.gov/11552348/ 3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1122955/

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	acquire knowledge on the application of bioinformatics in life sciences.	K1, K2
	CO2	realize the importance and application of database.	K1, K2, K3
	CO3	determine the sequence of unknown sample through various e- resources.	K1, K2, K3
	CO4	explain the importance of data banks and visualization tools.	K1, K2, K3
	CO5	gain knowledge on evolutionary analysis.	K1, K2, K3

Mapping of CO with PO & PSO

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	M	S	M	S	S	M	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCE532	CANCER BIOLOGY	L	T	P	C
Elective	III		3	-	-	3
Cognitive Level	K1:Recall K2:Understand K3:Apply					
Learning objective	➢ To distinguish normal cell and cancer cell. ➢ To understand the various methods of diagnosis of cancer ➢ To obtain the knowledge of staging the cancer cells ➢ To know about different types of cancer ➢ To obtain the knowledge about treatments for cancer.					
UNIT – I	**Normal and Cancer cell**					
Properties of normal cell and cancer cell, benign tumor and malignant tumor. Type of cancer common symptoms, causative factors, Definition of primary and secondary cancer						
UNIT – II	**Classification and diagnosis of cancer:**					
Classification and diagnosis of cancer by tissue type - Solid tumor, Histopatholgical diagnosis. Immunohistochemistry Hematological malignancies, morphological diagnosis Biopsy its types. Clinical examinations.						
UNIT – III	**Cancer classification**					
TNM classification Purpose types of staging. TNM System, Stage grouping. Factors affecting the stage and staging system.						
UNIT – IV						
Sporadic cancers, hereditary cancers, examples of cancer susceptibility syndromes, Immune suppression related malignancies, transplantation related malignancies.						
UNIT –V	**Cancer treatments**					
Surgery and its types, Radiation, Chemotherapy, Biological therapy, Hormone therapy, transplantation. Targeted therapy, Gene therapy and other treatment methods						
Text Books	1. Robert A. Weinberg, Robert A Weinberg .The Biology of Cancer, Publisher Garland Science,2013 2. Robin Hesketh,Introduction to Cancer Biology, Publisher Cambridge University Press,2015					
Reference Books	1. Francesco Pezzella, Mahvash Tavassoli, David J. Kerr.Cancer Biology, Publisher OUP Oxford,2019 2. Kleinsmith, Principles of Cancer Biology, Publisher Pearson Education,2016 3. Lewis Kleinsmith, Principles of Cancer Biology, Publisher Pearson,2017					
E-References	1. http://csbl.bmb.uga.edu/mirrors/JLU/DragonStar2017/download/introduction-to-cancer-biology.pdf 2. https://sphweb.bumc.bu.edu/otlt/MPH-					

	Modules/PH/PH709_Cancer/A10-Cancer.pdf		
Course out come	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	differentiate between normal cell and cancer cell.	**K3**
	CO2	understand the classification and diagnosis of cancer by tissue type	**K2**
	CO3	gain the knowledge of classification of cancer	**K1**
	CO4	understand the sporadic cancers, hereditary cancers and examples of cancer susceptibility syndromes	**K2**
	CO5	acquire the knowledge of cancer treatments like radiation, chemotherapy, biological therapy, hormone therapy and transplantation	**K2**

Mapping of COs with POs & PSOs

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	M	S	M	S	S	M	S	S	S	M
CO2	S	S	S	S	S	M	S	S	M	S	S	M	S
CO3	S	S	S	S	S	M	S	S	S	S	S	S	S
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks Weakly Correlating (W) - 1 mark
Moderately Correlating (M) - 2 marks No Correlation (N) - 0 mark

Course Code	U21BCS531	FOOD PROCESSING TECHNOLOGY	L	T	P	C
SBE	III		2	-	-	2
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning objective	• To understand the functional groups of food • To acquire the knowledge on principle of food spoilage and food preservation. • To learn the techniques of food packaging					
Unit I	Food preservation					
Food Irradiation, microwave heating & cosmic heating preparation of cakes-methods. Assessment of Quality Factors in foods: - Appearance factors, Textural factors, flavor factors, quality standards.						
Unit II	Food deterioration and its control					
Shelf life & dating of foods, principles of food preservation, control of microorganisms. Beverages: Carbonated non-alcoholic beverages, beer, wine, coffee, tea. Causes of spoiling and their control methods.						
Unit III	Food Safety, Risks Hazards					
Food processing & the environment, principles of food packaging. Governmental regulation of food & nutrition labelling for jam, jelly, squash, pickle. General characteristic of milk, milk products.						
Unit IV	Food Preparation:					
Preparation of fermented foods – Idli, Dosa, Wine Preparation of preserved food – JAM, Pickle						
Unit V	Food preservation:					
• Preparation of product by using salt as preservative • Preparation of product by using sugar as preservative • Preparation of product by using oil as preservative						
Text Books	1. Sukumar De, Outlines of Dairy Technology, Oxford university press ,2011. 2. W.Hartel, Principles of Food Processing, Springer,2019. 3. Shubhangini A.Joshi, Nutrition & Dietetics , Mc Graw hill, 2017.					
References	1. Normal N.Potter, Joseph H. Hotchkiss, Food Science, Shafifur, 2017. 2. P.J Fellows**,** Food processing technology, Wood Head publishing, 2017.					
E-References Link	1. https://application.wiley-vch.de/books/sample/3527338802_c01.pdf 2. https://bioeng.berkeley.edu/research/bioinstrumentation 3. https://worldwidescience.org/topicpages/b/bioinstrumentation.html					

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	gain knowledge and understanding about the nature of food and human nutrition and an appreciation of the importance of food to health	K1, K2
	CO2	understand the sources of food spoilage and control	K1, K2, K3
	CO3	gain knowledge on food safety	K1, K2, K3
	CO4	explain the preparation of fermented foods	K1, K2, K3
	CO5	gain knowledge about the food preservation methods	K1, K2, K3

Mapping of CO with POs & PSOs

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	S	S	S	S	S	S	M
CO4	M	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	M	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCS532	MOLECULAR MODELLING AND DRUG DESIGNING	L	T	P	C
SBE	III		2	-	-	2

Cognitive Level	K2: Understand K3: Apply K4: Analyze
Learning Objective	• To know the concepts in Quantum mechanics, molecular modelling and molecular dynamics • To learn the basic modelling techniques to explore biological phenomena at the molecular level • To attain perceive knowledge in protein-ligand interaction study by docking and visualization tools for molecular modelling.
Unit I	**Quantum mechanics & concepts in molecular Modeling**
Coordinate systems, potential energy surfaces. Introduction to quantum mechanics. Force Fields - Bond stretching; angle bending. torsional terms; non-bonded interactions; electrostatic interactions; Vander Waals interactions	
Unit II	**Molecular Dynamics and Monte Carlo simulation:**
Design Constraints, Potentials in MD simulation, Molecular dynamics algorithms.	
Unit III	**Analysis and Properties**:
Geometry optimization, Vibrational frequencies: potential energy surface, harmonic vs. fundamental frequencies, zero-point vibrational energies.	
Unit IV	**Modelling:**
Homology Modeling, Ab initio, Protein Threading. Drug design -Structure-based methods to identify lead compounds: finding lead compounds by searching 3D databases; de novo ligand design.	
Unit V	**Molecular Docking :**
Docking - molecular Modeling in Drug Design – structure-based drug design – pharmacophores - QSAR.	
Text Books	1. Moore E A, Molecular Modelling and Bonding, C Publishing.2002 2. Schneider, Molecular Design Concepts and Applications, John Wiley. 2008 3. Rajesh Kumar, Anju Sharma, Tiwari, Introduction To Drug Designing And Development by Kumar, Nova. 2014 4. Cohen Claude N. Guidebook on Molecular Modeling In Drug Design, Elsevier India. 2014
References	1. Leach AR, Molecular Modeling, Principles & Applications, Pearson education Ltd, UK. 2010. 2. Arjun S, Drug Discovery, Design & Development Lambert Academic publishing. 2013. 3. Clark T, Thurston DE, and Banting L, Drug Design Strategies: Computational Techniques & Applications Royal society of chemistry,2012. 4. Kukol**,** Andreas, Molecular Modeling of Proteins, Publisher Springer,2015.

E-Reference links	1. https://www.mdpi.com/books/pdfview/book/1187 2. https://www.kobo.com/us/en/ebook/molecular-modelling-and-drug-design 3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6539951/ 4. https://link.springer.com/article/10.1007/BF02834015 5. http://www.drugdiscoverytoday.com/view/25419/molecular-modeling/		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	know the concepts of Molecular modelling	**K2**
	CO2	employ different designs and potentials in molecular dynamics simulation	**K3**
	CO3	illustrate the concept of optimization and vibrational frequencies	**K3**
	CO4	understand homology modelling and the methods to identify lead compounds	**K3**
	CO5	compare different drug designs for molecular modelling by docking	**K4**

Mapping of COs with POs & PSOs

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	M	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	M	M	S	M	S	S	S	M	M	S
CO3	S	S	S	S	M	M	M	S	S	S	M	S	S
CO4	S	S	M	M	S	S	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER VI

Course Code	U21BCT61	PRINCIPLES OF ENZYME TECHNOLOGY	L	T	P	C
CORE	XIII		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning objective	• To know about the enzyme reaction and enzyme kinetics through Michaelis- Menten equation and LB plot. • To learn the methods of enzyme assay and the regulation mechanism of enzyme activity. • To understand and know the mode of enzyme action and the industrial applications of enzymes.					
Unit I	**Enzymes**:					
Introduction, Function, nomenclature, classification, isolation, purification and characterization of enzymes. Metallo enzymes and metal activated enzymes. Enzyme specificity and its reactions						
Unit II	**Enzyme substrate complexes**					
Michaelis – Menten kinetics: Determination of Km and V max – Line Weaver Burk plot – Factors influencing enzyme reaction and Enzyme inhibition – competitive inhibition, non - competitive inhibition, un competitive inhibition.						
Unit III	**Enzyme assay**					
Methods and applications, regulation of enzyme activity- allosteric regulation, covalent modification, zymogens and feedback regulation						
Unit IV	**Mechanism of enzyme action**					
Acid base catalysis – Ribonuclease, covalent catalysis - chymotrypsin, metal ion catalysis – carboxy peptidase A, activation energy, role of coenzymes in enzyme reaction. eg: NADH,FADH and CoASH.						
Unit V	**Enzyme Applications**					
A brief account of enzyme applications – Immobilized enzymes and diagnostic enzymes (Liver enzymes (SGOT,SGPT),LDH,CK, Phosphatase) – enzymes as drugs in digestive disorders, applications of enzymes in Industries.						
Text Books	1. Athel Cornish Bowden Fundamental of Enzyme kinetics, Wiley – Blackwell, 2012. 2. T.D.H. Bugg, Introduction to Enzymes & Co-Enzyme chemistry, Wiley, 2012					
References	1. Irwin.H. Segel, Enzyme kinetics - Wiley, 2014. 2. A.C.Bowden, Fundamentals of Enzyme kinetics, Medtech, 2017. 3. N.S. Punekar, Enzymes: Catalysis, kinetics and Mechanisms, Springer, 2018.					
E-References	1. https://www.longdom.org/open-access/enzyme-technology--an-emerging-trend-in-biotechnology-2329-6674-1000163.pdf					

Link	2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3962110/ 3. https://www.kth.se/dib/enzyme-technology-1.783173
Course outcomes	Upon completion of this course, the students will be

CO	**Course Outcomes**	**Knowledge Level**
CO1	understand the basics and characterization and purification of enzymes.	K1, K2
CO2	gain knowledge on enzyme kinetics and inhibition	K1, K2, K3
CO3	learn about the enzyme assay and their regulation.	K1, K2, K3
CO4	learn the mechanism of action of enzyme with examples	K1, K2, K3
CO5	illustrate the applications of enzyme and its immobilization techniques	K1, K2, K3

Mapping of CO with PO & PSO

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	M	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	M	S	S	S	M	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	M	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks Weakly Correlating (W) - 1 mark
Moderately Correlating (M) - 2 marks No Correlation (N) - 0 mark

Course Code	U21BCT62	MEDICAL BIOCHEMISTRY	L	T	P	C
CORE	XIV		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand about scope of clinical biochemistry to detect disorders. • To know about disorders caused due to the error in carbohydrate, lipid, protein metabolism and regulation of blood glucose level. • To learn the tissue function tests, biochemical tests and renal disorders.					
Unit I	**Clinical biochemistry**					
Introduction, scope of clinical biochemistry in diagnosis and preservation of biological fluids (Blood, Urine and CSF). Disorders of carbohydrate metabolism: Regulation of blood glucose, digestion and absorption, normal blood glucose level, hypo and hyper glycemia, diabetes GTT, glucosuria GTT and galactosemia. Inborn errors of carbohydrate metabolism						
Unit II	**Disorders of lipid metabolism**					
Digestion and absorption of lipid, hypo and hyper lipoproteinemias, disorders of triglycerides, phospholipids and cholesterol metabolism, inborn errors of lipid metabolism.						
Unit III	**Disorders of amino acid and protein metabolism**					
Digestion and absorption, urea cycle, disorders of urea, uric acid, creatinine and ammonia. Hypo urecemia, hyper urecemia and porphyria, inborn errors of amino acid metabolism.						
Unit IV	**Disorders of nucleic acid metabolism**					
Purine and pyrimidine metabolism. Gout, oroticaciduria and xanthinuria.						
Unit V	**Tissue function tests**					
Biochemical tests of liver, kidney and pancreas, significance of tissue function tests. Renal and liver transport: Renal Glycosuria, cystenuria, Fanconi syndrome, Crigglar - Najjar disease, Gilbert's disease, Dubin – Johnson disease.						
Text Books	1.Nanda Maheswari, Clinical Biochemistry Jaypee Brothers Medical Publishers, 2016. 2.John. E. Hall, Guyton & Hall Text book of Medical Physiology, Elsevier, Health, 2017.					
References	1.Rajinder Chawla, Tarek. H. E, Metwally Sucherda sahu, Text book of Medical Biochemistry Wolters Kluwer India, Pvt, Ltd, 2017. 2.Allan Gaw, *et al*., Clinical chemistry Churchill Living Stone, 2018. 3.Michael Murphy, Rajeer Srivastava, Kevin Deans, Clinical Biochemistry, Elsevier, 2018.					
E-References link	1. https://cscc.ca/en/about-us/what-is-clinical-chemistry.html 2. https://journals.sagepub.com/home/acb 3. https://www.mayoclinic.org/departments-centers/laboratory-medicine-pathology/overview/specialty-groups/clinical-biochemistry-immunology					

Course outcomes	Upon completion of this course, the students will be		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	describe various mechanism disorders of carbohydrates	K1, K2
	CO2	discuss about the lipid metabolism disorders	K1, K2, K3
	CO3	realize the disorders of protein and amino acid metabolism	K1, K2, K3
	CO4	know and understand about the nucleic acid metabolism	K1, K2, K3
	CO5	analyze and realize the facts of tissue function tests	K1, K2, K3

Mapping of CO with PO & PSO

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	M	S	S	M
CO4	M	S	S	S	S	M	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BCT63	BIOPROCESS TECHNOLOGY	L	T	P	C
CORE	XV		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To learn about Industrial microorganisms • To understand learn the techniques of fermentation. • To learn the production of industrial products using microorganisms.					
Unit I	**Introduction to industrial microorganisms:**					
Isolation, Preservation and Maintenance of Industrial Microorganisms. Kinetics of microbial growth and death. Media for industrial fermentation. Air and Media Sterilization.						
Unit II	**Types of fermentation processes:**					
Solid state and liquid state fermentations; batch,fed-batch and continuous fermentations. Components of bioreactor, Types of bioreactor, Measurement and control of bioprocess parameters- pH, temperature, dissolved oxygen, foaming and aeration.						
Unit III	**Downstream Processing:**					
Introduction, Removal of microbial cells and solid matter, foam removal, precipitation, filtration, centrifugation, cell disruption, liquid-liquid extraction chromatography, Membrane process, Drying and Crystallization.						
Unit-IV	**Microbial production of Industrial Products:**					
Alcohol (Ethanol), Acids (Citric),Antibiotics (Penicillin), Amino acids (lysine), Single Cell Protein (algae/fungi).						
Unit-V	**Enzyme immobilization:**					
Methods of immobilization, advantages and application of immobilization, large scale application of immobilized enzymes.						
Text Books	1. S.M. Reddy, Basic Fermentation Technology, New Age International Publishers, 2017. 2. H. K. Das, Textbook of Biotechnology, 5th Edition, Wiley, 2017. 3. Wulf Crueger, Anneliese Crueger, A Textbook of Industrial Microbiology, Wiley, 2017. 4. U. Sathyanarayana, U. Chakrapani, Biotechnology, Books & amp; Allied Ltd, 2020.					
References	1. Doraiswami Ramkrishna, Subhabrata Sengupta, Sudipta Dey Bandyopadhyay, Avijit Ghosh, Advances in Bioprocess Engineering and Technology, Springer, r 2020. 2. Michael l. Shuler, Fikret Kargi Bioprocess Engineering: Basic Concepts, Pearson Education India 2015. 3. Casida, L. E. Industrial Microbiology. New Age International (P) Ltd., New Delhi, 2013. 4. Michael Shuler and Fikret Kargi.. Bioprocess Engineering: Basic Concepts, Prentice Hall, Englewood Cliffs, 2020 5. Bioprocess Engineering Principles by Pauline M. Doran, 2nd Edition, Elsevier, 2012.					

E-References link	1. http://microbio.du.ac.in/web3/uploads/Microbiology%20Uploads/Reading%20material/MBOE-201%2002.%20strain%20improvement.pdf 2. https://www.mpgmahavidyalaya.org/userfiles/Fermentation%20Types.pdf 3. https://theconstructor.org/environmental-engg/difference-chemical-oxygen-demand-cod-biological-oxygen-demand-bod/34792/ 4. https://microbiologynotes.org/downstream-processing-and-its-steps/ 5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5385174/ 6. https://www.britannica.com/topic/food-preservation/Fungi 7. https://www.news-medical.net/health/What-are-Biosensors.aspx
Course outcomes	Upon completion of this course, the students will be able to

CO	Course Outcomes	Knowledge Level
CO1	gain a comprehensive understanding of media formulations, microbial growth kinetics	K1, K2
CO2	acquire knowledge on bioreactor selection, upstream & fermentation processes, and its role in manufacturing bio-products	K1, K2, K3
CO3	gain knowledge on downstream processing	K1, K2, K3
CO4	discuss about various products obtained from microbes	K1, K2, K3
CO5	illustrate the techniques of enzyme immobilization	K1, K2, K3

Mapping of CO with PO & PSO

CO	POs								PSOs				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	M	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BCT64	BIO- INSTRUMENTATION	L	T	P	C
CORE	XVI		5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning objective	• To know the fundamental principles and applications of basic instruments in biology • To learn the types of electrophoresis and spectroscopy • To understand, design and evaluate systems and devices that can measure, test and/or acquire biological information					
Unit I	**Microscopy**					
Parts and their function, resolving power, aperture – simple, compound, light and dark field, electron and phase contrast microscopes, fluorescent– their applications.						
Unit II	**Colorimetry**					
Parts and their functions - Beer Lambert's Law. pH metry, Spectroscopy -NMR, IR, UV. Centrifugation techniques – principle, centrifuges and their uses, separation methods. Ultracentrifugation – applications						
Unit III	**Chromatography techniques**					
Principles and types – paper, TLC, Column, HPLC and GC. Electrophoretic techniques – principle, electrophoresis of proteins and nucleic acids. Capillary electrophoresis**,** Pulse field electrophoresis and 2 D gel electrophoresis						
Unit IV	**Biochemical Techniques**					
	• Estimation of carbohydrates • Estimation of Proteins • Preparation of Buffers • Qualitative identification of Nucleic Acids					
Unit V	**1. Lipid analysis** a) Determination of Saponification number b) Determination of Acid number c) Determination of Iodine number **2. Separation of lipids by TLC** Separation of Amino acids by Paper chromatography.					
Text Books	1. M. J. Reilly, Bioinstrumentation , CBS Publishers & Distributers, 2016. 2. John G. Webster ,Bioinstrumentation, Wiley,2018. 3. M.H. Fulekar & Bhawana Pandey, I. K. Bioinstrumentation, International Publishing House Pvt. Ltd., 2014					
References	1. L. Veerakumari, Bioinstrumentation, MJP Publisher, 2019. 2. M. J. Reilly, Bioinstrumentation, CBS Publishers & Distributers, 2016. 3. John G. Webster, Bioinstrumentation, Wiley, 2018. 4. Keith Wilson and John Wilson, Practical Biochemistry, Fifth edition Cambridge University Press, 2018. 5. M.H. Fulekar & Bhawana Pandey, Bioinstrumentation , I. K. International Publishing House Pvt. Ltd., 2014.					

E-References Link	1. https://application.wiley-vch.de/books/sample/3527338802_c01.pdf 2. https://bioeng.berkeley.edu/research/bioinstrumentation 3. https://worldwidescience.org/topicpages/b/bioinstrumentation.html
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	understand the fundamentals of microscope and its working principle.	K1, K2
CO2	realize the use of Colorimetry and spectroscopy. Acquire knowledge on centrifuge and its types	K1, K2, K3
CO3	recognize the importance of chromatographic techniques and Empathize on electrophoretic techniques	K1, K2, K3
CO4	explain the fundamentals of Biochemical techniques	K1, K2, K3
CO5	estimate and separate the lipid molecules	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	S	M	S	S	S	S	M
CO4	M	S	S	S	S	M	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BCP64	PRINCIPLES OF ENZYME TECHNOLOGY & MEDICAL BIOCHEMISTRY - PRACTICAL	L	T	P	C
CORE	XVII		5	-	-	4

Cognitive Level	K1:Recall K2:Understand K3:Apply K5:Analyze
Learning Objective	➢ To acquire the practical knowledge for the estimation of blood sugar and uric acid level estimation ➢ To know the diagnostic methods in laboratory level. ➢ To develop skill to do the test such as Blood analysis, Urine analysis
Enzyme & Enzyme Technology & Clinical Biochemistry	
	Preparation of crude enzyme extract a) Effect of pH b) Temperature c) Substrate concentration d) Enzyme concentration e) Determination of km. **Clinical Biochemistry** **Blood analysis** 1. Blood sugar– Azatoor and king's method 2. Blood urea-Dam method 3. Blood cholesterol– Zak's method 4. Blood uric acid– Caraway method 5. Serum Creatinine –Picric acid method 6. Estimation of protein by biuret method 7. Estimation of Calcium and phosphorous **Urine analysis** 1. Urine urea 2. Uric acid 3. urine sugar
Text Books	1. Shivaraja Shankara. Y. M. Laboratory Manual for Practical Biochemistry Jaypee Brothers Medical Publishers, 2nd Edition, 2013. 2. S. Rajan, R. Selvi christy Experimental Procedures in Lifesciences CBS, 2019
References	1. Soundravally Rajendiran, Pooja Dhiman, Biochemistry Practical Manual, Elsevier, 2019. 2. CG. Kaushik, Neha Sharma, Sabira Dabeer, Ruchi Jindal, Practical Manual of Biochemistry, CBS, 2020. 3. Rafi M. D, Manual of Practical Biochemistry Orient Black swan Pvt. Ltd, 2020. 4. Shivananda Nayak B. Manipal Manual of Clinical Biotechnology Jaypee Brothers, 2013. 5. Drew Provan, Oxford Handbook of Clinical and Laboratory Investigation OUP, Oxford, 2018.

E-References Link	1. https://youtu.be/-atHARq0JbQ 2. https://youtu.be/HfubKxTjvlE 3. https://youtu.be/B88TqQYOENU 4. https://youtu.be/yxokk8VYfII 5. https://www.tasmc.org.il/sites/en/Lab/Pages/Clinical-Biochemistry-Laboratory.aspx 6. https://www.researchgate.net/publication/260182512_Practical_Manual_in_Biochemistry_and_Clinical_Biochemistry 7. http://rajswasthya.nic.in/RHSDP%20Training%20Modules/Lab.%20Tech/Biochemistry/Dr.%20Jagarti%20Jha/Techniques%20In%20Biochemistry%20Lab.pdf
Course outcomes	Upon completion of this course, the students will be able to

	CO	**Course Outcomes**	**Knowledge Level**
	CO1	acquire knowledge on preparation of enzyme and their effect various factors	K1,K2
	CO2	analyze the blood sugar, Protein, Cholesterol	K1,K2,K5
	CO3	acquire knowledge on blood urea, uric acid, creatinine	K1,K2,K3
	CO4	learn and understand the urine urea, uric acid and sugar	K1,K2,K3
	CO5	analyze the urine component	K1,K2,K3

Mapping of CO with PO& PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	M	S	S	S	M	S	M	S
CO2	S	M	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BCE641	HORMONES AND NEUROCHEMISTRY	L	T	P	C
Elective	IV		3	-	-	3
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning objective	• To get the deep knowledge about the classification, biosynthesis and degradation mechanism of hormones. • To learn about the biosynthesis and mode of action of thyroid hormone, pancreatic and adrenal hormones. • To gain the profound knowledge about the structure and function of brain, neurotransmitters with examples.					
Unit I	**Hormones**					
Definition, classification, biosynthesis and degradation. Mechanism of hormone action, class I and II hormone receptors, steroids. Feedback regulation of hormones.						
Unit II	**Hypothalamus and pituitary hormones**:					
Hypothalamic releasing factors vasopressin, oxytocin. Biosynthesis, secretion, transport, regulation and biological effects of growth hormones, FSH, LH, TSH, ACTH and prolactin						
Unit III	**Thyroid hormones**					
Biosynthesis, secretion, transport, regulation and biological actions. Hypo and hyperthyroidism, antithyroid agent's role of parathyroid hormones, calcitriol, calcium and phosphorous homeostasis. Hypo and hyperparathyroidism.						
Unit IV	**Pancreatic hormones**					
Insulin and glucagon: biosynthesis, mechanism of action and biological effects. Adrenal hormones: biosynthesis, mechanism of action of glucocorticoids, mineralocorticoids, adrenal medullary hormones - epinephrine and nor epinephrine, steroid hormones - androgens and estrogens.						
Unit V	**Neurotransmitters**:					
Synthesis, storage, release, uptake, degradation and action of neurotransmitters. Acetyl choline, GABA, serotonin, dopamine, glutamate, aspartate, nitrous oxide.						
Text Books	1. C. Donnell Turner, Joseph. T. Bagnara, General Endocrinology Affiliated East – West Press Pvt. Ltd – New Delhi, 6th edition, 2012.					
References	1. Shiomo Melmed, Kenneth S. Polonsky, P. Reed Larsen, Henry. M. Kronberg, Williams Textbook of Endocrinology Elsevier, 13th Edition, 2015. 2. Bernhard Kleine, Winfried. G. Rossmanith Hormones and the Endocrine System – Textbook of Endocrinology Springer Nature, First Edition, 2016. 3. J.Larry. Jameson, Harrison's Endocrinology Chaukhamba Auriyantaliya, 4th Edition, 2017. 4. David. G. Gardner & Dolores Shoback, Greenspan's Basic & Clinical Endocrinology Overruns, 2017.					

E-References link	1. https://link.springer.com/chapter/10.1007/978-1-4757-9847-0_34\ 2. https://pubmed.ncbi.nlm.nih.gov/1363136/ 3. https://www.visiblebody.com/blog/endocrine-system-hypothalamus-and-pituitary 4. https://courses.lumenlearning.com/suny-ap2/chapter/the-pituitary-gland-and-hypothalamus/
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	acquire the knowledge on classification and regulation of hormones	K1, K2
CO2	learn about the hypothalamus and pituitary hormones	K1, K2, K3
CO3	explain the secretion and role of thyroid and parathyroid hormones	K1, K2, K3
CO4	understand about pancreas and adrenal hormones	K1, K2, K3
CO5	know about the cells of nervous system , neurotransmitters and related drugs	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	M	S	M	S	S	M
CO4	S	M	S	S	S	M	S	S	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BCE642	PLANT PATHOLOGY	L	T	P	C
Elective	IV		3	-	-	3
Cognitive Level	K1: Recall K2: Understand					
Learning objective	• To learn plant diseases Classification and defense mechanisms in Plants • To know the methods of assessment of disease incidence and disease severity • To gain knowledge on principles and methods of plant disease control.					
Unit I	**History and development of Plant Pathology Disease concept in plants:**					
Disease classification, Causal factors - biotic and abiotic, disease diagnosis, Koch's postulates. Defense Mechanism in plants: Structural and Biochemical.						
Unit II	**Epidemiology**:					
Traditional and modern concepts of disease triangle, Role of host, pathogen and environment in disease development. Aerobiology in relation to Epidemiology. Methods of monitoring splash borne and airborne inoculum.						
Unit III	**Assessment of disease:**					
Methods of assessment of disease incidence and disease severity and estimation of yield loss. Study of plant diseases of major crops in India caused by fungi, bacteria, and viruses. (with reference to symptoms, etiology and control)						
Unit IV	**Plant diseases:**					
Study of importance, symptoms, causal organism, disease cycle and control of diseases of crop plants. Rots diseases with special reference to fruit and stem end rot of papaya. Damping off of seedlings of crop plants. Downy mildews of cucurbits.						
Unit V	**Principles and methods of plant disease control**:					
Control through regulatory methods: Plant quarantine. Cultural and biological methods of control. Control through physical means. Chemical method for plant disease control: Fungicides, chemotherapy. Use of resistant varieties.						
Text Books	1. P. D. Sharma, Environmental Botany and Plant Pathology, Publisher, Rastogi,2015 2. R.S. Mehrotra, Ashok Aggarwal ,John William Harshberger, Mycology and Plant pathology, Publisher McGraw Hill Education, 2015					
References	1. Chaube H.S. Introductory plant pathology, Publisher CBS,2017 2. Stephen Burchett, Sarah Burchett, Plant Pathology, Garland Science,2017					
E-References link	1. http://ceventura.ucanr.edu/Environmental_Horticulture/Landscape/Problems/Pathology/ 2. https://phytopath.ca/education/what-is-plant-pathology/					

	3. https://cropwatch.unl.edu/soybean-management/plant-disease 4. https://www.saferbrand.com/advice/plant-disease-library
Course outcomes	Upon completion of this course, the students will be able to

	CO	**Course Outcomes**	**Knowledge Level**
	CO1	know the concept of plant diseases and its classification	K1
	CO2	understand the epidemiology of plant diseases	K1, K2
	CO3	attain knowledge on plant diseases of major crops in India	K1, K2
	CO4	understand disease cycle and control of diseases of crop plants	K2
	CO5	learn the Principles and methods of plant disease control	K2

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	M	S	M	S	M	S	S	S	S	S
CO3	S	S	M	S	M	S	S	M	S	M	S	M	M
CO4	S	M	S	S	S	M	M	S	S	S	M	S	S
CO5	S	S	M	M	S	S	S	S	M	M	S	M	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BCS641	MEDICAL CODING	L	T	P	C
SBE	IV		2	-	-	2
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the scope of medical coding • To learn the basics in medical coding • To acquire knowledge on Indian and US healthcare providers and payers • To understand the coding procedures and techniques • To learn the terminologies, general and specific codes					
Unit I	**Medical coding:**					
Introduction to medical coding, basic structure of the medicare program, Health insurance portability and accountability act, Healthcare in India and US, Patient, Provider and Payers Relationship, Importance and significance of coding in today's world						
Unit II	**Anatomy and Pathophysiology:**					
Human body – Anatomical Position, Body Cavities, Important terminologies in Dermatology, Ophthalmology, Otorhinolaryngology, Pulmonology, Cardiology. Gastroenterology, Genitourinary system, Gynaecology and Obstetrics, Orthopaedics, Endocrinology, Immunology, Lymphatics, and Hematology						
Unit III	**ICD-9-CM:**					
History, Volumes, Conventions, General Coding Guidelines, Infections and Parasitic Diseases, Endocrine, Nutritional and metabolic diseases, and immunity disorders, Diseases of blood and blood forming organs, Mental disorders , Diseases of Circulatory System , Diseases of Respiratory system , Diseases of Digestive system						
Unit IV	**Current Procedural Terminology**					
Introduction to CPT, Category I to Category III, Six sections of CPT in Detail Evaluation and Management, Anesthesiology, Surgery, Radiology, Pathology and Laboratory, Medicine, Significance of Parent codes, CPT Modifiers, Symbols and significance, Alphanumeric codes overview of categories II and III						
Unit V	**HCPCS** (Healthcare Common Procedure Coding System):					
Introduction to HCPCS, Significance and Usage, Types of HCPCs, Modifiers Level II HCPCS						
Text Books	1. Patricia A.T, 2009, Medical coding, Jones and Bartlett Publishers, Inc 2. Patricia A.T, 2005, Medical Coding What It Is And How It Works, Jones and Bartlett Publishers					
References	1. Sandra, J.2018, Understanding medical coding, 4 th edition, Cengage Learning Inc. publishers 2. Mcgrath M, 2017, Coding for beginners in easy steps, PBP publications					

E-References Link	1. https://www.velocityhc.com/wp-content/uploads/2019/09/Step-by-Step-Medical-Coding-2017-Edition-E-Book.pdf 2. https://aapcperfect.s3.amazonaws.com/ppdf/2011MCT_CPC_TB_Student-Press_Sample1.pdf 3. https://www.icslearn.ca/~/media/files/pdf/samplelessons/582-basic-medical-coding.pdf?la=en 4. http://www.billing-coding.com/pdf/mbacc_ebook_full_pages.pdf
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	understand the basics and the importance of medical coding	K1, K2
CO2	gain knowledge on human anatomy and important terminologies	K1, K2, K3
CO3	learn about ICD-9-CM and general coding guidelines	K1, K2, K3
CO4	acquire knowledge on current procedural terminologies	K1, K2, K3
CO5	know about Healthcare Common Procedure Coding System	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	M	M	S	M	S	S	S	S	M	S
CO2	S	S	S	M	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	M	S	M	S	S	M	S	M	M
CO4	S	S	S	M	S	M	S	S	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	M	M	M	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BCS642	BIOSAFETY & IPR	L	T	P	C
SBE	IV		2	-	-	2
Cognitive Level	K1: Recall K2: Understand K3: Apply					
Learning Objective	• To understand the key concept and historical background of biosafety and to know the importance of biosafety levels, biosafety guidelines and regulations and the function of institutional biosafety committee. • To study the application of GMOs in various field and methods to release GMO's in the environment. • To acquire the knowledge about IPR, patenting, trademark, copyrights and geographical indications.					
Unit I	**Biosafety**					
Introduction; biosafety issues in biotechnology-historical background; Introduction to Biological Safety Cabinets; Biosafety Levels.						
Unit II	**Biosafety Guidelines**					
Biosafety guidelines and regulations (National and International) – operation of biosafety. Guidelines and regulations of Government of India; Roles of Institutional Biosafety Committee.						
Unit III	**GMO**					
Definition of GMOs, GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication.						
Unit IV	**Types of Intellectual Property**					
Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications. Importance of IPR						
Unit V	**Patent Filing Procedures**:					
National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Precautions while patenting – disclosure/nondisclosure; Financial assistance for patenting						
Text Books	1. V.K. Ahuja ,Intellectual property rights in India , Lexisnexis publishers, 2015 2. M.K.Satheesh, Bioethics and Biosafety, Wiley Publishers, 2020. 3. Deepa Goel ,IPR, Biosaftey and Bioethics ,Pearson publishers ,2013.					
References	1. M.M.S.Karki, Intelleutal property rights , Basic concept, 2011. 2. Rae Scott B Willam B, Bioethics, Eerdmans publishing house,2013.					
E-References Link	1. https://www.researchgate.net/publication/329170462_IPR_Biosafety_Bioethics 2. https://biocyclopedia.com/index/biotech_biosafety_ipr_ipp.php 3. https://link.springer.com/chapter/10.1007/978-981-10-2961-5_14					

Course outcomes	Upon completion of this course, the students will be able to		
	CO	**Course Outcomes**	**Knowledge Level**
	CO1	explain the basics of biosafety	K1, K2
	CO2	recognize the guideness and regulation of biosafety	K1, K2, K3
	CO3	acquire knowledge on food assessment and risks analysis	K1, K2, K3
	CO4	realize and Learn about intellectual property	K1, K2, K3
	CO5	gather information regarding patenting and its procedures	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	M	S	M	S	S	M	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BCV51	SINGLE CELL PROTEIN	Total Hours	C
Value Added Programme	IV		30	2
Cognitive Level	K1: Recall K2: Understand K3: Apply			
Learning Objective	1. To understand the key concept and historical background of algal biomass as non-conventional food 2. To know about the application of SCP and mass cultivation of spirulina 3. To acquire the knowledge about the uses of spirulina and steps of mass cultivation			
Unit I	**Algal biomass as non- conventional food:**			
Introduction, Concept and need, Advantages, disadvantages and Sources of non-conventional food				
Unit II	**Introduction to SCP production**			
Historical use and rediscovery of *Spirulina* importance – morphology, taxonomy and habitat of *Spirulina* –biochemical composition including proximate composition – amino acids – unsaturated fatty acids – minerals and vitamins. Human health benefits of *Spirulina*.				
Unit III	**Spirulina cultivation for single cell protein**			
SCP Introduction, Systematic position, thallus structure, Merits of Spirulina cultivation, Methods of cultivation- Small scale cultivation, Mass cultivation, Harvesting of Spirulina, Flow chart of Spirulina cultivation, Limiting factors for Spirulina cultivation, Spirulina products –Powder, Biscuits, Tablets				
Unit IV	**Spirulina cultivation**			
Principle, Requirement, chemicals, Sample or Inoculum of Spirulina, procedure, observations, Harvesting, results and records, precautions Visit to a spirulina cultivation laboratory in nearby area (Students are expected to prepare a model of spirulina cultivation laboratory, a visit report and to submit the same at the time of practical examination.				
Unit V	**Natural production**			
Laboratory cultivation – small scale commercial production – commercial and mass cultivation (tank construction, culture medium, strain selection, scaling up of the process) – importance of light and pH in *Spirulina* cultivation – harvesting, drying and packing				
Text Books	1. Umar Bacha, Muhammad Nasir, Single Cell Protein: Production and Evaluation for Food Use Evaluation for Food Use, Lambert Publication, 2011 2. Amos Richmond, Qiang Hu, Handbook of Microalgal Culture: Applied Phycology and Biotechnology, Wiley, 2013			
References	1. Biswas S., Datta M. and Ngachan S.V, Mushrooms: A Manual for Cultivation, PHI, 2012. 2. Aaron Baum, Grow Your Own Spirulina Superfood: A Simple How-To Guide Kindle Edition, 2013. 3. Selvendran D, Large Scale Algal Biomass (Spirulina) Production in India. In: D. Das Algal Biorefinery: An Integrated Approach, Springer. 2015.			
E-References Link	1.https://www.researchgate.net/publication/329170462_IPR_Biosafety_Bioethics			

	2.https://biocyclopedia.com/index/biotech_biosafety_ipr_ipp.php 3.https://link.springer.com/chapter/10.1007/978-981-10-2961-5_14
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	understand the advantages and disadvantages of algal mass	K1, K2
CO2	learn the production of SCP	K1, K2, K3
CO3	acquire knowledge on spirulina cultivation	K1, K2, K3
CO4	illustrate the steps of spirulina cultivation	K1, K2, K3
CO5	gather information regarding natural production, mass cultivation and process	K1, K2, K3

Mapping of CO with PO & PSO

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	M	S	M	S	S	M	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL - 624 101
Tamil Nadu.

DEPARTMENT OF BIOTECHNOLOGY

Curriculum Framework and Syllabus for

B.Sc. BIOTECHNOLOGY

(For the candidates to be admitted from the academic year 2021-2022 onwards)

(UNDER CHOICE BASED CREDIT SYSTEM- CBCS)

Mother Teresa Women's University, Kodaikanal
Department of Biotechnology
Choice Based Credit System (CBCS)
(2021-2022 onwards)
B.Sc. Biotechnology

1. About the Programme

B.Sc., Biotechnology is a 3 year Undergraduate Programme and the Programme is offered through six semesters providing a strong foundation of biotechnological concepts. This Programme is rationalized to bestow students with an improved knowledge of the basic cellular and molecular level and acquire an indepth knowledge of biotechniques. The meticulously structured Programme has a strong interdisciplinary research base in biological sciences which prepares the student for the industry as well as research programmes. Graduates in this discipline significantly will contribute to research and development for society's welfare in terms of Environment, Agriculture and Medicine.

2. Programme Educational Objectives (PEOs)

PEO1	To disseminate knowledge to the students to shape a successful career in Biotechnology.
PEO2	To equip the students with fundamental concepts to handle scientific challenges.
PEO3	To emphasize the need for skilled biotechnologists in the modern scientific society.
PEO4	To create awareness regarding the professional demands and opportunities in the field of biotechnology.
PEO5	To persuade the students to move for higher studies and research to contribute scientifically to the society.

3. Eligibility

i. Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Examination, Govt. of Tamilnadu or any other Examination accepted by the syndicate as equivalent there to with at least one of the following subject Biology/Botany/Zoology.

ii. Candidate should have secured atleast 55% in the above subject and above in the aggregate.

iii. A relaxation of 10% in the total percentage will be given to SC, ST candidates.

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	**10**	**25**	**10**	**25**
External	**30**	**75**	**30**	**75**

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade

(Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

Program Outcomes (POs)

Upon completion of the B. Sc Biotechnology programme, the students will be able to

PO1	elucidate the key concepts and principles of Biotechnology.
PO2	employ the knowledge of biotechnology to make scientific queries and understand recent advancements in biotechnology.
PO3	exhibit proficient skills in handling sophisticated and advanced scientific instruments.
PO4	achieve expertise in different aspects of basic biotechnology.
PO5	apply the concepts of biotechnology to study the fundamentals of different bio-techniques
PO6	utilize the theoretical and practical knowledge in their higher studies and careers.
PO7	apply the scientific skills acquired to develop a sustainable environment for the society.
PO8	use the scientific knowledge obtained to develop and support the Indian economy.

9. Program Specific Outcomes (PSOs)

On completion of B. Sc. BiotechnologyProgramme, the students will be able to

PSO1	enrich the knowledge in the basic concepts and principles of Biotechnology.
PSO2	apply the theoretical and practical knowledge of Biotechnology in gaining a successful career.
PSO3	work as entrepreneurs and techno managers with strong ethics and communication skills.
PSO4	interact effectively with people in the field of Biotechnology and allied industries in designing, developing, and providing solutions for product/ processes/ Technology/ Development.
PSO5	be proficient with basic laboratory skills and hands on training reuired for higher studies and research.

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL

Framework of the Syllabus to be implemented from the Academic Year 2021-2022
Curriculum Framework and Syllabus for

B.Sc. BIOTECHNOLOGY

(For the candidates to be admitted from the academic year 2021-2022 onwards)

Paper No.	Paper Code	Course Title	Credits	Hours		(CIA)	(ESE)	Total
				T	P			
Semester I								
1	U21LTA11	Tamil I- Part – I	3	6		25	75	100
2	U21LEN11	English I-Part- II	3	6		25	75	100
3	U21BTT11	Core I- Cell and Molecular Biology	4	6		25	75	100
4	U21BTT12	Core II- Genetics	4	5		25	75	100
5	U21BTA11	Allied I- Taxonomy and Plant Physiology	4	5		25	75	100
6	U21EVS11	Environmental Studies	2	2		25	75	100
7	U21PELS11	Professional English - I	4	6		25	75	100
		Total	**24**	**36**				**700**
Semester II								
8	U21LTA22	Tamil II -Part- I	3	6		25	75	100
9	U21LEN22	English II-Part- II	3	6		25	75	100
10	U21BTT21	Core III- Biochemistry	4	5		25	75	100
11	U21BTP21	Core IV – Practical - Biochemistry	4		5	25	75	100
12	U21BTA22	Allied II - Animal Physiology	4	5		25	75	100
13	U21VAE21	Value Education	3	3		25	75	100
14	U21PELS22	Professional English - II	4	6		25	75	100
		Total	**25**	**36**				**700**
Semester III								
15	U21LTA33	Tamil III- Part I	3	6		25	75	100
16	U21LEN33	English III -Part -II	3	6		25	75	100
17	U21BTT31	Core V- Developmental Biology	4	5		25	75	100
18	U21CHA33	Allied - Chemistry	4	5		25	75	100
19	U21BTE311/ U21BTE312	Elective I- Endocrinology/Nutrional Biochemistry	3	4		25	75	100
20	U21MSS31	Skill Based Elective I - Managerial Skills	2	2		25	75	100

21		Non Major Elective I	2	2		25	75	100
		Total	**21**	**30**				**700**
Semester IV								
22	U21LTA44	Tamil IV-Part –I	3	6		25	75	100
23	U21LEN44	English IV-Part –II	3	6		25	75	100
24	U21BTT41	Core VI- Microbiology	4	4		25	75	100
25	U21BTP42	CoreVII- Practical - Microbiology	4		4	25	75	100
26	U21CHA43	Allied IV- Practical - Chemistry	4	4		25	75	100
27	U21BTE421/ U21BTE422	Elective II-Seed Technology/Biofertilizer	3	3		25	75	100
28	U21CSS42	Skill Based Elective II- Computer Skills for Office Management	2	2		25	75	100
29		Non Major Elective II	2	2		25	75	100
		Total	**25**	**31**				**800**
Semester V								
30	U21BTT51	Core VIII- Immunology	4	5		25	75	100
31	U21BTT52	Core IX - Principles of Animal Biotechnology	4	5		25	75	100
32	U21BTT53	Core X- Basics of Plant Biotechnology	4	5		25	75	100
33	U21BTP53	Core XI - Bioinstrumentation	4	5		25	75	100
34	U21BTP54	Core XII-Practical - Immunology, Principles of Animal Biotechnology and Basics of Plant Biotechnology	4		5	25	75	100
35	U21BTE531/ U21BTE532	Elective III - Forestry/ Biodiversity Conservation	3	3		25	75	100
36	U21BTS531/ U21BTS532	Skill Based Elective – III – Medical Lab Technology / Food Processing Technology	2	2		25	75	100
		Total	**25**	**30**				**700**
Semester VI								
37	U21BTT61	Core XIII – Environmental	4	5		25	75	100

		Biotechnology						
38	U21BTT62	Core XIV – Fermentation Technology	4	5		25	75	100
39	U21BTT63	Core XV - Bioinformatics	4	5		25	75	100
40	U21BTT64	Core XVI- Biostatistics	4	5		25	75	100
41	U21BTP65	Core XVII- Practical- Environmental Biotechnology, Fermentation Technology & Bioinformatics	4		5	25	75	100
42	U21BTE641/ U21BTE642	Elective IV - Biosafety and IPR/ Food Biotechnology	3	3		25	75	100
43	U21BTS641/ U21BTS642	Skill Based Elective –IV- Mushroom Cultivation/ Single Cell Protein	2	2		25	75	100
44	U21EAS61	Extension Activity (NSS/NCC/YRC/Physical Education)	3			100		100
		Total	**28**	**30**				**800**
Grand Total			**148**	**193**				**4400**

Extra Credit Course:
U21BTO31 - Online Course – III Semester
U21BTI41 - Internship – IV Semester
U21BTV51 - Value added course – V Semester (Dairy Technology)
Each carries 2 Credits to be included as additional credit courses.

Non Major Elective

NME - I	U21BTN31	Vermitechnology
NME - II	U21BTN42	Intellectual Property Right

SEMESTER – I

Course Code	U21BTT11	CELL AND MOLECULAR BIOLOGY	L	T	P	C
CORE - I			6	-	-	4

Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyze**
Learning Objective	• To make the students exposed to the structure of cells • To make the students understand the function of cell organells • To understand the concepts of cell cycle • To learn the process of replication, transcription and translation
Unit I	**The plant cell**
Structure and function of cell wall, membrane, chloroplast,mitochondria, ribosomes, peroxisomes, Golgi apparatus, nucleus, Nucleolar organizer and ER.	
Unit II	**Cell cycle**
Mitosis and meiosis, pairing, crossing over and cytokinesis.Transposons and Plasmids.	
Unit III	**Chromosomes**
Morphology and chemistry, Chromatin organization – C- valueparadox. Mechanism of DNA: Enzymes and Proteins involved in DNA replication – DNA polymerases, DNA Ligase, Primase and telomerase.	
Unit IV	**Transcription**
Transcription, RNA splicing – post transcriptional modification. Enzymes involved in transcription.	
Unit V	**Translation**
Translation – mechanisms of initiation, elongation and termination of polypeptides. Post translational modifications – targeting of proteins to different cellular components	
Text Books	1. S. C. Rastogi, Cell Biology, New Age International Publishers, 2019. 2. P. S. Verma, V. K. Agarwal, Cell Biology, S. Chand Publishing, 2016. 3. N. Arumugam, Cell Biology and Molecular Biology, Saras Publication, 2014. 4. Gerald Karp, Cell Biology 7 th Edition, Wiley, 2013. 5. Ajoy Paul, Textbook of Cell and Molecular Biology, Books & Allied Ltd. , 2011

References Books	1. SP Vyas, A.Mehta Cell and molecular biology- by CBS Publishes 2019. 2. Gerald Karp, Cell Biology, One buy Publisher,2014. 3. Donald E. Bianchi Philip Sheeler, Cell and molecular biology , 3RD Edition, Wiley India Pvt.Ltd , 2011. 4. S.C.Rastogi, Cell and Molecular Biology,New Age international publishers, 2012.		
E-reference links:	1. https://microbenotes.com/cell-organelles/ 2. https://www2.le.ac.uk/projects/vgec/highereducation/topics/cellcycle-mitosis-meiosis 3. https://medlineplus.gov/genetics/understanding/basics/chromosome/ 4. https://biologydictionary.net/transcription/		
Course Outcomes	At the end of the course, the student will be able to		
	CO1	comprehend the structure and function of the plant cell.	**K2**
	CO2	understandthe importance of cell cycle.	**K2**
	CO3	gain knowledge in the organization of chromosomes and replication of DNA	**K2**
	CO4	illustrate the mechanisms in the process of transcription.	**K3**
	CO5	analyse the factors required for the translation and post translational modifications	**K4**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	S	S	S	S	M	S	M	S
CO2	S	M	S	S	M	M	M	M	S	S	S	M	M
CO3	M	S	S	S	M	S	S	S	M	S	M	S	S
CO4	M	S	M	M	S	S	M	M	S	S	S	S	S
CO5	S	M	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

CODE	U21BTT12	THEORY - GENETICS	L	T	P	C
CORE II			5	-	-	4

Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyze**
Learning Objective	• To acquaint with the concepts in genetics. • To understand the concepts in mendalian genetics • To learn the concepts in gene interaction • To learn the human genetic traits, chromosomal abnormalities and population genetics
Unit I	**Classical genetics:**
Mendelian laws – monohybrid, dihybrid inheritance –complete, incomplete and co-dominance – lethal factor – allelic and non-allelic gene interaction – complementary and supplementary genes – epistasis – Pleotrophism.	
Unit II	**Inheritance:**
Multiple alleles and blood groups antigens. Quantitative inheritance Sex determination and sex linked inherited disorders – X – linked, Y – linked inheritance.	
Unit III	**Chromosome and Pedigree:**
Chromosome organization – linkage and crossing over-theories and types. Maternal inheritance. Pedigree studies: Symbols used in pedigree analysis.	
Unit IV	**Chromosomal abnormalities:**
Structural and numerical- deletion, duplication, translocation, inversion – number: Autosomal disorder-Down's syndrome, Edward's syndrome-sex chromosomal-turner's syndrome, klenefelters syndrome. Mutation – gene mutation – molecular basis of mutation	
Unit V	**Population genetics**:
Hardy Weinberg equilibrium, gene pool, Eugenics, Prevention of disease: Prenatal diagnosis; Genetic counseling	
Text Books	1. BenjaminA.pierce ,Genetics A conceptual Approach,W.H Freeman, 2016. 2. ProfessorBrooker R.G ,Genetics,McGraw Hill Education, 2014. 3. Hartwell,L.H.etal,Genetics From Genes to Genome, McGraw Hill Education 2014.
Reference Books	1. B.D.Singh, Fundamentals of Genetics, kalyaniPublishers , 2014. 2. Veer BalaRastogi ,Genetics,MEDTECK , 2019 . 3. Klug,Cummings, Spencer ,Concepts of Genetics, Pearson, 2019. S.S. Randhawa, A text book of Genetics, PeeVee ,2017.
E-reference links:	1. https://courses.lumenlearning.com/boundless-biology/chapter/laws-of-inheritance/

	2. https://www.ncbi.nlm.nih.gov/books/NBK21850/ 3. https://biologydictionary.net/multiple-alleles/#:~:text=Multiple%20alleles%20exist%20in%20a,is%20called%20a%20homozygous%20genotype. 4. https://nptel.ac.in/content/storage2/courses/102103012/pdf/mod2.pdf 5. https://www.ncbi.nlm.nih.gov/books/NBK21578/ 6. https://plato.stanford.edu/entries/population-genetics/		
Course Outcomes	Upon completion of this course, the students will be able to		
	CO1	describe the classical concepts of Mendelian genetics across life-forms.	**K2**
	CO2	understand the concepts of multiple alleles and sex linkeddisorders.	**K2**
	CO3	illustrate the chromosome organization and pedigree analysis.	**K3**
	CO4	compare and contrast the chromosomal traits in different chromosomal disorders.	**K4**
	CO5	know about population genetics and learn the ways to prevent chromosome disorders.	**K2**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	M	S	S	S	S	M	S	M	M	S
CO2	M	M	M	M	S	M	M	M	M	M	S	M	M
CO3	S	S	M	S	S	S	S	M	S	M	M	M	S
CO4	M	M	S	S	M	S	S	S	S	S	S	S	M
CO5	M	S	S	S	M	S	M	S	S	S	S	S	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BOA11	TAXONOMY AND PLANT PHYSIOLOGY	L	T	P	C
Allied - I			5	-	-	4
Cognitive Level		**K2: Understand K3: Apply K4:Analyse**				
Learning Objective		• To know the Kingdom andclassification of plants • To learn the structure and morphology of plants. • To gain knowledge on the physiological functioning of plants.				
Unit I		**Terminology of flower and floral parts:**				
Morphology – Inflorescence – types- racemose, cymose, mixed and special types. Descriptive Fruit-classification. Details of simple, fleshy, dry dehiscent and dry indehiscent, aggregate and multiple fruits.						
Unit II		**Taxonomy:**				
Binomial nomenclature. Systems of classification-Bentham &Hooker.A detailed study of the following families and their Economic Importance - Annonaceae, Leguminosae, Asclepiadaceae, Caesalpinoideae, (Caesalpiniaceae) &Mimosoideae (Mimosaceae), Cucurbitaceae, Apiaceae, Gramineae (Poaceae).						
Unit III		**Water relation:**				
Significance, - osmotic and non-osmotic uptake of water. Ascent of sap-cohesion theory: root pressure, transpiration, physiology of stomatal Action, Translocation of solutes and assimilates. Mineral uptake: Passive and active. Role of major and minor elements, mineral deficiency symptoms.						
Unit IV		**Photosynthesis:**				
Role of pigments enhancement effect, photosystems I & II Photosynthetic electron transport, Photophosphorylation, Carbon Assimilation: Calvin cycle Hatch &Salck pathway, CAM pathway.						
Unit V		**Plant Growth:**				
Regulatory substances; auxin, kinins, gibberellins, abscissic acid and their function. Photoperiodism, phytochrome-vernalization.						
Text Books		1. Annie Ragland, V. Kumaresan, A Text Book of Botany-Volume – I, Saras Publication,2015. 2. Annie Ragland, V. Kumaresan, A Text Book of Botany Volume – II, Saras Publication,2015. 3. Annie Ragland, V. Kumaresan, A Text Book of Botany Volume– III, Saras Publication,2015. 4. Annie Ragland, V. Kumaresan, A Text Book of Botany Volume – IV, Saras Publication,2015. 5. V. Kumaresan, Annie Ragland, Taxonomy of Angiosperms, Saras Publication, 2014.				

Reference Books	1. S. L. Kochhar, SukhbirKaurGujrat ,Plant Physiology: Theory and Applications, Cambridge University Press, 2021. 2. Dr. R P. Singh, Plant Anatomy, Physiology and Taxonomy ,KK Publication, 2014. 3. V. K. Jain, Fundamentals of Plant Physiology ,S Chand Publishing, 2017. 4. Lincoln Taiz, Eduardo Zeiger, Plant Physiology ,Sinauer Associates, 2016. 5. Dr. P. C. Vashishta, Dr. A. K. Sinha, Dr Anil Kumar, Botany for Degree Gymnosperms , S. Chand & Company, 2011.		
E-reference Links	1. https://forestrypedia.com/floral-terminology-illustrated/ 2. https://www.biologydiscussion.com/plants/families-of-flowering-plants-and-their-economic-importance/6580 3. https://ssec.si.edu/stemvisions-blog/what-photosynthesis 4. https://biologydictionary.net/c3-c4-cam-plants/ 5. http://www.omafra.gov.on.ca/english/crops/hort/plantgrowthregulators.htm		
Course Outcomes	Upon completion of this course, the students will be able to		
	CO1	list the terminologies in taxonomy.	**K2**
	CO2	illustrate the key concepts in Bentham and Hooker classification.	**K3**
	CO3	understand the different types of water, solute and mineral uptake in plants.	**K2**
	CO4	understand and demonstrate the process of photosynthesis.	**K3**
	CO5	compare the role of different regulatory substances in plant growth.	**K4**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	M	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S	S	M	S
CO3	M	M	S	M	S	M	S	S	S	M	S	S	S
CO4	S	S	M	M	S	S	M	S	S	S	S	M	M
CO5	S	M	S	S	S	S	S	M	S	S	S	M	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

SEMESTER – II

CODE	U21BTT21	BIOCHEMISTRY	L	T	P	C
CORE III			5	-	-	4

Cognitive Level	**K2: Understand K3: Apply**
Learning Objective	▪ To gain knowledge about biomolecules and their influence in day to day life ▪ To learn the nomenclature of different carbohydrates, lipids and amino acids. ▪ To learn about function, structure and various concepts of biomolecules
Unit I	**Carbohydrates**
Classification of Carbohydrates .structural elucidation of glucose and fructose. Properties, structure and biological functions of mono, di, oligo and polysaccharides. Homoglycans and Heteroglycans. Carbohydrate metabolism: Glycolysis and TCA cycle; Glycogenesis; Glycogenolysis; Gluconeogenesis	
Unit II	**Amino acids**
Structure, classification, physical and chemical properties. Peptides, peptide bond, biologically important peptides. **Proteins**: classification and Biological importance. Primary structure, Secondary, tertiary and quaternary structure. Ramchandranplot	
Unit III	**Nucleic acids**
DNA and RNA, Components of mono nucleotides, Purines and pyrimidine's: Physical properties and structure of double stranded DNA (A, B and Z DNA). The biological significance of double strandedness. Types of RNAs and their biological significance.	
Unit IV	**Lipids**
Nomenclature, classification and Biological significance. Simple lipids: types of fatty acids, triglycerides, waxes, steroids. Compound lipids: Phospholipids, sphingolipids and glycolipids, Lipoproteins; Structure and functions of lipoproteins; Role of lipids in bio membrane	
Unit V	**Vitamins**
Source, structure, biological role, daily requirement and deficiency manifestation of the fat soluble vitamins A,D,E & K. Water soluble vitamins-Ascorbic acid, thiamine, riboflavin, pyridoxine, niacin, pantothenic acid, lipoicacid, biotin, folic acid and vitamin B12.	
Text Books	1. T. Devasena ,Biomolecules , MJP Publishers, 2011. 2. Mohan P Arora ,Biomolecules , Himalaya publishing House ,Ist edition, 2012. 3. S. AzhaguMadhavan, P. Vinotha, V. Uma, Chemistry of Biomolecules, Notion Press , 2020.

Reference Books	1. P.K.Gupta ,Biomolecules and cell Biology, Rastogi Publication, 2017-2018. 2. Arihant Experts, Handbook of Chemistry , ArihantPubklications,

	2020. 3. Voet and Voet, Biochemistry ,John Wiley, 4 th edition, 2011. 4. Keith Wilson and John Walker, Principle and Techniques of Biochemistry and Molecular Biology ,Cambridge university Press, 2013. 5. Lehninger,Principles of Biochemistry,W H Freeman &co ,2017.
E-reference links:	1. https://microbenotes.com/carbohydrates-structure-properties-classification-and-functions/ 2. https://bio.libretexts.org/Bookshelves/Biochemistry/Book%3A_Biochemistry_Free_For_All_(Ahern_Rajagopal_and_Tan)/02%3A_Structure_and_Function/202%3A_Structure_Function_-_Amino_Acids 3. https://www.thoughtco.com/protein-function-373550 4. https://www.healthline.com/nutrition/micronutrients#definition 5. https://courses.lumenlearning.com/boundless-biology/chapter/nucleic-acids/ 6. https://www.verywellhealth.com/what-is-a-lipid-5084584
Course Outcomes	At the end of the course, the student will be able to
	CO1 understand about the classification of carbohydrates - Properties, structure and biological functions
	CO2 knowamino acids-structure, classification, physical and chemical properties.
	CO3 illustrate the structure and functions of nucleic acids
	CO4 gain knowledge on lipids- classification and biological
	CO5 know the importance of vitamins and their deficiency problems

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	2	3	4	5	6	7	8	1	2	3	4	5
CO1	S	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	M	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S	M
CO4	S	S	M	S	S	S	S	S	M	S	S	M	M
CO5	S	S	S	S	S	S	S	S	M	M	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

<table>
<tr><td colspan="2">Course Code U21BTP21</td><td colspan="3" rowspan="2">PRACTICAL - BIOCHEMISTRY</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td colspan="2">CORE IV</td><td>-</td><td>-</td><td>5</td><td>4</td></tr>
<tr><td colspan="2">Cognitive Level</td><td colspan="7">K2: Understand K3: Apply K4: Analyse K5: Evaluate</td></tr>
<tr><td colspan="2">Learning Objective</td><td colspan="7">• To know the fundamental aspects in biological phenomenon.
• To develop the skills in identifying the various biomolecules
• To develop the skills of quantifying the various biomolecules</td></tr>
<tr><td colspan="2">Experiments in Biochemistry</td><td colspan="7">1. Estimation of Protein – Lowry’s method.
2. Estimation of DNA by DPA Method
3. Estimation of RNA by Orcinol method
4. Estimation of Sugars by Benedict method
5. Estimation of Lipids
6. Analysis of Oils- Iodine Number- Saponification Value –Acid Number.
7. Estimation of Vitamin C.
8. Paper Chromatography.
9. Preparation of Buffer- Phosphate, Acetate, Tris.
10. Principles of Colorimeter, Spectrophotometer and pH.
11. Determination of Normality, Molarity, Molality, Percent Solution</td></tr>
<tr><td colspan="2">References</td><td colspan="7">1. David T. Plummer, An introduction to practical bio-chemistry. Tata McGraw publication 2008
2. Pattabiraman, Laboratory manual in bio-chemistry. Pineapple research ststion 2015
3. J. Jayaraman, Practical bio-chemistry. Jaypee brothers medical 2013
4. Keith Wilson & John Walker, Principle and Techniques of Biochemistry and Molecular Biology Cambridge university Press, 2010</td></tr>
<tr><td colspan="2">E- references Links</td><td colspan="7">1. https://www.thoughtco.com/protein-function-373550
2. https://www.healthline.com/nutrition/micronutrients#definition
3. https://courses.lumenlearning.com/boundless-biology/chapter/nucleic-acids/
4. https://www.verywellhealth.com/what-is-a-lipid-5084584</td></tr>
<tr><td colspan="2">Course Outcomes</td><td colspan="7">Upon completion of this course, the students will be able to</td></tr>
<tr><td colspan="2" rowspan="5"></td><td>CO1</td><td colspan="4">analyse the role of chemical constituents required for the estimation of biomolecules.</td><td>K4</td></tr>
<tr><td>CO2</td><td colspan="4">illustrate the principle behind the estimation ofprotein, DNA and RNA.</td><td>K3</td></tr>
<tr><td>CO3</td><td colspan="4">organize the laboratory setup for oil analysis using iodine and acid number.</td><td>K5</td></tr>
<tr><td>CO4</td><td colspan="4">learn about the basic procedureof paper chromatography.</td><td>K5</td></tr>
<tr><td>CO5</td><td colspan="4">learn about the basic preparation of buffers and the principles of basic instruments.</td><td>K3</td></tr>
</table>

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	2	3	4	5	6	7	8	1	2	3	4	5
CO1	S	M	S	M	S	M	M	S	S	M	M	S	S
CO2	S	S	S	M	M	S	M	M	S	M	M	S	S
CO3	M	M	S	M	S	S	M	S	S	S	S	S	M
CO4	M	M	M	S	S	S	S	S	M	S	S	M	M
CO5	S	S	S	S	S	S	S	S	M	M	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21ZOA22	ANIMAL PHYSIOLOGY	L	T	P	C
ALLIED II			5	-	-	4
Cognitive Level		**K2: Understand K3: Apply K5:Evalute**				
Learning Objective		• To get knowledge about different Systems In the Body • To get basic Knowledge on Functioning of Different organs. • To make the students Know about Reproductive system in humans.				
UNIT I		**Introduction to Organs of Digestion:**				
Role of enzymes in carbohydrate, Protein and Fat Digestion ,absorption of digested food materials in man						
Unit II		**Respiration:**				
Respiratory pigments – Distribution – composition – properties –Functions-Transport and exchange of oxygen and carbon-di-oxide - Anaerobiosis - Respiratory Quotient						
Unit III		**Circulation:**				
Origin and conduction of heat beat – cardiac cycle – ECG – Blood pressure -. Excretion – kinds of excretory products – structure of kidney – Nephron – Mechanism of urine formation in man – composition of urine.						
Unit IV		**Nerve Physiology:**				
Structure, types and functions of neuron. Nerve impulse – Definition – Conduction of nerve impulse through nerve– Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular Junction.						
Unit V		**Reproductive Physiology:**				
Ovary, Graafian follicles, menstrual cycle, pregnancy, lactation, menopause - the role of hormones.						
References		**Text Books** 1.S C Rastogi , Essentials of animal physiology, New age International (P) Ltd., Publishers, 2019. 2.Wesley Mills, A Text book of Animal physiology, Alpha editions, 2019. 3.MohanP.Arora, Animal physiology, Himalaya Publishing House, 2014. 4.Richard W. Hills, Gordon A. Wyse, Margaret Anderson, Animal Physiology, Oxford university press , 2017.				
		Reference Books 1.BansiDhar Singh, Animal Physiology and Biochemistry, Ram Prasad Publication, 2020. 2.Bhatia Jain Patni Singh Kohli, Animal Physiology and Biochemistry,RBD Publication,2016. 3.Vernon. L. Kellogg, The animal and man, Alpha Editions, 2020				

E-Reference Links	1. https://healthyeating.sfgate.com/enzymes-used-break-down-carbohydrates-2211.html 2. https://opentextbc.ca/biology/chapter/11-3-circulatory-and-respiratory-systems/ 3. https://www.khanacademy.org/science/biology/human-biology/neuron-nervous-system/a/overview-of-neuron-structure-and-function 4. http://www.lamission.edu/lifesciences/lecturenote/AliPhysio1/Reproduction.pdf		
Course Outcomes	Upon completion of this course the students will be abte to		
	CO1	know about the role of enzymes in digestion	**K2**
	CO2	acquire knowledge on respirarionand functions of respiratory pigments	**K2**
	CO3	differentiate the blood components and apply them to find each component	**K3**
	CO4	gain knowledge on nervous system and functions of neurotransmitters	**K2**
	CO5	evaluate the concepts of reproductive system and understand its functioning	**K5, K2**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	M	S	S	S	S	S	S	S
CO2	M	M	S	S	S	S	M	S	S	S	M	M	S
CO3	S	M	S	S	S	M	S	S	S	S	S	M	S
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	S	S	M	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER – III

Course Code	U21BTT31	DEVELOPMENTAL BIOLOGY	L	T	P	C
CORE V			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply				
Learning Objective		• To study about gametogenesis, origin of sperm and egg, cleavages. • To learn about gastrulation, metabolism and molecular changes and gene activities during gastrulation. • To study about the organogenesis and regeneration.				
Unit I		**Gametogenesis**				
Definition-primordial germ cells-origin-spermatogenesis-physiological ripening of sperm-oogenisis-previtellogenesis-vitellogenesis						
Unit II		**The egg**				
Size-shape-egg membranes,tertiarymembranes,organization of the egg yolk, pigments, egg cortex, polarity, oriin of polarity, types of eggs. Cleavage-Definition, morula, blastula, types of blastula, molecular changes, planes of cleavages, types of cleavage, factors affecting cleavage, cleavage laws, adhesion of blastomeres during cleavage, nuclei of cleaving cells, cytoplasm of cleaving cells.						
Unit III		**Gastrulation:**				
Definition, exogastrulation, metabolism and molecular changes during gastrulation, gene activities during gastrulation. Morphogenic movements- Definition, types epiboly, emboly mechanism of morphogenic movements						
Unit IV		**Organogenesis**				
Definition, tabulation, neurogenesis, spermatogenesis, growth and differentiation derivatives of ectoderm and mesoderm.						
Unit V		**Regeneration:**				
Definition – Types, Human Reproduction puberty, Menstrual cycle. Menopause, Pregnancy and related problems parturition and lactation.						
Textbook		1. Leon. W. Browder, Developmental Biology; Springer, 2012Sastry and 2. Shukla, Developmental Biology, Rastogt Publication, 2017				
References		1. Michael J. Barresh, Developmental Biology, Oxford, 2020 2. Scott F. Gilbert, Developmental Biology, OUP, publisher, 2017 3. A.K.Rathoure, Developmental Biology, Brillion Publishing, 2017				

E-References Link	1. https://www.e-libraryme.com/2019/12/developmental-biology.html 2. https://plato.stanford.edu/entries/biology-developmental/ 3. https://www.ncbi.nlm.nih.gov/books/NBK9983/		
Course outcomes	Upon completion of this course, the students will be able to		
	CO1	gather knowledge on gametogenesis	K1, K2
	CO2	acquire information on egg and cleavage	K1, K2, K3
	CO3	recognize the importance of gastrulation	K1, K2, K3
	CO4	explain the process of oogenesis	K1, K2, K3
	CO5	describe regeneration and human reproduction	K1, K2, K3

Mapping of CO with PO & PSO:

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	M	M	S
CO2	S	S	M	M	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	S	M	S	S	M	S	M
CO4	S	M	S	M	S	S	M	S	S	S	S	S	S
CO5	S	S	M	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21CHA33	CHEMISTRY	L	T	P	C
ALLIED	III		5	-	-	4
Cognitive Level		**K1: Recall K2: Understand K3: Apply**				
Learning Objective		• To understand the handling of chemicals and errors in chemical analysis • To get knowledge in chemical bonding and hybridization • To acquire knowledge in volumetric analysis • To understand the basic concept of Biomolecules				
Unit I		**Handling of chemicals and Data analysis :**				

a) Storage and handling of chemicals: Handling of acids, ethers, toxic and poisonous chemicals. Antidotes, threshold vapour concentration and first aid procedure.

b)Errors in chemical analysis: Accuracy, precision. Types of error-absolute and relative errors. Methods of eliminating and minimizing errors.

c) Separation techniques–Solvent extraction. Principle of adsorption and partition chromatography, column chromatography, thin layer chromatography (TLC), paper chromatography and their applications.

Unit II	**Chemical bonding :**

a) Ionic Bond: Nature of Ionic bond. Structure of NaCl, KCl and CsCl. Factors influencing the formation of ionic bond.

b) Covalent Bond: Nature of covalent bond. Structure of CH_4, NH_3, H_2O based on hybridisation.

c) Coordinate Bond: Nature of coordinate bond. Coordination complexes. Werner's theory. Geometrical and optical isomerism in square planar and octahedral complexes. Mention of structure and functions of chlorophyll and hemoglobin

d) Hydrogen Bond: Theory and importance of hydrogen bonding. Types of hydrogen bonding. Hydrogen bonding in carboxylic acids, alcohol, amides, polyamides, DNA and RNA.

e) vander Waal's forces: Dipole – dipole and dipole - induced dipole interactions.

Unit III	**Volumetric analysis :**

a) Methods of expressing concentration: normality, molarity, molality, ppm.

b)Primary and secondary standards: preparation of standard solutions

c) Principle of volumetric analysis: end point and equivalence points.

d) Strong and weak acids and bases - Ionic product of water , pH, pKa, pKb. Buffer solutions - pH of buffer solutions. Mention of Henderson equation & its significance.

Unit IV	**Chemical Kinetics:**
a) Chemical Kinetics: Rate, rate law, order and molecularity. Derivation of rate expressions for I and II order reactions. b) Catalysis-Homogeneous and heterogeneous catalysis. Enzyme catalysis, enzymes in biological system and in industry.	
Unit V	**Chemistry of biomolecules :**
a) Fats – Occurrence and composition. Hydrolysis of fats. b) Vitamins – Source, provitamin, properties and classification. Structure and function of vitamin A, C, D, K and E c) Hormones – Thyroxin, adrenaline and sex hormones (structure and functions only)	
Text Books	1. R. Gopalan, S. Sundaram, Allied Chemistry, Sultan Chand and Sons, 1995.
Reference Books	1. U. Sathyanarayana, Biochemistry, Books and allied (p) Ltd, 1999. 2. B.R.Puri and L.R.Sharma, Principles of physical chemistry, ShobanLalNagin Chand and Co., 1992.
Course Outcomes	Upon completion of this course, the students will be able to

	CO1	gain the knowledge on the handling of chemicals and errors in chemical analysis	**K1, K2**
	CO2	learn about chemical bonding and hybridization	**K1, K2**
	CO3	acquire knowledge on calculations for preparing standard solutions	**K1,K2**
	CO4	understand the advanced concepts and rate equations in chemical kinetics.	**K1, K2, K3**
	CO5	learn the importance of chemistry inBiomolecules	**K1, K2, K3**

Mapping of COs with POs & PSO:

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S		S	S	M	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTE311	ENDOCRINOLOGY	L	T	P	C
ELECTIVE - I			4	-	-	3

Cognitive Level	K1:Recall K2:Understand
Learning Objectives	• To have a knowledge on the functions of neuroendocrine systems • To get a thorough knowledge on various glands and related hormones • To know the role of hormones in metabolism • To understand the hormonal regulation in reproduction
Unit I	**Hormones**
Nature, function and classification of hormones – Feedback control of hormone secretion – Organisation and functions of neuroendocrine systems- Hypothalamo– hypophyseal interactions- Bioactive peptides.	
Unit II	**Pituitary gland**
Pituitary gland – Structure and functions, role of hormone secretions - Thyroid gland – Structure, function and biosynthesis of thyroid hormone – Parathyroid –Structure and PTH – Calcitonin – Role of hormones in calcium and phosphate metabolism.	
Unit III	**Gastrointestinal system**
Gastrointestinal hormones - their secretion, control and function – Insulin and glucagons – Adrenal hormones and Stress management – Catecholamines as emergency hormones- their role in the regulation of carbohydrate, protein and lipid metabolisms.	
Unit IV	**Human gland**
Adrenal gland – Structure and role played its hormones in glucose metabolism – Aldosterone and the rennin- angiotensin system – Pineal gland- structure and its influence on reproduction and pigmentation – Thymus gland – Structure and thymic hormones – their functions in brief	
Unit V	**Hormone Biosynthesis**
Steroid hormone biosynthesis in the ovary and testis – Hormonal regulation of ovarian cycles in mammals – Folliculogenesis, ovulation, corpus luteum formation and regression – Hormones in pregnancy and lactation. Gonadal steroid action on spermatogenesis and spermiogenesis – Role of hormones in sex accessory gland growth and functions.	
Text Books	1. Shlomo Melmed,Endocrinology, Publisher Saunders,2011 2. John Wass , Katharine Owen, Endocrinology and Diabetes, Publisher OUP UK,2014 3. Dharmalingam, Endocrinology, Publisher Jaypee Brothers

	Medical Publishers, 2010		
Reference Books	1. M.P. Goswami, Endocrinology and Molecular Cell Biology, Gaurav book centre Pvt Ltd, Delhi .2013 2. George Griffing, Endocrinology,Stat Pearls Publishing, USA. 2015		
E-Reference	1. https://www.classcentral.com/course/swayam-endocrinology-19855 2. https://www.webmd.com/diabetes/endocrine-system-facts 3. https://www.livescience.com/26496-endocrine-system.html 4. https://www.healthline.com/health/the-endocrine-system		
Course	Upon completion of this course, the students will be able to		
	CO1	understand the hormone classification and function of hormones	**K1**
	CO2	know the structure of Pituitary glands and its hormone function	**K2**
	CO3	comprehend the gastrointestinal hormones functions on the regulation of macromolecules metabolism	**K2**
	CO4	learn the importance of adrenalin and thymic hormones	**K2**
	CO5	get deep knowledge on ovarian cycles and sex hormones	**K2**

Mapping of COs with POs & PSOs:

CO	**Pos**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	M	M	S	S	M	S	M	S
CO2	S	S	M	M	M	S	S	S	S	S	M	S	S
CO3	S	S	M	S	S	S	M	S	S	M	M	M	S
CO4	M	S	S	S	M	S	M	S	S	M	S	M	M
CO5	S	S	S	M	S	S	S	S	S	M	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BTE312	NUTRITIONAL BIOCHEMISTRY	L	T	P	C
ELECTIVE - II			4	-	-	3

Cognitive Level	K1: Recall K2: Understand K3: Apply
Learning objective	• To explain mechanisms of digestion and absorption. • To learn the factors influencing bioavailability of nutrients • To describe the biochemical and physiological functions of the nutrient • To explain the mechanisms of nutrient homeostasis in the body. • To attain knowledge in Physiological role and nutritional significance ofcarbohydrates, lipids, vitamins
Unit I	**Food and its nutrition**:
Introduction and definition of food and nutrition. Basic food groups; Basic concepts of energy expenditure, unit of energy, measurements of food Stuffs by bomb calorimeter	
Unit II	**Value of Nutrition:**
Nutritive value of proteins; essential amino scids. Single cell proteins. Protein malnutrition and under nutrition, their preventive and curative measures.	
Unit III	**Hyperglycemia & hypoglycemia**
Diabetes mellitus - definition, types, features, gestation diabetes mellitus , glucose tolerance test, glycosurias, Hypoglycemia & its causes	
Unit IV	**Balanced diet:**
Composition of balanced diet and RDA for infants, children, adolescent, adult male and female, pregnant lactating woman and old age.	
Unit V	**Significance of nutrients:**
Physiological role and nutritional significance of carbohydrates, lipids, vitamins (water and fat soluble) and minerals.	
Textbook	1. Victor Rodwell, David Bender, & Kathleen Botham. Harper's Illustrated Biochemistry. 31st Edition. McGraw-Hill Education; 2018. 2. Dr. M Swaminathan. Text Book On Food & Nutrition. The Bangalore Press.
References	1. B. R. Mackenna & Robin Callander. Illustrated Physiology. 6th Edition. Churchill Livingstone; 1996. 2. White, Abraham; Handler, Philip; Smith, Emil L. Principles of biochemistry. 3rd Edition McGraw - Hill; 1964. 3. John E. Hall . Guyton and Hall Textbook of Medical Physiology. 13th Edition. Saunders; 2015.

E-references	1. https://www.otsuka.co.jp/en/nutraceutical/about/nutrition/functions/ 2. https://www.ncbi.nlm.nih.gov/books/NBK279510/ 3. https://www.contemporaryclinic.com/view/treatment-strategies-for-hypoglycemia-and-hyperglycemia 4. https://www.nutrition.org.uk/healthyliving/healthydiet/healthybalanceddiet.html 5. https://oneyouleeds.co.uk/the-five-food-groups/		
Course outcome	Upon completion of this course, the students will be able to		
	CO1	gather information on food and its nutrition.	K1
	CO2	know the nutrients value and its importance in prevention of disease.	K1
	CO3	acquire knowledge on diabetes mellitus and its effect in our body.	K2
	CO4	recognise the importance of balanced diet.	K2
	CO5	realise the facts behind the significance of nutrients.	K2

Mapping of COs with POs & PSOs:

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	M	M	S	S	S	S	S	M	M	S
CO2	S	S	S	S	S	M	S	S	S	S	M	M	S
CO3	S	S	M	S	M	S	S	S	S	M	S	S	M
CO4	S	M	S	M	S	S	S	S	S	S	M	S	S
CO5	S	S	S	M	S	S	S	S	S	M	S	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ; No Correlation (N) - 0 mark

CODE U21BTN311	VERMI TECHNOLOGY	L	T	P	C
NME I		2	-	-	2
Cognitive Level	**K2: Understand K3: Apply K6: Create**				
Learning Objective	• To learn about the types of earthworms • To learn the tchniques of bed preperations • To acquire knowledge on vermicast collection and packaging of vermicompost • To acquire the knowledge on applications and uses of vermicompost				
Unit I	**Vermi compost**				
History and scope of Vermi composting - Ecological classification: Humus feeders, Humus formers leaf, mold, top soil and sub soil types.					
Unit II	**Earthworm:**				
Physical, chemical and biological changes brought by earthworm in soil burrows- drilosphere - earthworm casts. Economic importance of vermicompost.					
Unit III	**Soil fertility:**				
Role of Earthworms in soil fertility– Types of Earthworm – Epigeics, Anecic and Endogeics –Use of Vermicompost for crop production					
Unit IV	**Earthworm Applications**:				
Use of earthworms in land improvement and land reclamation					
Unit V	**Vermiwash:**				
Economics of Vermicompost and Vermi wash production.					
Text Books	1. Vermiculture and vermitechnology ,Peter Davis Fresh Organic Gardening ,2014. 2. Jason Johns ,Worm Farming Creating compost at home with Vermiculture , Create space Independent, 2015.				
Reference Books	1. AvinashChauhan ,Vermitechnology, Vermiculture, vermicompost and earthworm , Lambert Pubishers ,2014. 2. Abdullah Adil Ansari, ,Vermitechnology- Permutaion and combination of organic waste, Lambert Pubishers, 2014.				
E-reference links:	1. https://www.ecomena.org/vermicomposting/ 2. https://www.trees.com/gardening-and-landscaping/types-of-earthworms 3. https://extension.psu.edu/six-steps-to-mushroom-farming 4. https://agritech.tnau.ac.in/farm_enterprises/Farm%20enterprises_%20Mushroom_Mother%20spawn.html				

Course Outcome	Upon completion of this course, the students will be able to		
	CO1	gain basic knowledge about Vermi composting.	**K2**
	CO2	illustrate the economic importance of vermi compost	**K3**
	CO3	evaluate the role of earthworms in soil fertility	**K6**
	CO4	appraise the role of earthworms in land improvement.	**K6**
	CO5	get the knowledge of vermiwash and its applications	**K6**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	S	S	M	S	M	S	M	S
CO2	S	M	M	S	M	S	M	S	S	M	S	S	S
CO3	M	S	S	M	M	M	M	S	M	S	S	S	M
CO4	M	S	S	M	S	M	S	S	S	S	M	M	S
CO5	S	M	M	S	S	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 marks ; Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ; No Correlation (N) - 0 mark

SEMESTER – IV

CODE	U21BTT41	MICROBIOLOGY	L	T	P	C
CORE VI			4	-	-	4

Cognitive level	K2 : Understand K3 : Apply K4: Analyse
Learning Objective	• To learn the concepts of microbiology and the contribution by different scientist • To enable the students to learn the structure, function and diversity of microorganisms • To identify the microorganism and analyse their classification. • To learn the genetic make up of the microorganisms, methods of reproduction and the factors affecting their growth
Unit I	**Concepts in Microbiology:**
Spontaneous generation vs. biogenesis. Contributions of Anton von Leuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming. Basic Principles in microscopy, Types of Microscopes – Light, Compound, Phase contrast and Electron microscope (TEM and SEM).	
Unit II	**Classification of microorganisms:**
Binomial Nomenclature, Whittaker's five kingdom and Carl Woese's three kingdom classification systems. Difference betweenProkaryotic and Eukaryotic microorganisms.General structure, growth and reproduction of Bacteria, Fungi, Algae, Virus and Protozoa.	
Unit III	**Nutritional requirements of Microorganisms:**
Autotrophs, Heterotrophs, Photoautotrophs, Chemotrophs. Culture media -Solid and Liquid -Types of media-Semisynthetic, synthetic, Enriched, Enrichment, Selective and Differential media.Macro nutrients growth factors	
Unit IV	**Microbial growth:**
Factors influencing and affecting microbial growth, Growth and death kinetics, Sterilization and Disinfection -Methods of sterilization- Physical methods- Dry heat- Moist heat, Radiation-Chemical sterilization -antimicrobial chemo therapy.	
Unit V	**Gene transfer in microbes**:
Conjugation, Transformation, Transduction.	
Text Books	1. C. P. Baveja, Textbook of Microbiology 6 th Edition, Arya Publications, 2021. 2. N. Arumugam, A. Mani, A. M. Selvaraj, L. M. Narayanan, Microbiology, Saras 3. Publication, 2014. 4. R. C. Dubey, D. K. Maheshwari, A Text book of Microbiology, S. Chand, 2013.
Reference Books	1. Ananthanarayan and Paniker's, Textbook of Microbiology, Eleventh Edition ,University press, 2020. 2. Harsh Mohan , Textbook of Pathology with Pathology Quick Review and MCQs-English,jaypeebrothers,medical publishers 2018 .

<table>
<tr><td></td><td colspan="3">3. SubhashChandraParija ,Textbook of Microbiology and Immunology ,Elsiever India Publication1 , 2016 .
4. Jeffrey C PommervilleFundamentals of Microbiology Jones and Bartlett publisher, 2017.
5. D.K.Sharma, Microbiology, Alpha science international limited,2013.</td></tr>
<tr><td>E-reference links</td><td colspan="3">1.https://blog.addgene.org/plasmids-101-transformation-transduction-bacterial-conjugation-and-transfection
2.https://www.ncbi.nlm.nih.gov/books/NBK21399/
3.http://www2.hawaii.edu/~johnb/micro/medmicro/medmicro.5.html
4.https://www.austincc.edu/rohde/CHP7a.htm
5.http://ecoursesonline.iasri.res.in/mod/page/view.php?id=5207</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">Upon completion of this course, the students will be able to</td></tr>
<tr><td rowspan="5"></td><td>CO1</td><td>define the concepts in microbiology and list the eminent scientists in the field of microbiology.</td><td>K2</td></tr>
<tr><td>CO2</td><td>identify the major categories of microorganisms and analyse their classification, diversity, and ubiquity.</td><td>K2</td></tr>
<tr><td>CO3</td><td>gain knowledge on the nutritional requirements of microbes and the factors influencing nutrition uptake.</td><td>K2</td></tr>
<tr><td>CO4</td><td>illustrate the factors influencing the microbial growth.</td><td>K3,K5</td></tr>
<tr><td>CO5</td><td>compare the techniques of gene transfer in microbes.</td><td>K4</td></tr>
</table>

Mapping of COs with POs & PSOs:

CO	POs								PSOs				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	M	M	M	S	S	S	M	S	S	S	M	S	S
CO2	S	S	M	M	M	S	M	S	S	S	S	M	M
CO3	S	S	M	M	M	S	S	S	M	M	S	S	S
CO4	S	S	M	M	M	M	M	S	S	M	M	S	S
CO5	M	S	S	S	S	M	S	S	S	M	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

<table>
<tr><td colspan="2">CODE U21BTP42</td><td colspan="3" rowspan="2">PRACTICAL - MICROBIOLOGY</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td colspan="2">COREV II</td><td>-</td><td>-</td><td>4</td><td>4</td></tr>
<tr><td colspan="2">Cognitive Level</td><td colspan="6">K2: Understand K3: Apply K4: Analyze</td></tr>
<tr><td colspan="2">Learning Objective</td><td colspan="6">• To learn the concepts of Microcsope
• To know about media preparation and sterilization techniques
• Learn the techniques of staining and plating methods</td></tr>
<tr><td colspan="2">Experiments in microbiology</td><td colspan="6">1. Maintenance of hygienic conditions in the laboratory-rules and regulations.
2. Microscope and its functions,
3. Preparation of different culture media and sterilization methods.
4. Simple staining
5. Gram’s staining
6. Capsule staining
7. Negative Staining
8. Endospore staining
9. Isolation of pure cultures of bacteria by streaking method.
10. Estimation of CFU count by Spread plate method / Pour plate method.
11. Motility by hanging drop method.
12. IMVIC test.</td></tr>
<tr><td colspan="2">Text Books</td><td colspan="6">1. C. P. Baveja, V. Baveja, Text and Practical of Microbiology for MLT 3 rdEdition,Arya Publications, 2019.
2. S. Rajan, R. Selvi Christy, Experimental Procedures in Life Sciences, CBS, 2019.</td></tr>
<tr><td colspan="2">Reference Books</td><td colspan="6">1.Wilson& Walker ,Biochemical Methods , Cambridge ,2018.</td></tr>
<tr><td colspan="2">E-reference links</td><td colspan="6">1. https://www.youtube.com/watch?v=icRQE73AUII
2. https://www.youtube.com/watch?v=AZS2wb7pMo4
3. https://www.youtube.com/watch?v=bRadiLXkqoU
4. https://www.youtube.com/watch?v=BY1scdexKIw</td></tr>
<tr><td colspan="2">Course Outcome</td><td colspan="6">Upon completion of this course, the students will be able to</td></tr>
<tr><td colspan="2" rowspan="5"></td><td>CO1</td><td colspan="3">know about the safe practices in a microbiology laboratory.</td><td>K2</td></tr>
<tr><td>CO2</td><td colspan="3">understand the functions of microscope.</td><td>K2</td></tr>
<tr><td>CO3</td><td colspan="3">experiment the methods of simple, gram,capsule and endospore staining.</td><td>K4</td></tr>
<tr><td>CO4</td><td colspan="3">apply and know about different techiquesfor isolation of organisms and staining techniques.</td><td>K3</td></tr>
<tr><td>CO5</td><td colspan="3">learn the principles of biochemical tests</td><td>K2</td></tr>
</table>

Mapping of COs with POs & PSOs:

CO	POs								PSOs				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	S	S	M	S	M	S	M	S
CO2	S	S	M	M	M	S	S	M	S	S	S	S	M
CO3	M	S	S	S	S	M	S	S	M	M	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	M	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

<table>
<tr><td colspan="2">Course Code U21CHA43</td><td colspan="2" rowspan="2">PRACTICAL - CHEMISTRY</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td colspan="2">ALLIED IV</td><td>-</td><td>-</td><td>4</td><td>4</td></tr>
<tr><td colspan="2">Cognitive Level</td><td colspan="6">K1: Recall K2: Understand K3: Apply</td></tr>
<tr><td colspan="2">Learning objective</td><td colspan="6">• To understand basics and gain knowledge on laboratory reagents and their uses in volumetric analysis.
• To acquire knowledge in he preparation of standard solutions.
• To be able to perform titratons for different solutions</td></tr>
<tr><td colspan="2">Experiments inChemistry</td><td colspan="6">Acidimetry and alkalimetry:
Titration acids used: hydrochloric acid, sulphuric Standard solutions prepared: sodium carbonate, sodiumbicarbonate, oxalic acid.

Oxidation and reduction titration:
Oxidising agents: Potassium permanganate (permanganimetry) Reducing agents: Ferrous sulphate, ferrous ammonium Sulphate, oxalic acid

Standard solutions prepared:
Ferrous Sulphate, ferrous ammonium Sulphate and oxalic acid.

Iodometry titrations:
titrations of liberated iodine against sodium thiosulphate using acidified potassium permanganate, potassium dichromate and copper Sulphate solutions.
Standard solutions: potassium dichromate, copper sulphate.</td></tr>
<tr><td colspan="2">Text Books</td><td colspan="6">1. Sundaram, Krishnan, Raghavan, Practical Chemistry (Part II), S. Viswanathan Co. Pvt., 1996.
2. B.S. Furniss, A.J. Hannaford, P.W. G. Smith, A.R. Tatchell, Vogel’s Text Book of Practical Organic Chemistry. 5th Edn., Pearson Education, 2005.</td></tr>
<tr><td colspan="2">References Books</td><td colspan="6">1. N.S. Gnanapragasam and G. Ramamurthy, Organic Chemistry – Lab manual, S. Viswanathan Co. Pvt., 1998.
2. Practical Chemistry by A.O. Thomas, Scientific Book Centre, Cannanore, 2003.
3. Basic Principles of Practical Chemistry, V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu, Sultan Chand & Sons, New Delhi, 2nd Edn., 2004.</td></tr>
<tr><td colspan="2">Course outcome</td><td colspan="6">Upon completion of this course, the students will be able to</td></tr>
<tr><td colspan="2" rowspan="2"></td><td>CO1</td><td colspan="3">know the procedure for titration of acid and bases.</td><td colspan="2">K1, K2</td></tr>
<tr><td>CO2</td><td colspan="3">gain knowledge in the oxidation and reduction agents and perform titrations.</td><td colspan="2">K1, K2, K3</td></tr>
</table>

	CO3	illustrate the methods to prepare standard solutions	**K1, K2, K3**
	CO4	learn and illustrate the concepts in iodometry titrations	**K1, K2, K3**
	CO5	explain and compare the principle behind different titration reactions	**K1, K2, K3**

Mapping of COs with POs & PSOs:

CO	**POs**								**PSOs**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	M	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S	S	S	M
CO4	S	M	S	S	S	S	S	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S		S	S	M	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

CODE	U21BTE421	SEED TECHNOLOGY	L	T	P	C
ELECTIVE II			3	-	-	3

Cognitive Level	K2: Understand K3: Apply K4: Analyze
Learning Objective	• To understand the structures of seed, formation and seed development. • To have knowledge about the production of high quality seeds • To know about the various metabolic changes at germination • To acquire a basic knowledge on seed treatment
Unit I	**Seed processing:**
Importance of seed processing in the pathway of seed improvement, physical characteristics used to separate seeds. Preparing seeds for processing. licensing of machines.	
Unit II	**Seed drying :**
Importance and advantages of seed drying ,moisture content and methods of seed moisture measurements, Theory of seed drying (wet dry seeds),advantages of mechanical drying equipments dehumidification and drying of heat sensitive seeds, relative humidity and equilibrium, moisture content of seeds.	
Unit III	**Seed processing machines :**
Principle, construction, working, adjustments, cleaning and uses of seed processing machines viz. i) Air screen cleaner cum grader ii) Specific gravity separator, aspirators, pneumatic aspirators, stoner iii)Roll mill iv) Magnetic separators v) Spiral separators, dropper best separator, electrostatic separators	
Unit IV	**Seed Treatment:**
Principle, construction, working, adjustments and uses of slurry seed treater mist -o- matic seed treated, storage and labeling of treated seeds, seed users safety. Seed conveyors and elevators	
Unit V	**Seed storage:**
structures and their management: Packing and marketing of seeds, bagger weigher, bag closing, portable and conveyor type of bag closer, labeling and maintaining lot identify, lot numbers, seed pellets, handling and stacking, maintenance of seed processing record.	
Text Books	1.Phundan Singh, Principles of seed technology, Kalyani Publisheres,2020. 2.Rahul Singh Rajput, Instant Plant Breeding and seed technology, Jain Brothers, 2019. 3.Rakesh singhNegi, NavneetiChamoli, DeeptiPrabha, Treasure of seed science and technology, Jain Brothers publishers, 2020. 4.K. Vanangamudi, Seed Science and technology, New India Publishing agency, 2020 .
Reference books	1.SR.Reddy, Farming system and sustainable agriculture, Kalyani publishers, 2017. 2.Mukesh Kumar, Compendum of seed technology, Write and print Publication, 2019.

E-reference links	1. https://agriallis.com/wp-content/uploads/2021/01/SEED-PROCESSING-AND-ITS-IMPORTANCE.pdf 2. https://www.biotecharticles.com/Agriculture-Article/Seed-Drying-Principle-Methods-and-their-Advantages-4077.html 3. https://agritech.tnau.ac.in/seed_certification/seed_processing_equipments.html 4. https://forestrypedia.com/seed-storage-its-importance-and-storage-methods/		
Course Objectives	Upon completion of this course the students will be able to		
	CO1	understand the basics of seed processing	**K2**
	CO2	learn the techniques of seed drying	**K4**
	CO3	illustrate the process of seed processing machines.	**K3**
	CO4	learn the seed tratement techniques	**K3**
	CO5	gain knowledge on the techniques of Seed storage	**K3**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	M	M	S	M	M	S	M	S	S	M	S
CO2	S	M	S	S	S	M	M	M	S	S	M	M	S
CO3	S	M	M	S	M	S	M	M	S	M	S	M	S
CO4	M	S	M	S	S	S	S	S	S	S	S	S	M
CO5	S	M	S	S	M	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BTE422	BIOFERTILIZER	L	T	P	C
Elective	II		3	-	-	3
Cognitive Level		**K2:Understand K3:Apply K4:Analyze**				
Learning Objective		• To understand the basic concepts of Biofertiliser • To learn the techniques of manufacture of Biofertiliser • To impart knowledge on Enterpreunership skill development				
Unit I		**Introduction:**				
History, importance of different types of fertilizers and their application to crop plants. Effect of chemical fertilizers on environment.						
Unit II		**Biofertilizer:**				
Algal and fungal (Mycorrhizal) biofertilizers, Bacterial biofertilizersRhizobial, free living N2 fixers and phosphate solubilizing bacteria, their significance and practice.						
Unit III		**Manures:**				
A general account of manures such as leaf moulds, composts form Yard Manure and a study of the following oilseed cakes: Castro and Neem as Biopesticides.						
Unit IV		**Application of biofertilizers and manures:**				
A combination of biofertilizer and manure application. Organic farming-compost and Vermi compost.						
Unit V		**Mass production of Cyanobacterial Biofertilizers:**				
Nostoc, Anabaena Azolla. Blue green algae.						
Text Books		1. ReetaKhosla, Biofertilizers and Biocontrol agents for organic Farming, KojoPress, 2017. 2. S.R. Reddy, Principles of Organic Farming, Kalyani, 2017. 3. V. Kumaresan, Biotechnology, Saras Publication, 2015.				
Reference Books		1. N.S. SubbaoRao, soil microorganisms and plant growth, Science publishers, 2011. 2. N. S. SubbaoRao, Biofertilizer, cbcs publishers, 2020. 3. Ronald M. Atlas & Richard Bertha, Microbial Ecology, Fundamentals & application, addidion Wesley, 2011 . 4. Surjitsen, Krisnenduacharya, Munjularai, Biofertilisers and Biopesticides Techno world publishers, 2019.				
E-reference links:		1. https://www.fertilizer-machine.net/solution_and_market/types-of-fertilizer.html 2. https://www.hunker.com/12401292/harmful-effects-of-chemical-fertilizers 3. https://www.nature.com/scitable/knowledge/library/biological-nitrogen-fixation-23570419/ 4. http://lnmuacin.in/studentnotice/2020/mass%20inoculation.pdf				
Course Outcomes		On Successful completion of the course, the students will be able to				

	CO1	know about the basics and history of biofertilizers.	**K2**
	CO2	illustrate the preparation of biofertilizers.	**K3**
	CO3	gain knowledge on the preparation of different types of manures.	**K2**
	CO4	gain knowledge on the types of manures accordingly to the plant type.	**K2,K3**
	CO5	learn and compare the statergies for mass production of biofertilizers.	**K4**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	2	3	4	5	6	7	8	1	2	3	4	5
CO1	S	M	S	S	M	S	S	S	S	S	S	M	S
CO2	S	S	S	M	S	S	M	S	S	S	M	S	S
CO3	M	M	S	S	S	S	S	M	S	S	S	M	S
CO4	M	S	S	M	S	S	S	S	S	S	S	S	S
CO5	S	M	S	S	S	S	M	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BTN421	INTELLECTUAL PROPERTY RIGHTS	L	T	P	C
NME II			2	-	-	2

Cognitive Level	**K2:Understand K4:Analyze**
Learning Objective	• To introduce fundamental aspects of Intellectual property Rights • To disseminate knowledge on patents, patent regime in India and abroad and registration aspects • To gain knowledge on copyrights and its related rights and registration aspects • To disseminate knowledge on trademarks and registration aspects • To disseminate knowledge on Design, Geographical Indication (GI).
Unit I	**IPR**
Introduction and the need for intellectual property right (IPR) - Kinds of Intellectual Property Rights: Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design- Trade Secret - IPR in India : Genesis and development – IPR in abroad	
Unit II	**Patents**
Elements of Patentability: Novelty , Non Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter - Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties - Patent office and Appellate Board	
Unit III	**Copyright**
Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings - Registration Procedure, Term of protection, Ownership of copyright, Assignment and license of copyright - Infringement, Remedies & Penalties.	
Unit IV	**Trademarks**
Concept of Trademarks - Different kinds of marks (brand names, logos, signatures, symbols, well known marks, certification marks and service marks) - Non Registrable Trademarks - Registration of Trademarks - Rights of holder and assignment and licensing of marks - Infringement, Remedies & Penalties - Trademarks registry and appellate board	
Unit V	**Other forms of IP**
Design: meaning and concept of novel and original - Procedure for registration, effect of registration and term of protection. Geographical Indication (GI) :Geographical indication: meaning, and difference between GI and trademarks - Procedure for registration, effect of registration and term of protection	
Text Books	1. Nithyananda, K V. Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited. 2019

	2. Neeraj, P., & Khusdeep, D. Intellectual Property Rights. India, IN: PHI learning Private Limited. 2014 3. Ahuja, V K. Law relating to Intellectual Property Rights. India, IN: Lexis Nexi 2017		
Reference Books	1. P.Narayanan,Intellectual Property Law,Eastern Law House,2017 2. J.P.Mishra,An Introduction to intellectual property rights,Central law Publications,2012 3. Professionals ,Intellectual Property Laws,Professional book publisher,2020		
E-reference links:	1. http://www.bdu.ac.in/cells/ipr/docs/ipr-eng-ebook.pdf 2. http://www.ipindia.nic.in/ 3. https://www.wipo.int/about-ip/en/		
Course Outcomes	On Successful completion of the course, the students will be able to		
	CO1	know the importance of IPR and IPR in India	**K2**
	CO2	know about patent and its importance	**K2,K3**
	CO3	acquire the knowledge on copyrights and its procedure	**K2**
	CO4	understand about Trademarks and Registration of Trademarks	**K3**
	CO5	know about the procedure for registration of Novel Products	**K2**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	M	M	M	S	S	S	M	S	S	S	M	S	S
CO2	S	S	M	M	M	S	M	S	S	S	S	M	M
CO3	S	S	M	M	M	S	S	S	M	M	S	S	S
CO4	S	S	M	M	M	M	M	S	S	M	M	S	S
CO5	M	S	S	S	S	M	S	S	S	M	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER – V

CODE	U21BTT51	IMMUNOLOGY	L	T	P	C
CORE VIII			5	-	-	4

Cognitive Level	**K2: Understand K3: Apply K4:Analyse**
Learning Objective	• To know about the basic concepts of Immunology • To learn about the immune organs and types of immunity • To understand the organization and function of immunoglobulins
Unit I	**Immunity:**
Introduction, History and Scope of immunology. Types of immunity, Antigen, Antibody-cells involved in immunity.	
Unit II	**Immunoglobulins:**
Immunoglobulins – Structure, types,distribution and functions. Single domain antibodies. Lymphoid tissues – Primary and secondary lymphoid organs – thymus, bone marrow; spleen, lymphnode, MALT. T & B Cells – receptors – activation and function. Humoral responses.	
Unit III	**MHC:**
MajorHistoCompatability – structure and functions. Typesof MHC. Antigen processing and presentation. T- Cell Activation. Cell mediated immunity	
Unit IV	**Hypersensitivity:**
Hypersensitivity reactions**,** Transplantation, HLA Typing; Mechanism of Graft rejection. Tumour immunology, Auto immune disorders, immuno deficiency and tolerance.	
Unit V	**Antigen-antibody interactions:**
precipitation – diffusion –radial and double diffusion – agglutination – Haemagglutination, Passive agglutination. Immunoelectrophoresis-definition and types Immuno diagnostics, ELISA, FISH, RIA and Western blotting. Monoclonal antibodies and vaccines	
Text Books	1. Jenny Punt, Sharon stranford, Patrica jones, Judith A Owen, Immunology, WH Freeman publisher , 2010. 2. Abul Abbas and Andrew H Lichtman and Shiv Pillai, Basic immunology Elsevier Publication , 2019.
Reference Books	1. S. K. Gupta ,Essentials of Immunology ,Publisher APC Books,2011. 2. Peter J Delves ,Roitts Essential Immunology , John Wiley publishers, 13 Edition, 2017. C. V. Rao ,Immunology: A Textbook , Good reads ,2020.
E-reference links	1. https://www.news-medical.net/life-sciences/What-is-an-Antigen.aspx 2. https://courses.lumenlearning.com/boundless-biology/chapter/antibodies/

	3. https://www.nursingtimes.net/clinical-archive/immunology/the-lymphatic-system-2-structure-and-function-of-the-lymphoid-organs-26-10-2020/ 4. https://www.lecturio.com/magazine/hypersensitivity-and-its-types/ 5. https://www.narayanahealth.org/organ-transplant/		
Course Outcomes	At the end of the course, the student will be able to		
	CO1	know about types of immunity and antigen and antibodies involved in immune reaction	**K2**
	CO2	describe the functions of Lymphoid organs	**K2**
	CO3	illustrate the structure and function of MHC	**K3**
	CO4	understand hypersensitivity reactions and learn about auto immune disorders and immuno deficiency	**K4**
	CO5	understand the mechanism of antigen and antibody reaction and alsoknow the immunotechniques for diagnosis of diseases.	**K2**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	M	S	S	S	S	M	S	M	S
CO2	M	M	S	S	S	S	S	M	S	S	S	S	S
CO3	S	S	M	S	S	M	S	S	S	M	S	S	M
CO4	S	M	S	S	S	S	M	M	S	S	S	M	S
CO5	S	M	S	S	S	S	S	S	S	M	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BTT52	PRINCIPLES OF ANIMAL BIOTECHNOLOGY	L	T	P	C
CORE	IX		5	-	-	4
Cognitive Level	**K2: Understand K3: Apply K4: Analyze K5: Evaluate**					
Learning Objective	• To learn animal cell culture techniques • To gain knowledge on invitro fertilization techniques • To know thebasic principles and techniques in genetic manipulation and genetic engineering.					
Unit 1	**Animal cell culture:**					
Fundamentals. Facilities and Applications. Media for Animal cells. Types of cell culture: Primary cell culture, secondary culture, cell transformation, cell lines, Insect cell lines, stem cell cultures, cell viability and cytotoxicity.Senescence and apoptosis, Organ culture.						
Unit II	**In Vitro Fertilization and Embryo Transfer:**					
Composition of IVF media, Steps involved in IVF, Fertilization by means of micro insemination, Stem cell culture,embryonic stem cell and their applications. Ethical issues in animal biotechnology.						
Unit III	**Genetic engineering in animals**:					
Methods of DNA transfer into animal cells- calcium phosphate co precipitation, micro-injection, electroporation, Liposome encapsulation, Biological vectors..						
Unit IV	**Gene therapy:**					
Gene therapy, mapping of human genome. RFLP and applications.DNA finger printing and Forensic Science. Cryopreservation- Need of Cryopreservation,						
Unit V	**Transgenics:**					
Transgenic animals. Transgenic animals: Mouse, Fish, Goat, Pig, Cattle, Sheep, Rabbit, Birds, Silkworm and Mosquitoes. Production and recovery of products from animal tissue cultures: cytokines, Plasminogen activators, Blood clotting factors, Growth hormones – Merits and demerits of transgenic animals						
References	**Text Books:** 1.B.Singh, S.K.Gautham, A text book of Animal Biotechnology, The energy and Resource Institute ,2015. 2. M. M. Ranga ,Animal Biotechnology, 3 rd edition .Agrobios publishers, 2019. 3. BhaskarGanguly& SohiniDey, Animal Biotechnology ,Stadium press publishers, 2014. 4. S. K. Jindal and M. C. Sharma, Biotechnology in animal health and Production , New India publishing Agency ,2015.					
	Reference Books 1.BhaskarGanguly&SohiniDey ,Animal Biotechnology, Stadium press					

	publishers,2014. 2.SarahLombard,AnimalBiotechnology,Callisto ,Reference publishers,2018. 3.S. K. Jindal and M. C. Sharma ,Biotechnology in animal health and Production, New India publishing Agency,2015. 4.SinghBirbal ,Advances in Animal Biotechnology , Springer publishers ,2019.
E-reference links	1. https://www.sigmaaldrich.com/technical-documents/protocols/biology/cell-types-culture.html 2. https://www.healthline.com/health/in-vitro-fertilization-ivf#purpose 3. https://www.mybiosource.com/learn/gene-transfer-technique/ 4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5823056/ 5. https://people.ucalgary.ca/~browder/transgenic.html 6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7112688/

Course Outcomes	Upon completion of this course the students will be able to		
	CO1	explain the fundamentals of animal cell and tissue culture.	**K2**
	CO2	get knowledge about various IVF Techniques	**K3**
	CO3	develop basic skills for the transfer of DNA into host cells	**K5**
	CO4	understand the gene therapy and its application in medicine	**K3**
	CO5	acquire knowledge in transgenic animals and its applications	**K3**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	M	M	S	S	S	S	M	S
CO2	S	M	S	S	S	M	S	S	S	S	S	M	S
CO3	S	S	S	M	M	S	M	S	S	S	S	S	S
CO4	S	M	S	M	S	S	S	M	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTT53	BASICS OF PLANT BIOTECHNOLOGY	L	T	P	C
CORE	X		5	-	-	4
Cognitive Level	K2: Understand K3: Apply K4: Analyze					
Learning Objective	• To understand the genome organization of plants • To aquire knowledge on plant vectors • To learn the techniques of plant tisuue culture					
Unit I	Plant genome organization					
Structure of representative plant genes and gene families in plant – organization of chloroplast genome – organization of mitochondrial genome. Micropropagation on large scale, somatic embryogenesis, protoplast culture and somatic hybridization, Anther, pollen and ovary culture for production of haploid plants.						
Unit II	Molecular biology and gene rearrangement					
Agrobacterium and crown gall tumours – mechanism of T-DNA transfer to plant – Ti plasmid vectors and its utility – plant viral vectors – symbiotic nitrogen fixation in Rhizobia						
Unit III	Genetic engineering of plants					
Construction of genome libraries and cDNA libraries Molecular breeding - probe construction – recombinant DNA – Transgenic plant and applications .						
Unit IV	Plant hormones					
Auxin, IAA. GA, Cytokinin and Absicisic acid (ABA) - molecular basis of action – phytochrome – role in photo – morphogenesis – regulation of gene expression - stress induced promoter switches in the control of gene expression – ethylene and fruit ripening.						
Unit V	Plant tissue culture					
Cells suspension cultures– haploid plants – cloning of hosts – micro propagation – somatic embryogenesis – protoplast isolation and applications.						
References	**Textbooks** 1.Trivedi, P.C.,Applied Biotechnology and plant genetics, Dominant publishers and distribution,2011. 2.H.S.Chawla ,Introduction to plant Biotechnology ,Oxford and IBH Publishers , 2020. 3.B.D.Singh ,Plant Biotechnology, Kalayani Publishers , January 2015.					
	Reference books 1.Abdin, M.Z.Kiran, U.Kamaluddin, Ali ,Plant biotechnology principles and applications, Springer publications, 2017. 2.R.Keshavachandran, V. Peter K, Plant Biotechnology methods in tissue culture and gene transfer , Universities press publishers,2018. 3. N.K.Gupta and Sunita Gupta Fundamental of plant biochemistry and biotechnology ,Kalyani publishers, 2018.					

E-reference links:	1. https://www.microscopemaster.com/micropropagation.html 2. https://www.apsnet.org/edcenter/disandpath/prokaryote/pdlessons/Pages/CrownGall.aspx 3. https://www.intechopen.com/books/symbiosis/potential-of-rhizobia-in-improving-nitrogen-fixation-and-yields-of-legumes 4. https://www.nature.com/scitable/topicpage/genetically-modified-organisms-gmos-transgenic-crops-and-732/ 5. https://www2.estrellamountain.edu/faculty/farabee/biobk/BioBookPLANTHORM.html		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	know the organisation of genome in plants	**K2**
	CO2	learn the mechanism of T-DNA transfer into a plant cell and to know about different plant viral vectors for gene transfer	**K3**
	CO3	acquire knowledge on construction of libraries, genetically modified plants with novel traits	**K2**
	CO4	compareplant growth hormones and gene expression in different plants.	**K4**
	CO5	illustrate the techniques of culturing tissues and protoplast isolation	**K3**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	M	M	M	M	S	S	M	M	S	S	S	M	M
CO2	M	M	S	S	S	M	M	M	S	S	S	M	M
CO3	S	S	M	M	S	M	M	S	S	S	S	S	M
CO4	S	S	M	S	M	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	M	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTP54	BIOINSTRUMENTATION	L	T	P	C
CORE	XI		5	-	-	4
Cognitive Level	K2: Understand K3: Apply K4: Analyze					
Learning Objective	• To know the fundamental principles and applications of basic instruments in biology • To learn the types of electrophoresis and spectroscopy • To understand, design and evaluate systems and devices that can measure, test and/or acquire biological information					
Unit I	**Microscopy**: Parts and their function, resolving power, aperture – simple, compound, light and dark field, electron and phase contrast microscopes, fluorescent– their applications.					
Unit II	**Colorimetry**: parts and their functions - Beer Lambert's Law. pH metry, Spectroscopy -NMR, IR, UV. Centrifugation techniques – principle, centrifuges and their uses, separation methods. Ultracentrifugation – applications					
Unit III	**Chromatography techniques** – Principles and types – paper, TLC, Column, HPLC and GC. Electrophoretic techniques – principle, electrophoresis of proteins and nucleic acids. Capillary electrophoresis**,** Pulse field electrophoresis and 2 D gel electrophoresis					
Unit IV	**Biochemical Techniques**: • Estimation of carbohydrates • Estimation of Proteins • Preparation of Buffers • Qualitative identification of Nucleic Acids					
Unit V	**1. Lipid analysis** a) Determination of Saponification number b) Determination of Acid number c) Determination of Iodine number **2. Separation of lipids by TLC** Separation of Amino acids by Paper chromatography.					
Text Books	1. M. J. Reilly, Bioinstrumentation , CBS Publishers & Distributers, 2016. 2. John G. Webster ,Bioinstrumentation, Wiley,2018. 3. M.H. Fulekar & Bhawana Pandey, I. K. Bioinstrumentation,International Publishing House Pvt. Ltd., 2014					
References	1. L. Veerakumari, Bioinstrumentation, MJP Publisher, 2019. 2. M. J. Reilly, Bioinstrumentation, CBS Publishers & Distributers, 2016. 3. John G. Webster,Bioinstrumentation, Wiley,2018.					

	4. Keith Wilson and John Wilson,Practical Biochemistry,Fifth edition Cambridge University Press ,2018. 5. M.H. Fulekar & Bhawana Pandey ,Bioinstrumentation , I. K. International Publishing House Pvt. Ltd., 2014.
E-Rreferences Link	1. https://application.wiley-vch.de/books/sample/3527338802_c01.pdf 2. https://bioeng.berkeley.edu/research/bioinstrumentation 3. https://worldwidescience.org/topicpages/b/bioinstrumentation.html
Course outcomes	Upon completion of this course, the students will be able to

CO	**Course Outcomes**	**Knowledge Level**
CO1	understand the fundamentals of microscope and its working principle.	K1, K2
CO2	realize the use of Colorimetry and spectroscopy. Acquire knowledge on centrifuge and its types	K1, K2, K3
CO3	recognize the importance of chromatographic techniques and Empathize on electrophoretic techniques	K1, K2, K3
CO4	explain the fundamentals of Biochemical techniques	K1, K2, K3
CO5	estimate and separate the lipid molecules	K1, K2, K3

Mapping of CO with PO & PSO:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	M	S	S	S	S	S	S	S	M	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	M	M	S	M	S	S	M	S	S	M	S	M
CO4	M	S	S	S	S	M	S	S	S	S	S	S	S
CO5	S	M	M	M	S	S	S	S	S	M	S	M	S

Strongly Correlating (S) - 3 marks ; Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark; No Correlation (N) - 0 mark

<table>
<tr><td>Course Code</td><td>U21BTP55</td><td rowspan="2">IMMUNOLOGY,PRINCIPLES OF ANIMAL BIOTECHNOLOGY AND BASICS OF PLANT BIOTECHNOLOGY</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>CORE</td><td>XII</td><td>-</td><td>-</td><td>5</td><td>4</td></tr>
<tr><td>Cognitive Level</td><td colspan="6">K2: Understand K3: Apply</td></tr>
<tr><td>Learning Objective</td><td colspan="6">• To learn about the techniques in immunology
• To acquire knowledge on Animal Biotechnology
• To gain knowledge in the field of Environmental Biotechnology</td></tr>
<tr><td>Experiments</td><td colspan="6">Immunology practicals

1. Antigen-anti body reactions
1. Immuno diffusion (Single radial, double Diffusion)
2. Blood grouping
3. Preparation of serum from blood

Practicals In Animal Biotechnology
1. Designing and safety measures in animal cell culture lab
2. Cleaning and sterilisationofglasswares and plastic tissue culture flasks
3. Preperation of Animal Tissue culture Media
4. Ehidium Bromide staining

Experiments in Plant Biotechnology
1. Sterilization procedures In Plant Tissue culture
2. Media preparation, different media combination used in plant tissue culture.
3. Explant preparation for plant tissue culture.
4. Isolation of protoplast from leaves (mechanical method)</td></tr>
<tr><td rowspan="2">References</td><td colspan="6">Text Books

1. V. Kumaresan, Animal Biotechnology, Publisher Saras Publication, 2019
2. Birbal Singh, Gorakh Mal , Sanjeev K. Gautam, Manishi Mukesh, Advances in Animal Biotechnology, Publisher Springer, 2019
3. Hrudayanth Thatoi, Supriya Dash, Swagat Kumar Das, Practical Biotechnology Principles and Protocols, Fream tech press, 2020
4. K. R. Aneja, Experiments in Microbiology, Plant Pathology, Tissue Culture and Microbial Biotechnology, New Age International Publishers, 2017.
5. Quak,F., Plant Tissue Culture: Methods and Applications in Agriculture, Academic Press, New York, 2018.</td></tr>
<tr><td colspan="6">Reference Books
1. Weir., Hand book of experimental Immunology. Vol I & II. Blackwell scientific publishing. 2011
2. Hudson L & Hay H.C, Techniques in clinical immunology, Blackwell scientific publishing, 2015.
3. Srivastava A K, Animal Biotechnology, Oxford& IBH Publishing, 2013</td></tr>
</table>

E- reference links	1. https://www.lecturio.com/magazine/hypersensitivity-and-its-types/ 2. https://www.narayanahealth.org/organ-transplant/ 3. https://www.dacollege.org/smat/zoo-sem4-ANTIGEN-ANTIBODY-INTERACTION.pdf 4. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5823056/ 5. https://people.ucalgary.ca/~browder/transgenic.html 6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7112688/		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	explain the procedure of immuno- assays and blood grouping.	**K2**
	CO2	understand the different types of media used animal cell culture	**K2**
	CO3	illustrate the staining techniques in animal tissue culture.	**K3**
	CO4	learn and understand the basic techniques of microbial isolation From soil	**K2**
	CO5	gain knowledge on isolation of azobacter and phosphate solubilizing bacteria	**K2**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	2	3	4	5	6	7	8	1	2	3	4	5
CO1	S	M	S	S	S	M	M	S	S	M	M	S	S
CO2	S	S	S	M	M	S	M	M	S	M	M	S	S
CO3	M	M	S	M	S	S	M	S	S	S	S	S	M
CO4	M	M	S	S	S	S	S	S	M	S	S	M	M
CO5	S	S	S	S	S	S	S	S	M	S	S	M	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTE511	FORESTRY	L	T	P	C
Elective	III		3	-	-	3
Cognitive Level	**K2: Understand K3: Apply**					
Learning Objective	• To know the scope and importance of forestry • To understand the methods in siviculture • To learn the scope and necessity of agroforestry • To acquire knowledge on forest soils, forest conservation and wildlife biology • To know about the forest economics and forest laws in India					
Unit I	**Siviculture:**					
Introduction to siviculture, Ecological and physiological factors influencing vegetation, natural and artificial regeneration of forests, Silviculture systems and their management. Mangrove and cold deserts- Characteristics, identification and management of species.Traditional and recent advances in tropical silvicultural research and practices.						
Unit II	**Agroforestry:**					
Scope and necessity; role in the life of people and domestic animals and in integrated land use. Agro forestry systems under different agroecological zones; selection of species and role of multipurpose trees and NTFPs, techniques, food, fodder and fuel security.						
Unit III	**Forests Soils:**					
Classification, factors affecting soil formation; physical, chemical and biological properties.Soil conservation – definition, causes for erosion.Role of forests in conserving soils. Maintenance and build up of soil organic matter, provision of loppings for green leaf manuring; forest leaf litter and composting; Role of micro-organisms in ameliorating soils; N and C cycles, VAM.						
Unit IV	**Forest Protection & wildlife Biology:**					
Susceptibility of forests to damage, nature of damage, cause, prevention, protective measures and benefits due to chemical and biological control. General forest protection against fire, equipment and methods, controlled use of fire, economic and environmental costs; timber salvage operations after natural disasters.Rotational and controlled grazing, human impacts; encroachment, poaching, grazing, live fencing, theft, shifting cultivation and control.						
Unit V	**Forest Economics and Legislation:**					
Socio-economic analysis of forest productivity and attitudes; valuation of forest goods and service.History of forest development;Indian Forest Policy of 1894, 1952 and 1990. National Forest Policy, 1988 of People's involvement, Joint Forest Management, Involvement of women. Indian Forest Act 1927; Forest Conservation Act, 1980; Wildlife Protection Act 1972 and their amendments; Application of Indian Penal Code to Forestry.						

References	**Text books** 1. Parmeshwar S. Concepts in Forestry, Publisher Anmol Publications Pvt. Ltd. 2013 2. De Vere Burton L. Introduction to forestry science, Delmar Publishers, New York. 2000 3. Manikandan K. and PrabhuS. Indian Forestry A Breakthrough Approach to Forest Service - 8th Edition, Jain brothers publication, India,2021		
	Reference Books 1. Roger S,2013, 2nd edition, Forestry in global context, CABI publishers,United States. 2. Donald L. Grebner , Pete Bettinger, Jacek P. Siry , 2013. Introduction to forestry and natural resource. 1 st Edition, Academic press		
E-reference links:	• http://www.jnkvv.org/PDF/11042020094651R.K.Bajpai.pdf • http://apps.worldagroforestry.org/Units/Library/Books/PDFs/32_An_introduction_to_agroforestry.pdf?n=161 • https://ucanr.edu/sites/SFIT/files/190066.pdf • https://www.cbd.int/idb/doc/2011/idb-2011-booklet-en.pdf • https://www.ubcpress.ca/asset/9068/1/9780774821520.pdf • http://ifs.nic.in/Dynamic/book/page3.pdf		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	learn about silviculture and the characteristics of different types of forests	**K2**
	CO2	understand the multipurpose of trees in different industries and the scope of agroforestry	**K3**
	CO3	acquire knowledge on forests soils and learn the importance of forests in soil conservation	**K2**
	CO4	learn the damages that occur in forests and ways to prevent the damages	**K3**
	CO5	attain knowledge on the forest economics and the forest laws in India	**K2**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	2	3	4	5	6	7	8	1	2	3	4	5
CO1	S	M	M	S	S	M	M	S	M	M	M	S	S
CO2	S	M	S	M	M	S	M	M	S	M	M	S	S
CO3	M	M	M	M	S	M	M	S	S	S	S	S	M
CO4	M	M	S	S	S	S	S	S	M	S	M	M	M
CO5	S	M	M	S	S	M	S	M	M	S	M	M	S

Strongly Correlating (S) - 3 marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark No Correlation (N) - 0 mark

Course Code	U21BTE512	BIODIVERSITY CONSERVATION	L	T	P	C
Elective	III		3	-	-	3
Cognitive Level	**K2: Understand K3: Apply K4:Analyse**					
Learning Objective	• To provide students with opportunities for goal oriented research in biodiversity conservation and management for ecotourism and wildlife development. • To identify the variety of our enormous biological resources in relation to their various ecological settings. • To understand the functioning of the ecological systems and their driving force.					
Unit I	**Biodiversity and Conservation**					
Catergories of biodiversity – species concepts: keystone, flagship, dominant and co-dominant species – Biogeography: Major terrestrial biomes – theory of island biogeography – Biogeographical zones of India – Principles and approaches of conservation – In-situ conservation: National parks, Wildlife Sanctuaries, Biosphere reserves – Ex-situ conservation: Botanical and herbal gardens, zoological parks, seed orchards and gene banks.						
Unit II	**Values of biodiversity**					
Ecosystem services- screening plants for medicines- New agricultural and industrial products from the tropics- identifying and protecting the origin of food crops. Speciation- species area relationship: productivity- diversity relationship – Biodiversity hot spot.						
Unit III	**Biosafety**					
The effect of global climatic change on natural communities- IUCN categories of extinction- red data book – causes for species extinction – impact of exotic species on native species – GMOs and biosafety – Intellectual property rights- GATT,WTO, farmers and breeders rights- Bodiversity act -2002.						
Unit IV	**Remote sensing**					
Introduction-Analysis techniques-Digital image processing Role of remote sensing in biodiversity management-GIS and biodiversity, landscape elements Oceans colour and fishery, water security. Environment assessment and monitoring.						
Unit V	**Conservation**					
In situ and Ex situ conservation methods- conservation of biological diversity in Botaniocal gardens- Information management for the conservation of biodiversity. Cryobiology-Agro ecology and in situ conservation of native crop diversity- International development and the protection of biodiversity						
References	**Text books** 1. B.B.Hosetti and S.Ramakrishna, Biodiversity concepts and conservations, Aavishkar publishers, 2016. 2.MahendraChaturvedi, Biodiversity and conservation, D.P.S. Publsihing House, 2011.					

	3.KV.Krishnamurthy, An Advanced textbook on Biodiversity, Oxford and IBH Publishing House, 2013. 4.PraveenGarg, Biodiversity and its conservation, BR Publishers, 2018.
	Reference Books 1.P.D.Sharma , Ecology and environment, Rastogi Publishers, 2017. 2. Ravi Biruduand P.Padmavathi, Ecology and Biodiversity, Notion Press, 2017.
E-reference links:	1. https://www.toppr.com/guides/biology/biodiversity-and-conservation/types-of-biodiversity/ 2. https://www.safeworldhse.com/2020/04/biodiversity-types-importance-loss-conservation.html 3. http://www.bsienvis.nic.in/Database/Biodiversity-Hotspots-in-India_20500.aspx 4. https://www.environmentbuddy.com/endangered-wildlife/list-of-biodiversity-hotspots-examples/ 5. file:///C:/Users/machs/Downloads/sensors-10-09647.pdf 6. https://www.scimagojr.com/journalsearch.php?q=21482&tip=sid
Course Outcomes	Upon completion of this course the students will be able to

	CO1	learn the fundamentals of Biodiversity -In-situ and Ex-situ conservation	**K2**
	CO2	know the value of Biodiversity and importance of ecosystem service	**K3**
	CO3	explain the global climate changes and biodiversity acts.	**K2**
	CO4	illustrate remote sensing and its techniques.	**K3**
	CO5	compare in-situ and ex-situ conservation techniques.	**K4**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	M	S	M	S	S	S	S	S
CO2	M	S	S	S	S	S	M	S	S	M	S	S	S
CO3	S	S	M	S	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S	S	M	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BTS531	MEDICAL LAB TECHNOLOGY	L	T	P	C
SBE	III		2	-	-	2

Learning Objective	• To understand the basic concepts of medical laboratory techniques • To learn the techniques required for clinical diagnosis • To perform basic biochemical tests and histopathology tests • To gain knowledge on the principles of diagnosis
Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate

Unit I **Basic Hematology**:

Specimen collection and handling, transportation of specimens, disposal of specimen after laboratory use. Specimen preservation. Composition of blood. Methods of estimation of Haemoglobin, PCV, total and differential count of WBC, platelet count, clotting, bleeding and prothrombin time. Blood Group - methods of grouping and Rh factor.

Unit II **Biochemical test:**

Tests for specific amino acids, determination of proteins in serum and plasma. Determination of glucose, glucose tolerance test, ketone bodies, glycated hemoglobin, triglycerides, cholesterol, lipoproteins. Examination of body fluids - ascitic fluid, pleural fluid, synovial fluid, pericardial fluid, CSF and amniotic fluid. Urine analysis, abnormal constituents. Faecal specimen - Macroscopic and microscopic examinations - detection of occult blood, Semen analysis. Laboratory analysis of throat swab, sputum specimens, purulent exudates – Tuberculosis

Unit III **Histopathology :**

Tissue reception, labeling, fixation and section cutting, Preparation of paraffin blocks (Dehydration, clearing, embedding, blocking).Handling and care of microtome, types of microtome, sharpening of knives, and section cutting. Frozen section techniques - CO2 freezing, cryostat. Preparation of common stains. H & E, Congo red, methyl violet, Leishman stain, Giesma and staining techniques. Mounting of specimens, record keeping, indexing of slides. Molecular analysis of chromosomal aberrations in leukemias and lymphomas. Molecular diagnosis of genetic diseases.

Unit IV **Principles of Diagnosis:**

History, Physical Examination, Treatment, Differential Diagnosis, Tests and procedure (Clinical laboratory test, Tests using Radioisotopes, Endoscopy, Ultrasound, X-Ray, MRI, CT scan, PET scans, cytologic and Histologic examination of cells and tissue from patients).

Unit V **Molecular Diagnosis:**

Nucleic acid amplification methods and types of PCR: Reverse Transcriptase-PCR, Real-Time PCR, Inverse PCR, Multiplex PCR, Nested PCR, Alu-PCR, Hot-start, In situ PCR, Long-PCR, PCR-ELISA, Arbitrarily primed PCR, Ligase Chain Reaction. Proteins and Amino acids, Qualitative and quantitative techniques: Protein stability, denaturation; amino acid sequence analysis. Viral diagnostics: immunodiagnosis, molecular diagnosis. SNP-based diagnosis. DNA chips, automation, gene therapy; applications in diagnosis of genetic disorders, Diagnosis of Prenatal & neonatal genetic disorders.

Text Books	1. GP Pal,Textbook of Histology, Publisher: Paras Medical Books,2015 2. B.S.Shah, Short Textbook Of Hematology,Publisher : CBS Publishers & Distributors,2014 3. Nader Rifai, A. Rita Horvath, Carl T. Wittwer, Clinical Chemistry and Molecular Diagnostics, Publisher Elsevier India,2018
References	1. Praful. B. Godkar, Darshan. P. Godkar, Text Book of Medical Laboratory Technology. Bhalani Publishing House. 2014. 2. F.J. Baker, R.E. Silverton, Butterworth - Heinemann. Introduction to Medical Laboratory Technology. Butterworth- Heinemann, Saunders Publisher, 2014. 3. Todd & Stanford. Clinical Diagnosis and Management by Laboratory Methods. 16th ed. 2016.
E-reference links:	1. https://www.thebalancecareers.com/what-is-a-medical-laboratory-technologist-526029 2. https://www.leicabiosystems.com/knowledge-pathway/an-introduction-to-specimen-processing/ 3. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1214554/ 4. https://www.justintimemedicine.com/CurriculumContent/p/387 5. https://www.bloodworksnw.org/medical-services/introduction-to-hematology
Course outcome	Upon completion of this course, the students will be able to

	CO1	know the methods of sample collection, specimen preservation and estimation methods	**K2**
	CO2	estimate biomolecules and body fluids using several biochemical tests	**K5**
	CO3	understand the methods in histopathology and sample freezing techniques	**K2**
	CO4	learn the principles of diagnosis and apply the techniques to perform tests	**K2**
	CO5	develop skills in handling different types of PCR for molecular diagnosis	**K1,K2,K3**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	S	M	M	S	S	S	M	S
CO2	S	M	S	S	S	S	S	S	M	S	S	M	S
CO3	M	S	M	M	S	S	S	S	S	M	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S	M	S	S
CO5	S	M	M	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTS532	FOOD PROCESSING TECHNOLOGY	L	T	P	C
SBE	III		2	-	-	2

Cognitive Level	**K1: Recall K2: Understand K3: Apply**
Learning Objective	• To learn the functional groups of food • To acquire knowledge on Food processing • To learn the principle of food spoilage and food preservation. • To learn the techniques of food packaging
Unit I	**Nutrient rich Foods:**
Carbohydrate, fat and protein rich foods, vitamins, minerals and fiber. Milk and milk Products – Fluid milk & some of its derivatives, Ice cream & related products, cheese, Yoghurt milk powder, paneer, Indian dairy products – kheer, khoa / mawa, khurchan, Rabri, kulfi / Dahi, Ghee, Lassi, Makkhan.	
Unit II	**Food preservation:**
Food Irradiation, microwave heating & cosmic heating preparation of cakes-methods. Assessment of Quality Factors in foods: - Appearance factors, Textural factors, flavor factors, quality standards.	
Unit III	**Food detoriation and its control:**
Shelf life & dating of foods, principles of food preservation, control of microorganisms. Beverages: Carbonated non-alcoholic beverages, beer, wine, coffee, tea. Causes of spoiling and their control methods.	
Unit IV	**Processing of food Materials Hands on training:**
Picklemaking, jamsjellies, squash.	
Unit V	**Food Safety, Risks Hazards:**
Food processing & the environment, principles of food packaging. Governmental regulation of food & nutrition labelling for jam, jelly, squash, pickle. General characteristic of milk, milk products.	
References	**Text Books** 1.Sukumar De ,Outlines of Dairy technology , Oxford university press ,2011. 2.W.Hartel ,Principles of Food Processing,Springer,2019. 3.Shubhangini A.Joshi ,Nutrition & Dietetics , McGraw hill, 2017
	Reference Books 1.NormalN.Potter, Joseph H. Hotchkiss ,Food science , Fifth Edition ,Shafifur, 2017. 2.P.J Fellows, Food processing technology ,wood head pulishing, 2017.
E-reference	1. https://academic.oup.com/advances/article/5/2/131/4557960 2. https://www.highspeedtraining.co.uk/hub/food-preservation-methods/

links	3. https://www.acsedu.co.uk/Info/Alternative-Living/Preventative-Healthcare/Food-Spoilage.aspx 4. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1750-3841.2007.00301.x		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	gain knowledge and understanding on different foods and milk products	**K1**
	CO2	understand the food preservation techniques and quality factors	**K3**
	CO3	understand the factors responsible for food detoriation and ways to prevent food spoilage.	**K2**
	CO4	understand the preparation of pickle, jam, jellies and squash.	**K4**
	CO5	gain knowledge on food safety and regulations of government.	**K2**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	M	S	S	S	M	M	S	S	S	M	S
CO2	S	M	S	S	M	M	M	S	M	S	S	M	S
CO3	M	S	M	M	S	S	M	S	S	M	S	S	S
CO4	S	S	S	S	S	M	M	S	S	M	M	S	S
CO5	S	M	M	M	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER - VI

Course Code	U21BTT61	ENVIRONMENTAL BIOTECHNOLOGY	L	T	P	C
CORE	XIII		5	-	-	4
Cognitive Level	**K2:Understand K3:Apply K4: Analyze K6: Create**					
Learning Objective	• To provide students with knowledge of environmental biotechnology. • To develop an knowledgeon pollution. • To gain working knowledge on bioremediation • To gain knowledge on genetically modified organisms.					
Unit I	**Natural resources:** Classification of Natural resources, Renewable and non-renewable, conservation of natural resources-water and soil resources. Environmental impact- production of biofuel and biogas.					
Unit II	**Bioremediation**: Concepts of bioremediation (in-situ and ex-situ), Bioremediation of toxic metal ions – bio sorption and bioaccumulation principles. Environmental impact of pollution and measurement methods – Composting of organic wastes, microbial bioremediation of oil spills; Bio-leaching: Microbial leaching of ores – direct and indirect mechanisms. Waste water treatment – sewage treatment and common industrial effluent treatment; Concepts of phytoremediation; Microbial biotransformation of pesticides and xenobiotic.					
Unit III	**Biofertilizers:** Biofertilizers and their importance in crop productivity; Algal and fungal (Mycorrhizal) biofertilizers Bacterial biofertilizers (Rhizobial, free living Nitrogen fixers and phosphate solubilizing bacteria, their significance and practice.					
Unit IV	**Biopesticides:** Bacterial (BT pesticides), fungal (Trichoderma); Viral biopesticides – Baculovirus, NPV insecticides; Production of biofertilizers and biopesticides for large scale application.					
Unit V	**Genetically Engineered Microorganisms:** Genetically Engineered Microorganisms in treatment of wastes, genetically engineered plants and microorganisms in agriculture and productivity. Hazards of genetically engineered microorganisms, plants and animals-Policies of genetic engineering research.					
References	**Text Books**. 1.U. Sathyanarayana, U. Chakrapani, Biotechnology, Books & Allied Ltd. , 2020. 2. N. Arumugam, M. G. Ragunathan, Environmental Studies, Saras Publication, 2019. 3. V. Kumaresan, Biotechnology, Saras Publication, 2015. 4. V. Kumaresan, N. Arumugam, Environmental Biotechnology, Saras Publication,2014. 5. R. C. Dubey, Advanced Biotechnology, S. Chand & Company, 2014.					
	Reference Books 1. Bruce E. Rittman Perry L. McCarty, Environmental Biotechnology:					

<table>
<tr><td></td><td colspan="3">Principles and Applications , McGraw-Hill Education, 2011.
2. Jogdand ,Environmental Biotechnology , S.N.. Himalaya Publishing House, Bombay, 2011.
3. De, K.K, Wiley ,Environmental Chemistry Eastern Ltd. NewDelhi, 2014.
4. Mackenzie Davis ,Waste Water Engineering , McGraw-Hill Education, 2012.
IndhuShekhar Thakur, Environmental Biotechnology Concepts and Applications 2nd Edition ,Dreamtech Press, 2019.</td></tr>
<tr><td>E-reference links</td><td colspan="3">1. https://www.environmentalpollution.in/natural-resources/natural-resources-meaning-and-classification-of-natural-resources/278
2. https://www.intechopen.com/books/frontiers-in-bioenergy-and-biofuels/biogas-biodiesel-and-bioethanol-as-multifunctional-renewable-fuels-and-raw-materials
3. https://www.intechopen.com/books/trace-metals-in-the-environment-new-approaches-and-recent-advances/bioremediation-techniques-for-polluted-environment-concept-advantages-limitations-and-prospects
4. http://wiki.biomine.skelleftea.se/wiki/index.php/Bioleaching
5. https://www.nap.edu/read/2131/chapter/4#19
6. https://investuttarakhand.com/themes/backend/investible/IP%20UK%20Manufacturing-of-Biofertilizers-and-Biopesticides.pdf</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">Upon completion of this course the students will be able to</td></tr>
<tr><td></td><td>CO1</td><td>illustrate the classification and conservation of natural resources</td><td>K3</td></tr>
<tr><td></td><td>CO2</td><td>compare the eco-friendly bioremediation techniques that can solve environmental problems.</td><td>K4</td></tr>
<tr><td></td><td>CO3</td><td>gain knowledge on biofertilizers and crop productivity.</td><td>K2</td></tr>
<tr><td></td><td>CO4</td><td>compare the potential use of different biopesticides on plants against pests and know production of biofertilizers and biopesticides</td><td>K4</td></tr>
<tr><td></td><td>CO5</td><td>evaluate the role of genetically engineered organisms for treatment of waste.</td><td>K6</td></tr>
</table>

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	M	S	S	S	S	S	S	M
CO2	S	S	M	S	M	S	M	S	M	S	M	S	S
CO3	S	S	M	M	S	S	S	S	S	S	S	S	M
CO4	S	S	S	S	S	S	M	S	S	S	S	S	S
CO5	S	S	M	S	S	S	S	S	S	S	S	S	M

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTT62	FERMENTATION TECHNOLOGY	L	T	P	C
CORE	XIV		5	-	-	4
Cognitive Level	**K2:Understand K3:Apply**					
Learning Objective	• To learn about importance of microorganisms in industries • To understand the techniques of fermentation. • To learn the production of industrial products using micro organisms.					
Unit I	**Introduction to industrial microorganisms**: Isolation, Preservation and Maintenance of Industrial Microorganisms. Kinetics of microbial growth and death. Media for industrial fermentation. Air and Media Sterilization.					
Unit II	**Types of fermentation processes:** Solid state and liquid state fermentations; batch, fed-batch and continuous fermentations. Components of bioreactor, Types of bioreactor, Measurement and control of bioprocess parameters- pH, temperature, dissolved oxygen, foaming and aeration.					
Unit III	**Downstream Processing:** Introduction, Removal of microbial cells and solid matter, foam removal, precipitation, filtration, centrifugation, cell disruption, liquid-liquid extraction chromatography, Membrane process, Drying and Crystallization.					
Unit-IV	**Microbial production of Industrial Products:** Alcohol (Ethanol), Acids (Citric), Antibiotics (Penicillin), Amino acids (lysine), Single Cell Protein (algae/fungi).					
Unit-V	**Enzyme immobilization:** Methods of immobilization, advantages and application of immobilization, large scale application of immobilized enzymes.					
References	**Textbooks** 1. U. Sathyanarayana, U. Chakrapani, Biotechnology, Books & Allied Ltd. , 2020. 2. S.M. Reddy, Basic Fermentation Technology, New Age International Publishers, 2017. 3. H. K. Das, Textbook of Biotechnology ,5th Edition, Wiley, 2017. 4. WulfCrueger, AnnelieseCrueger, ATextbook of Industrial Microbiology,Wiley,2017 5. Dr. R. C. Dubey, A Textbook of Biotechnology, S. Chand, 2014. 6. N. Arumugam, Microbial Biotechnology, Saras Publication, 2007.					
	ReferenceBooks 1.DoraiswamiRamkrishna, SubhabrataSengupta, SudiptaDeyBandyopadhyay, AvijitGhosh, Advances in Bioprocess Engineering and Technology , Springer, 2020. 2. Michael l. Shuler, FikretKargi ,Bioprocess Engineering: Basic Concepts, Pearson Education India, 2015. 3.Casida, L. E, Industrial Microbiology, New Age International (P) Ltd., New Delhi, 2013.					

	4.Michael Shuler and FikretKargi, Bioprocess Engineering: Basic Concepts, 2nd Edition, Prentice Hall, Englewood Cliffs, NJ. 2020.		
E-reference links:	1. http://microbio.du.ac.in/web3/uploads/Microbiology%20Uploads/Reading%20material/MBOE-201%2002.%20strain%20improvement.pdf 2. https://www.mpgmahavidyalaya.org/userfiles/Fermentation%20Types.pdf 3.https://theconstructor.org/environmental-engg/difference-chemical-oxygen-demand-cod-biological-oxygen-demand-bod/34792/ 4. https://microbiologynotes.org/downstream-processing-and-its-steps/ 5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5385174/ 6. https://www.britannica.com/topic/food-preservation/Fungi 7. https://www.news-medical.net/health/What-are-Biosensors.aspx		
Course Outcomes	On Successful completion of the course, the students will be able to		
	CO1	describe the media formulations, microbial growth kinetics and isolation techniques.	**K2**
	CO2	acquire knowledge on bioreactor selection, upstream & fermentation processes, and its role in manufacturing bio-products	**K3**
	CO3	learn and describe the down-stream process in fermentation.	**K2,K3**
	CO4	gain knowledge about production of commercial products using microbes.	**K3**
	CO5	learn the techniques in enzyme immobilization.	**K3**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	2	3	4	5	6	7	8	1	2	3	4	5
CO1	S	M	S	S	S	S	S	S	S	M	S	M	S
CO2	S	M	M	M	M	S	M	M	M	S	S	S	M
CO3	S	S	M	S	S	S	M	S	S	S	M	S	M
CO4	M	S	M	M	S	S	M	S	S	S	M	S	S
CO5	S	M	M	M	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTT63	BIOINFORMATICS	L	T	P	C
CORE	XV		5	-	-	4
Cognitive Level	K2: Understand K3: Apply K4: Analyze					
Learning Objective	• To gain knowledge in the concepts of bioinformatics. • To learn about programming languages, internet nd search engines. • To acquire knowledgeon database searching tools					
Unit I	**Introduction and history of bioinformatics:**					
History, development and types of computers. General awareness of computer systems – hardware and software (CPU and other peripheral devices, computer arithmetic, computer logic.						
Unit II	**DataBases:**					
Programming languages – Internet, World Wide Web, Web browser,EMB net, NCBI. File transfer protocol. Search engines						
Unit III	**Sequence analysis :**					
Sequence analysis – need and importance – pair wise alignment – dynamic programming – Global (Needle man – Wunsch) and local (Smith Waterman) Alignment Concepts –Multiple sequence alignment – RFLP, SNP, RAPD, Human Genome Project.						
Unit IV	**DataBanks:**					
Use of nucleic acid and protein databanks.Database searching tools Definition, Entrez, BLAST, FASTA, Genbank. 3D structural analysis of biomolecules – molecular visualization tools Rasmol, chemsketch and SPDBV – Protein Docking.						
Unit V	**Evolutionary analysis:**					
Phylogeentic tree- Distance – clustering methods – Rooted and unrooted tree representation. Neutral Networks. Bootstrapping stratergies.						
References	**Text books** 1. S.C.Rastogi, N.Meniratta, Bioinformatics Methods and Applications, Prentice Hall India Learning Private Limited, 2013. 2. Harsha ,Fundamentals of bioinformatics, S. Wiley Publishers ,2019. 3. Jeremy Ramdass, Bioinformatics An Introduction,Springer publishers ,2015. 4. T.K.Atwood ,Introduction to Bioinformatics , Pearson Publishers, 2017.					
	Reference books 1.ZhumurGhosh&BibekanandMallick ,Bioinformatics Principles and applications , OUP Publishers ,2018. 2.Ruchi Singh, Bioinformatics Preoteomics and genomics ,Vikas publishing House ,2014.					

E-reference links	1. https://www.cs.cmu.edu/~fgandon/lecture/uk1999/computers_types/ 2. https://www.wikilectures.eu/w/Computer_hardware_and_software 3. https://webfoundation.org/about/vision/history-of-the-web/ 4. https://www.ncbi.nlm.nih.gov/books/NBK20261/ 5. https://www.mrc-lmb.cam.ac.uk/genomes/madanm/pdfs/biodbseq.pdf 6. https://www.intechopen.com/books/computational-biology-and-chemistry/bioinformatics-as-a-tool-for-the-structural-and-evolutionary-analysis-of-proteins		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	learn about history of bioinformatics and computerhardwares and softwares	**K2**
	CO2	gain knowledge to use internetand the search engines	**K3**
	CO3	gain the knowledge about gene sequences analysis,Multiple sequence alignment	**K3**
	CO4	gain knowledge in using various biological databases tools	**K3**
	CO5	know and analyze about evolution and construction of the Phylogenetic tree	**K4**

Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	M	S	S	S	S	M	M	S
CO2	S	S	S	S	S	S	M	M	S	S	S	M	S
CO3	M	M	S	M	M	S	S	M	M	S	S	S	S
CO4	M	M	M	S	M	S	M	S	S	M	S	S	M
CO5	S	M	M	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

Course Code	U21BTT64	BIOSTATISTICS	L	T	P	C
CORE	XVI		5	-	-	4
Cognitive Level	**K2: Understand K3: Apply K4:Analyse**					
Learning Objective	• To recognize the definition of statistics, its subject and its relation with the other sciences. • To identify data relating to variables and suitable sampling theories • To create awareness on various calculation methodologies used in life science					
Unit I	**Introduction to Basis of statistics**					
Definition – Statistical methods – kinds of Biological Data. Classification of Data, Meaning and definition, objectives of Classification of Data.						
Unit II	**Collection, Organization and Representation of Data**					
Collection of Data, Types of Data- Primary Data and Secondary Data, methods of collecting Data. Sampling and sampling Designs – Meaning and Definition – Random and Non – Random sampling. Tabulation and representation of data – diagrammatic and graphical.						
Unit III	**Measures of central Tendency**					
Definition, Types of averages- Arithmetic mean,Median, Mode, Problems related to ungrouped data, simple grouped data – Continuous and discrete series.						
Unit IV	**Measures of Dispersion**					
Definition, Types of dispersion – Range, Mean deviation,Standard deviation and variance, problems related to measures of dispersion.						
Unit V	**Correlation and Regression analysis**					
Correlation analysis (Karl Pearson's and Spearman's Rank), Regression analysis – simple, linear. Analysis of variance (ANOVA): One-way & Two-way. Concept of probability – Addition and multiplication theorem of probability, conditional probability.						
References	**Text books** 1. Veer Balarastogi ,Biostatistics , Medtech publishers, 2015. 2. B. Annadurai ,A textbook of Biostatistics ,New age international publishers , 2017. 3. BelavendraAntonisamy, Prasanna S Preamkumar, Principles and practices of Biostatistics,Elseviar Publishers ,2017. 4. K.L.A.P Sarma, B,Ravindra Reddy, Biostatistics, Daya Publishing House, 2013					
	Reference Books 1.APKulkarni ,Basics of Biostatistics ,CBS publishers ,2020. 2.K. Balaji, A.V.S. Raghavaiah& K. N. Jayaveera ,Biostatistics, Wiley Publishers ,					

<table>
<tr><td></td><td colspan="3">2020.
3. VeerBalarastogi ,Biostatistics , Medtech publishers , 2015.
4. Wayne W. Daniel & Chad L. Cross ,Biostatistics , Wiley Publishers, 2014.
5. B.Annadurai,A textbook of Biostatistics,New age international publishers,2017.</td></tr>
<tr><td>E-reference links:</td><td colspan="3">1. https://www.easybiologyclass.com/statistical-data-variables-types-and-classification-biostatistics-short-notes/
2. https://www.toppr.com/guides/business-economics-cs/descriptive-statistics/diagrammatic-presentation-of-data/
3. https://www.kluniversity.in/arp/uploads/2096.pdf
4. https://www.statisticshowto.com/probability-and-statistics/hypothesis-testing/anova/
5. https://www.investopedia.com/terms/s/standarddeviation.asp
6. https://www.graphpad.com/support/faq/what-is-the-difference-between-correlation-and-linear-regression/
7. https://data36.com/statistical-averages-mean-median-mode/</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">Upon completion of this course the students will be able to</td></tr>
<tr><td rowspan="5"></td><td>CO1</td><td>understandthe fundamentals of statistics, methodology and classification of data.</td><td>K2</td></tr>
<tr><td>CO2</td><td>know themethods of collecting data and the different typres of sampling and sampling designs</td><td>K3</td></tr>
<tr><td>CO3</td><td>understand and analyze the mesures of central tendency</td><td>K4</td></tr>
<tr><td>CO4</td><td>classify variables and meaures of dispersion.</td><td>K3</td></tr>
<tr><td>CO5</td><td>learn to use correlation analysis, regression analysis and analysis of variance.</td><td>K2</td></tr>
</table>

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	S	S	M	S	M	S	S	S	S	S
CO2	S	S	M	S	S	S	M	S	S	S	S	S	S
CO3	S	S	M	S	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	M	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Title & Code	U21BTP65	ENVIRONMENTAL BIOTECHNOLOGY, FERMENTATION TECHNOLOGY AND BIOINFORMATICS	L	T	P	C
CORE	XVII		-	-	5	4
Cognitive Level	K2: Understand K3: Apply K4: Analyze					
Learning Objective	• To learn about fermentation and bioreactors • To acquire knowledge on industrial application of microorganisms • To learn the techniques plant tissue culture • To know about BLASTA and FASTA					
Experiments	**Experiments in Environmetnal Biotechnology** 1.Enumeration of Microbial population in soil-Bacteria,fungi.actinomycetes 2.Isolation of Azotobacter from the soil 3.Isolation of Phosphate solublising bacteria 4.Isolation and charaterization ofbacteria from crude oil contaminated soil **Experiments in BioprocessTechnology** 1.Isolation and characterization of Microorganisms involved in Biodegradation (Cellulolytic) 2.Isolation and characterization of microorganisms involved in biodegradation (amylolytic) 3.Production of wine from grapes using baker's yeast 4.Production of alcohol by S. cerevisiae 5.Isolation of Rhizobial colonies involved in biofertilization **Experiments in Bioinformatics** 1.Evolutionary analysis/Phylogenetic analysis-Analysis of parametersaffectinc trees 2.PDB structure retrival and visualization analysis of Homologous structures 3.Sequence (FASTA and BLAST) searches 4.Bibliographic search from PUBMED					
References	**Text Books** 1.S.V.S. Rana, Environmental Biotechnology, Publisher Rastogi,2014 2.S.C.Rastogi, N.Meniratta, Bioinformatics Methods and Applications, Prentice Hall India Learning Private Limited, 2013.					
	Reference Books 1.Abunayeem Book , Microbiology laboratory, Research gate,2016. 2.DasSurajitHirakRanjan, Microbial Biotechnology,springer, 2015. 3.Marchan, D.J.,Handbook of Cell and Organ Culture,BurgessPub.Co., Minneapolis, USA,2011. 4.Shanmugam, Laboratory Manual of Cell Biology,Macmillan, India. 2012. 5.Ruchi Singh ,Bioinformatics Preoteomics and genomics , Vikas publishing House ,2014. 7.T.K.Atwood ,Introduction to Bioinformatics , Pearson Publishers ,2017.					
E-Links	1.http://www.unice.fr/EB/USTH%202013/BP04_practical_2_protoplast_boncompagni.pdf 2.https://www.plantcelltechnology.com/blog/meristem-and-shoot-tip-culture/					

	3.https://www.grin.com/document/265322 4.https://www.cs.cmu.edu/~fgandon/lecture/uk1999/computers_types/ 5.https://www.wikilectures.eu/w/Computer_hardware_and_software 6.https://webfoundation.org/about/vision/history-of-the-web/		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	acquire basic techniques in plant biotechnology.	**K2**
	CO2	understand the different types of media used in microbial isolation	**K2**
	CO3	demonstrate the production of wine and alcohol.	**K3**
	CO4	know the basics of phylogenetic analysis	**K2**
	CO5	analyze sequences using BLAST and FASTA	**K4**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	M	M	S	M	S	M	S	M	S
CO2	S	S	M	M	M	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S	S	M	S
CO4	S	M	S	M	M	S	S	M	S	S	M	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTE641	BIOSAFETY AND IPR	L	T	P	C
ELECTIVE	IV		3	-	-	3
Cognitive Level	K2: Understand K3: Apply K4: Analyze					
Learning Objective	• To gain knowledge on various aspects of biosafety regulations and IPR • To analyse the concerns arising from the commercialization of biotech products • To gain knowledge on process of applying for patent					
Unit I	**Biosafety**					
Introduction; biosafety issues in biotechnology. Introduction to Biological Safety Cabinets; Biosafety Levels. Containment levels and their impact on Environment- Containment-definition, types of containment,						
Unit II	**Biosafety Guidelines:**					
Biosafety guidelines and regulations (National and International) – operation of biosafety. Guidelines and regulations of Government of India; Roles of Institutional Biosafety Committee. Biotechnology and bio piracy.						
Unit III	**Risk management:**					
Definition of GMOs & LMOs; RCGM, GEAC etc.GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment; Risk management and communication.						
Unit IV	**Types of Intellectual Property:**					
Patents, Trademarks, Copyright & Related Rights, Industrial Design, Traditional Knowledge, Geographical Indications. Importance of IPR – patentable and non patentables – patenting life – legal protection of biotechnological inventions – world intellectual property rights organization (WIPO).						
Unit V	**Patent Filing Procedures:**					
National & PCT filing procedure; Time frame and cost; Status of the patent applications filed; Precautions while patenting, financial assistance for patenting.						
References	**Text Books** 1. V.K. Ahuja ,Intellectual property rights in India , Lexisnexis publishers, 2015 2. M.K.Satheesh, Bioethics and Biosafety, Wiley Publishers, 2020. 3. DeepaGoel ,IPR, Biosaftey and Bioethics ,Pearson publishers ,2013.					
	Reference Books					

	1.M.M.S.Karki, Intelleutal property rights , Basic concept, 2011. 2.Rae Scott B Willam B, Bioethics , Eerdmans publishing house,2013.		
E-reference links:	1. https://www.mobt3ath.com/uplode/books/book-7844.pdf 2. https://microbenotes.com/biosafety-cabinets/ 3. https://consteril.com/biosafety-levels-difference/ 4. https://genesandnutrition.biomedcentral.com/articles/10.1007/s12263-012-0316-4 5. https://www.dubaicustoms.gov.ae/en/IPR/Pages/WhatIsIPR.aspx 6. https://cleartax.in/s/patent-regsitration 7. https://www.mondaq.com/india/patent/783950/international-patent-filing-via-patent-co-operation-treaty-pct		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	gain awareness about biosafety and its levels	**K2**
	CO2	analyse the guidelines of biosafety.	**K4**
	CO3	acquire adequate knowledge in the use of genetically modified organisms and its effect on human health.	**K2**
	CO4	illustrate the concepts of IPR	**K3**
	CO5	learn the process for applying patent	**K3**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	S	S	M	S	M	M	S	M	S	S	M	S
CO2	S	M	S	S	S	M	M	M	S	S	M	M	S
CO3	S	M	M	S	M	S	M	M	S	M	S	M	S
CO4	M	S	M	M	S	S	S	S	S	S	S	S	M
CO5	S	M	S	S	M	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTE642	FOOD BIOTECHNOLOGY	L	T	P	C
Elective	IV		3	-	-	3
Cognitive Level	K2 : Understand K3 : Apply K4: Analyze					
Learning Objective	• To learn the concepts of Food Biotechnology • To gain knowledge on role of microorganism in food industry • To Know about the applications of biotechnology					
Unit I	**Biotechnological appoarches in food processing**:					
Food Biotechnology -Scope, Importance and applications in fields of medicine, agriculture, industry and environment. Microorganisms associated with food biotechnology – Bacteria, Yeast, Mould						
Unit II	**Enzymes in food industry:**					
Proteases, glucose oxidase, catalase, lactase.Definition, Properties of enzymes, Microorganisms producing enzymes, Enzymes used in the production of fruit juices, beer and distilled alcoholic drinks, processing steps of wine and beer.						
Unit III	**Production of Cultures for Food Fermentation:**					
Culture of food microbes -Preparation of nutrient media, Sterilization and disinfection, inoculation techniques, Staining methods, Microbial examination						
Unit IV	**Fermentation Technology:**					
Fermentation – Definition, Fermentation process,Fermented food Products. , Advantages of fermented products.Organic acids and Sweeteners Organic acids – Production of citric acid, acetic acid, lactic acid Sweeteners						
Unit V	**Single Cell Protein:** Single cell Protein: Definition, Microorganisms used for					
	SCP, Advantages of SCP, Limitations of SCP. Food and Biotechnology - Application of Plant and Animal Biotechnology in Food industry – Approaches of genetic engineering in foods					
References	**Text Books** 1. Ananthanarayan and Paniker's, Textbook of Microbiology, Eleventh Edition ,University press, 2020. 2. V.K.Joshi,Food Biotechnology,Principles and Practices,I K International Publishing House,2012. 3. S.C.Bhatia,Food Biotechnology,Wood Head publishind India pvt ltd,2016.					
	Reference Books 1. Byong H Lee, Fundamentals of food Biotechnolgy,Wiley					

	Publishers,2015 2. G N Foster, food Biotechnology,CBS Publishers and Distributors,2020 3. Lee BH, Fundamentals of Food Biotechnology, John Publisher, 2014.		
E-reference links:	1. http://www.businessdictionary.com/definition/foodbiotechnology.html 2. http://www.mrothery.co.uk/genetech/genetechnotes.htm 3. http://www.mrothery.co.uk/genetech/genetechnotes.htm 4. http://drs.cift.res.in/bitstream/handle/123456789/4540/Sterlization%20technique%20used%20in%20microbiology.pdf?s 5. https://www.aladdine.com/up_files/docs/Types%20of%20culture%20media%20used%20in%20microbiology.pdf		
Course Outcomes	Upon completion of this course the students will be able to		
	CO1	gain knowledge importance and applications of Food Biotechnology	**K2**
	CO2	learn about the importances of enzymes used in food industry	**K3**
	CO3	apply the techniques and methods for the preparation of culture media, sterilization, inoculation and staining	**K4**
	CO4	knowledge on fermentation process and its application	**K3**
	CO5	understand the knowledge in production of single cell protein and its uses.	**K2**

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	M	M	M	S	S	S	M	S	S	S	M	S	S
CO2	S	S	M	M	M	S	M	S	S	S	S	M	M
CO3	S	S	M	M	M	S	S	S	M	M	S	S	S
CO4	S	S	M	M	M	M	M	S	S	M	M	S	S
CO5	M	S	S	S	S	M	S	S	S	M	M	S	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTS61	MUSHROOM CULTIVATION	L	T	P	C
SBE	V		2	-	-	2

Cognitive Level	**K2: Understand K3: Apply K5: Evaluate K6: Create**
Learning Objective	• To gain knowledge on mushroom cultivation and harvesting methods • To learn the nutritional value of mushroom • Acquire entrepreneur opportunities
Unit I	**Mushroom Morphology:**
Different parts of a typical mushroom & variations in mushroom morphology. Key to differentiate Edible from Poisonous mushrooms.	
Unit II	**Mushroom Classification**:
Based on occurrence- Epigenous & Hypogenous,Natural Habitats - Humicolous, Lignicolous& Coprophilous, Colour of spores- white, yellow, pink, purple brown & black, Morphology- fruiting layers exposed to air, fruiting layers not exposed to air, plants with predominantly pitted cap, cap saddled shape & saucer shape, Structure and texture of fruit bodies-gilled fungal & pore fungal.	
Unit III	**Biology of Mushrooms:**
Button, Straw & Oyster- General morphology, distinguishing characteristics, spore germination and life cycle.	
Unit IV	**Nutrient Profile of Mushroom:**
Protein, amino acids, calorific values,carbohydrates, fats, vitamins & minerals.	
Unit V	**Economic Importance:**
Antiviral value, antibacterial effect, antifungal effect,anti-tumour effect, haematological value cardiovascular & renal effect, in therapeutic diets, adolescence, for aged persons & diabetes mellitus.	
References	**Textbooks** 1.Pathak, Yadav and Gaur,Mushroom production and processing technology, Agrobios publishers,2011. 2.Shubhrata. R.Mishra ,Techniques of Mushroom cultivation, Discovery publishing House, 2014. **Reference Books** 1.Roger Philips ,Mushroom : A Comprehensive guide to mushroom identification , Macmillan Publishers , 2013. 2. Dr. Ravinder Singh Rana& Dr. IshaSlathia, Mushroom cultivation and its disease , Sankalp publications, 2020. 3. D.P.Tripathi ,Mushroom cultivation , Oxford and IBH publishers ,2017 .

E-reference links:	1. http://www.botany.hawaii.edu/faculty/wong/BOT135/Lect19.htm 2. https://mushroomsite.com/2020/09/06/parts-of-a-mushroom/ 3. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=103103 4. https://www.medicalnewstoday.com/articles/278858#benefits 5. https://www.mushroom-appreciation.com/nutritional-value-of-mushrooms.html#sthash.LGpqFLPo.dpbs
Course Outcomes	Upon completion of this course, the students will be able to

	CO1	easily differentiate edible and Poisonous mushroom	**K2**
	CO2	differentiate the various types of mushroombased on occurrence, colour and morphology.	**K3**
	CO3	compare the germination and lifecycle of different mushrooms.	**K5**
	CO4	explain the nutrional benefits of mushrooms.	**K2**
	CO5	evaluate the medicinal properties of mushrooms.	**K6**

\Mapping of COs with POs & PSOs:

CO	**PO**								**PSO**				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	M	S	M	S	S	S	S	M	S
CO2	S	S	M	M	S	S	M	M	S	S	S	S	S
CO3	S	S	S	M	S	M	S	S	M	S	M	S	S
CO4	M	M	S	S	S	S	S	S	S	S	S	M	M
CO5	M	M	S	S	S	S	S	S	S	M	S	M	S

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

Course Code	U21BTS62	SINGLE CELL PROTEIN	L	T	P	C
SBE	VI		2	-	-	2

Cognitive Level	K1: Recall K2: Understand K3: Apply
Learning Objective	• To understand the key concept and historical background of algal biomass as non-conventional food • To know about the application of SCP and mass cultivation of spirulina • To acquire the knowledge about the uses of spirulina and steps of mass cultivation
Unit I	
Algal biomass as non- conventional food : Introduction, Concept and need, Advantages, disadvantages and Sources of non-conventional food	
Unit II	**Introduction to SCP production**
Historical use and rediscovery of *Spirulina* importance – morphology, taxonomy and habitat of *Spirulina* – biochemical composition including proximate composition – amino acids – unsaturated fatty acids – minerals and vitamins. Human health benefits of *Spirulina*.	
Unit III	**Spirulina cultivation methods :**
Spirulina cultivation for single cell protein - SCP Introduction, Systematic position, thallus structure, Merits of Spirulina cultivation, Methods of cultivation- Small scale cultivation, Mass cultivation, Harvesting of Spirulina, Flow chart of Spirulina cultivation, Limiting factors for Spirulina cultivation, Spirulina products –Powder, Biscuits, Tablets	
Unit IV	**Procedure of Spirulina cultivation**
Principle, Requirement, chemicals, Sample or Inoculum of Spirulina, procedure, observations, Harvesting, results and records, precautions Visit to a spirulina cultivation laboratory in nearby area (Students are expected to prepare a model of spirulina cultivation laboratory, a visit report and to submit the same at the time of practical examination.	
Unit V	**Production and Packing**
Natural production – laboratory cultivation – small scale commercial production – commercial and mass cultivation (tank construction, culture medium, strain selection, scaling up of the process) – importance of light and pH in *Spirulina* cultivation – harvesting, drying and packing	
Text Books	1.Umar Bacha, Muhammad Nasir, Single Cell Protein: Production and Evaluation for Food Use Evaluation for Food Use,Lambert Publication,2011 2. Robert Henrikson ,Spirulina - World Food: How this micro algae can transform your health and our planet,2010 3. Amos Richmond , Qiang Hu, Handbook of Microalgal Culture: Applied Phycology and Biotechnology,Wiley,2013
References	1. Paul M. Coates, Joseph M. Betz, Marc R. Blackman Encyclopedia of Dietary Supplements, 2010.

<table>
<tr><td></td><td colspan="3">2. Biswas S., Datta M. and Ngachan S.V, Mushrooms: A Manual for Cultivation, PHI, 2012.
3. Aaron Baum, Grow Your Own Spirulina Superfood: A Simple How-To Guide Kindle Edition, 2013.
4. Aaron Baum, Grow Your Own Spirulina Superfood: A Simple How-To Guide, 2013.
5. Selvendran D, Large Scale Algal Biomass (Spirulina) Production in India. In: D. Das Algal Biorefinery: An Integrated Approach, Springer. 2015.</td></tr>
<tr><td>E-References Link</td><td colspan="3">1.https://www.researchgate.net/publication/329170462_IPR_Biosafety_Bioethics
2.https://biocyclopedia.com/index/biotech_biosafety_ipr_ipp.php
3.https://link.springer.com/chapter/10.1007/978-981-10-2961-5_14</td></tr>
<tr><td>Course outcomes</td><td colspan="3">Upon completion of this course, the students will be able to</td></tr>
<tr><td></td><td>CO</td><td>Course Outcomes</td><td>Knowledge Level</td></tr>
<tr><td></td><td>CO1</td><td>understand the advantages and disadvantages of algal mass</td><td>K1, K2</td></tr>
<tr><td></td><td>CO2</td><td>learn the production of SCP</td><td>K1, K2, K3</td></tr>
<tr><td></td><td>CO3</td><td>acquire knowledge on spirulina cultivation</td><td>K1, K2, K3</td></tr>
<tr><td></td><td>CO4</td><td>illustrate the steps of spirulina cultivation</td><td>K1, K2, K3</td></tr>
<tr><td></td><td>CO5</td><td>gather information regarding natural production, mass cultivation and process</td><td>K1, K2, K3</td></tr>
</table>

Mapping of CO with PO & PSO:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S	S	S	S
CO3	S	M	S	S	M	S	M	S	S	M	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3 marks ; Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark; No Correlation (N) - 0 mark

<table>
<tr><td>Course Code</td><td>U21BTV51</td><td colspan="2">DIARY TECHNOLOGY</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td colspan="3">Value Added Programme</td><td colspan="2"></td><td>30</td><td>-</td><td>-</td><td>2</td></tr>
<tr><td>Semester</td><td colspan="2">Semester-V</td><td>Credits:2</td><td colspan="4">Hours/weeks: 30</td></tr>
<tr><td>Cognitive Level</td><td colspan="7">K1: Recall K2: Understand K3: Analyze
K4: Apply K5:Evaluate</td></tr>
<tr><td>Learning Objective</td><td colspan="7">• To learn about the basic applications of microorganisms.
• To understand the identification of microorganisms using advanced microbiological methods
• To identify any microorganisms, predict the intermediate metabolism of any microbe used in industrial production processes,
• To understand the pathogenesis of micro organisms</td></tr>
<tr><td rowspan="6">Course Outcomes</td><td colspan="6">Upon completion of this course the students will be able to</td></tr>
<tr><td>CO1</td><td colspan="4">list the benefits of milk and milk products.</td><td>K1</td></tr>
<tr><td>CO2</td><td colspan="4">knowthe salient features of milk.</td><td>K2</td></tr>
<tr><td>CO3</td><td colspan="4">illustrate the ways to produce hygienic dairy products</td><td>K3</td></tr>
<tr><td>CO4</td><td colspan="4">compare the benefits of traditional and modern dairy products</td><td>K4</td></tr>
<tr><td>CO5</td><td colspan="4">understand the right ways to store and preserve dairy products</td><td>K5</td></tr>
<tr><td>Unit I</td><td colspan="7">Introduction to Diary technology</td></tr>
<tr><td colspan="8">Need – Benefits and application of Diary technology</td></tr>
<tr><td>Unit II</td><td colspan="7">Physical chemistry of milk</td></tr>
<tr><td colspan="8">Chemistry of milk - condensed and dried milks. Salient features of Milk</td></tr>
<tr><td>Unit III</td><td colspan="7">Introduction to diary microbiology</td></tr>
<tr><td colspan="8">Microorganisms in milk – the ways of hygienic milk production.</td></tr>
<tr><td>Unit IV</td><td colspan="7">Traditional dairy products</td></tr>
<tr><td colspan="8">Fat rich dairy products and other related products</td></tr>
<tr><td>Unit V</td><td colspan="7">Packing and storaging of milk products</td></tr>
<tr><td colspan="8">Refrigeration and air conditioning</td></tr>
</table>

References	**TextBooks** 1.M. K Srivastava ,Hand book on Analysis of Milk: Chemical & Microbial Analysis of Liquid Milk , CBS Publishers & Distributors,2015. 2.Sukumar De ,Outlines of Dairy Technology, Oxford University Press Indian Branch,2019.
	Reference Books 1.M. P. Mathur, D. Datta Roy, P. Dinakar, Textbook of Dairy Chemistry ,Indian Council of Agricultural Research, New Delhi.2011. 2.R. Fernandez ,Microbiology Handbook of Dairy Products, , Medtech Publishers.2018. 3.Norman N. Potter, Joseph H. Hotchkiss ,Food Science, , CBS Publishers & Distributors , 2019.
E-reference links:	1.https://www.myvmc.com/lifestyles/milk-and-milk-products-dairy-products/ 2. https://academic.oup.com/advances/article/5/2/131/4557960 3.https://medcraveonline.com/MOJFPT/health-benefits-of-milk-and-functional-dairy-products.html 4. https://www.britannica.com/topic/dairy-product 5.https://www.milkmeansmore.org/10-reasons-to-include-milk-and-milk-products-in-your-diet/

Mapping of COs with POs & PSOs:

CO	PO								PSO				
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
CO1	S	M	S	S	S	S	S	S	S	S	S	M	S
CO2	S	M	S	M	S	S	S	S	S	S	M	M	S
CO3	S	M	M	S	S	S	S	S	S	S	S	M	S
CO4	S	M	M	S	S	S	S	S	S	S	S	S	M
CO5	S	M	S	S	S	S	S	S	S	S	S	S	M

Strongly Correlating (S) - 3 marks ;Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark ;No Correlation (N) - 0 mark

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

DEPARTMENT OF HOME SCIENCE

B.Sc. FOODS & NUTRITION

SYLLABUS TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2021-2022

(CHOICE BASED CREDIT SYSTEM)

Mother Teresa Women's University, Kodaikanal
Department of Home Science
Choice Based Credit System (CBCS)
2021-2022 onwards)
B. Sc-Foods and Nutrition

1. **About the Programme:**
Foods and Nutrition specialization provides the students an in depth knowledge and skills for enhancing employability and entrepreneurship in all areas namely; Food Processing, Quality Control, Food safety, Nutrition and Dietetics. This programme facilitates to gainknowledge on concepts, theories, principles of food science, food service management, food preservation, interior decoration, child development, physiology, biochemistry, microbiology, basic nutrition, clinical nutrition, life span nutrition, medical nutrition therapy and public health nutrition related to the holistic development and wellness of the individual, family and community at large.

2. **Program Educational Objectives (PEOs)**

PEO 1	To impart the fundamental knowledge in all the major domains of Home Science and related areas of studies
PEO 2	To develop competency of students in application of knowledge in different settings i.e. family, community, workplace etc.
PEO 3	To impart and cultivate skills for wide range of professions related Home Science
PEO 4	To prepare them for higher degrees with specializations
PEO 5	To create professionals in home science related areas and to foster research acumen, teaching skills for career prospects in government and public services or to emerge as successful entrepreneurs.

3. Eligibility:
Candidates for admission to the first year of the Degree of B. Sc-Home Science shall be required to have passed the Higher Secondary Examinations (with the specialization-Chemistry/ Biology/ Home Science/Nursing/Science-based disciplines) conducted by the Government of Tamil Nadu or any recognized board.

4. **General Guidelines for UG Programme**

1. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

2. **Medium of Instruction:** English

3. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	**10**	**25**	**10**	**25**
External	**30**	**75**	**30**	**75**

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either /or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

5. Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form

with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

9. Program Outcomes

On completion of this Programme, the learners will be able to

PO1 - gain an understanding of the association between food and health.
PO2 - learn the preventive measures to overcome metabolic abnormalities.
PO3 - acquire knowledge and skills in the pursuit of academic excellence aimed at advancement in this area of specialization and extension activities.
PO4 - develop self-reliance through the balance of freedom and discipline within the body, mind, and spirit.
PO5 - understand and apply nutritional assessment techniques.
PO6 - integrate the broad aspect of food into dietetics practice.
PO7 - impart nutrition counseling and education to individuals, groups, and communities.
PO8 - acquire professional, vocational, and entrepreneurial skills for career design and development.

10. Program Specific Outcomes (PSO)

On completion of this Programme, the learners will be able to

PSO1 - appraise the quality of foods and nutrition and appreciate their significance for healthy living.
PSO2 - apply food science knowledge to describe the function of ingredients food.

PSO3 - apply technical skills, knowledge of health behavior, clinical judgment, and decision-making skills.
PSO4 - assess and evaluate the nutritional status of individuals and communities and their response to nutrition intervention.
PSO5 - educate the community on dietary modification based on the severity of illness and complications of the diseases.

B.Sc. FOODS and NUTRITION Curriculum

S. No	Course Code	Title of the Course	Credits	Hours		Maximum Marks		
				T	P	INT	EXT	Total
FIRST SEMESTER								
1	U21LTA11	PART-I Tamil I	3	6	0	25	75	100
2	U21LEN11	PART-II English I	3	6	0	25	75	100
3	U21FNT11	**CORE I** - Food Science	4	5	0	25	75	100
4	U21FNP11	**CORE II** – Practical-I Food science practical	4	0	6	25	75	100
5	U21CHA11	**ALLIED I** – Chemistry	4	5	0	25	75	100
6	U21EVS11	Environmental Studies	2	2	0	25	75	100
7	U21PELS11	Professional English-I	4	6	0	25	75	100
		Total	**24**	**36**		-	**-**	**700**
SECOND SEMESTER								
8	U21LTA22	PART-I -Tamil II	3	6	0	25	75	100
9	U21LEN22	PART-II English II	3	6	0	25	75	100
10	U21FNT21	**CORE III**– Fundamentals of Nutrition	4	5	0	25	75	100
11	U21FNT22	**CORE IV** – Human physiology	4	5	0	25	75	100
12	U21CHA22	**ALLIED II** - Chemistry Practical	4	0	5	25	75	100
13	U21VAE21	Value Education	3	3	0	25	75	100
14	U21PELS22	Professional English-II	4	6	0	25	75	100
		Total	**25**	**36**		**-**	**-**	**700**
THIRD SEMESTER								
15	U21LTA33	PART-I Tamil III	3	6	0	25	75	100
16	U21LEN33	PART-II English I	3	6	0	25	75	100
17	U21FNT31	**CORE V** Nutrition Through Life Cycle	4	5	0	25	75	100
18	U21FNA33	**ALLIED III** Nutritional Biochemistry	4	5	0	25	75	100
19	U21FNE311 U21FNE312 U21FNE313	**ELECTIVE-I** Entrepreneurship Development/ Bakery and Confectionary/ Extension Education	3	4	0	25	75	100
20	U21MSS31	**SBE-I** Managerial skills	2	2	0	25	75	100
21		**Non-Major Elective-I**	2	2	0	25	75	100
22	U21PELS33	Professional English- III	4	6	0	25	75	100
		Total	**25**	**36**				**800**
IV SEMESTER								

23	U21LTA44	PART-I Tamil IV	3	6	0	25	75	100
24	U21LEN44	PART-II English IV	3	6	0	25	75	100
25	U21FNT41	**CORE VI** - Therapeutic Nutrition	4	4	0	25	75	100
26	U21FNP42	**CORE VII** Therapeutic Nutrition Practical	4	0	4	25	75	100
27	U21FNA44	**ALLIED IV** Nutritional Biochemistry Practical	4	0	4	25	75	100
28	U21FNE421 U21FNE422 U21FNE423	**ELECTIVE-II** Food hygiene and sanitation Communication and Media Skills Diet for Disease	3	3	0	25	75	100
29	U21CSS42	**SBE-II**-Computer Skills for Office Management	2	0	2	25	75	100
30		**Non -Major Elective –II**	2	2	0	25	75	100
31	U21PELS44	Professional English- III	4	6	0	25	75	100
		Total	**29**	**37**		**-**	**-**	**900**
FIFTH SEMESTER								
31	U21FNT51	**CORE VIII**- Textiles and Clothing	4	5	0	25	75	100
32	U21FNT52	**CORE IX** – Community Nutrition	4	5	0	25	75	100
33	U21FNT53	**CORE X** - Human Development	4	5	0	25	75	100
34	U21FNT54	**CORE XI** - Food Service Management	4	5	0	25	75	100
35	U21FNT55	**CORE-XII**-Food Microbiology	4	5	0	25	75	100
36	U21FNE531 U21FNE532 U21FNE533	**ELECTIVE-III** Food Safety and Quality Control /Nutritional Counseling/ Gender and Development	3	3	0	25	75	100
37	U21FNS53	**SBE III-** Food processing Fundamentals	2	2	0	25	75	100
		Total	**25**	**30**		**-**	**-**	**700**
SIXTH SEMESTER								
38	U21FNT61	**CORE XIII** – Nutrition and Fitness	4	5	0	25	75	100
39	U21FNT62	**CORE XIV** – Family Resource	4	5	0	25	75	100

		Management						
40	U21FNT63	**CORE XV** – Functional Foods and Nutraceuticals	4	5	0	25	75	100
41	U21FNT64	**CORE-XVI**- Nutrition in special Condition	4	5	0	25	75	100
42	U21FNP63	**CORE-XVII** –Community Nutrition Practical	4	0	5	25	75	100
43	U21FNE641 U21FNE642 U21FNE643	**ELECTIVE-IV** Food Packaging / Children with Special Needs/ Fashion Design	3	3	0	25	75	100
44	U21FNS64	**SBE-IV** Food fermentation	2	2	0	25	75	100
45	U21EAS61	Extension Activities (NSS/NCC/RRC/YRC/Physical education)	3	-	-			100
		Total	**28**	**30**				**800**
		Grand total	**156**	**205**		**-**	**-**	**4600**

Non-Major Electives– NME

NME – I - U21FNN311 -Fundamentals of Food Science
U21FNN312 - Nutrition and wellness

NME – II - U21FNN421 - Basics of Human Nutrition
U21 FNN422 - Food Preservation concepts

Additional credit courses

U21FNO31 Online course 3rd semester
U21FNI41-Internship 4th semester
U21PHV-Value added course 5th semester

SEMESTER – I

Course Code	U21FNT11	FOOD SCIENCE	L	T	P	C
CORE-I			5	-	-	4
Cognitive level		**K2-Understanding K3-applying K4-Analysing K5 –valuating**				
Learning objectives		**The course aims** 1) to know the role of food inhealth. 2) to enable students to obtain knowledge of different food groups and their contribution tonutrition. 3) to help them study the different methods of cooking and their advantages anddisadvantages. 4) to enable the students to apply the process of differentfoods. 5) to enable them to gain experience in the preparation of foods with attention to the preservation of their nutritive value-oriented to Indiancooking.				

Unit I Food groups

Food definition, functions of food, food groups-: energy-yielding foods, body building foods, protective foods, classification, five food groups, seven food groups, balanced diet- definition, planning of balanced diet, Recommended Dietary Allowances (RDA) Dietary guidelines.

Unit II Cereals and Pulses

Cereals: Structure and nutritive value of rice and wheat, Gelatinization, Process of milling and malting -wheat, Rice, Gluten formation, Nutritive value of millets - ragi, bajra. Pulses: Germination process, factors affecting the cooking quality of pulses, composition, nutritive value, and its advantages in cookery. Cereals-structure, nutritive value, classification, processing, milling, Pulses and legumes - nutritive value, processing in pulses, toxins in pulses.

Unit III Vegetables and Fruits Vegetables

Vegetables and Fruits Vegetables – Selection of vegetables, Nutritive value, Changes in nutritive value before and after cooking, Effect of cooking on the vegetable pigments. - chlorophyll, carotenoids, anthocyanin, anthoxanthin. Fruits- Classification, nutritive value, ripening of fruits, Effect of browning and its prevention, Storage of fruits.

Unit IV Milk and meat products

Milk and Milk Products: Types of milk, pasteurization of milk, composition and nutritive value, milk products – cheese, paneer, and khoa Egg: Structure, composition and nutritive value, Qualitative determination of egg and its role in cookery.Meat: Structure, composition, and nutritive value of meat, the cutting process of meat, cooking changes in meat, and tenderness of the meat. Poultry-classification, Nutritive value, Selection and cooking methods poultry. Fish -selection of fish, Structure, composition, and nutritive value.

Unit V Fats and sugar

Fats, Sugar, Beverages and Spices Fats and Oils- composition of common fats and oils, smoking temperature, rancidity, and role of fats and oils in cookery. Sugar – Nutritive value, sugar-related products, stages of sugar cookery, Crystallization, Factors affecting crystallization. Beverages: classification, nutritive value - coffee, tea, cocoa, milk-based beverages, fruit juices, and aerated beverages. Spices and condiments – Types and use in Indian cookery, Medicinal value.

Textbooks

1. SrilakshmiFood Science, Seventh Edition, New Age International Publishers, New Delhi, 2018
2. Manay S and Swamy S, Food Facts and Principles, New Age International (P) Ltd Publishers, New Delhi, 2001

Reference books

1. Reddy SM, Basic Food Science and Technology, New Age Publishers, New Delhi, 2015
2. Lowe B, Experimental cookery from chemical and physical stand point, forgotten books, UK, 2015
3. Potter NM andHotchkiss JH, Food Science, C.B.S. Publishers, New Delhi, reprint 2008
4. Roday S, Food Science and Nutrition, Oxford university press, New Delhi, 2007
5. McCance and Widdowson, Composition of food, 6th Edition, Food Standards Agency, 2004

COURSE OUTCOMES:

On successful completion of the course, the students will be able to gain knowledge about

K2	**CO1**	energy requirements and the Recommended Dietary Allowances.
K2	**CO2**	nutritive value, understand the cooking quality factors, and develop skills in the preparation and storage of milk and egg products.
K3	**CO3**	nutritional classification, understand the changes in pigments and acquire skills in preserving nutrients and pigments in the processing and storage of vegetables and fruits.
K4	**CO4**	determine the smoking point of any cooking oils and the stages of sugar cookery
K5	**CO5**	Assess the effect of the addition of acid, fat, salt, water, and sugar on the texture of flesh foods quality.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	M	S	S	S	S	S	S	S
CO5	S	M	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
WeaklyCorrelating(W) - 1Mark
NoCorrelation(N) - 0mark

Course Code	U21FNP11	FOOD SCIENCE PRACTICAL	L	T	P	C
CORE-II			-	-	6	4
Cognitive level		K 1 – Recall K2 - Understanding K3 -Applying K4 - Analyzing K6 -Creating				
Learning objectives		Course aims 1. to understand the advantages and disadvantages of cooking methods on the stability of nutrients. 2. to analyze the effect of processing and storage on the nutritional composition of foods. 3. to learn the factors influencing the cooking quality of different foods.				

I. Grouping offoods

a. Basic 4, 5, 7, and 11, Meaning of foods – solids, liquids, andbutter.
b. My plate

Familiarizing with laboratory equipment, procedure, and learn to weigh food ingredients.

II. Experimental cookery ofcereals

Preparation of cereal products using rice, wheat, and ragi based on steaming, absorption, pressure cooking, and straining methods. Steaming, boiling,and pressure -cooking separation ofthe gluten content ofWheat.

III. Experimental cookery ofPulses

Effect of Cooking in hard and soft water, alkali.

IV. Experimental cookery of vegetables, Green leafyVegetables

Study on the effect of acid, alkali, heat, and time on the color, texture, and flavor.

V. Milk

Preparation of Paneer, Curd, and Whey water using different types of milk. (Identification of physical parameters of developed products) Stages of sugar cookery

Textbook

1. Srilakshmi B Nutrition Science, New age International Pvt Ltd, 2017

Reference books

1. *Williams Aspden*Practical Skills in Food Science, Nutrition and Dietetics, Pearson Education Limited, 2011
2. Mohini Sethi. EramS. Rao Food science Experiments and

Applications,SecondEdition2019

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K1	CO1	fundamentals of cereals, pulses,fruits &vegetable processing, equipment, andproducts.
K2	CO2	Demonstrate the different methods of cooking.
K3	CO3	Choose Appropriate Cooking Method to Conserve Nutrients.
K4	CO4	Evaluate the basic methods and principles involved in cooking.
K6	CO5	evaluate the change of pigment during cooking

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating(W) - 1Mark
No Correlation(N) - 0mark

SEMESTER-II

Course Code	U21FNT21	FUNDAMENTALS OF NUTRITION	L	T	P	C

CORE-III		5	-	-	4
Cognitive level	**K 1 – Recall** **K2 - Understanding** **K4 - Analyzing** **K5 – Evaluating**				
Learning objectives	**Course aims** 1. To enable the students to learn the basic nutrients and their functions. 2. To enrich the students to familiarize the RDA and deficiency of nutrients. 3. Understand the sources of nutrients, the role of nutrients in the maintenance of good health.				

Unit I Energy

Energy – a unit of energy, determination of energy, Contents of food, Basal Metabolic Rate (BMR), energy requirement (ICMR) of various age groups and sources.

Carbohydrates – classification, functions in the body, digestion, absorption and utilization, sources, requirements. Dietary fibre - Classification, sources, Requirements, and physiological importance.

Unit II Protein

Protein – classification, functions in the body, digestion, absorption, utilization, sources, and requirements. Essential and non-essential amino acids, Protein Energy Malnutrition (PEM) –causes, prevention, and treatment.

Unit III Lipids

Lipids – simple lipids, compound lipids, derived lipids, classification, functions, digestion, essential fatty acids, absorption, utilization, sources, and requirements. Lipids in our daily diet, the role of lipids in various diseases.

Unit IV Fat-soluble vitamins

Fat-soluble vitamins: A, D, E, K: Functions, digestion and absorption, RDA, food sources, and deficiency diseases.

Water-soluble vitamins: Vitamin B1, B2, B4, B6, B12, and C: Functions, digestion and absorption, RDA, food sources, and deficiency diseases.

Unit V Micro and Macro minerals

Macro minerals: Calcium, phosphorus, magnesium, sodium, and potassium: functions, requirements, deficiency and toxicity.

Micro minerals: Iron, copper, zinc, manganese, iodine, fluoride: Function, Requirements, Deficiency &toxicity

Textbook:

1. Srilakshmi B Nutrition Science, New Age International Pvt Ltd.2017

References

1. Paul S Bio Nutrition, Fundamental, and Management, RBSAPublishers, 2003
2. Kango m Normal Nutrition, Curing disease through diet, Third Edition, CBSPublication, 2005
3. Benjamin Caballero et.al Encyclopedia of Human Nutrition, Second Edition, Elsevier Limited, 2005
4. MahtabS, Bamji, Kamala et.al Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2015
5. Sumati R Mudambi et.al Fundamentals of Foods, Nutrition and Diet Therapy, New age International (P)Ltd, 2020

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K1	**CO1**	Understand the role of food and nutrients in health and disease prevention.
K2	**CO2**	Develop competence to carry out investigations in nutrition.
K3	**CO3**	Development of a balanced diet to improve the general wellness of an individual.
K4	**CO4**	Understand functions of physiological systems as related to nutrition.
K5	**CO5**	Evaluate nutrition information based on scientific reasoning for clinical and community application.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	M	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	M	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNT22	HUMAN PHYSIOLOGY	L	T	P	C
CORE-IV			5	-	-	4

Cognitive level	**K2- Understand K3 –Applying K4 –Analyzing**
Learning objectives	**Course aims to** 1. Enable students to understand the structure and physiology of various organs in thebody. 2. Help students to obtain a better understanding of the principles of nutrition and dietetics through the study of physiology.

UNIT: I Cell

Cell – structure, types of tissue, cell functions.

Digestive system –mouth, tongue, salivary glands, esophagus, stomach, small intestine, large intestine: Structure, functions, movements (Deglutition, peristalsis) and secretion of the gastrointestinal tract (Various enzymes and indigestion).

UNIT: II Respiratory system

Respiratory system external organs of the respiratory system- nasal cavity, respiratory organ, parts of the respiratory system, structure, functions of the respiratory system, mechanism of the respiratory system, transport ofgases.

UNIT: III Circulatory system

Circulatory system – Composition of blood – the structure of the heart and its working mechanism – conduction of heartbeat.

Excretion organ – general organization (including the structure of kidney, nephron, mechanism of urineformation).

UNIT: IV Sense Organs

Sense Organs – tongue, nose Eye, Ear, Skin: structure, functions, and its importance. Nervous system – Central nervous system – autonomic nervous system: structure of the brain, the role of the spinalcord.

UNIT: V Endocrine gland

Endocrine gland: definition, functions, hormones, Pituitary, Adrenal, Thyroid, ACTH, Parathyroid, and sex glands - Structure. Functions of ductless glands, location, hormone secretion, hyper, and hyposecretion its effect

Text book

1. M. Arumugam,Human physiology, SarasPublication, 2016

Reference Books

1. Sembulingam, Kirma, and PremaSembulingam. *Essentials of medical physiology*. JP Medical Ltd, 2012.
2. Ashalatha, P. R., and G. Deepa. *Textbook of Anatomy & Physiology for Nurses*. JP Medical Ltd, 2012.
3. Chatterjee CC, Human Physiology, Volume I, 11th Edition, CBS Publishers, New Delhi, 2016.
4. Sathya P and Devananda V, Textbook of Physiology, First edition, CBS Publishers and

Distributors Pvt Ltd, New Delhi, 2013
5. Boron WF and Boulais EL, Medical Physiology, IIedition,SaundersElsevier, 2009

COURSE OUTCOMES:

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the Structure and Functions of the various organ systems of the body.
K2	CO2	Compare the digestive and excretory systems and infer the mechanisms of digestion and excretion in human beings.
K3	CO3	Relate the Structure with Functions of the tissues and organs.
K4	CO4	Comprehend the Mechanism of Action of Organs.
K4	CO5	Discuss the role of hormones and functions of human reproductive System.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO3	PSO4	PSO 5
CO1	S	S	S	S	S	S	S	M	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S	S	S
CO3	M	S	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	S	S	S	M	S	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

SEMESTER- III

Course Code	U21FNT31	NUTRITION THROUGH LIFE CYCLE	L	T	P	C
CORE-V			5	-	-	4

Cognitive level	**K2: Understand K3: Applying** **K4: Analyzing K5: Evaluating**
Learning objectives	**Course aims to** 1. Learn the principles of mealplanning. 2. Plan& prepare meals for the family members at different income levels. 3. Plan meals for special groups - infants, preschoolers, adolescents, pregnant & nursing mothers, and theaged.

Unit I - Nutrition in Pregnancy and Lactation

Nutritional status and general health, Physiological changes in pregnancy, Fetal under nutrition and consequence, Energy and calorie relationship in pregnancy, Weight gain protein vitamin mineral nutrition in pregnancy. Nutritional status and physiological changes during pregnancy and nutritional requirements. Complications Role of specific nutrients in pregnancy.

Lactation: Composition of breast milk, Importance of colostrum, RDA for lactating mother.

Unit II - Nutrition during early childhood

Infancy: Nutritional status of infancy, Growth monitoring, Nutritional allowances, Breast feeding- importance, Weaning, Feeding premature infants, Low birth weight babies, and their nutritional care. Breast feeding Vs Bottle feeding

Pre-school age: Nutritional requirements, growth and diet prevalence of malnutrition, Malnutrition, and mental development, food habit, RDA.

Unit III – Nutrition during school age and adolescence

School-age: Physical development and nutritional status, Food habits, and nutritional requirements.

Adolescent: Pattern of growth, nutritional need and food habit, Behavioral modification to combat malnutrition. Factors affecting food choices Nutritional problems among adolescence eating disorders

Unit IV - Nutrition for adult

Adulthood-definition stages of adulthood period, early adulthood, middle adulthood, late adulthood, nutritional needs, deficiencies, RDA, Factors influencing Nutritional requirements based on physical activity.

Unit V - Nutrition for Elderly (Geriatric nutrition)

Old age: definition, stages of old age, physiological changes in old age period, socio-economic and physiological factors of the aged, and nutritional care of elderly. Dietary modification for old age recommended dietary intake.

Textbook

1. Srilakshmi, Dietetics, New Age Publishers, New Delhi, 2017

Reference books

1. Williams SR Nutrition and Diet Therapy, Sixth Edition C.V. Melskey Co,2000
2. Kango M Normal Nutrition, Curing diseases through diet, First Edition CBS Publications.2005
3. Paul S Text Book of Bio-Nutrition, Fundamental, and Management, RBSA Publishers.2003
4. Judith E. Brown Nutrition through the life cycle 5thEdition, CENGAGE Learning, US. 2019
5. Swaminathan M Food and Nutrition, SecondEdition, 2017

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	**CO1**	Physiological changes and hormones are involved during pregnancy and lactation.
K3	**CO2**	Plan a healthy food choice for physical, physiological psychological aspects in infancy.
K4	**CO3**	the students will be able to relate nutrient needs to developmental stages and plan diets that will adequately meet nutritional needs During childhood.
K4	**CO4**	the student will learn the impact of growth and development in Arriving at the nutritional needs of adolescents.
K5	**CO5**	Determine nutrient requirements during old age.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	M	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	M	S	S	S	S	S	S	S
CO5	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	M	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 Marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0 Mark

Course Code	**U21FNA33**	**NUTRITIONAL BIOCHEMISTRY**	**L**	**T**	**P**	**C**
Allied-III			**5**	**-**	**-**	**4**
Cognitive level		**K2: Understanding** **K4: Analyzing** **K5: Evaluating**				

Learning objectives	**Course aims to** 1. the principles of Biochemistry 2.knowledge on the effect of diet on health and the functions of biological systems in relation to Nutritional biochemistry

Unit I – Carbohydrates

Carbohydrate Metabolism Definition, Classification of carbohydrates – Monosaccharide, Disaccharide, and polysaccharide. Metabolism – glycolytic pathway, Electron transport chain, glycogenesis, Glycogenolysis, and Gluconeogenesis. Disorder of carbohydrate metabolism-Diabetes mellitus.

Unit II - Proteins and lipids

Protein metabolism Definition, Classification of protein, Structure, Physical properties, Chemical properties, Amino acids- Essential and non-essential.

Lipid metabolism Definition, Structure, Classification of lipids-Saturated, Unsaturated fatty acid, Bio-Synthesis of fatty acid. Lipoproteins: Types, composition, role, and significance in diseases.

Unit III – Enzyme

Enzymes –definition, functions of enzymes, classification of enzymes, mechanism of enzyme action, regulation of enzyme action, factors affecting enzyme activity. Role of enzymes in different digestion and metabolicpathways.

Unit IV - Water balance

Water- composition of water in the human body, functions of water, water intake, Output, Balance, Dehydration: causes, and overcome measures, edema: causes, and preventive measures. Factors affecting water balance, Buffer system,

Unit V - Antioxidants

Biochemical reactions in the human body, antioxidants and human health, free radical formation, antioxidant-rich foods, application of biochemistry in medicine & treatment in food science and nutrition.

Text books:

1. Ramadevi K, Ed: Ambika Shanmugam's Fundamentals of biochemistry for medical students, 8th edition, Wolters Kluwer Health, India, 2016
2. Rodwell V, Bender D, Botham KM, Kennelly PJ, Weil PA, Harper's Illustrated Biochemistry, 30th Edition, McGraw hill Education, 2015.
3. Sulochana H, Principles of Biochemistry, PBS enterprises, Chennai, 2010

Reference books

1. Cox MM and Nelson DL, Lehninger Principles of biochemistry, 5th edition, EH Freman&Company, New York, 2008
2. Vasudevan DM, Sreekumari S, Textbook of Biochemistry, 5th edition, Jaypee Publishers, New Delhi, 2007.
3. Veera Kumari L, Biochemistry, 1st edition, MJP Publishers, 2005.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to gain knowledge about

K2	**CO1**	Students will understand the principles of biochemistry and also chemistry of major nutrients.
K2	**CO2**	The knowledge about the major metabolic pathways in human metabolism.
K3	**CO3**	The synthesis of nucleic acids and proteins.
K4	**CO4**	obtain complete knowledge on Enzyme and its application
K5	**CO5**	gain knowledge about the importance of vitamins and minerals in Human development.

Mapping of COs with Pos & PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO 2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	M	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	M	S	S	M	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	M	S	S	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

SEMESTER-IV

Course Code	U21FNT41	THERAPEUTIC NUTRITION	L	T	P	C
CORE-VI			4	-	-	4

Cognitive level	**K2: UnderstandingK3: Applying** **K4: Analyzing K6: Creating**
Learning objectives	**Course aims to** 1. Understand the fundamentals of baking and learn t 2. Learn the current status, growth rate, the economic importance of baking and confectionery inIndia.

Unit I Diet therapy

Concept of Diet therapy: Purpose and principle of therapeutic diets, modification of normal diet, classification of therapeutic diets. Different feeding techniques - oral feeding, tube feeding, parenteral feeding, the role of dieticians in nutritionalcare.

Unit II Fever diet

Fever: Causes, symptoms, management: Febrile disease acute – Typhoid, influenza, malaria, chronic – tuberculosis. Dietary management for fever condition: menu planning.

Unit III Gastro intestinal diet

The disease of GI Tract: Diarrhoea, dysentery and constipation, Peptic ulcer: causes, symptoms, dietary recommendations.

The disease of Liver – Hepatitis, Cirrhosis, Assessment of gall bladder diseases nutritional status, causes, symptoms, and dietary treatment

Unit IV Life style diseases

Life style associated diseases

a) Causes symptoms and food exchange list, dietary treatment for Diabetesmellitus
b) Cardiovascular diseases – hypertension, atherosclerosis, congestive cardiac failure, and sodium-restricted diet in causes symptoms and dietarytreatment.
c) Obesity and leanness – cause symptoms and dietarytreatment.

Unit V Renal diseases and cancer

a) Diseases of the excretory system– nephritis, nephritic syndrome, urinary calculi, renal failure.
b) Diet in allergy – definition, classification, food allergies. Test for allergy, dietetic treatment.
c) Cancer – causes symptoms of dietary treatment.

Text books

1. Robinson, Corinne Hogden, and Marilyn R. Lawler. *Normal and therapeutic nutrition*. No. Ed. 16. Collier Macmillan Publishers, 1982.
2. Dietary Guidelines of Indians- A Manual, National Institute of Nutrition, Hyderabad, 2006.
3. Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi, 2011.

Reference books

1. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005.
2. Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
3. Mahan LK, Stump SE, and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders,2004.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Plan and prepare a standardized hospital diet for the needed patients.
K2	CO2	Understand the concept, purpose, and principles of diet therapy and the role and types of dietitians.
K3	CO3	Delineate various deficiency disorders concerning their prevalence, causes, symptoms, and preventive measures.
K4	CO4	discuss the kinds of commercial formulas available for oral and enteral feedings.
K5	CO5	compare the food exchange list in the control of diabetes and complications.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO 2	PSO3	PSO4	PSO 5
CO1	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	M	S	**S**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNP42	THERAPEUTIC NUTRITION PRACTICAL	L	T	P	C
COREVII			-	-	4	4
Cognitive level		K2: Understanding K3: Applying K4: Analyzing K5: evaluating K6: creating				
Learning objectives		The course aims to 1. gain knowledge about the role of nutrition in disease conditions. 2. develop skills and techniques in the planning and preparation of therapeutic diets for various disease conditions.				

Planning and preparation of therapeutic dietfor:

1. Routine hospital diet.
2. Typhoid
3. Tuberculosis
4. Diabetes mellitus
5. Peptic ulcer
6. Heart diseases
7. Kidney disease
8. Liver disease
9. Obesity
10. Underweight
11. Diarrhea
12. Constipation

Text Book

1. Swaminathan Food Nutrition, Volume I, The Bangalore Printing and Publishing Company, Bangalore, 2002
2. Gibney M J, Elia, MLjingquist. O Clinical Nutrition, Blackwell Science Publishing Co. USA. 2005

References:

1. Anita F.P. Nutrition, Fourth Edition, Oxford University Press, Delhi, 2002
2. Raheena, BA Textbook of Food, Nutritionand Dietetics, Sterling Publishers, New Delhi, 2009
3. Srilakshmi, B Dietetics New Age International Publishers, NewDelhi, 2018

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	design the principles of meal planning, diet therapy, therapeutic diets, and nutrition support.
K3	CO2	make appropriate dietary modifications for various disease conditions based on the path physiology.
K4	CO3	demonstrate the method to plan and prepare a diet for various diseases.
K5	CO4	evaluate the concept of food groups and exchanges for planning and preparing a balanced diet for various age groups and physiological conditions.
K6	CO5	create skill development in planning therapeutic diets using food exchange lists.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO 4	PO5	PO 6	PO 7	PSO 1	PSO2	PSO 3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	S	S	S	S	S	S
CO2	M	**S**	S	**S**	**S**	**S**	S	S	S	S	S	S
CO3	S	**S**	S	**S**	**S**	**S**	S	S	S	S	S	S
CO4	S	**S**	S	**S**	**M**	**S**	S	S	S	S	S	S
CO5	S	**S**	S	**S**	**S**	**S**	S	S	S	S	S	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNA44	NUTRITIONAL BIOCHEMISTRY PRACTICAL	L	T	P	C
Allied-IV			-	-	4	4
Cognitive level		**K2: Understanding** **K3: Applying** **K4: Analyzing** **K5: Evaluating**				
Learning objectives		**Course aims to** 1. Understand the biochemical preparationmethods. 2. Identify the qualitative analysis of bio-organic compounds.				

1. Qualitative analysis of bio-organiccompounds

a. Carbohydrates
b. Aminoacids
c. Tests forproteins
d. Tests for lipids – test for cholesterol – kit method TGkit

2.Biochemicalpreparation

a. Starch(potato)
b. Lactose(Milk)
c. Casein(Milk)

3.Use of PH meter for the preparation of buffer.

4.VerificationofBeerLambert'slawusing a colorimeter.

1. Determining the extinction coefficient of a given color compound.
2.Determining the concentration of any given colour compound using a standard graph.

Text book

1. Miller DD Food chemistry a laboratory manual, First Edition, John Wiley &Sons, 2014

Reference book

1. Conn EE and Stump PK Outlines of Biochemistry, Wiley Eastern (P) Ltd., NewDelhi, 1981
2. Linder MC Nutritional Biochemistry and Metabolism with clinical applications, Second Edition, Appleton andLange, 1991
3. Plummer DT An introduction to Practical Biochemistry, Tata McGraw Hill, New Delhi.1996

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledgeabout

K2	CO1	gain knowledge about quantitative analysis.
K2	CO2	use of PH meter for the preparation of buffer
K3	CO3	apply practical skills in qualitative analysis of proteins
K4	CO4	Acquire skill in the preparation of the solution.
K5	CO5	determining the extinction coefficient of a given colour compound.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**M**	S	**S**	**S**	S
CO5	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Semester-V

Course Code	U21FNT51	TEXTILES AND CLOTHING	L	T	P	C
CORE-VIII			5	-	-	4
Cognitive level		**K2: Understanding K3: Applying K4: Analyzing K5: Evaluating**				
Learning objectives		**The course aims to** 1. understand textile fibers, their properties, andtheir uses. 2. impart knowledge on spinning, fabricproduction. 3. to develop the skill to choose appreciate dyes and printing techniques for a givenfabric				

Unit I Textile fibers

Fiber – Definition, Meaning, Classification of Textiles Fibers- Natural fiber-cotton, Flax, silk, wool- origin, manufacturing process, properties, and end-uses. Minor Textile fibers-, properties and uses.Regenerated fibers-Rayon and acetate-origin, manufacturing process, properties, and end-uses.

Unit II Synthetic fibers

Synthetic fibers: Nylon, Dacron, Orlon, and Acrylic- origin, manufacturing process, properties, and end-users. Spinning –Definition, meaning, types of spinning. Yarn and Twist – Definition, counts of yarns.Meaning and Classification natural manmade yarns and Novelty yarns.Blends and Mixtures (understanding concepts only).

Unit III Fabric structure

Fabric Structure: Weaving- Definition, Meaning, parts, and functions of the simple loom. Types of weaves- Basic weaves and fancy weaves-Mock leno, honeycomb, huck-a-back, backed cloth, dobby, jacquard. Non-woven, knitting- Definition, Meaning, classification of knitting, Knotting, Lacing, Braiding, Bonding and Felting.

Unit IV Textile finishing

Textile Finishing –Basic Finishes-Singeing, Desiring, scouring bleaches, Mercerizing, Napping, Sanforising, Special finishes –Antimicrobial, Water-repellent, and Waterproof finishes, Flame Resistant, Stain Resistant, finishes suitable to Natural and manmade fibers.

Unit V Dyeing

Dyeing- Definition of Dyes, Meaning and concept of Dyes, Classification of dyes, Dyes suitability to various fibers. Methods of Dyeing- Stock dyeing, yarn dyeing, piece dyeing, cross, and union dyeing. Printing – Definition, Styles of printing-Direct, Discharge, Resist. Colorfastness.

Textbook

1. Rose Sinclair Textile and Fashion, wood head publishingLtd. 2005

Reference books

1. Anne Allen and Fulani Seaman Fashion Drawing-The basic principles replica press private Ltd,India.2005
2. H. Mattila intelligent textiles and clothing wood head publishing Ltd. 2006
3. Sara J Kadolph The Textiles Dorling Kindersley India Pvt.,Ltd.2009
4. R.Shishao The global textile and clothing industry wood head publishing Ltd.2012
5. Dr. SubramaniaSenthilKannanMuthu Handbook of lifecycle assessment(LCA) of textile and clothing,wood head publishing Ltd.2015

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the textile fibers, their properties, and their uses.
K3	CO2	Impart knowledge on spinning, fabric production
K4	CO3	Gain knowledge in different types of textile fibers, origin, its classifications and properties.
K4	CO4	Able to identify different fiber types based on their physical and chemical parameters.
K5	CO5	Acquire knowledge in dyeing and finishing.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**M**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0Mark

Course Code	U21FNT52	COMMUNITY NUTRITION	L	T	P	C
CORE IX			5	-	-	4
COGNITIVE LEVEL		K2: Understanding K3:Applying K4: analyzing K5: Evaluating				
Learning Objectives		The Course aims to 1. know the development of an individual from infancy to adolescence. 2. develop an awareness of the problems of children, adolescents, and exceptionalchildren.				

Unit I Community nutrition

Concept of Community, the concept of nutrition, Determinants of food consumption and nutritional problems of the community- Malnutrition- aetiology of malnutrition- Measure to combat malnutrition improvement of nutrition of a community.

Unit II Assessment of nutritional status

Assessment of Nutritional status of the community -Anthropometry: height, weight, BMI, WHR, IBW, Clinical: deficiency diseases, Biochemical methods: Hemogram analysis, Diet surveys: 24-hour recall, three-day dietary recall, food frequency.

Unit III Nutrition program

Existing nutrition programs in the state- various National (ICMR, ICAR, NIN, NNMB, NHANES, CFTRI) and international organizations (UNICEF, WHO, FAO).Nutrition surveillance – objectives, indicators in nutritional surveillance and their characteristics, data surveillance in India.

Unit IV Nutrition education

Nutrition education: definition, concept, tothe community- meaning and principles of program planning – plan of work and its elements, conducting nutrition education to the community. Learning objectives and outcomes of nutritioneducation.

Unit V Teaching aids

Teaching aids for nutrition education: Audio Visual Aids- Traditional and modern methods in conducting nutrition education program to the community. Benefits of nutritioneducation tools.

Textbook

1. Dandiya S. ChandZafer, Z.Y Health Education and Community, Vallabh Prakashan Printers, New Delhi. 2003

Reference: -

1. Park Textbook of preventive and social Medicine, 18th,

BanarsidesBhanotPublishers, Jabalpur, 2005
2. Srilakshmi B Nutrition Science, New Age International Pvt.Ltd, NewDelhi, 2006
3. KhaderFoods, Nutrition, and Health, Kalyani Publishers, New Delhi. 2003
4. RamachandranDharma lingam Health education, VikasPublishingHouse Pvt.Ltd. New Delhi. 2005
5. Reedy. R.S Nutrition Education common health, Publishers, New Delhi, 1998

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	identify suitable methods for resolve nutrition-related problems in community.
K3	CO2	evaluatethe nutritional status of the community.
K4	CO3	analyze maternal and child health care programs.
K4	CO4	assess immunization and its effective actions.
K5	CO5	outline the various agencies in uplifting the nutritional status and their roles.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M
CO2	S	**M**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S
CO4	S	**S**	S	**S**	**M**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNT53	HUMAN DEVELOPMENT	L	T	P	C

CORE X		5	-	-	4
COGNITIVE LEVEL	K 2: Understanding K 4: Analyzing K 5: Evaluating				
Learning Objectives	The Course aims to 1. know the development of an individual from infancy to adolescence. 2. develop an awareness of the problems of children, adolescents, and exceptionalchildren.				

Unit I Growth and development

Human Development – Significance – Stages of Life Span Growth and Development - Meaning, principles, factors influencing growth and development. Methods of child study-- projective technique, observation, experimentation, case study (elementary treatment). Needs of Children.

Unit I Prenatal development and childbirth

Conception, Stages of prenatal development. Signs and symptoms of Pregnancy.Common discomforts and complications of pregnancy.Factors influencing prenatal development.Maternal mortality – Causes and prevention. Child Birth – stages and types. Post-natal care of the mother.

Unit III

Pre-School Education: Meanings, objectives, importance, and types. Pre-school setup, equipment, characteristics of pre-school teacher's importance of audio-visual aids for pre-school.Play- definition and types.

Unit IV Social and emotional development

Social, emotional, adjustment problem of adolescence.Physiological needs of children-love, affection – security independence.

Behavior Problems: Causes, prevention, types – temper tantrum, thumb sucking, bedwetting, and other issues.

UNIT-V

Children with Special Needs - Definition, identification, Classification: physically challenged, visually challenged, autism, ADHD, dyslexia, and other learning disabilities, special education services, and their importance. Agencies to promote the special children.

Textbook

1. Devadas R.P and Jaya N Child development, Macmillan Publishers, India, 1994

Reference book

1. Hurlock, F. B Child development, 6 th Edition M.C grow Hill Network. 2004
2. Suriakanthi A Child development, An introduction. Kavitha publicationsGandhigram Tamil Nadu, 2004

3. Papalia,D.E and Olds,S.W Human Development, TataMc.Graw Hill Company, NewYork, 2005
4. ShrimaliS Child Development, RawatPublications, NewDelhi. 2008
5. Santrock J. WChild development grows Hill Network. 2014

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Outline the principles of development from conceptionto birth.
K5	CO2	Compare the development pattern of infancy and early childhood during the life cycle.
K5	CO3	Critique the growth and development changes between childhood and adolescence.
K4	CO4	Explain the importance of childhood care, guidance and Counseling.
K4	CO5	Discuss the methods of disciplining children and their effects.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S
CO3	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO5	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNT54	FOOD SERVICE MANAGEMENT	L	T	P	C

CORE XI		5	-	-	4
COGNITIVE LEVEL	K 2: Understanding K 4:Analyzing K 5:Evaluating				
Learning Objectives	The course aims to • discuss the scope of foodservice management principles and functions. • explain the functions of personnel management organization. • compare the electrical and non-electrical equipments in the food serviceestablishment. • analyze the cost account methods and theirimportance. • evaluatethe kind of kitchenlayout.				

Unit I Foodservice management: overview

Foodservice systems: Definition, objective, functions: Planning, organizing, directing, controlling, coordinating, and evaluating. Types of service – English, French, American, room service and mobile, buffet. Growth of foodservice industry – factors affecting the growth of food service industry.

Unit II Equipments and layout

Equipments used in Foodservice industries-Classification of equipments electrical and non-electrical equipments for food storage, preparation, serving, dishwashing, and laundering. Food plant -Types of Kitchens, Layout of different food service establishments, drainage, Waterlines, lighting, and ventilation.

Unit III Food safety

Food safety: definition, principles, the importance of food safety in foodservice institutes, sanitation and hygiene in food service institution- kitchen, distribution, and Storage. Waste disposal, Pest control, and other safety measures.

Unit IV Tools of management and personnel management

Tools-The Organization Chart, Job Description, and specification, Time schedule, Work schedule, Job Analysis, Personnel Management: Selection, training, supervision of personnel. Labor policy and legislation. Employee facilities and benefits, welfare schemes, and laws governing food service institutions.

Unit V Financial management

Financial Management: Buying and accounting procedures in food service institution, budget and its types, inventory control, methods of cost control, Cost accounting/analysis-

Cost concepts- types of cost-fixed cost, semi-fixed cost, variable cost. Cost accounting and bookkeeping, maintenance of the account, balance sheet, foodcosting.

Textbook

1. Mohini Sethi and SurjeetMalhan, Catering Management, Third Edition, New Ade International (P) Ltd Publishers, 2015

Reference

1. West. B.B. Wood L., Harger, V.F. Food Service Institutions,5thEdition, John Wiley and Sons, INC., New York1977
2. Shukla. M.C. Business Organization and Management S. Chand and Co., Ltd., Ramnagar, New Delhi1982
3. Nathaniel,R.S Catering Management for Hotel,Surjeet publication New Delhi, 1991
4. P.N. Reddy, S. SGulshan. Principles of Business Organization and Management, Eurasia Publishing House, Ramnagar New Delhi.2007
5. June Payne Foodservice Management Principles and Practices, 13 th Edition, Pearson Education Limited.2016

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain Knowledge about

K2	CO1	Discuss the scope of foodservice management principles and functions.
K5	CO2	Explain the functions of personnel management organization
K4	CO3	Compare the electrical and non-electrical equipment's in foodservice establishment.
K4	CO4	Analyze the cost account methods and their importance.
K5	CO5	Evaluate the kind of kitchen layout.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S
CO4	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	M	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNT55	FOOD MICROBIOLOGY	L	T	P	C

CORE-XII		5	-	-	4
Cognitive level	**K2: Understanding** **K3: Applying** **K4: Analyzing**				
Learning objectives	**The course aims to** 1. gain knowledge of the role of micro-organisms in health and disease 2. to understand the role of micro-organisms in the spoilage of various foods. 3. to gain knowledge of micro-organisms in relation to food and food preservation				

Unit I Microorganisms classification

Micro Organism in food Bacteria – General characteristics of bacteria, bacteria morphology, cell structure, motility, nutrition, reproduction, and respiration.

Virus: - General characteristics of viruses, viral diseases, symptoms, and control of viral diseases.

Yeast: - General characteristics of yeast, the economic importance of yeast.

Mould: - General characteristics of Mould, economic importance of Mould.

Protozoa: - General characteristics of protozoa, morphology, plasmodium, protozoa diseases- dysentery, malaria.

Unit II Factors affecting microbial growth

The general principle underlying spoilage of food: fitness and unfitness of food for consumption, causes of spoilage, factors affecting the growth of microorganisms in food: moisture, humidity, temperature, oxygen, pH, and other factors. Physicaland Chemical changes caused bymicroorganisms.

Unit III Food contamination

Sources of Microorganisms in foods, classification of food: perishable, semi-perishable, non-perishable foods. Types of food spoilage microorganisms Spoilage of specific food groups- cereal and cereal products, pulses, fruits and vegetables, milk and meat products,

Unit I Food Fermentations

Fermentation –definition and types, Microorganisms used in food fermentations Dairy Fermentations-starter cultures and their types, the concept of probiotics, types of fermented foods, methods and preparation for vinegar, sauerkraut, soya sauce. Advantages of fermented foods, commercially fermentedfoods.

UNIT: V

Food-borne diseases: Bacterial food borne diseases (Staphylococcal intoxication, Botulism, Salmonellosis, Shigellosis, Enteropathogenic Escherichia Coli Diarrhoea Clostridium Perfringens gastroenteritis, Bacillus cereus Gastroenteritis). Food Borne Viral Pathogens, protozoa, Mycotoxins: Aflatoxicosis, Mycotoxicosis, Ergotism

Textbooks: -

1. Frazier W.C and West Off DC 2013) Food Microbiology. Fifth Edition Graw HillEducation (India) Pvt Ltd. Delhi 2013

Reference Books-

1. PelczarMicha ECS and Kreigh NR Microbiology, Eighth Edition, Tata McGraw Hill, NewDelhi. 2000
2. Willey UM, Sherwood LM, and WoolvertonCJ Prescott's Microbiology, Eighth Edition, Mc Graw-HillInternational, 2011
3. Foster WM Food Microbiology, CBSPublishers. 2016
4. Thomas J. Montville Food MicrobiologyJohnwiley and Sons, Ltd. 2008)
5. GeorgeBanwart Basic FoodMicrobiologySecondEdition, International ThomsonPublishing, Tokyo. 2012

COURSE OUTCOME

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the classification of micro-organisms and its characteristics in foods.
K2	CO2	The factors affecting the growth in controlling the growth curve of micro organisms.
K3	CO3	Able to preserve the perishable foods from different types of microbial spoilage.
K4	CO4	Compare food borne infection and food intoxication.
K4	CO5	Explore the beneficial effects of microorganisms in the processing and development of fermented foods.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S
CO4	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	M	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S

Strongly Correlating (S)	-	3Marks
Moderately Correlating (M)	-	2marks
Weakly Correlating (W)	-	1Mark
No Correlation (N)	-	0mark

SEMESTER VI

Course Code	U21FNT61	NUTRITION AND FITNESS	L	T	P	C
CORE-XIII			5	-	-	4
COGNITIVE LEVEL		K2: Understanding K3: Applying K4: Analyzing				
Learning Objectives		The Course aims to 1. learn about the importance of Nutrition in sports personnel. 2. to find out the sources of generation of energy for muscle and force generation.				

Unit I Body composition

Body composition and fitness Body Composition- classification (Fat mass and fat-free mass) and its components, factors influencing body mass composition. Techniques for measuring body composition Fitness-definition, parameters of fitness- cardiovascular endurance, muscular strength, muscular endurance, flexibility, and bodycomposition

Unit II Assessment of exercise

Assessment and benefit of exercise- physiological, psychological, and sociological.Physical activity guidelines. Assessing personal fitness- pre-participation, screening, and risk assessment. Role of exercise in disease prevention – diabetes, cardiovascular disease, obesity, bone health, andcancer**.**

Unit III Energy system

Energy systems and electrolyte balance Reviews of different energy systems for endurance and power activity- Fuels and nutrients to support physical activity. Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise. Water and electrolyte balance- Losses and their replenishment during exercise and sports events, the effect of dehydration, sports drinks

Unit IV Nutrition for sportspersons

Nutrition for sports person Definition, physiological and significant changes during exercise, types of stress faced by sports persons, nutrition needs of sports persons-macro and micronutrient needs,the role of water and electrolytes. Role of nutrition and recommendations – pre-exercise, during, and post-exercise Nutrition supplement and ergogenicaids**.**

Unit V Yoga and fitness

Yoga and nutrition fitness in special conditions 5.1 Yoga and fitness- effects on general vitality and immune, endocrine, neurons, digestion, and muscular systems, dietary pattern. Awareness about the alternative systems for health and fitness like Ayurveda, yoga, vegetarianism, and traditionaldiets

Textbooks

1. Bean A,*The Complete Guide To Sports Nutrition,* 7th edition, Bloomsbury, London, 2013.
2. Srilakshmi B, Suganthi V, Ashok CK. Exercise physiology, fitness and Sports Nutrition. New age international publishers, 2018.

Reference Books

1. Dunford M, *Fundamentals Of Sports And Exercise Nutrition,* Human Kinetics, Illinois, 2010
2. Jeukendrup A and Gleeson M, *Sports Nutrition: An introduction to energy production and performance,* Human Kinetics publishers, 2004
3. Maughan RJ, Burke LM, Handbook of Sports Medicine & Science- Sports Nutrition, Blackwell Science publications, 2002

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Outline the self-responsibility for personal health and wellness.
K4	CO2	Analyze the role ole of nutrition in sports.
K2	CO3	Discuss the various parameters used to find healthstatus.
K3	CO4	Evaluate the effect of exercise on various nutrient metabolisms.
K2	CO5	Compare different exercise methods and learn their application.

Mapping of COs with POs& PSOs:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO4	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S
CO5	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNT62	FAMILY RESOURCE MANAGEMENT	L	T	P	C
CORE- XIV			5	-	-	4
COGNITIVE LEVEL		K2: Understanding K3: Applying K4: Evaluating				
Learning Objectives		The Course aims to • understand the importance of management in family and personalliving • improve their ability in the management of familyResources • understand and apply the basic principles of art in Interior decoration. • understand the elementary principles of planning a house and its interiorarrangement. • to use the principles of design in day-to-daylife.				

Unit I Hotel management

Home Management Meaning and Process-Concept of Home Management.Planning, organizing, controlling, and evaluation. Managerial inputs – values, goals, and standards – their interrelationship. Resources – classification and characteristics; are optimizing the use of family resources.Decision making – Meaning, types – steps in decision making – ways of resolving conflicts.Characteristics of a good homemanager.

Unit II Time and energy management

Time and energy management Time - Importance of time management – guidelines in the planning time schedule. Energy: Its importance –fatigue-types of fatigue and ways of overcoming fatigue. Work simplification – Mundel's Classes of changes. Work measurement. Advantages of worksimplification.

Unit III Applied art design

Applied art Design - Meaning, types, characteristics, elements of design, principles of design harmony, proportion, balance, emphasis, and rhythm. Colour: Qualities of colour – Prang colour system – colour harmonies. Application of the principles in simple designs. Flower arrangement: Principles, types. Accessories in the home – Classification, and selection.

Unit IV House Plan and Arrangement Site

House plan and arrangement Site - Selection – factors to be considered. House Plans – types – reading of floor plans – drafting floor plansfor middle- and low-income group families.Features of a house contributing to livability – orientation, grouping – roominess, lighting and ventilation, circulation, storage facilities, privacy, flexibility, sanitation, andeconomy**.**

Unit V Room Arrangement Furniture

Room arrangement furniture - Selection, arrangement,and care.Furnishings – Type, Selection, and care. Application of art principles in room arrangement. Kitchen – different types of kitchen layout and its work simplification.

Textbook

1. Seetharaman, Premavathy, Sonia Batra, and PreetiMehra. *An Introduction to Family Resource Management*.CBS, 2005.

References:

1. Seymour, John, The Self-Sufficient Life and How to Live It. London: DK Publishing, 2003.
2. Princen, T, The Logic of Sufficiency. New York: MIT Press, 2005.
3. Ciperthwaite, Wm, A Handmade Life: In Search of Simplicity. New York: Chelsea Green, 2004.
4. Heinberg, Richard, Power-down: Options and Actions for a Post-Carbon World. Canada: New Society Publishers, 2004.
5. Moore, Tami James, and Sylvia M. Asay. *Family resource management*. Sage Publications, 2017.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledgeabout

K4	CO1	improve their ability in the management of family Resources
K2	CO2	understand and apply the basic principles of art in Interior decoration.
K2	CO3	understand the elementary principles of planning a house andits interior arrangement.
K3	CO4	to use the principles of design in day-to-day life.
K5	CO5	the importance of management in family and personal living.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	M	**S**	S	**S**	**S**	**S**	S	**M**	S	**S**	**S**	S
CO3	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M
CO5	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNT63	FUNCTIONAL FOODS AND NUTRACEUTICALS	L	T	P	C
CORE-XV			5	-	-	4
COGNITIVE LEVEL		K 2 -Understanding K 4 – analyzingK 5 – Evaluating				
Learning Objectives		The course aims to 1. enable the students to familiarize themselveswith functional foods and Nutraceuticals 2. enable the students to know the importance of functional foods andNutraceuticals				

Unit I Functional foods

Definitions Background, the status of nutraceuticals and functional food market, the difference between nutraceuticals and functional foods, Types of nutraceutical compounds and their health benefits, currentscenario.

Unit II Nutraceuticals

Types of nutraceutical compounds – Phytochemicals, phytosterols, and other bioactive compounds, peptides, and proteins, carbohydrates (dietary fibers, oligosaccharides, and resistant starch), prebiotics, probiotics and symbiotic, lipids (Conjugated Linoleic Acid, omega-3 fatty acids, fat replacers), vitamins and minerals; their sources and role in promoting humanhealth.

Unit III Phytochemicals

Phytochemicals compounds used as functional food sources, their sources and health benefits: Flavonoids, allylsulfides, carotenoids, indoles, isothiocyanates, cardiac glycosides, monoterpenes, isoflavones and saponins, glycosylates, OrganoSulphur compounds, omega- 3 fattyacids.

Unit IV Functional foods in various groups

Functional foods: Cereal and cereal products, Milk and milk products, egg, oils, meat and products, seafoods, nuts and oilseeds, functional fruits and vegetables, herbs and spices, beverages (tea, wine,etc.), Fermented foods – their health benefits and role in conditions like cardiovascular diseases, hypertension, diabetes, etc. Pre-biotic and probiotics –health and other benefits.

Unit V Functional foods regulations

Role of functional foods as an antioxidant, their potential for use in improving health.Development in the processing of functional foods.Formulation and fabrication of functional foods.Stability of nutraceuticals. Safety, Consumer acceptance, and assessment of health claims, labeling, marketing, and regulatory issues related to nutraceuticals and functional foods.

Textbook:

1. Satyanarayana, U, Biotechnology, Books and Allied (P) Ltd., Kolkata, 2007

References:

1. Dubey, R.C Text Book of Biotechnology, S. Chand and Co. Ltd, NewDelhi2001
2. Israel Goldberg Functional foods, Pharma foods and Nutraceuticals, Culinary and Hospitality Industry Publication Services, 2001
3. Robert Easy Wildman Handbook of Nutraceuticals and functional foods, Culinary and Hospitality Industry Publication Services, 2001

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledgeabout

K2	CO1	Analyze the photochemical compounds physiological compounds and functional of natural as basis well of as various synthetic
K5	CO2	Compare functional food and nutraceuticals in plant sources to evaluate the potential health benefits of plant-based bioactive components
K4	CO3	Assess pro-biotics, prebiotics, and symbiotics and evaluate the potential health benefits.
K4	CO4	Explain the regulatory issues related to nutraceuticals and functional foods.
K5	CO5	Evaluate the Consumer acceptability and marketing of potentially available functional food Products

Mapping of COs with POs& PSOs:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNT64	NUTRITION IN SPECIAL CONDITION	L	T	P	C
CORE-XVI			5	-	-	4
COGNITIVE LEVEL		K2 -Understanding K4 - analyzing K5 – Evaluating				
Learning Objectives		The course aims to 1. to identify and contribute to the prevention of public health/ social health problems in the country. 2. to equip students with workable knowledge to treat common illnesses athome. 3. to combat various National nutritional emergencies and epidemic diseases. 4. to understand the difficulties involved in feeding children withspecial needs.				

Unit I - Nutritional care for the children with special needs

Nutritional care for the children with special needs Overview of the disability, food and nutritional needs, and their modification. Attention deficit hyperactivity disorder, Autism, Cerebral palsy, Down's syndrome. Major nutritional problems and eatinghabits.

Unit II - Epidemic diseases

Epidemic diseases - (i) Dengue, chikungunya, and other epidemic conditions.Hypothyroidism and hyperthyroidism. Wilson's Disease: epidemiology, causes, symptoms, complications, nutritional requirement, dietary measures, a nutritional and eating disorder in epidemic diseases, problems, and preventive measures.

Unit III- Nutritional Emergency

Nutritional Emergency Nutrition during an emergency: Natural calamity - war, flood, fire famine Nutrition in a sea voyage, Mountaineering. Food requirements, the importance of food supply, the concept of food preparation and distribution, food contamination, and food-borne diseases.

Unit IV- Space nutrition

Space Nutrition: Food Selection. Food preparation for space Planning and serving the food, Classification of space food and Dehydrated foods use in space. Organization for food safety, safety measures in space foods, and importance of space nutrition. Recent advances in space nutrition.

Unit V - Armed forces nutrition

Armed forces nutrition: The history of Military nutrition, Nutrient Support in Military person, the role of nutrient in the injured person, Estimation of energy and protein metabolism in armed person. Recent developments in armed forces nutrition, the significance of armed forces nutrition.

Text books

1. Sharma S, Wadhwa A., "Nutrition in the Community- A textbook", Elite Publishing House Pvt. Ltd, 2003.
2. Srilakshmi B. "Dietetics" Seventh Edition, New Age International (P) Ltd, 2011

References:

1.Gibney., "Public Health Nutrition", Blackwell Publishing,2004.
2.Khanna., "Textbook of Nutrition and Dietetics", Phoenix Publisher,2013.

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	prevention of public health/ social health problems in the country.
K5	CO2	workable knowledge to treat common illnesses at home.
K4	CO3	combat various National nutritional emergencies
K4	CO4	epidemic diseases.
K5	CO5	difficulties involved in feeding children with special needs.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**M**	**S**	**S**
CO3	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
CO4	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**
CO5	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**	**S**

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNP63	COMMUNITY NUTRITION PRACTICAL	L	T	P	C
CORE-XVII			-	-	6	4
COGNITIVE LEVEL		K2: Understand K3: Applying K4: Analyzing K5: Evaluating K6: Creating				
Learning Objectives		The Course aims to 1. identify suitable methods for resolve nutrition-related problems inthe community. 2. analyze maternal and child health careprograms. 3. understand the various AV Aids used itseffectiveness.				

Assessment of nutritional status

1. Anthropometry–Hb,weight,BMICalculation,HeadandChestcircumference,
2. Biochemicalassessment(Haemoglobin,Bloodpressure, andbloodglucoselevels)
3. Clinical assessment – using aquestionnaire
4. (3 days 24 Hour dietary recall, foodfrequency)

II. Visit ICDS and Noon mealcentres

1. Functions of ICDS and noon mealcentres
2. Beneficiaries of ICDS and noon mealcentres

III. Nutritioneducation

1. Av Aids and tools used for nutritioneducation
2. Plan a nutrition education program for a selectedgroup.

Textbook:

1. Park K, Park's Textbook of preventive medicine, 2005.
2. Bamji, Textbook of Human Nutrition, Oxford publishers, New Delhi, 2010

Refernces

1.ChanderVir S, Public Health Nutrition in developing countries, Part II, 1st edition, Woodhead Publishing, New Delhi, 2011
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indian foods, NIN, Hyderabad, 2010
3. Bhatt VB, *Protein Energy Malnutrition*, PeePee Publishers, New Delhi, 2008
4. Sharma N, *Child Nutrition*, 1st edition, Murarilal& sons, New Delhi, 2006

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledgeabout

K2	CO1	Assess the nutritional status of the community.
K3	CO2	To understand the Functions and beneficiaries of ICDS and noon meal centres.
K4	CO3	Gain knowledge on the national effort to combat malnutrition.
K5	CO4	Biochemical assessment (Haemoglobin, Blood pressure, and blood glucose levels)
K6	CO5	To gain knowledge about Dietary assessment.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	M
CO3	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO4	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**M**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNE311	ENTEREPRENEURSHIP DEVELOPMENT	L	T	P	C
ELECTIVE-I			4	-	-	3
COGNITIVE LEVEL		K2: Understanding K 4: Analyzing K5: Evaluating				
Learning Objectives		The course aims to 1) create awareness about entrepreneurship as an effective to a "White-collarjob". 2) students can be taken to trade fairs to collect information on industrial products of interest.				

Unit I Entrepreneurship

Entrepreneurship – meaning, importance, types – the role of entrepreneurs in economic development, need, the transition from income generation to self-employment, and Entrepreneurship. Qualities of a good entrepreneur.Problems of entrepreneurs, qualities of an entrepreneur – entrepreneur as a career.

Unit II Factors influencing entrepreneurial development

Factors influencing entrepreneurial development – Economic, legal, social and psychological factors. How to start a business – production, selection – a form of ownership plant location – land, building, water, and power – raw materials – machinery – manpower – otherinfrastructuralfacilities– Licensing,registration,andlocalbye-laws.

Unit III Agencies supporting Entrepreneurial Development Programme

Agencies supporting Entrepreneurial Development ProgrammeInstitutional Arrangement for Entrepreneurship development – D.I.C., TIIC, S.I.D.C.O, N.S.I.C., S.I.S.I – Institutional Finance to Entrepreneurs – T.I.I.C.,S.I.D.B.I.
Commercial Banks – Incentives to small-scale industries.

Unit IV Project proposal

Project proposal – Proposal format and contentsteps in its preparation, Feasibility testing, SWOT analysis. Project report – Meaning and Importance – Project Identification – Contents of a project report – (as per requirements of Financial Feasibility and Economic Feasibility – Break-Even Analysis.

Unit V Entrepreneurship in food product development

Entrepreneurship developments in food product developments, functions, significance.Case histories of successful entrepreneurs – Entrepreneurship development in India – Women Entrepreneurship in India -Sickness in small scale industries and their remedialmeasures.

Text books

1. Chaiwallah S.A. Sales Management, Himalayan Publishing House New Delhi, 1999.
2. Dr.N.Rajan Nair, Sajith R. Nair Marketing, Sutanchand Sons, New Delhi, 2002

References

1. Vasant Desai, Project Management and entrepreneurship, Himalaya Publishing House, New Delhi, 2000
2. David H. Moll, Entrepreneurship, prentice Hall of India, New Delhi 1999.
3. Frank Jerkins, Advertising, prentice Hall of India, New Delhi, 2000.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledgeabout

K2	CO1	have an ability to discern and distinct entrepreneurial traits.
K4	CO2	understandthe systematic process to select and screen a businessidea.
K4	CO3	to assess opportunities and constraints for new business ideas
K5	CO4	design strategies for successful entrepreneurs.
K5	CO5	write a business plan.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO2	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M
CO3	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	M	**S**	S	**S**	**S**	**S**	S	**S**	M	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNE312	BAKERY AND CONFECTIONERY	L	T	P	C
ELECTIVE-I			4	-	-	3
Cognitive level	K2: Understanding K3: Applying K4:Analyzing K6: Creating					
Learning objectives	**Course aims to** • understand the fundamentals of baking and learn the technologies behind bakery products. • learn the current status, growth rate, the economic importance of baking, and confectionery in India.					

Unit I - Introduction of bakery

Introduction of bakery–definition, principles, types of baked and confectionery products. Major and minor equipment – required to start a small bakery unit. Baking Industry: scope in the Indian economy. History of Baking- present trends, Bakery terms. Nutritional facts of bakery products, Standards, and regulations.

Unit II - Ingredients of bakery

Major and minor ingredients in baking Major ingredients – flour, fat, sugar and leavening agent – types, role in bakery Minor ingredients – milk, water, salt – types, role in baker.
Bakery Products: Ingredients & processes for bread, biscuits, cookies & crackers.
Cakes, pastries, doughnuts, rusks, other baked products Staling and losses in baking.

Unit III - Principles of baking

Principles involved in the yeast products preparation, methods – straight dough method, salt delayed method, no dough time method, sponge and dough method, ferment and dough method. Modified bakery products and breakfast cereals: High fiber, low sugar, low fat, and gluten-free bakery products for people with special requirements. Production and quality of breakfastcereals.

Unit IV - Confectionery Products

Confectionery Products: Characteristics and processingof raw material; Technology of manufacturing of Hard-boiled candies, toffees, fruit drops, chocolates, and other confectioneries: ingredients, processes, product quality parameters, defects, and corrective measures.

Unit V - Equipments in bakery and confectionery

Equipment used in Bakery and Confectionery Industry: Working on various equipment like Mixers, proofing chambers, dough dividers, molder and sheeter, baking ovens, cooling chamber, sealing and packaging machines, rolling and cutting machine of bakery and confectioneryunit.

Text Books:

1. Dubey, S.C (2007) Basic Baking 5 th edition. ChanakyaMudrak Pvt. Ltd. New Delhi.
2. Raina,Basic Food Preparation-A complete Manual. 3 rd. edition, Orient Longman Pvt. Ltd. USA, 2003.

Reference Books

1. Hui, YiuHin, Harold Corke, Ingrid De Leyn, Wai-Kit Nip, and Nanna A. Cross, eds. *Bakery products: science and technology*. John Wiley & Sons, 2008.
2. Kaur, Kulvinder. *In the Bakery*.Routledge, 2019.
3. Khetarpaul, Neelam. *Bakery Science and cereal technology*.Daya Books, 2005.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	understand the bakery science and its application on processing.
K3	CO2	identify the basic ingredients to prepare bakery and confectionery products.
K4	CO3	assess various methods in the preparation of modified bakeryproducts.
K4	CO4	choose the appropriate bakery equipment based on the specific needs.
K6	CO5	check Faults and provide remedies for bakery products.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**M**	S	**S**	S	**S**	**S**	S
CO2	S	**M**	S	**S**	**M**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**M**	S	**S**	**S**	M
CO4	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**	M

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0marks

Course Code	U21FNE313	EXTENSION EDUCATION	L	T	P	C
ELECTIVE-I			4	-	-	3
Cognitive Level	K2: Understand K3: Apply K4: Analyze					
Learning Objectives	**The course aims to** • Understand the fundamentals of Extension Education • know the various extension methods and • familiarizing types of audios - visual aids					

Unit I Fundamentals of Extension Education

History of Extension - origin, and growth, Scope and importance of Extension Education Meaning and definition of extension education, Characteristics and types of Extension Education, Contents and components of extension education, Goals and objectives of extension education.

Unit II Principles of Extension Education

Principles of extension education: Philosophy of extension education, Principles of extension education, Principles of Teaching, Training and Field work, Principles of Learning, Learning Experience, Elements of teaching-learning situation, Types of the Learning situation.

Unit III Classification of extension methods

Classification of extension methods: Meaning and functions of extension methods, the significance of extension methods, techniques, approaches, and strategies, Classification based on the size of the audience, nature or form, Criteria for selection, and combination of various extension methods.

Unit IV Audio-Visual aids

Audio-Visual aids - Meaning and definition, Types of Audio-Visual aids - Merits and Demerits. – Meaning, classification – Audio aids, visual aids, Audio visual aids. preparation and use of audio, visual aids. Factors influencing the effectiveness of audio visual aids, Cone of Experience and its importance in extension teaching.

Unit V New initiatives in Extension pluralism

New initiatives in Extension pluralism: Meaning and definition of private extension, Public extension and Extension pluralism, Role of public and private extension system, Strategies for privatizing Extension, Cyber extension, Public-private partnership, New Concepts: Demand-driven extension, market-led extension.

Text books

1.Reddy, Adivi. An Extension Education, Sree Lakshmi Press, Bapatala, 1995.
2. Jha, J.K, Encyclopaedia of Teaching of Home Science, Vol.I, II, and III. New Delhi: Anmol Publications, 2002

3. Easwaran A., ABC of Extension Education, GRI, Gandhi gram 2007.

Reference books

1..Mohanty, Sandhya Rani. *Home Science Extension Education and Rural Development*.Anchor Academic Publishing, 2017.
2. Rathore, O. S., O. S. Rathore, S. D. Dhankar, M. S. Chauhan, and S. N. Ojha. *Handbook of Extension Education*.Agrotech Pub. Academy, 2001.
3. Nisha, Maimun. *Understanding extension education*.Gyan Publishing House, 2006.

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Know the concept, fundamentals, and scope of extension
K2	CO2	Know the principles of extension education
K2	CO3	Understand the classification of extension methods
K3	CO4	Analyze the audio-visual aids, types, merits, and demerits
K4	CO5	Examine the new initiatives in extension pluralism

Mapping of COs with POs& PSOs:

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	S
CO2	S	S	M	S	S	M	S	S	S	S	M	S
CO3	S	S	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	U21FNE421	FOOD HYGIENE AND SANITATION	L	T	P	C
ELECTIVE II			3	-	-	3
COGNITIVE LEVEL		K 1: Recall K2: Understanding K 5: Evaluating				
Learning Objectives		The course aims to 1)To study the Introduction to sanitation and public health related to the foodservice industry which includes potential hazards that may occur in the operation and production offood.				

Unit I Food hygiene

Food hygiene: Importance of food safety in the food processing industry, Risk classification, Microbial contamination (including cross-contamination/indirect contamination) Chemical contamination, Physical contamination, Allergen contamination. Sanitation Overview Sanitary Regulations: Definition, Types of Hygiene and sanitation.

Unit II Personal hygiene

Personal hygiene: General principle of food hygiene and food handling habits, Importance of worker hygiene, health status, illness and injuries, Personal cleanliness and behavior, visitors, hygiene verification, Hand washing procedure. Personal hygiene of the food handler, Program of Good Health For Food handlers, Roots of Contamination, safety measures for food service personnel. • Care maintenance of Protective Clothing.

Unit III Insect and pest control

Insect and pest control: Importance of Pest Control in the food industry, Pest Classification (insects, rodents, and birds), Problems caused by pests, Prevention and effective control measures, Integrated pest management system, and tools. Food Storage Sanitation; Food Transport Sanitation, Pest Control, Packaging Sanitation, Waste Product Disposal.

Unit IV Cleaning and sanitation

Cleaning and sanitation: Importance of cleaning technology, general cleaning and sanitary considerations, sanitation principle and the requirements for a food sanitation program, Cleaning agents: different types of cleaning agents, Sanitizing agents, Equipment and systems, Evaluation of sanitation efficacy.

Unit V Water supply and Infrastructure

Water supply and Infrastructure: Sanitary aspects of building, Plant layout and design, Water in the food industry, water sources, water uses, Water quality, Purification and disinfection of water, water treatments, water quality standards, Drinking water specifications, Pollution Control, Waterborne diseases, airborne diseases preventing measure for diseases.

Text books

1.Bryan, F.L. Hazard Analysis Critical Control Point Evaluations A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. World Health Organization, Geneva, 2000.
2. Frazier. W., Food Microbiology, McGraw-Hill co Ltd, New Delhi.2015
3.Adams M, R and Moss M, O., Food Microbiology, New Age International (P) Ltd., New Delhi, 2015.

Reference books

1. Vijaya Ramesh, Food Microbiology, MJP Publications, 2007.
2. David, A. Shapton, and Naroh F. Shapton Principles and Practices for the Safe Processing of Foods, Heineman Ltd., Oxford, 2011.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K1	CO1	Classify the common kinds of physical/chemical contamination and simple measures to prevent food poisoning.
K2	CO2	Explain how high standards of personal hygiene for food handlers can be achieved.
K1	CO3	Define integrates practices for economic control of pests
K6	CO4	Design food hygiene and sanitation measures to control the spread of microorganisms.
K5	CO5	Criteria to fulfil water safety and environmental requirements.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	M	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	M	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	U21FNE422	COMMUNICATION AND MEDIA SKILLS	L	T	P	C
ELECTIVES II			3	-	-	3
Cognitive Level	K2: Understand K3: Apply K4: Analyze					
Learning Objectives	**The course aims to** 1. State the basics of communication. 2.acquire skills in producing visual aids. 3.select, use and prepare visual aids for non-formal education.					

Unit I Communication overview

Communication – Meaning, objectives, elements, communication models – Aristotle, Shanon Weaver, Berlo and Leagns.and barriers of communication – How to overcome barriers, advantages of proper communication, communication barriers, problems of communication barriers and its overcome measures.

Unit II Methods of teaching

Methods of teaching: concept, objectives, different types of teaching, functions, and significance of different teaching methods. According to use – Individual, Group, and Mass. According to form – Written, Spoken and Visual – Objectives, advantages, and limitations of all form's methods of teaching

Unit III Audio visual aids

Audio-Visual aids – Meaning, classification – Audio aids, visual aids, Audio visual aids. Preparation and use of audio, visual, and audio-visual aids.Factors influencing the effectiveness of audio-visual aids, Cone of Experience and its importance in extension teaching.

Unit IV Mass media

Mass media – Meaning, Characteristics, types – Radio, Television, Print media, Outdoor.Media. Print Media Vs Broadcast Media. New communication technologies – computers, e -mail, video conferencing, internet, cyber safes, (elementary understanding).

Unit V Traditional media

Traditional Media – concept, types, uniqueness, different types of traditional media, folk songs, puppets shows, Street play, drama, and villupattu. Objectives of traditional media, comparison between traditional media and modern media.Significance of traditional media and its advantages.

References:

1.Baran, Stanley J. "Introduction to mass communication." (2015).
2. Singhal, A. & Rogers, E. India's Communication Revolution from Bullock Carts to Cyber Marts. New Delhi: Sage Publications, 2001.

3. Reddy, A. Adivi, and A. Reddy. *Extension education*.Sree Lakshmi Press, 1987.
4.Dubey, V. K. *Extension education and communication*. New Age International, 2008.

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understanding of communication, models of communication.
K3	CO2	Acquire skills in the Preparation of visual aids.
K2	CO3	Collect first-hand information in visiting media centres.
K3	CO4	Able to organize exhibitions at the village level.
K4	CO5	Able to effectively use modern communication technologies.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	S	S	S	S
CO3	S	S	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	U21FNE423	DIET FOR DISEASES	L	T	P	C
ELECTIVES II			3	-	-	3

Cognitive level	K2:Understanding K3: Applying K4: Analyzing K6: Creating
Learning objectives	**Course aims to** 1. To develop capacity and aptitude in taking up dietetics as a profession. 2. Understanding the consequences of nutritional problems in the society. 3. Create awareness on community nutrition-based programmes.

Unit I Concept of diet therapy

Concept of diet therapy: Purpose and principle of therapeutic diets, modification of normal diet, classification of therapeutic diets, routine hospital diets: clear fluid, full fluid, semi-fluid, semi-solid, solid. Different feeding techniques - oral feeding, tube feeding, parenteral feeding, the role of dieticians in nutritional care.

Unit II Fever diet

Fever: Causes, symptoms, dietary management: Febrile disease acute – Typhoid, influenza, malaria, chronic – tuberculosis: epidemiology, causes micro organism involved in fever, symptoms, complications, diagnosis, dietary recommendations and foods included and avoided.

Unit III Gastro intestinal diseases

Diseases of upper-gastrointestinal tract: Causes, pathogenesis, dietary modification, and diet planning for Gastritis, Peptic ulcer, Diseases of lower-intestinal tract: Causes, pathogenesis, dietary modification, and diet planning fordiarrhoea, dysentery, Constipation Haemorrhoids, Surgery of colon – gastrostomy, jejunostomy, and cancer of the colon

The disease of liver – hepatitis, cirrhosis, gall bladder diseases

Unit IV Life style associated diseases

a. Diabetes mellitus: Causes symptoms and food exchange list, dietary treatment for Diabetes mellitus.

b.Cardio vascular diseases – hypertension, atherosclerosis, congestive cardiac failure, and sodium-restricted diet in causes symptoms and dietary treatment.

c. Obesity and leanness – causes symptoms and dietary treatment.

Unit V Renal diseases and others

a.Diseases of the excretory system– nephritis, nephrotic syndrome, urinary calculi, renal failure.

b.Diet in allergy – definition, classification, food allergies. Test for allergy, dietetic treatment.

c.Cancer – causes symptoms of dietary treatment.

Text books

1. Robinson, Corinne Hogden, and Marilyn R. Lawler. *Normal and therapeutic nutrition*. No. Ed. 16. Collier Macmillan Publishers, 1982.
2. Dietary Guidelines of Indians- A Manual, National Institute of Nutrition, Hyderabad, 2006

3. Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi, 2011.

Reference books

1. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005.
2.Elia M, Ljunggvist O, Stratton RJ, Lanham SA, Clinical Nutrition (The Nutrition Society Textbook), 2nd edition, Wiley Blackwell Publishers, 2013
3. Mahan LK, Stump SE, and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, 2004.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Plan and prepare a standardized hospital diet for the needed patients.
K2	CO2	Understand the concept, purpose, and principles of diet therapy and the role and types of dieticians.
K3	CO3	Apply various deficiency disorders concerning their prevalence, causes, symptoms, and preventive measures.
K4	CO4	Discuss the kinds of commercial formulas available for oral and enteral feedings.
K4	CO5	Compare the food exchange list in the control of diabetes and complications.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	M	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	U21FNE531	FOOD SAFETY AND QUALITY CONTROL	L	T	P	C
ELECTIVES III			3	-	-	3
COGNITIVE LEVEL		K2-Understand K3 -Applying K4 –Analyzing				
Learning Objectives		The course aims to 1) Acquire knowledge on food safety and food laws 2) Study about quality control and common food standards.				

Unit I Food safety concept

Importance of food safety in the food processing industry Risk classification, National and international food regulatory agencies, General food laws and food safety regulations, Nutritional labeling regulation (mandatory and optional nutrients, nutritional descriptors, and approved health claims); Microbial contamination (including cross-contamination/indirect contamination) Chemical contamination, Physical contamination, Allergen contamination.

Unit II Food Safety Programs

Definitions and importance, Good Manufacturing Practices, (GMPs), Pest Control Program, Facility Maintenance, Personal Hygiene, Supplier Control, Sanitary.

Design of Equipment and Infrastructure, Procedures for Raw Material Reception, Storage and Finished Product Loading, Sanitation Program.(Sanitation Standard Operating Procedures (SSOPs).Product Identification, Tracking and Recalling Program, Preventive Equipment Maintenance Program, Education and Training Program.

Unit III Food adulteration

Adulteration of food - common adulterants and tests to detect common adulterants.Cereals and products - bread, biscuits, cakes products. Fruits Products: Jam, juices, squashes, ketchup, sauce. Oils and Fats: Coconut oil, groundnut oil, palm oil, sunflower oil, Vanaspati. Milk and Products: Skimmed milk powder, partly skimmed milk powder, condensed sweetened milk. Other products - coffee, tea, sugar, honey,toffees.

Unit IV Hygiene and Sanitary Practices

Personal Hygiene - Health Requirements - Location and Surroundings of Food Industry - Slaughter House - Good Manufacturing Practices - Good Food Hygiene Practices - Storage.

The food safety concepts, importance, and its significance, food safety, and hygiene in differentfoods.

Unit V National and International laws

FAO/WHO, FSSAI Codex Alimentarius commission, fair average quality (FAQ) specification for food grains, ISO 22000 series. HACCP: Background, current status, structuredapproach,principles,benefits, and limitations.ConsumerProtectionAct(CPA).

Text Books:

1. Sather A.Y A first course in food analysis, New Age Publications, New Delhi 1999
2. Redman, Nina. *Food safety: a reference handbook*. ABC-CLIO, 2007.

References:

1. Motarjemi, Yasmine, Gerald Moy, and Ewen Todd, eds. *Encyclopedia of food safety*. Academic Press, 2013.
2. Roberts, Cynthia A. *The food safety information handbook*. Greenwood Publishing Group, 2001
3. Motarjemi, Yasmine, and HuubLelieveld, eds. *Food safety management: a practical guide for the food industry*. Academic Press, 2013

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Discuss different food safety and quality aspects.
K2	CO2	gain knowledge on food safety and food laws and study about quality
K4	CO3	Identify objectives, Importance, functions of quality control, stages of quality control.
K3	CO4	Apply safety principles related to the food industry.
K4	CO5	Analyze basic principles of HACCP, SQF, and ISO and sanitation.

Mapping of COs with POs& PSOs:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO 6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	M	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**M**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNE532	NUTRITIONAL COUNSELLING	L	T	P	C
ELECTIVES III			3	-	-	3
Cognitive level		K2: Understanding K3: Applying K5: Evaluating				
Learning objectives		**Course aims to** 1. learn the basic concept of nutrition counselling 2. enrich the different types of counseling and the importance of diet counselling				

Unit I Nutritional counselling

Nutritional counselling: Meaning, needs, and types of nutritional counseling planning of diet and their importance, techniques, and qualities of nutritional counseling. Nutritional counselling in health management, technology in nutritional counselling, applications of video, posters telephonic conversation in online dietcounselling.

Unit II Dietician roles

The Dietician a) Classification b) Code of ethics c) Responsibility d) The dietician in India e) Indian dietetic association f) Technology in diet counselling- usage of mobile applications in diet counselling.

Unit III Disease specific diet counselling

Nutritional counseling for cardiovascular patients, diabetes mellitus, malnourished pregnant women, obese person, anemic person: counselling based on disease, age of the patient, educational status of the patient, stages of disease condition, complications of disease condition, new diet adaptation, and otherissues.

Unit IV Assessment needs of patients

Assessment – Assessment of needs of patients, Communication process, Patient Education. Anthropometrical profile of the patient, biochemical parameters of the patients, clinical status, and their type of dietary pattern also assessed the previous nutritional status of the patient screening.

Unit V Community-based counselling

Counseling for communities: definition, objectives of community-based counselling, the importance of counselling to the community, planning, and Organizing counseling Camps for a specific disease, counselling for nutritional deficiencies, counselling for vulnerable groups, tools used for counselling to thecommunity.

Textbook:

1. Srilakshmi,Dietetics Eight Edition ,New age international (p) Ltd .2014
2. Gopalan C., Ramanathan, P.V. Balasubramanian, S.C., Nutritive value of Indianfoods, NIN, Hyderabad, 2010

References Books

1. RuthA. Roth, Nutrition Diet therapysixth Edition, New age international (p) Ltd.2013
2. KaveriChakravarthy.A.SText book of Nutrition in health anddisease.2016
3. Joshi Y.K, Basics of Clinical Nutrition, 2nd edition, JP Medical Publishers Pvt Ltd,New Delhi, 2008
4. Stacy N, *William's Basic Nutrition and Diet Therapy*, 12th edition, Elsevier publications, UK, 2005

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	To gain knowledge about the role of dietician in nutritional counselling
K2	CO2	Explain types of diet and compare.
K3	CO3	Planning of diet in Diabetes mellitus.
K3	CO4	Planning of diet in Pregnant women.
K5	CO5	Create skill development in planning diets using food exchange lists

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	M	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNE533		L	T	P	C

ELECTIVES III	GENDER AND DEVELOPMENT	3	-	-	3
Cognitive Level	K2: Understanding K4:Analyzing K5: Evaluating				
Learning Objectives	**The course aims to** 1. develop concern for women's issues and problems 2. have a basic idea of the efforts in India for womenuplift.				

Unit I Gender and Development:
Concept of gender, gender roles, gender budgeting, gender auditing, gender mainstreaming, gender analysis matrix, shift from welfare to development and empowerment, gender in development, gender and development, National and International efforts for gender empowerment.

Unit II Status of Women in India
Status of Women in India:Status – Meaning, Status of Women as per latest census report – Gender gaps and their implications, Sex ratio, Life expectation at birth, Health, Nutrition and Mortality, age at marriage, fertility, literacy, employment.

Unit III Violence against women
Violence against women: concepts, different types of violence, dowry, divorce, female feticide and infanticide, sexual discrimination, sexual exploitation, obscene advertisements, and projects in the mass media. Efforts for the elimination of all forms of discrimination.

Unit IV Policies for Women's development
Policies for Women's development: objectives of women development policies, National Policy for Women's empowerment, Policy perspective, mainstreaming, a gender perspective in the development process. Economic, Social, Legal, and political empowerment of Women.

Unit V Women and Law
Women and law: concept of law in women's development, importance of law in women's development, popular women welfare laws, marriage, dowry, divorce, property, employment and adoption, political participation, legal literacy for Women, family Counselling center and cybercrime.

References

1. Presser, Harriet, and Gita Sen. *Women's empowerment and demographic processes: Moving beyond Cairo*. Oxford University Press, 2000.
2. Sawyer, Roger. *We are but women: women in Ireland's history*. Routledge, 2002.
3. Forster, Christine, and Jaya Sagade. *Women's Human Rights in India*. Routledge India, 2019.
4. Pandit, Harshida. *Women of India: An Annotated Bibliography*. Vol. 26. Routledge, 2017.

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	trace the significance of gender development in national development
K3	CO2	report the violence against women at family and workplace.
K2	CO3	get familiarize with legislation and policies for women
K4	CO4	Analyze the status of women in society.
K3	CO5	Identify the laws available for the welfare of women.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	S	S	S	S	M	M
CO2	S	S	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S) -3 Marks
Moderately Correlating (M) -2 marks
Weakly Correlating (W) -1 Mark
No Correlation (N) -0 mark

Course Code	U21FNE641		L	T	P	C

ELECTIVES IV	FOOD PACKAGING	3	-	-	3
COGNITIVE LEVEL	K2: Understanding K4:Analyzing K5: Evaluating				
Learning Objectives	The course aims to 1) The functions of packaging 2) Various methods of packaging 3) Shelf Life of the products 4) Various equipment for packaging 5) Application during transportation.				

Unit I Food packaging concepts

Food packaging: definition, objectives of food packaging, the importance of food packaging, Introduction to food packaging: Packaging terminology- definition. Functions of food packaging, Packaging environment. Characteristics of foodstuff that influences packaging selection

Unit II Different package methods

Different types of packaging material and their properties: Glass, Paper and paper board, Corrugated fibre board (CFB), Metal containers: Tin Plate and Aluminum, Composite containers, Collapsible tubes, Plastic Films, Laminations, Metalized films, Co-extruded films, Testing of packaging material

Unit III Packaging systems

Packaging Systems and methods: Vacuum Packaging, controlled atmospheric packaging, modified atmospheric packaging, Aseptic Packaging, Retort processing, Microwave packaging, Active Packaging, intelligent packaging, Edible packaging, Shrink and stretch packaging.

Unit IV Packaging of finished goods

Packaging of finished goods: Weighing, filling, scaling, wrapping, cartooning, labelling, marking, and trapping. Labelling: Standards, purpose, description types of labels, labeling regulation barcode, nutrition labelling, health claims, mandatory labeling provision.

Unit V Safety measures of packaging

Safety measures of food packaging: Hazards of packaging material: Packaging specifications, the shelf life of packed foods, convenience and hazards of packaging materials, moisture absorption properties of foods and selection of packaging materials, the interaction between packaging and foods.

Text books

1. Vijaya Khader Food Science and Technology, Indian Council of Agricultural Research, Newdelhi. 2001
2. NIIR Board Food Packaging Technology, Handbook National Institute of

IndustrialResearch, New Delhi. 2004

Reference books

1. Jung H. Han Innovations in FoodPackaging, 2013
2. AlexandraGrumezescuFoodPackaging. 2016
3. AlexandraMihaiGrumezescuFood Packaging and preservation. 2017

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	To discuss the characteristics and functions of materials used in food packaging.
K4	CO2	To identify the types of packaging material for suitable product.
K4	CO3	The standard method used for the marketing of developed products.
K5	CO4	Various methods of food packaging to increase the shelf life's
K5	CO5	Construct audio-visual aids.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO2	PSO 3	PSO4	PSO 5
CO1	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**M**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNE642	CHILDREN WITH SPECIAL NEEDS	L	T	P	C
ELECTIVE-IV			3	-	-	3

Cognitive Level	K2: Understanding K4: Analyze K3: Apply
Learning Objectives	**The course aims to** • Acquire knowledge about the special needs of exceptional children and the methods of satisfying their needs • Acquire skills in guiding the parents of exceptional children.

Unit I Children with special needs

Children with Special needs: Meaning, Types, Characteristics, History of Education of Exceptional Children. Special educators – their qualities and qualifications. Defining disabilities, Models of disability Classifying disabilities, the social construction of disability, Demography, Rights of Children withDisabilities.

Unit II Common childhood disabilities

Common Childhood Disabilities –definition, methods of identification, assessment methods, and etiology with reference to Locomotor disability, Visual disability, Auditory and speech disability, Intellectual disability, Autism, and Learning Disability.

Unit III Children with disabilities

Children with Disabilities and Society - Families of children with disability, Prevention, and management of different disabilities, physicallyChallenged Children: Orthopedically Handicapped – types, educational practices- Special education and inclusion, Policy andprogrammes and Policies for children withdisabilities.

Unit IV Programmes

Programmes and Policies for children with disabilities -The Indian Constitution, National Policy for Persons with Disabilities 2006, The Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995, The Rehabilitation Council of India Act 1992, The National Trust for Welfare of Persons with Autism, Cerebral Palsy, Mental Retardation, and Multiple Disabilities Act 1999. Legal Rights of the Disabled in India, Role of Important Institutionslaws.

Unit V Characteristics and educational needs

Characteristics and educational needs– types, characteristics, and educational needs, Speech challenged – types, characteristics, and educational needs, Assistive technology - meaning, need, types benefits - the barriers to assistive technology. Scheme of Assistance to Disabled Persons for Purchase/ Fitting of Aids & Appliances (ADIP).

Text books

1. Mangal S.K., “Educating Exception Children”, PHI Learning Private Limited, New Delhi, 2009
2. Reddy G.L, and Sujatha J., “Children with Disabilities” Discovery Publishing House, New Delhi,2006
3. Reddy S.K.,” Educating of Children with Special Needs” Discovery

publishing House, New Delhi 2007

Reference books

1. Reddy L., Ramar R., and Kusuma A. "Hearing Impairment-An Educational Consideration", Discovery Publications, New Delhi 2004
2. Relakar S., Delvi U., and KautA. "Fundamentals of speech and speech teaching" 2006
3. SharmaK., "Rehabilitation of Hearing-Impaired Children", Sarup and Sons,NewDelhi, 2006

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K3	**CO1**	empathize the needs of exceptional children
K2	**CO2**	familiarize with the educational provisions of exceptional children
K4	**CO3**	gain skills in identifying children with special needs.
K2	**CO4**	Understand the special needs of exceptional children
K3	**CO5**	Identifying the methods to satisfy the need of exceptional children.

Mapping of COs with POs& PSOs:

CO/ P O	PO 1	PO2	PO 3	PO4	PO5	PO6	PO 7	PS O 1	PS O 2	PS O 3	PS O 4	PS O 5
CO1	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**M**	S
CO3	S	**S**	S	**M**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO4	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	U21FNE643	FASHION DESIGN	L	T	P	C
ELECTIVE-IV			3	-	-	3

Cognitive Level	K2: Understand K3: Apply K4: Analysis
Learning Objectives	**The course aims to** 1. Impart knowledge about functions and theories of clothing. 2. Understand the basics of the fashion and fashion industry. 3. Develop sensitivity towards the selection of garments and garment design.

Unit I Meaning of fashion

Meaning of Fashion– objectives, scope, importance, Need for clothing, and Fashion perspectives - Fashion terminologies. Fabric terms, Accessory Terms, Common Sewing Terms, and Industry Language. Fashion evolution- haute couture, pretaporter.

Unit II Fashion Movement

Fashion Movement - Meaning, Theories, and principles- trickle up, trickledown, and trickle across. Fashion - cycle, Fashion forecasting, fashion change – social and psychological reasons.

Unit III Substance of Fashion Industry

The substance of Fashion Industry -concepts and importance of fashion industry, fashion industry in India, Soft goods chain-textile, apparel & retail segment - Apparel Categories, Designing process - World fashion design centers, Influential designers in India and abroad

Unit IV Fashion Business Trends

Fashion Business Trends –current trends in India, importance, Consumer Groups, Consumer Buying Consumer market, Importance of demographics and psychographics & Niche Marketing. Fashion enterprise- fashion information services.Fashion websites.

Unit V Career in Fashion Industry

A career in Fashion Industry– importance and scope, Career planning process, Training and experience needed, Career in textile, apparel, retail & fashion promotion, Entrepreneurship in fashion, boutique management.

Text books

1. Kathryn Mc Kelvey and Janine Munslow Fashion Design: Process, Innovation, and Practice,BlackwellScienceLtd.,BlackwellPublishingCompany,UK.2005
2. Jenny Davis A Complete Guide to Fashion Designing, First Edition, Abhishek Publications, Chandigarh.2006
3. Mahadevan, M.G. Textile colouring, First Edition, Abhishek Publication Chandigarh. 2008

Reference books

1. Premlata Mullick Textbook of Textile Designing, Kalyani Publishers, Ludhiana. 2006
2. Parachure, J. W Fundamentals of Designing for Textiles and other end-use,

Woodhead publishing, India, New Delhi.2009

Course outcomes

On successful completion of the course, the students will be able to gain knowledge about

K3	**CO1**	Identify the role and functions of clothing and recognize the factors affecting selection and evaluation of clothing.
K2	**CO2**	Explain the concept of fashion, its terminology, sources, and factors affecting it.
K2	**CO3**	Describe the global fashion industry and its leading designers.
K4	**CO4**	Classify and illustrate various components of the garment.
K3	**CO5**	Apply the knowledge of elements and principles in design interpretation.

Mapping of COs with POs& PSOs:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	M	**S**	S	S	S	S	S	S	S
CO2	S	S	S	M	**S**	S	S	S	S	S	S	S
CO3	S	S	M	M	**S**	S	S	M	S	S	M	S
CO4	S	S	S	M	**S**	S	S	S	S	S	S	S
CO5	S	S	S	M	**S**	S	S	S	S	S	S	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	**U21FNN311**	**FUNDAMENTALS FOOD SCIENCE**	**L**	**T**	**P**	**C**
Non-Major electives			**2**	**-**	**-**	**2**

Cognitive level	K2-Understanding K3-applying K4-Analysing K5 – Evaluating
Learning objectives	**Course aim** 1. To know the role of food inhealth. 2. To enable students to obtain knowledge of different food groups and their contribution tonutrition. 3. To help them study the different methods of cooking and their advantages anddisadvantages. 4. To enable the students to apply the process of differentfoods. 5. To enable them to gain experience in the preparation of foods with attention to the preservation of their nutritive value-oriented to Indian cooking.

Unit I Food groups

Food definition, functions of foods: energy-yielding foods, bodybuilding foods, protective foods. Food groups-classification of foods by ICMR, five food groups: balanced diet- definition, planning of balanced diet, Recommended Dietary Allowances (RDA) Dietary guidelines.

Unit II Cereals and pulses

Cereals and pulses: different types of cereals and pulses, structure, nutritive value, classification, processing, milling, nutrient content, different types of cooking cereals. Pulses and legumes –different types of pulses, nutritive value, processing in pulses, toxins in pulses.

Unit III Fruits, vegetables, and milk foods

Fruits: classification of fruits Vegetables: classification of vegetables, Milk – classification, nutritive value. Pigments and Flavouring compounds, the role of pectin in fruits, processing, and preservation. Milk - composition and Nutritive value, physical properties of milk, Different types of milk and milk products, the role of milk and milk products in cookery.

Unit IV Meat and fish foods

Meat: Different types of flesh foods, fish and poultry – meat – composition, and nutritive value, post-mortem changes, ageing of meat, tenderizing of meat, curing of meat, cuts, and grades of meat, meat cookery, storage. Fish and poultry - Nutritive value.

Unit V Nuts and oilseeds, Sugar, Spices, and Condiments

Nuts and oilseeds- different types of nuts and oilseeds and their availability nutritive value and processing. Sugar –types, stages, sugar cooking, and processing. Spices and Condiments – Classification description, uses procurement and storage.

Textbook:

1. SrilakshmiFoodScience,SeventhEdition,New Age International Publishers, New Delhi.2018

Reference books

1. M.N.AhmedFood Science and Nutrition, First Edition, 2005
2. Norman N.Potter.JosephHotchkissFood Science,Fifth Edition,2007
3. Sunetra RodayFood Science and Nutrition,Second Edition,2012
4. Sumati RajagopalMudambi Food Science,2015
5. Dr.M.SwaminathanFood and Nutrition, SecondEdition,2017

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	The student will gain knowledge about energy requirements and the Recommended Dietary Allowances.
K2	CO2	Knowledge of nutritive value, understand the cooking quality factors, and develop skills in the preparation and storage of milk and egg products.
K3	CO3	Knowledge on nutritional classification, understand the changes in pigments, and acquire skills in preserving nutrients and pigments in the processing and storage of vegetables and fruits
K4	CO4	Determine the smoking point of any cooking oils and the stages of sugar cookery
K5	CO5	Assess the effect of the addition of acid, fat, salt, water, and sugar on the texture of flesh foods quality.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**M**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO4	S	**S**	S	**S**	**M**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**M**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0Mark

Course Code	U21FNN312	NUTRITION AND WELLNESS	L	T	P	C
on-Major electives			2	-	-	2

Cognitive level	**K1-Knowledge K2- Understandin g K3- applying**
Learning objectives	To enable the students to acquire Elementary knowledge on wellness and fitness Knowledge on the relationship between nutrition andwellness

Unit I Concept of wellness

Wellness; definition and concept of wellness, fitness and Health Definition and Indicators of Health - Parameters, Components, and Relationship between Wellness, Fitness, and Health - Challenges and Personalized approach.

Unit II Nutrition and health

Nutrition and Health Introduction - Food Groups, Adequate Diet, My Pyramid, Foods for Health, Millennium Development Goals, Role of Macro and Micronutrients – Carbohydrates, Proteins, Fats, Vitamin D, Calcium, Iron, Optimum Nutrition and Hydration forHealth.

Unit III Physical activity

Physical Activity: definition and methods of physical activity, training Aerobic and anaerobic training -To enhance Cardio Vascular Endurance, Flexibility, and Body Composition, Measurement of PAL, Benefits of Fitness training and Gadgets for measuring PA.

Unit IV Diseases and fitness

Diseases and fitness: Diseases due to faulty food habits and physical inactivity. Non-communicable Disease conditions- Underweight, Obesity, Diabetes mellitus, Hypertension, Cancer, Cardiovascular Disease, Anemia. Diet modifications, the role of physical activity in disease prevention.

Unit V Stress management

Stress and Health Management: definition and objectives, the importance of stress management. Stress assessment and management techniques-under weight, overweight, and obesity, relaxation techniques –yoga and meditation for health, theimportance of yoga and its benefits in health management.

Text books

1. Swaminathan, Essential of Food and Nutrition‟, Bangalore Printing Publishing Company, 2008
2. Kathleen Mahan, Sylvia Escott Stump, “Krause’s Food and Nutrition and Diet Therapy‟ W.B Saunders Company, USA,2000.
3. Swaminathan, M. Essentials of Foods and Nutrition, Volume I and II Ganesh and Co., Madras,2003.

Reference books

1. Mahan, Kathleen L. Krause's Food, Nutrition and Diet Therapy, W.B. Saunders, 11th Edition 2004.
2. Srilakshmi. E. Nutrition Science, New Age International Publishers, 2012.
3. Swaminathan, M. Advanced Textbook on Food Science and Nutrition, Vol:2, Second edition, Reprinted, Bangalore Printed and publishing Co Inc, Bangalore, 2003.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the concept of Wellness, Fitness, and Health
K2	CO2	Acquired knowledge on basic food groups
K3	CO3	Importance of wellness
K4	CO4	Different types of diet-related diseases
K5	CO5	Role of nutrition in health

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S
CO2	S	**S**	S	**S**	**S**	**S**	S	**M**	S	**S**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**S**	**M**	S
CO4	S	**S**	S	**S**	**M**	**S**	S	**S**	S	**S**	**S**	S
CO5	S	**M**	S	**S**	**S**	**S**	S	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0

Course Code	**U21FNN421**	**Basics of Human Nutrition**	**L**	**T**	**P**	**C**
NME-II			**2**	**-**	**-**	**2**
Cognitive Level		K2: Understand K3: Apply K5: Evaluate				

Learning Objectives	Course aims to 1. understand the major nutrients relevant to human health. 2. gain knowledge on dietary sources, intake levels, physiological role, and requirement of major nutrients on the human body. .

Unit I Introduction to nutrition

Introduction to nutrition: Definition of nutrition- food, health, nutritional status, malnutrition, over nutrition, under nutrition, functions of food, balanced diet, food pyramid, ICMR Basic five food groups.

Unit II Macronutrients

Macronutrients: carbohydrates- classification, functions, food sources.
Dietary fibre - Functions, food sources & deficiencies. Lipids and fats- definition, classification, functions, Deficiency, sources-Proteins, Definition, classification, functions, deficiency, sources.

Unit III Micronutrients

Micronutrients: vitamins-, definition, classification &functions of vitamins
Nomenclature, functions, deficiency& sources of vitamins A, D, E, K Nomenclature, functions, deficiency& sources of vitamins B1, B2, B3, folic acid, B6, B12.

Unit IV Minerals

Minerals: classification, Macrominerals: and micro minerals:Calcium, phosphorus, magnesium, sulfur, sodium and potassium.
Micro minerals: Iron, Zinc, iodine, fluorine, sodium
Definition functions, deficiency diseases, food sources, recommended dietary intake.

Unit V Water

Water: Distribution of water and electrolytes, functions, requirements, sources, water balance, water depletion, water excess. Water: dehydration, causes, symptoms, preventive measures, oedema- causes, and preventive measures.

Text books

1. Srilakshmi B, Dietetics, sixth edition, New age Publishing Press, New Delhi, 2011
2. Park, K.: Park's Textbook of Preventive and Social Medicine, 18th Edition, M/s. Banarasi das Bhanot, Jabalpur, 2000.
3. Swaminathan, M. Essentials of Food and Nutrition, Vols. I and II. Ganesh & Co. 2000.

Reference books

1. Stacy N, William's Basic Nutrition and Diet Therapy, 12th edition, Elsevier publications, UK, 2005.
2. Mahan LK, Stump SE, and Raymond JL, Krause's Food and Nutrition Care Process, 13th Edition, Elsevier Saunders, Missouri, 2012
3. Barasi, Mary. *Human nutrition: a health perspective*. CRC Press, 2003.
4. Roday S, Food Science, and Nutrition, Oxford university press, New Delhi, 2007

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Identify the functions and deficiencies of minerals.
K2	CO2	Explain the structure and components of nutrients.
K3	CO3	Outline the water distribution in the human body
K4	CO4	Analyze the different quality aspects of macronutrients and discuss on specific functions of macronutrients in the human body
K5	CO5	Identify the functions and deficiencies of minerals.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks Moderately Correlating (M) - 2 marks
Weakly Correlating (W) -1 Mark No Correlation (N) - 0 mark

Course Code	U21FNN422	FOOD PRESERVATION CONCEPTS	L	T	P	C
Non-Major electives			2	-	-	2
COGNITIVE LEVEL		K 2: Understanding K3: Applying K5: Evaluating K 6: Creating				

Learning Objectives	The course aims to 1) study the basics of various food preservation technologies and the criteria needed to be taken for the appropriate processing of foods. 2) contribute proper utilization of food free from contamination increased shelf life with prevention of wastage.

Unit I Food preservation

Introduction to Food Preservation: Definition and scope of Food preservation Technology, Principles of food preservation, perishable, non-perishable food, causes of food spoilage: Microbial, Physical, Chemical contamination, causes of food contamination, sources of microorganisms.

Unit II Food preservation methods

Food preservation by low temperature: Introduction to Refrigeration, cold storage, and freezing, Principle of the freezing, freezing curve, Changes occurring during freezing, Types of freezing - slow freezing, quick freezing. Introduction to thawing, changes during thawing, and its effect on food.

Unit III Methods of preservation

Food preservation by high-temperature Thermal processing methods of foods: cooking methods blanching methods, pasteurization methods and sterilization of foods, canning in food preservation, bottling methods, and spoilages in canned foods.

Unit IV Food preservation by drying and dehydration

Food preservation by drying and dehydration-Definition of drying and dehydration, Drying curve and Factors affecting rate of drying, Different methods of drying and driers used in the food industry, drying foods, dehydrated foods, availability of drying foods in the market,

Unit V Food preservatives

Food preservation by irradiation and preservatives: Definition, Methods of Irradiation, Uses and safety aspects of radiation in food processing. Preservatives: natural preservatives- salt, sugar, honey, oil, tamarind, chemical preservatives: class II Preservatives.

Text Books:

1. Sivasankar, B. Food Processing and preservation 2nd edition, prentice Hall, Pvt, Ltd.2013

Reference Books

1. Subbulakshmi, Shobha A et.al., Food Processing and Preservation, New Age International Publishers.2006
2. Srilakshmi Food Science, NewAgeInternational Publishers 2008
3. Sudesh and Neelam Food Preservation, Published by Agro tech 2009
4. Brennan JG and Grandison AS Food processing handbook. 2nd Edition, John Wiley 2012
5. Mano Ranjan Kalia Food Quality Management Second Edition, Agrotech Publishing Academy, Udaipur 2014

6. Dr. Anju Singh Handbook of food preservation, Published by Agro tech 2017

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K6	CO1	Design and develop the unit operations required to produce a given food product.
K2	CO2	Classify the various types of food spoilage and prevent using suitable processing methods.
K2	CO3	Outline the principles and concepts of processing techniques and its effects on product quality.
K5	CO4	Evaluate the novel technologies in food preservation.
K3	CO5	Utilize the possible, recent preservation methods in the food processing sector.

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S
CO2	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO4	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M
CO5	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	**U21FNS53**		**L**	**T**	**P**	**C**
Skill based Electives-III		**FOOD PROCESSING FUNDAMENTALS**	**2**	**-**	**-**	**2**
COGNITIVE LEVEL		K 2: Understanding K3: Applying				
Learning Objectives		The course aims to 1. Plan a processing method to increase the shelf life using Thermal and non-thermal methods of processingtechniques. 2. Choose the best processing techniques to be used for a				

	specific group ofproducts.

Unit I Pre- and post-harvest processing

Pre-and post-harvest processing: concepts, principles, advantages of pre-and post-harvest processing, nature of harvested crop, plant, and animal products. Maturity index – definition, principle, Assessment methods for various crops. Principles of storage: storage of grains – conditions and effects of cold storage onquality.

Unit II Processing and preservation

Processing and preservation by heat: Blanching, Pasteurization, sterilization and UHT processing, canning, extrusion cooking, dielectric heating, microwave heating, roasting, and frying. Retort processing. Drying – types, principles, drying curve, water activity, and microbial spoilage due to moisture. Dehydration of fruits, vegetables, and animal products – ultra filtration, reverse osmosis.

Unit III Different preservation

Different preservation and processing methods: the objective of preservation, advanages of food preservation. Preservation using low temperature: Refrigeration, freezing, CA, MA & freeze-drying principles, mechanism of action, and effect on the quality of food product quality, advantages, and disadvantages.

Unit IV other preservation methods

Food irradiation and chemical preservation: Food irradiation regulations in food irradiation. Food additives and chemical preservatives: natural preservatives: honey, salt, sugar, oil and chemical preservatives, GRAS and permissible limits for chemical preservatives, advantages, and disadvantages.

Unit V Non-thermal methods

Processing and principles using non-thermal methods: High-pressure processing, Use, and application of enzymes and microorganisms in processing and preservation of foods. Food fermentation: objectives, principles, advantages of fermentation, fermented foods, pickling, and smoking.

Text books:

1.Rao, M.A., S.S.H. Rizvi, and A.K. Datta ―Engineering Properties of Rood¦, 3rd Edition, Taylor & Francis,2005
2. Majumdar, A.S. ―Dehydration of Products of Biological Origin¦, Oxford & IBH Publication,2004
3. Fellows, P.J. Food processing technology: Principle and Practice. 2nd Ed. CRC Publishers,2005

Reference books

1. Desrosier NW & James N. Technology of food preservation. AVI. Publishers, 2007

2. Das, H. ―Food Processing Operations Analysis¦, Asian Books, 2005

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K6	CO1	Understand the pre-and post-harvest technology
K2	CO2	Different processing methods
K2	CO3	Various techniques in food processing
K5	CO4	Chemical preservation methods
K3	CO5	Thermal processing methods

Mapping of COs with POs& PSOs:

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S
CO2	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO4	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M
CO5	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

Course Code	**U21FNS64**	**FOOD FERMENTATION**	**L**	**T**	**P**	**C**
SBE IV			**2**	**-**	**-**	**2**
COGNITIVE LEVEL		K 2: Understanding K3: Applying				
Learning Objectives		This course aims to Provide the concepts of fermentation techniques Importance and benefits of fermented foods				

Unit I Basics of fermentation

Fermentation, types of fermentation, Fermentation Pathways for Industrial Products: Biochemical pathways of metabolic reactions for utilization of carbon sources and formation of different metabolites by microorganisms; Strain Development -Various techniques of modifying the strains for increased production of industrialproducts.

Unit II Fermented foods

Fermentative Production: a) Foods: Processes for preparing fermented products including Yogurt (curd) and other Traditional Indian Products like idli, dosa, dhokla, shrikhand, etc., Soya based products like soya sauce, natto, etc., Cocoa, Cheese, etc.; fermented foods in the market and itsneeds.

Unit III Beverages

Beverages: concepts of fermentation in beverage processing, types of fermented beverages, alcoholic beverages based on fruit juices (wines), cereals (whisky, beer, vodka, etc.,), sugar cane (rum), etc. Process description, quality of raw materials, fermentation process controls,etc.) Industrial chemicals.

Unit IV Fermented production

Fermentative Production of different products: Organic acids like (Citric Acid, Lactic Acid), Amino Acids (Glutamic acid, Lysine), Antibiotics (Erythromycin, Penicillin), Polysaccharides (Dextran, Xanthan), etc.; steroids transformation; process descriptions and key controls for optimal production.

Unit V Advantages of fermentation

Advantages of fermentation: health benefits, gastrointestinal diseases and fermented foods, the role of fermented foods in nutrient absorption. Processed fermented foods in the market. Prebiotics: role of prebiotics in health, probiotics: role of probiotics in health.

Text books

1. M.N. Ahmed Food Science and Nutrition, First Edition, 2005
2. Norman N. Potter.Joseph H. Hotchkiss Food Science, fifth edition, 2007
3. SunetraRoday Food Science and Nutrition, SecondEdition, 2012
4. SumatiRajagopalMudambi Food Science, 2015
5. Swaminathan Food and Nutrition, SecondEdition, 2017

Reference books

1. Vogel, H.C. and C.L. Todaro, Fermentation and Biochemical Engineering Handbook: Principles, Process Design and Equipment, 2nd Edition, Standard Publishers 2005.

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K6	CO1	Concept and types of fermentation
K2	CO2	Different types of fermented foods
K2	CO3	Alcoholic fermented foods
K5	CO4	Fermentation with acids and alkalis
K3	CO5	Advantages of fermented foods

Mapping of COs with POs& PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S
CO2	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO3	S	**S**	S	**S**	**S**	**S**	S	**S**	S	**M**	**S**	S
CO4	S	**S**	M	**S**	**S**	**S**	S	**S**	S	**S**	**S**	M
CO5	S	**S**	S	**S**	**S**	**S**	M	**S**	S	**S**	**S**	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

VALUE ADDED COURSE

Course Code	U21FNV51	FOOD BIOTECHNOLOGY	L	T	P	C
SEMESTER -V			30			2
COGNITIVE LEVEL		K 4: Analyzing K 5: Evaluating K 6: Creating				

Learning Objectives	The course aims to 1) Explain the methods that humans have developed to use biotechnology to produce foods and food ingredients 2) Apply the biotechnological tools and techniques

Unit I Introduction to biotechnology:
Scope of biotechnology, Concept of Gene Cloning-Restriction enzymes, Modifying enzymes, enzymes and its application in food biotechnology. Vectors- Properties of good vector, Introduction of Genes, Selection of recombinants.

Unit II Genetic Engineering:
Genetically modified foods-Definition, examples of genetically modified foods, advantages, disadvantages, and safety aspects of foods produced by genetic engineering, Application of genetic engineering in food biotechnology. Rules and regulations for genetically modified foods

Unit III Food fermentation:
Food fermentation: the concept of microbial fermentation; fermentation process: dual and multiple fermentation, continuous fermentation and batch fermentation; factors controlling fermentation, fermented food products: dairy fermented foods, cereal-based food fermentation,

Unit IV Enzymes in food processing industries
Principles of enzyme immobilization: concept and importance of enzyme application. Types of immobilization techniques and their importance; Immobilized enzymes in food processing. Enzymes application advantages and its harmful effects on health

Unit-V Biotechnology for Food Production
History, developments, current status of transgenic crops -Crop improvement and enhanced agronomic performance- Food products with enhanced shelf-life, processing and functional quality- Nutritional enhancement-macro and micronutrients.

Textbook:

1. Satyanarayana, U, Biotechnology, Books and Allied (P) Ltd.,Kolkata2007

Reference books

1. Dubey, R.C Text Book of Biotechnology, S.Chand, and Co. Ltd, NewDelhi. 2001

2. Israel Goldberg Functional foods, Pharma foods and Nutraceuticals, Culinary and Hospitality Industry PublicationServices.2001
3.Robert Easy Wildman Handbook of Nutraceuticals and functional foods, Culinary and Hospitality Industry Publication Services, 2001

COURSE OUTCOMES

On successful completion of the course, the students will be able to gain knowledge about

K4	CO1	Explain the methods that humans have developed to use biotechnology to produce foods and food ingredients.
K4	CO2	Identify the pros and cons of the use of biotechnology to produce foods including ecological, social, and economic impacts
K5	CO3	Apply the biotechnological tools and techniques
K5	CO4	Assess the importance of various fermentation methods to design various fermented foods and food products
K6	CO5	Apply the knowledge and synthesize new solutions and ways of thinking in food industries

Mapping of COs with POs& PSOs:

CO / PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	S	S	S	S	S	**S**	S	**S**	S	S
CO2	S	S	S	S	S	S	S	**S**	M	**S**	S	S
CO3	M	S	S	S	S	S	S	**S**	S	**S**	S	S
CO4	S	S	S	S	S	S	S	**S**	S	**S**	S	S
CO5	S	S	S	S	S	S	S	**S**	S	**M**	S	S

Strongly Correlating (S) - 3Marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1Mark
No Correlation (N) - 0mark

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MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL

DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS

SYLLABUS TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2021-2022

(CHOICE BASED CREDIT SYSTEM)

Mother Teresa Women's University, Kodaikanal
Department of Mathematics
Choice Based Credit System (CBCS)
(2021-2022 onwards)
B.Sc Mathematics

1. About the Programme

B.Sc. (Bachelor of Science) Mathematics is a three year programme to encourage students in subject area by creates interest and sprit in mathematics to help them potential, to become excellent mathematician and develop knowledge in logical and analytical thinking.

2. Programme Educational Objectives (PEOs)

The B.Sc. Mathematics program describe accomplishments that graduates are expected to attain within five to seven years after graduation

PEO1	Acquire knowledge in functional areas of Mathematics and apply in all the fields of learning.
PEO2	Recognize the need for lifelong learning and demonstrate the ability to explore some mathematical content independently.
PEO3	The graduates will become successful professionals through logical and analytical thinking abilities.
PEO4	Employ mathematical ideas encompassing logical reasoning, analytical, numerical ability, theoretical skills to model real-world problems and solve them.
PEO5	Develop critical thinking, creative thinking, self confidence for eventual success in career.
PEO6	Analyze , interpret solutions and to enhance their Entrepreneurial skills, Managerial skill and leadership
PEO7	To prepare the students to communicate mathematical ideas effectively and develop their ability to collaborate both intellectually and creatively in diverse contexts.
PEO8	Rewarding careers in Education, Industry, Banks, and pursue higher studies.
PEO9	The graduates will work and communicate effectively in inter-disciplinary environment, either independently or in a team, and demonstrate leadership qualities.

3. Eligibility : + 2 pass with General Mathematics

4. General Guidelines for PG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.
ii. **Medium of Instruction:** English
iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	10	25	10	25
External	30	75	30	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

Programme Outcomes:

PO.No.	Upon completion of this course the students will be able to
PO 1	think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
PO 2	formulate hypothesis, design experiments, use appropriate tools and interpret the results.
PO 3	demonstrate the precise understanding of the principles and theories of their discipline through experiments.
PO 4	enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
PO 5	identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.

Programme Specific Outcomes:

PSO. No	upon completion of this course the students will be able to	PO MAPPED
PSO-1	perceive the relevance of the subject in various fields such as science, technology, business and industries.	PO-3
PSO-2	interpret the graphical and numerical data and apply the analytical, theoretical and computational skills to solve problems.	PO-1 PO-2 PO-3
PSO-3	acquaint with the knowledge on the effects of changing conditions in real life systems to construct mathematical models and excel in various decision making tasks	PO-2 PO-3
PSO-4	understand mathematical ideas and foundations of mathematics to develop proficiency in Mathematics	PO-4
PSO-5	engage in activities directly benefiting the broader community and acquire job oriented knowledge	PO-3 PO-5

B.SC. MATHEMATICS CURRICULUM

S. No.	Course Code	Title of Course	Credits	Hours		Maximum Marks		
				T	P	CIA	ESE	Total
Semester I								
1.	U21LTA11	Part-I Tamil I	3	6	-	25	75	100
2.	U21LEN11	Part-II English I	3	6	-	25	75	100
3.	U21MTT11	Core – I Calculus	4	5	-	25	75	100
4.	U21MTT12	Core – II Classical Algebra	4	6	-	25	75	100
5.	U21PHA11	Allied I Ancillary Physics	4	5	-	25	75	100
6.	U21EVS11	Environmental Studies	2	2	-	25	75	100
7.	U21PEPS11	Professional English –I	4	6	-	25	75	100
		Total	24	**36**				**700**
Semester II								
8.	U21LTA22	Part-I Tamil II	3	6	-	25	75	100
9.	U21LEN22	Part- II English II	3	6	-	25	75	100
10.	U21MTT21	Core-III Analytical Geometry 3D	4	5	-	25	75	100
11.	U21MTT22	Core- IV Differential Equations & Laplace Transforms	4	5	-	25	75	100
12.	U21PHA22	Allied –II Physics Practical	4	-	5	25	75	100
13.	U21VAE21	Value Education	3	3	-	25	75	100
14.	U21PEPS22	Professional English – II	4	6	-	25	75	100
		Total	25	36				700
Semester III								
15.	U21LTA33	Part I Tamil-III	3	6	-	25	75	100
16.	U21LEN33	Part II English- III	3	6	-	25	75	100
17.	U21MTT31	Core - V Vector Calculus, Fourier Series & Fourier Transforms	4	5	-	25	75	100
18.	U21MTA33	Allied III Ancillary Mathematical Statistics –I	4	5	-	25	75	100
19.	U21MTE311 / U21MTE312 / U21MTE313	Elective I Numerical Methods/ Stochastic Process/ Principles of Experimental Design	3	4	-	25	75	100
20.	U21MSS31	SBE I-Managerial skills	2	2	-	25	75	100

21.	U21MTN31	Non Major Elective –I	2	2	-	25	75	100
Total			**21**	**30**				**700**
Semester IV								
22.	U21LTA44	Part I Tamil IV	3	6	-	25	75	100
23.	U21LEN44	Part II English IV	3	6	-	25	75	100
24.	U21MTT41	Core-VI Statics	4	4	-	25	75	100
25.	U21MTT42	Core-VII Sequence & Series	4	4	-	25	75	100
26.	U21MTA44	Allied- IV Ancillary Mathematical Statistics – II	4	4	-	25	75	100
27.	U21MTE421/ U21MTE422/ U21MTE423	Elective- II Programming in C & C++/ Automata Theory/ Knowledge for Industry	3	3	-	25	75	100
28.	U21CSS42	SBE II-Computer Skills for Office Management	2	2	-	25	75	100
29.	U21MTN42	Non Major Elective –II	2	2	-	25	75	100
		Total	**25**	**31**				**800**
Semester V								
30.	U21MTT51	Core-VIII Dynamics	4	5	-	25	75	100
31.	U21MTT52	Core-IX Abstract Algebra	4	5	-	25	75	100
32.	U21MTT53	Core-X Real Analysis	4	5	-	25	75	100
33.	U21MTT54	Core- XI Operations Research –I	4	5	-	25	75	100
34.	U21MTT55	Core- XII Theory Of Numbers	4	5	-	25	75	100
35.	U21MTE531/ U21MTE532/ U21MTE533	Elective III Fuzzy Sets and Fuzzy Numbers / Mathematical Modeling / Data Structures and Algorithms	3	3	-	25	75	100
36.	U21MTS53	SBE:III Mathematical Aptitude	2	2	-	25	75	100
		Total	**25**	**30**				**800**
Semester VI								
37.	U21MTT61	Core- XIII -Linear Algebra	4	5	-	25	75	100
38.	U21MTT62	Core- XIV Complex	4	5	-	25	75	100
		Analysis						

39.	U21MTT63	Core- XV Operation Research – II	4	5	-	25	75	100
40.	U21MTT64	Core- XVI Graph Theory	4	5	-	25	75	100
41.	U21MTT65	Core -XVII Discrete Mathematics	4	5		25	75	100
42.	U21MTE641/ U21MTE642	Elective-IV Astronomy / Mathematical Cryptography	3	3	-	25	75	100
43.	U21MTS64	SBE- IV- Operations Research Lab	2	2	-	25	75	100
44.	U21EAS61	Extension Activities (NSS/NCC/RRC/ YRC/ PYE)	3	-	-	25	75	100
		Total	**28**	**30**		**200**	**600**	**800**
		Total Credits	**148**	**193**				**4400**

Non Major Elective

The candidates, who have joined the UG Programme, can also undergo Non Major Elective offered by other Departments

Non Major Elective- For Other Department

Semester –III

NME	Course code	Course Name
I	U21MTN31	Resource Management Techniques

Semester –IV

NME	Course code	Course Name
II	U21MTN42	Numerical Methods

Additional Credit Courses (Two Credit courses)

U21MA031: Online Course – III Semester-2 Credits
U21MAI41: Internship – IV Semester-2 Credits

Value added course – V Semester: 2 Credits

S.No	Course code	Course Name
1	U21MAV51	Numerical Methods Lab Using C++

B.Sc. Physics / Chemistry: Ancillary Mathematics I & II

Semester I
Course code: U21MAA11 Ancillary Mathematics I 5 Hours/ 4 credits

Semester - II
Course code: U21MAA22 Ancillary Mathematics II 5 Hours /4 Credits

SEMESTER – I

COURSE CODE	U21MTT11	CALCULUS	L	T	P	C
CORE -I			5	-	-	4

Objectives:

- To learn the different concepts of differential and integral calculus.
- To learn will acquire basic knowledge of integration
- To learn will become proficient in multiple integrals and its applications
- The learner will gain concepts of change of variables

Unit-I: Successive differentiation:
Introduction- the nth derivative-standard results- examples-Trigonometrically transformation – formation of equation involving derivatives-Expansion of function - Leibnitz Theorem and its application Maxima and Minima of Function of two variables.

Unit-II: Curvature:
Introduction of Curvature-circle- Radius of Curvature and Center of Curvature in Cartesian formula for the radius of Curvature-coordinates of the center of curvature - evolute and involute – radius of curvature when the curve is given in polar coordinates- Form and Polar Form p - r equation; Pedal Equation of a Curve – Chord of a Curvature.

Unit-III: Double Integral:
Definition of the Double Integral –Evaluation of double integral – solved problem- exercise - Double integral in polar Co- ordinates- solved problem - exercise.

Unit-IV: Triple Integral:
Definition – Examples- Applications of multiple integrals – finding the area between two coordinates- coordinate of the center of gravity-moment of inertia of an area- properties - Change of variables in the case two variables - Change of variables in the case three variables.

Unit-V: Beta and Gamma Functions:
Definitions of Beta and Gamma Functions – Convergence of $\Gamma(n)$ – Recurrence formula of Gamma functions – Properties of Beta functions – Relation between Beta and Gamma functions – Solved problems - Applications of Gamma functions to multiple Integrals.

Text Book:

1. **S.Narayanan and T.K.Manickachagam Pillai, –**Calculus-Volume I & II, Viswanathan Printers and Publishers - 2011.
   Unit I – Calculus – Volume I: Chapter 3 and Chapter 8-Sec 4,
   Unit II - Calculus – Volume I: Chapter 10.2.1 to 3.1
   Unit III - Calculus – Volume I: Chapter 5- Sec. 1 to 3.1
   Unit IV – Calculus - Volume II: Chapter 5- Sec. 4 to 5.4 and Chapter 6
   Unit V - Calculus - Volume II: Chapter 7 – Sec. 2.1 to 6

Reference books:

1. **P.Kandasamy and K.Thilagavathi,**–Mathematics for Branch I: Vol I and Vol II"- S.Chand and Company Ltd., - New Delhi - 2004.
2. **Arumugam Issac – –**Calculus – New Gamma Publishing House – Jan 2011.

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	identify areas in Mathematics and study of functions expansion	K1
CO2	understand the concepts of Radius of Curvature, Cartesian Form, p - r equations	K2
CO3	apply the concept of change of variables in double and triple integrals.	K3
CO4	apply double, triple integral to find the area and volume respectively.	K3
CO5	apply the Beta and gamma function to solve the multiple integrals.	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	S	S	S	S
CO2	S	M	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT12	CLASSICAL ALGEBRA	L	T	P	C
CORE -II			6	-	-	4

Objectives:

- To impart skills in the various applications of algebraic methods.
- The learner will become proficient in expansion and summation of function.
- Understanding relation between roots and coefficients of equations, sign changes, reciprocals.
- To understand terms of series, summation and its changes

Unit-I: Binomial theorem:

Introduction of Binomial theorem – Greatest term in the expansion of $(1 + x)^n$ - sum of the coefficients - Multinomial theorem - Binomial theorem for rational index – Particular cases –Summation of binomial series - Approximate values- solved problems.

Unit-II: Exponential Limits:

Introduction of Exponential limit – Exponential theorem – Summation – Logarithmic series – Modification of Logarithmic Series – Euler's constant – Series summed by Logarithmic series – Application of exponential and logarithmic series to limits and approximation - Logarithms of Complex Numbers.

Unit-III: Summation:

Summation of series – Definition and Examples - Application of partial fraction- Summation by difference series – Recurring series – To find r^{th} order of a Recurrence series when 2r terms are given - Generating function.

Unit-IV: Theory of Equations:

Remainder Theorem – Relation between roots and coefficients of equations Symmetric Function of Roots – Newton's Theorem on the sum of the powers of the roots. Transformations of Equations: Roots with signs changes - Reciprocal roots.

Unit-V: Reciprocal Equation:

Introduction-Standard form of reciprocal equation – Examples – To increase/ decrease the roots of the equation by given quantity – Removal of terms – Transformation – Discard's rule of signs - Solutions of Numerical Equations: Solutions of Numerical Equations – Newton's methods of divisors – Horner's method.

Text book:

1. **T.K.Manickachagam Pillai and others**, –Algebra Volume II, - S. Viswanathan Printers & Publisher Pvt, Ltd., - 2010.
   Unit – I - Algebra Volume I – Chapter 3
   Unit – II - Algebra Volume I – Chapter 4

Unit – III - Algebra Volume I – Chapter 5
Unit – IV - Algebra Volume I – Chapter 6 – Section 1 to 15.2
Unit – V - Algebra Volume I – Chapter 6 – Section 15.3 to 30

Reference book:

1. **P. Kandasamy and K.Thilagavathy**, –Mathematics, Volume I, S.Chand and Company Ltd., New Delhi – 2004.

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	knowledge in Binomial, Exponential, Logarithmic series and summation of series	K1
CO2	knowledge in methods to find an approximate roots of the equations	K2
CO3	apply the all tests to find the convergence or divergence of an infinite series.	K3
CO4	find the number of positive and negative roots of polynomial equation	K3
CO5	analyze the relation between roots and coefficients of the polynomial equations	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	S	S	S	S	M	S
CO2	S	M	M	S	S	S	S	S	M	M
CO3	S	M	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21PHA11	ANCILLARY PHYSICS	L	T	P	C
ALLIED I			5	-	-	4

Objective:

- To impart preliminary knowledge on basic concepts of physics to chemistry and mathematic students to make them understand the fundamentals of core physics.

Unit- I: Mechanics:

Centre of Gravity – Centre of Gravity of a solid hemisphere – Hollow hemisphere – Centre of Gravity of a solid cone – Centre of Gravity of a solid tetrahedron. States of Equilibrium: Equilibrium of a rigid body – Stable, unstable and neutral equilibrium – Example. Stability of Floating bodies – Meta center – Determination of Metacentric height of a ship.

Unit II: Properties of Matter:

Stress – Strain – Young‘s modulus – Behavior of wire under progressive tension –Bending of beams – Expression for the bending moment – Measurement of Young‘s modulus by bending of a beam – Non uniform bending and Uniform bending. Viscosity: Streamline flow and Turbulent flow – critical velocity - Poiseuille‘s formula – Determination of coefficient of viscosity of a liquid (Variable pressure head). Surface Tension: Drop weight method of determining the surface tension of a Liquid – Experiment to determine the interfacial tension.

Unit-III: Electronics:

Intrinsic and extrinsic semiconductor – PN Junction diode – Biasing of PN junction – V-I characteristics of junction diode – Rectifiers – Half wave – Full wave and bridge rectifiers – Zener diode – Characteristics of Zener diode – Voltage regulator – Transistor – Characteristics of transistor – CB, CE mode – Transistors as an amplifier. **Digital:** Decimal – Binary – Octal and Hexa Decimal number systems and their Mutual Conversions – 1‘s and 2‘s complement of a Binary number and Binary arithmetic (Addition, Subtraction, Multiplication and Division) – Binary Subtraction by 1‘s and 2‘s complement method – Basic logic gates – AND, OR, NOT, NAND, NOR and EXOR gates – NAND and NOR as universal building gates – Boolean Algebra – Laws of Boolean Algebra – De Morgan‘s Theorems – Their verifications using truth tables.

Unit -IV: Optics :

Geometrical Optics: Spherical aberration of a thin lens – Methods of reducing spherical aberration – Coma – Aplanatic surface – Astigmatism – Curvature of the field – Distortion. Interference: Introduction – Air wedge – Newton‘s rings – Colors of thin films. Diffraction: Plane diffraction Grating – Theory of plane transmission Grating

Unit-V: Modern Physics

Atomic Physics Atom Models: Sommerfield‘s and Vector atom Models – Pauli‘s exclusion Principle – Various quantum numbers and quantization of orbits. X-rays: Continuous and Characteristic X-rays – Mosley‘s Law and importance – Bragg‘s law – Miller indices.

Nuclear Physics Introduction – Nucleus – Classification of Nuclei – Nuclear Size – Charge – Mass and Spin -Nuclear Radiations and their properties, Laws of Radioactivity-Decay Constant-Half life and mean life- age of the earth- carbon Dating.

Text Books:

1. R. Murugeshan, Properties of Matter, S. Chand & Co. Pvt. Ltd., Revised edition, 2012.
2. Narayanamoorthy and N. Nagarathinam, Mechanics – Part II, The National Publishing Company, Chennai, 2005.
3. N. Subramaniyam, Brijlal and M.N.Avathanulu, Optics, S. Chand &Co. Pvt.Ltd.—25 th revised edition, New Delhi, 2012.
4. V. Vijayendran, S.Viswanathan, Digital Fundamentals, Printers & Publishers Private Ltd, Chennai, 2004.
5. Mehta V.K., Principles of Electronics, S.Chand and company Ltd, 2014.
6. Albert Paul Malvino, Digital Principles and Applications, McGraw-Hill International Editions, New York, 2002.
7. Puri V.K., Digital Electronics Circuits and Systems, TATA McGraw Hill Publications, New Delhi, 2011.
8. R. Murugeshan, Kiruthiga Sivaprasath, Modern Physics, S. Chand & Co, New Delhi, First edition, 1984.
9. R. S. Sedha, A Text Book of Digital Electronics, S. Chand & Co, New Delhi, First edition,2004

Books for Reference:

1. D.S Mathur. Revised by: Dr. P.S. Hemne, Mechanics –S. Chand and Co. New Delhi. First edition 1981, Reprint 2015.
2. Brij Lal and Subramanyam, Properties of Matter –Eurasia publishing house (Pvt.) LTD. New Delhi. Sixth Edition 1991
3. B. L. Theraja, Basic Electronics (Solid State), S. Chand and Co. New Delhi 2006
4. R. Murugesan,Optics and Spectroscopy- S. Chand Publishing, 1997.
5. J. B. Rajam, Atomic Physics., S. Chand & Company Limited, New Delhi, First edition, 1990.
6. B. N. Srivastava, Basic Nuclear Physic, Pragati Prakashan, Meerut, 2005.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Analyze center of gravity	K4
CO2	Learn about modulus, viscosity and surface tension of materials	K2
CO3	Study the characteristics of diode and transistor	K1
CO4	Understand about aberration and different properties of lenses	K2
CO5	Gain knowledge about atomic model and basic nuclear properties	K2

K1- Remember K2- Understand K3- Apply K4- Analyze K5-Evaluate

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	S	S	S	S	S	S
CO2	S	M	S	S	S	S	M	S	S	S
CO3	S	M	S	M	M	S	S	S	S	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER – II

COURSE CODE	U21MTT21	ANALYTICAL GEOMETRY 3D	L	T	P	C
CORE III			5	-	-	4

Objectives:

- This is used to model geometric objects - *points*, (straight) *lines*, and *circles* being the most basic of these.
- To acquire knowledge of planes and its properties as a 3 dimensional objects.
- To understand the concepts skew lines and spheres.
- Solving problems related to geometry of three dimensions.

Unit-I: Rectangular Cartesian Coordinates:

Direction cosines of the line – Coordinates-Distance between points–Angle between the lines – Projections – Direction cosines-Relation between the direction cosines of a straight lines-Direction ratios- The. Projection of the line on any other line with direction cosines-Conditions for perpendicularity and parallelism.

Unit-II: The Plane:

The General equation of the first degree in x,y,z, represents a plane-The equation of the plane making intercepts a,b,c on the axes OX,OY,OZ respectively-The equation of the plane passing through the three given points – Angle between planes – Equation of plane through the intersection of two given planes –Length of the perpendicular.

Unit-III: Straight line:

A straight line in the intersection of two planes – Symmetric form of the equations of a line-Equation of a straight line passing through two given points – Equation of Plane and straight line- The condition for the line perpendicular to the plane – Shortest distance between two given lines.-Coplanar lines.

Unit-IV: Sphere:

Definition-The equation of a sphere when the centre and radius are given– Length of the tangent – Plane section of a sphere – Equation of circle on sphere- Equation of a sphere passing through a given circle – Intersection of two spheres in a circle– Equation of the tangent plane to the sphere and examples.

Unit-V: Cone:

Equation of a Cone with its vertex at the origin - equation of a quadratic cone with given vertex and given guiding curve - necessary condition for general equation of second degree to represent a cone - circular cone - equation of circular cone with given vertex - axis and semi vertical angle – Cylinder – Equation – Enveloping cylinder.

Text book:

1. **T.K.Manickavachagom Pillay and T.Natarajan**,―A Text Book of Analytical Geometry – part II - Three dimensions‖, Viswanathan Printers and Publishers, 2011.

Unit I - Chapter 1
Unit II - Chapter 2
Unit III - Chapter 3
Unit IV - Chapter 4
Unit V - Chapter 5 – Sec. 1 to 8

Reference books:

1. **H.K.Dasse, H.C.Saxena and M.D.Raisinghania,** –Simplified Course in Solid Geometry (3D)‖, S.Chand and Company, 2009
2. **P.Duraipandian**, –Analytical Geometry – 3 Dimensional‖, Emerald publishers – 1998

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	familiarize the concept of direction cosines and projections	K1
CO2	identify different forms of equations of plane.	K1
CO3	analyze the symmetric form of equations of a line and the angle between a line and a plane.	K3
CO4	acquire the knowledge of coplanar lines, skew lines and its properties.	K3,K4
CO5	apply concept of a sphere and circle to determine their equations.	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	S	S	S	S	S	S
CO2	S	M	S	S	S	S	M	S	S	S
CO3	S	M	S	M	M	S	S	S	S	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTT22	DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	L	T	P	C
CORE IV			5	-	-	4

Objectives:

- To introduce the basic concepts of differential equations and Laplace Transforms.
- Understand the basic concepts of first order differential equation and it applications.
- Determine solutions to second order linear homogeneous, non-homogeneous differential equations with constant coefficients.
- Find solutions by applying Laplace transform methods.
- Understand the elementary theory of partial differential equations, and solve it using various techniques.

Unit-I: Differential Equations of The First Order And First Degree:

Introduction-Variable separable Homogeneous, non – homogeneous, Linear equation, Bernoulli‘s equations, Exact differential equations. Equation of the first order and higher degree: Equations Solvable for dy/dx – equations solvable for y – equations solvable for x – Clairaut‘s form.

Unit-II: Linear Equations With Constant Co – Efficient:

Definition – complementary function of a Linear equation with constant Co – efficient – particular Integral – General method of finding P.I – special methods for finding P.I of the functions of the type e^{ax} , cos ax or sin ax , e^{ax} V where V is any function of x , x^m – Linear equations with Variable Co – efficient, Equations reducible to the linear equations.

Unit-III: Simultaneous Differential Equations:

Introduction of Simultaneous equations of the first order and first degree – Simultaneous linear differential equations: Linear equations of the second order : Complete solution given a known integral – Reduction to the normal form – Change of Independent Variables – Variation of Parameters – Methods of operations factors.

Unit-IV: Partial Differential Equations:

Formation of Partial Differential Equation of the first order-Classification of integrals-Singular Integral- General Integral- Derivation of partial differential equation– Lagrange method of solving linear PDE – Solution of PDE of type F(p, q)=0, F(z, p, q)=0, F(x, p) = G(y, q), Clairaut‘s form and Charpit‘s method.

Unit-V: Laplace Transforms:

Definition of Laplace Transforms – Piecewise Continuity- Sufficient condition for the existence of the Laplace transform-methods-Examples - Laplace transform of periodic functions – Properties- examples– Some general theorems- Examples – The inverse Transform‘s- Properties.- Examples

Text Book:

1. **S. Narayanan and T.K. Manickavachagam pillai**, –Differential equations and its applications‖, S. Viswanathan Printers and Publishers Pvt. Ltd., Madras 2014.
   Unit I - Chapter 2 and 4.
   Unit II - Chapter 5 – Sec. 1 to 6.
   Unit III- Chapter 6 and 8.
   Unit IV –Chapter 12 Sec. 1 to 5.
   Unit V- Chapter 9 – Sec. 1to 7.

Reference Books:

1. **Arumugam and Isaac,–** Differential equations and applications‖, New gamma publishing house – 1999.
2. **P.Kandasamy and K. Thilagavathi, –**Mathematics for Branch I: Volume III‖ ,S. Chand and Company Ltd., New Delhi - 2004.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	solve linear equations with variable coefficients.	K2
CO2	understand the fundamental properties of the Laplace transforms	K1&K2
CO3	apply the Laplace inverse transforms to solve simultaneous equations	K3
CO4	solve partial differential equations using Lagrange‘s method and Charpit‘s method	K3&K4
CO5	create real life problems into ordinary differential equations.	K4 &K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO4	PO3	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	M	S	M	M	S	S
CO2	S	M	S	S	S	S	M	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	S	S	S	S	M	S	S	S
CO5	S	S	S	S	S	S	S	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21PHA22	PHYSICS PRACTICAL	L	T	P	C
ALLIED II			-	-	5	4

Objective:

It is aimed at exposing the non-physics under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical, electrical and optical properties of matter

Any Twelve experiments

1. Estimation of Error
2. Compound Pendulum – g and unknown mass determination
3. Young‘s Modulus – Uniform bending – pin and microscope method
4. Young'sModulus–Cantilever–Pin&Microscope
5. Young‘s Modulus – Uniform bending – Optic lever method
6. Young‘s Modulus – Non-Uniform bending – pin and microscope method
7. Viscosity –Stoke‘s Method
8. Viscosity – Poiseuille‘s method
9. Sonometer – frequency of a lining fork
10. Calibration of Voltmeter – potentiometer
11. Comparison of capacitances – B.G
12. Dispersive power of prism – Spectrometer
13. Logic Gates – AND, OR, NOT using discrete components
14. Logic Gates – NAND, NOR – using IC‘s
15. Diode Characteristics
16. Zener diode Characteristics
17. Newton‘s rings of a liquid
18. Spectrometer – Prism-i-d curve to find μ
19. NANDasUniversalgate: IC
20. NORasUniversalgate:IC
21. SurfaceTension– CapillaryRise
22. Newton‘s Law of cooling

Text Books

1. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics, - S. Viswanathan Publisher-Part I (1990).
2. C.C Ouseph, Rangarajan, R. Balakrishnan, A Text Book of Practical Physics, S.Viswanathan Publisher-Part II (1996).
3. S. L Gupta and V.Kumar - Practical Physics, Pragati Prakashan – 25th, Edition (2002).
4. A. P. Malvino, Electronics, Cybergear, 2010.
5. John Morris, Analog Electronics, Import, 1999.
6. S.K. Bhattacharya, Electrical Machines (TTTI Chandigarh) - TMH 1998.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Able to Estimate Errors	K3
CO2	Analyze dimensional change of bar	K4
CO3	Determine viscosity of liquid	K4
CO4	Study the characteristics of diode and ICs	K3
CO5	Determine surface tension of liquis	K4

K1- Remember K2- Understand K3- Apply K4- Analyze K5-Evaluate

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	S	S	S	S	S	S
CO2	S	M	S	S	S	S	M	S	S	S
CO3	S	M	S	M	M	S	S	S	S	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER - III

COURSE CODE	U21MTT31	VECTOR CALCULUS, FOURIER SERIES AND FOURIER TRANSFORM	L	T	P	C
CORE - V			5	-	-	4

Objectives:

- To enhance basic skills in the areas of vector calculus , Fourier series and Fourier transforms
- Vectors and its product
- Multiple vector integration
- To study about Fourier series and their applications.

Unit-I: Differentiation of Vector:

Introduction - Vector Algebra- Differentiation of Vector – Vector operator del - Grad, Div and Curl – geometrical interpretation –Directional derivative - Solenoid, Irrotational vector – formulas involving del operator – Angle between the surfaces.

Unit-II: Double and Triple Integral:

Introduction- Vector Integration – Line Integrals Surface Integrals and volume integrals- (Theorems of Green, Gauss and Stokes) Gauss divergence, Green‘s and Stoke‘s theorems – Verification of theses theorems.

Unit-III: Fourier Series:

Definition- Dirchlet‘s conditions- Fourier series of periodicity 2π – Problems in Fourier series of periodicity 2π - Fourier series of periodicity 2l-Problems in Fourier series of periodicity 2l - Odd and even functions –Root mean square value of a function - Parseval‘s theorem.

Unit-IV: Half range series:

Introduction about Half range series definition - Half range series formula –Cosin series- Sin series – Problems using Cosin series - Problems using Sin series- Parseval‘s theorem - Harmonic analysis- Complex form of Fourier series introduction- Definition and . Problems using Complex form of Fourier series.

Unit-V: Fourier Transform:

Introduction of Fourier Transform – Definition of Fourier Transform – Fourier Transform Properties – Fourier integral theorem – convolution theorem – problems solving using Fourier Transform.

Text Books:

1. **Arumugam and Issac**, ‘Analytical Geomentry 3D and Vector Calculus’, Sci. Tech Publishers – 2011.
   Unit I –Chapter 5.

Unit II – Chapter 6 – Sec 6.1, 6.2.

2. **P. Kandasamy and K.Thilagavathy**, "Mathematics, Vol IV", S.Chand and Company Ltd.,- 2004.
   Unit III – Chapter I
   Unit IV – Chapter I
   Unit V - Chapter IV

Reference Book:

1. **T.K.Manickavasagam pillay and Narayanan , "**Vector Algebra and Analysis" Viswanathan printers and publishers Pvt Ltd
2. **Murray R. Spiegel**, "Outline of Theory and Problems of Vector Analysis and an Introduction to Tensor Analysis" , Schaum's, 1959.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	demonstrate the operator of vector	K1
CO2	apply double and triple integration	K2
CO3	demonstrate the Fourier Transforms	K3
CO4	analysis half range series	K3
CO5	integral equations of Fourier Transforms	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	M	M	S	S
CO2	S	S	S	S	M	S	S	M	M	S
CO3	M	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	M	M	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTA33	ANCILLARY MATHEMATICAL STATISTICS-I	L	T	P	C
CORE - V			5	-	-	4

Objectives:

- To impart skills in various applications of statistical methods.
- Analyze the given data by using statistical methods.
- Understand the basic concepts of probability and related results.
- Use different probabilistic methods to solve problems arise in different situations.

Unit-I: Measures Of Dispersion:

Dispersion – range, quartile deviation – mean deviation – standard deviation – root mean square deviation – Relation between standard deviation and root mean square deviation – effect of change of origin and scale on moments – Karl pearson‘s beta and gamma co-coefficient – measures of Skewness – Kurtosis.

Unit-II: Theory Of Probability:

Introduction-Short history- Definition of various terms Mathematical or classical or ‗priori‘ probability-Statistical or Empirical Probability-Problems – Law of addition of probabilities for two events – statement of general law of addition of probabilities – Bayes Theorem.

Unit-III: Random Variables:

Distribution Function-Properties of distribution function-Discrete Random Variable- Probability Mass function-Continuous Random Variables: Probability density function – various measures of central tendency, dispersion, Skewness and Kurtosis for continuous probability distribution and Problems.

Unit-IV: Mathematical Expectation:

Addition and Multiplication Theorem – covariance – Expectation and variance of a linear combination of random variables – Expectation of continuous random variable – Moment generating function and its properties – uniqueness Theorem on Characteristic function-Chebyshev‘s inequality – weak law and bernoulie‘s law of large numbers.

Unit-V: Theoretical Discrete Distribution:

Bernoulli Distribution and its moments – Binomial Distribution – moments, mean deviation about mean, mode, M.G.F and Characteristic function – recurrence relation for the moments – additive property of independent Poission variants – recurrence formula for the probability of the Binomial Distribution and Poission Distribution.

Text Book:

1. **S.C Gupta and V.K. Kapoor** , ―Elements of Mathematical Statistics‖,Sultan Chand Publishers, New Delhi. 2009.
   Unit I - Chapter 3
   Unit II - Chapter 4

Unit III- Chapter 5
Unit IV- Chapter 6
Unit V – Chapter 7

Reference Book:

1. **P.R.Vittal**, ―Mathematical Statistics‖, Margham Publications -2002- Reprint 2012.
2. **S.C.Gupta and V.K.Kapoor**,‖Funtamentals of Mathematical Statistics‖, 10th edition,Sulton Chand Publications, 2002.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	calculate mean, median and mode.	K1
CO2	be familiar with elementary statistical methods of analysis of data and interpret them.	K1,K2
CO3	understand the concept of correlation and regression.	K3
CO4	relate Binomial, Poisson and Normal distributions.	K3
CO5	develop problem solving skill on applying statistical methods to real problems.	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	S	S	M	M
CO2	S	S	S	M	M	M	M	S	M	M
CO3	S	S	S	M	M	M	M	S	S	S
CO4	M	M	S	M	M	M	S	M	M	M
CO5	M	S	S	S	M	M	M	S	S	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTE311	CHOICE I	L	T	P	C
ELECTIVE I		NUMERICAL METHODS	4	-	-	3

Objectives:

- To develop efficient algorithms for solving problems in Science, Engineering and Technology.
- The leaner will analyze the different aspects of numerical solution of algebraic and transcendental equations.
- Students will be able to identify the basic concept of numerical differentiation and integration, principle of least squares.
- The learner will become knowledgeable in solving solution to simultaneous linear equations.

Unit-I: Introduction:

Solution of Algebraic and Transcendental Equations: Bisection Method definition – Algorithm for Bisection Method - problem solving using Bisection Method -Iteration Method introduction – Condition for Convergence – Order of Convergence of an iterative process.

Unit-II: Solution of Algebraic and Transcendental Equations:

Regular Falsi Method – Geometrical interpolation - Newton‘s Raphson Method – Geometrical meaning of Newton‘s method – Criterion for the convergence in Newton Raphson method – Order of convergence of Newton‘s method.

Unit -III: Solutions of Simultaneous Linear Algebraic Equations:

Simultaneous Linear Algebraic Equations- Solutions of Simultaneous Linear Algebraic Equations introduction - Direct method – Introduction - Gauss Elimination Method for Simultaneous Linear Algebraic Equations – Gauss Jordan Elimination Method Simultaneous Linear Algebraic Equations – Method of triangularization – Iterative methods.

Unit -IV: Solutions of Simultaneous Equations cont.:

Gauss Jacobi method for Solutions of Simultaneous Linear Algebraic Equations Introduction- Algorithm for Gauss Jacobi method for Solutions of Simultaneous Linear Algebraic Equations – Gauss Seidel Method of iteration for Solutions of Simultaneous Linear Algebraic Equations Introduction- . Algorithm and problems in both methods .

Unit -V: Finite Differences:

Introduction about First and Higher Order Differences – Express any value of y in term of y_n and the backward difference of y_n – Difference of a factorial polynomial - Forward and Backward Differences. problems in Forward and Backward Differences.

Text Book:

1. **P.Kandasamy, K.Thilagavathi and K. Gunavathi**, –Numerical Methods‖, S.Chand and Company Ltd , New Delhi 2013.

Unit I – Chapter 3 -3.1 to 3.2
Unit II – Chapter 3 -3.3 to 3.4
Unit III – Chapter 4 -4.1- 4.2
Unit IV – Chapter 4 - 4.8 - 4.9
Unit V – Chapter 5 – 5.1 – 5.2

Reference Books:

1. **Arumuga, Issac, Somasundaram**,‖Numerical Analysis‖, New Gamma Publishing House, Palayam Kottai 2003
2. **G. Balaji**, –Numerical Methods‖, G.Balaji Publishers, Chennai 2007.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the equations using different methods under differ conditions and numerical solutions of system algebraic equation	K1
CO2	apply various interpolation methods and finite different concepts	K3
CO3	analyse differentiation and integration whenever and where ever routine methods are not applicable	K4
CO4	evaluate the ordinary differential equations using different methods through the theory of finite differences.	K5
CO5	evaluate the partial differential equations using different methods through the theory of finite differences.	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	S	M	M	S	M	S
CO2	S	S	S	M	S	S	M	M	M	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	M	S
CO5	S	M	S	S	M	S	M	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTE312	CHOICE II	L	T	P	C
ELECTIVE I		STOCHASTIC PROCESS	4	-	-	3

Objectives:

- To give a depth knowledge about Markov chain and Process.
- To understanding the stochastic models for much real life probabilistic situations and expected results.
- To learn the well known models like birth – death and queueing to reorient the knowledge of stochastic analysis.
- The learner understands in depth knowledge about ergording, renewal theory and its application in discrete and continuous process.

Unit-I: Basic Definitions:

Stochastic Processes: An Introduction-Specification of Stochastic process - Markov Chains: Definition and Examples- Higher Transition Probabilities - Generalization of Independent Beronoulli Trials : Sequence of Chain – Dependent Trails

Unit-II: Morkov Chains:

Definition and examples-:Transition matrix(or Matrix of Transition Probabilities) – order of a Markov Chains – Markov chain in graphs – Higher Transition Probabilities - Classification of States and Chains: Communication relationships – Class properties- Classification of Chains – Classification of States – Determination of Higher Transition Probabilities - Stability of A Markov System – Graph Theoretic Approach.

Unit-III: Markov Process with Discrete State Space:

Poisson Process and its extension: Introduction- Postulates for Poisson Process and its Extension: Poisson Process: Introduction- Poisson Process and Related Distributions – Interval Time-Properties of Poisson process- Generalisation of Poisson process: Poisson process in Higher Dimensions- Poisson Cluster Process – Pure Birth Process: Yule-Furry Process- Birth-Immigration Process- Time dependent Poisson process- Random Variation of the Parameter λ-Renewal process.

Unit-IV: Classification of States:

Introduction about Classification of States -Brownian Motion – Wiener Process – Differential Equations for a Wiener Process -Kolmogorov Equation – First Passage Time Distribution for wiener Process. Problem solving using wiener Process.

Unit-V: Birth and Death Distribution Process:

Introduction about Birth and Death Distribution Process- Renewal Process - Renewal Processes in Continuous Time with problems – Renewal Equation - Stopping Time: Wald‘s Equation - Renewal Theorems with Applications.

Text Book:

1. **J.Medhi**, –Stochastic process‖, Second edition- New Age International Publishers.
   Unit I: Chapter 1: 1.5;
   Unit II: Chapter 2: 2.1 to 2.7
   Unit III: Chapter 3: 3.1 to 3.3
   Unit IV: Chapter 4: 4.1 to 4.5
   Unit V: Chapter 6: 6.1 to 6.5

Reference Books:

1. Samuel Karlin and Howard M. Taylor, –A First Course in stochastic process‖, second edition, academic Press. 1975
2. Samuel Karlin and Howard M. Taylor, –A Second course in stochastic process‖, Academic Press, 1981
3. Narayan Bhat, U, –Elements of Applied Stochastic Processes‖, Second Edition John Wiley & Sons, New York
4. Feller, –An Introduction to Probability theory and its applications‖, Volume 1. Third edition, John Wiley & Sons, New York

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	remember random variables with Probabilistic condition	K1
CO2	understand Markov chains , Markov process and alternate approach	K2
CO3	apply the concepts in Birth and Death Distribution Process	K3
CO4	identify the type of the Differential Equations for A Wiener Process -Kolmogorov Equation	K3
CO5	prove the sampling distribution theory	K3, K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	S	M	M	M
CO2	M	S	M	M	M	M	S	S	S	M
CO3	S	S	S	S	S	M	M	M	S	S
CO4	M	S	S	S	S	S	S	S	M	S
CO5	M	S	S	S	S	S	S	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTE313	CHOICE III	L	T	P	C
ELECTIVE I		PRINCIPLES OF EXPERIMENTAL DESIGN	4	-	-	3

Objectives:

- To learn analysis skill with models
- To know comparing ideas
- To find errors

Unit-I: Basic Principles For Designing Statistical Experiments:
Randomization, Replication and local control techniques - Determination of experimental units and notion of experimental error - Analysis of variance with one–way and two–way classifications - Models and Methods of analysis.

Unit-II: Completely Randomized Design (CRD) and Randomized Block Design (RBD):
Models and estimates of parameters and their standard error - Analysis of data arising from such designs, Analysis when one or two observations are missing.

Unit-III: Latin Square Design (LSD):
Latin Square Design introduction -Model – Estimation of parameters – Method of analysis – Missing Plot technique in Latin Square Design

Unit-IV: Multiple Comparison Tests:
Multiple Comparison Tests introduction -Least Significant Difference- Student-Newman–Keuls test-Duncan‘s Multiple Range test- Tukey‘s test

Unit-V: Factorial Experiments:
Factorial Experiments 2^2, 2^3 and 3^2 designs; estimation of main effects and interactions and their standard errors and error estimations..

Text Books:

1. **Das, M.N. and Giri.N.C. –**,Design and Analysis of Experiments‖, Wiley eastern, 1986
2. **Montgomery, C.D “**,Design of Experiments‖, 8/e, John Wiley and Sons, 2012

Reference Books:

1. **Goon.A.M, Gupta and Dasgupta.B**. , –An Outline of statistical theory, vol. II –, 6/e World Press Calcutta. 2001
2. **Gupta .S.C. and Kapoor.V.K.,** –Fundamentals of Applied Statistics –, Sultan Chand. 2000.
3. **Parimal Mukhopadhyay**, –Applied Statistics –, 2/e, Books and Allied (P) Ltd, Kolkata,2

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	acquire skills in statistical analysis.	K1
CO2	calculate values through designs.	K2
CO3	apply the concepts through models.	K3
CO4	comparing results in Latin square design.	K3, K4
CO5	calculating standard errors.	K3, K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	M	M	S	M	M
CO2	M	M	S	M	M	S	M	M	S	M
CO3	M	S	S	S	M	M	M	S	S	S
CO4	M	M	M	M	M	M	M	M	M	S
CO5	M	M	M	M	M	M	M	M	S	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER – IV

COURSE CODE	U21MTT41	STATICS	L	T	P	C
CORE VI			4	-	-	4

Objectives:

- To learn the application of geometric properties in equilibrium and motion of particles.
- To learn know to apply geometrical concepts in parallel forces, moments and couples
- Proficient in static equilibrium‘s three forces acting on a rigid body and friction.
- The learner to understand real time application.

Unit–I: Forces Acting At A Point:

Resultant and Components- Parallelogram of Forces- Analytical expression for the Resultant of two forces acting at a point – Triangle of Forces – Perpendicular Triangle of Forces – Converse of the Triangle of Forces- The Polygon of Forces – Lami‘s Theorem – An extended form of the parallelogram law of Forces- Resolution of a Force – Components of a Force along two given directions –Theorem on Resolved parts.

Unit–II: Resultant Of Any Number Of Coplanar Forces Acting At A Point:

Analytical Method - Conditions of Equilibrium of any Number of forces Acting upon a Particle – Geometrical or Graphical Conditions - Analytical Conditions. Parallel Forces and Moments: To find the Resultant of Two like parallel forces acting on a rigid body- To find the Resultant of Two unlike and unequal parallel forces acting on a rigid body – Resultant of a Number of Parallel Forces Acting on a rigid Body – conditions of Equilibrium of Three Coplanar Parallel Forces – Centre of two Parallel Forces – Moment of a Force – Physical Significance of the Moment of a Force – Geometrical Representation of a Moment – Sign of a Moment.

Unit–III: Unit of Moment:

Varigon‘s theorem of moments – Generalised Theorem of Moments (Principle of Moments)- Moment of a Force a about an axis. Couples: Definition – Equilibrium of two couples – Equivalence of two Couples- Couples in Parallel Planes – Resultant of Coplanar Couples - Resultant of a Couple and a Force.

Unit–IV: Equilibrium Of Three Forces Acting On A Rigid Body:

Rigid Body subjected to any Three Forces – Three Coplanar Forces – Conditions of Equilibrium- Procedure to be followed in solving any Statical Problem – Two Trigonometrical Theorems – Coplanar Forces: Introduction - Reduction of any number of Coplanar forces – analytical Proof of theorem – Conditions for a system of forces to Reduce to a single force or to a Couple.

Unit–V: Friction:

Introduction – Experimental Results – Statical, Dynamical and Limiting Friction – Law of Friction – Friction-a Passive force – coefficients of Friction – Angle of Friction – Cone of Friction – Numerical Analysis – Equilibrium of a particular on a rough inclined plane - Equilibrium of a body on a rough inclined plane under a force parallel to the plane - Equilibrium of a body on a rough inclined plane under any force.

Text Book:

1. **M.K.Venkatraman**, ―Statics‖, 12th edition, Agasthiar Publications, Trichy, 2010.
   Unit I - Chapter 2 – Sec. 1 to 13.
   Unit II - Chapter 2 – Sec 15, 16 and Chapter 3 – Sec 1 to 10.
   Unit III- Chapter 3 – Sec. 11 to 14 and Chapter 4.
   Unit IV – Chapter 5 and Chapter 6 – Sec. 1 to 5.
   Unit V – Chapter 7.

Reference Books:

1. **A.V.Dharmapadam**, ―Statics‖, S Viswanathan Printers and Publishing Pvt.,Ltd. 1993
2. **P.Duraipandian and Lakshmi Duraipandian**, ―Mechanics‖, S.Chand and Company Ltd,New Delhi - 1985.
3. **Dr.P.P.Gupta**, ―Statics‖, Kedal Nath Ram Nath, Meerut,1983-1984.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the action of forces on rigid bodies.	K1
CO2	analyze the concept of parallel forces and moments.	K2
CO3	compute equation of central orbit.	K3
CO4	understand the concept of friction.	K2
CO5	compute equation of equilibrium of strings.	K3

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO4	PO3	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	S	S	M	M	S	S
CO2	S	M	S	S	M	M	M	M	M	S
CO3	S	M	S	S	M	M	S	S	S	S
CO4	S	M	S	S	S	S	M	S	S	S
CO5	S	S	S	S	S	M	S	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT42	SEQUENCE AND SERIES	L	T	P	C
CORE VII			4	-	-	4

Objectives:

- To enhance basic skills in the areas of sequences and series.
- Types of sets, inequalities and sequences
- Behavior of sequences and its subsequences
- Infinite series and various tests for finding rearrangements its convergence

Unit–I: Sequences:

Definition of Sequences – Bounded sequences – Monotonic sequences – Convergent sequences – Divergent and Oscillating sequences – Solved problems – The Algebra of limits- Behaviour of monotonic sequences- solved problem.

Unit–II: Limit points:

Limit points definition -Some theorems on Limits – Cauchy‘s first limit theorem- subsequences – Limit points – Cauchy sequences – Cauchy‘s general principle of convergence- the upper and Lower limits of a sequence – solved problems.

Unit–III: Series of Positive Terms:

Infinite series- Definition – Cauchy‘s general Principle of convergence – comparison test – Kummer‘s Test – D‘ Alembert‘s ratio test- Solved problems in D‘ Alembert‘s ratio test – Raabe‘s Test – Solved problems in Raabe‘s Test- De Morgan and Bertrand‘s test , Gauss‘s test- solved problems.

Unit–IV: Root test and condensation test:

Cauchy‘s root test – Cauchy‘s Condensation test – Cauchy‘s Integral test – Series of arbitrary terms: Alternating series – Leibnitz‘s test – Absolute Convergence – Test for Convergence of Series of Arbitrary terms – Dirichlet‘s test – Abel‘s test – solved problems.

Unit–V: Rearrangement of Series:

Rearrangement(Derangement) of Series Definition – Riemann‘s theorem –Insertion of brackets – multiplication of series : Definition – Abel‘s theorem – Merten‘s theorem – Power series.

Text Book:

1. **Arumugam and Issac,** ‒Sequences and series‖, New Gamma publishing House, December 2015 and reprint 2017.
   Unit I – Chapter 3 – 3.1 to 3.7.
   Unit II – Chapter 3 – 3.8 to 3.12.
   Unit III – Chapter 4 – 4.1 to 4.3.
   Unit IV –Chapter 4 – 4.4 and 4.5, Chapter 5 – 5.1 to 5.3.
   Unit V – Chapter 5 – 5.4 to 5.6.

Reference Book:

1. **S.C.Malik ,Savita Arora., "**Mathematical Analysis**",** New Age International Private Limited.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the fundamental principles of Analysis	K2
CO2	identify convergence and divergence of series	K2
CO3	apply various tests to find the limit of a series	K3
CO4	distinguish between absolute convergence and ordinary convergence of a Series.	K4
CO5	compute the radius of convergence of the power series.	K4, K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	M	S	S	M
CO2	S	S	S	M	M	M	M	S	S	M
CO3	S	S	M	S	M	M	M	S	M	M
CO4	M	M	M	M	M	S	M	S	S	M
CO5	S	S	M	M	M	M	S	M	M	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTA44	ANCILLARY MATHEMATICAL STATISTICS - II	L	T	P	C
ALLIED IV			4	-	-	4

Objectives:

- To impart skills in various applications of statistical methods.
- Analyze the given data by using statistical methods.
- Construct and evaluate hypothesis tests.
- Apply sampling techniques to real life situations.

Unit–I: Distributions:

Theoretical Continuous Distributions – Rectangular Distribution – Normal Distribution as Limiting form of Binomial Distribution – Chief Characteristic of Normal Distribution and Normal Probability curve – Mode, Median, M.G.F, Moments, Mean Deviation from the Mean of Normal Distribution – A linear combinations of Independent Normal variants – Points of Inflexion of Normal Curve – Area property- Fitting of Normal distribution.

Unit–II: Curve fitting:

Fitting of a straight Line, Second degree Parabola Polynomial of k^{th} degree change of Origin – fitting of power curve $y=ax^b$ fitting of Exponential curves $y=ab^x$, $y=ae^{bx}$ - Theory of attributes – Notations – Dichotomy Classes and Class frequencies – order – relation between class frequencies – class symbols as operators – Condition, for consistency of data – Independence of Attributes and its criterion – association of Attributes – Yule‘s – Co-efficient of association.

Unit–III: Correlation and regression:

Bivariate Distribution – Correlation – Scatter diagram- Karl Pearson Co-efficient for correlation and Limits – calculation of Correlation Co-efficient for a bivariate frequency Distribution- Rank Correlation- Repeated Ranks – Regression – Line of Regression – Regression Co-efficient and Its Properties – Angles between two lines of regression.

Unit–IV: Sampling and Large sample test:

Introduction- Types of sampling – parameters and Statistics – Test of Significance – Null – Hypotheses – test of Significance for single mean, Difference of Means – Difference of standard Deviation, Exact Sampling Distribution – Chi-square variant – Derivation- M.G.F.Mode, Skewness of Chi square Distribution – additive property of Chi-square variants – Application Chi-square Distribution – Chi-square test for population Variance and Goodness of Fit – Independence of Attributes.

Unit–V: Distribution:

Exact Sampling distribution – t,f and z distribution, definitions and Applications to t,f and z distribution – test for single mean, differences of mean, Observed Correlation Co-efficient – f test for quality of population on variance .

Text Book:

1. **S.C.Gupta&V.K.Kapoor** ,‖Elements of Mathematical Staistics‖, course of Madras: Madurai University, Sultan Chand Publishers, New Delhi 2009.

Unit I - Chapter 8 -8.1 to 8.2.11,8.2.14.
Unit II -Chapter 9- 9.1 to 9.3 and chapter 11
Unit III -Chapter 10
Unit IV - Chapter 12
Unit V -Chapter 13 and 14

Reference Books:

1. **Arumugam and Thangpandi "**Probability and Statistics‖, New Gamma Publishing House, 2006.
2. **P.R. Vittal**, –Mathematical Statistics‖, Margham Publications, 2012.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand Theoretical Continuous Distributions	K2
CO2	estimate the parameters of population on the basis of given information, Correlation and regression.	K3
CO3	make decision using t- test and F- test, z - test.	K4
CO4	analyze the association between two or more groups and populations.	K4
CO5	evaluate sample distributions	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	M	S	M	M
CO2	M	M	M	M	S	M	M	S	S	M
CO3	M	S	S	S	M	M	M	M	M	M
CO4	S	S	S	M	M	M	S	M	M	M
CO5	S	S	S	M	M	M	S	S	M	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTE421	CHOICE I	L	T	P	C
ELECTIVE -II		PROGRAMMING IN C & C++	3	-	-	3

Objectives:

- To develop programming skills in C and its object oriented concepts.
- The learner will become proficient in object oriented programming concept and proficient in C tokens
- Proficient in C operators , class declaration and definition and its objects
- Proficient in conditional statements and loop concept

Unit–I: Overview of C:

Importance of C - Sample C Programs - Basic structure of C program- Programming style - Executing a C Programe .Constants, Variables and Data types : – Character set – C tokens – Keywords and Identifiers – Constants – Variables – Data types – Declaration of Variables – Assigning Values to Variables – Defining Symbolic Constants.

Unit–II: Operators and Expression:

Arithmetic of Operators – Relational Operators – Logical Operators – Assignment Operators- Increment and decrement Operators – Conditional Operator – Bitwise Operators- Special Operators – Arithmetic Expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Some Computational Problems – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical Functions.

Unit–III: Principles of Object- Oriented Programming:

Software crisis – Software evolution – A look at procedure-oriented programming – Object oriented programming paradigm – Basic concept of Object -oriented programming – Benefits of OOP – Object Oriented Languages – Applications of OOP.

Unit–IV: Tokens, Expressions and Control Structures:

Introduction – Tokens – Keywords – Identifiers and constants – Basic data types – User Defined data types – Derived data types – Symbolic constants – Type compatibility – Declaration of variables – Dynamic initialization of variables – Reference variables – Operators in C++ - Scope resolution operator – Member Dereferencing operators - Memory management operators – Manipulators – Type cast operator – Expressions and their Types – Special assignment expressions – Implicit conversions – Operator overloading – Operator precedence – Control structures.

Unit–V: Functions in C++:

Introduction – The main function – Function prototyping – Call by reference – Return by reference- Inline functions – Default arguments – Constant arguments – Function overloading – Friend and Virtual Functions – Math Library functions. Managing Console I/O operations Introduction – C++ streams – C++ stream classes – Unformatted I/O operations – Formatted Console I/O operations – Managing Output with Manipulators

Text Books:

1. **E.Balagurusamy**, –Programming in ANSI C‖ , 4th Edition , Tata McGraw- Hill Publishing Company Ltd., New Delhi, Ninth Reprint 2009.
   Unit I – Chapter 1&2
   Unit II – Chapter 3
2. **E.Balaguruswamy,** –Object – Oriented Programming with C++ –, Tata McGraw Hill Education Private Limited, New Delhi, Tenth Reprint 2010.
   Unit I – Chapter 1 & 2
   Unit II – Chapter 3
   Unit III –Chapter 4 & 10

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the concepts and Programming	K2
CO2	discuss the representation and appropriate use of primitive data types	K1
CO3	describe the object-oriented programming approach in connection with **C**++	K2
CO4	apply the concepts of object-oriented programming	K3
CO5	evaluate the process of data file manipulations using **C**++	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	S	M	M	M	M	S
CO2	S	S	S	S	S	M	M	S	M	S
CO3	S	M	M	M	S	S	M	S	S	S
CO4	S	S	S	S	S	S	M	S	S	M
CO5	S	S	S	S	S	M	S	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTE422	CHOICE II	L	T	P	C
ELECTIVE -II		AUTOMATA THEORY	3	-	-	3

Objectives:

- To make the students to understand the nuances of Automata and Grammar.
- To explain various types of automata and grammar.
- Introduce the fundamental concepts of formal languages, grammars and automata theory.
- Identify different formal language classes and their relationships
- To make them to understand the applications of these techniques in computer science.

Unit–I: Finite Automata-An Informal picture of Finite Automata:

The Ground Rules – The Protocol- Enabling the Automata to Ignore Actions – The Entire System as an Automation – Using the Product to Validate the Protocol- Deterministic Finite Automata: Definition of a Deterministic Finite Automation – How a DFA Process strings- Extending the Transition Function to Strings – The Language of a DFA- Exercise

Unit–II: Nondeterministic Finite Automata:

An Informal View of Nondeterministic Finite Automato – Definition of Nondeterministic Finite Automata – The Extended Transition Function- The Language of an NFA- Equivalence of Deterministic and Nondeterministic Finite Automata- A Bad Case for the subset Construction – An Application: Text Search: Finding Strings in Text – Nondeterministic Finite Automata for Text Search – A DFA to Recognize a Set of Keywords – Exercise.

Unit–III: Finite Automata with Epsilon-Transitions:

Use of $\in$ - Transitions – The Formal Notation for an $\in$- NFA- Epsilon–Closures –Extended Transitions and Languages for $\in$-NFA‘s – eliminating $\in$-Transitions – exercises.

Unit–IV: Regular Expressions and Languages:

Regular Expressions: The operators of Regular Expressions- Building Regular Expressions – Precedence of Regular –Expression operators – Exercises – Finite Automata and Regular Expressions: From DFA‘s to Regular Expressions – Converting DFA‘s to Regular Expressions by eliminating states – Converting Regular Expressions to Automata – Exercise.

Unit–V: Algebraic Laws for Regular Expressions:

Associativity and Commutativity – Identities and Annihilators – Distributive Laws – The Idempotent Law – Laws Involving Closures – Discovering laws for Regular Expressions. Properties of Regular Languages: Closure Properties of Regular Languages: Closure of Regular Languages under Boolean Operations –Homomorphisms – Inverse Homomorphisms –Decision properties of Regular Languages: Converting Among Representations – Testing Emptiness of Regular Languages – Equivalence and Minimization of automata:Testing Equivalence of States.

Text Book:

1. **John E. Hopcroft and Rajeev Motwani and Jeffrey D. Ullman**, ―Introduction to Automata theory, Languages and Computations‖, 3rd edition, Pearson Addison Wesley,NewYork,2006 Chennai, 2000.
   Unit I: Chapter 2: Sections 2.1-2.2
   Unit II Chapter 2 Section 2.3.-2.4
   Unit III: Chapter 2, Section 2.5,
   Unit IV: Chapter 3, Sections 3.1-3.2,
   Unit V: Chapter 3, Sections 3.4 and Chapter 4: 4.2-4.4

References Books:

1. **Harry R. Lewis and Christos H. Papadimitriou**, ― Elements of the Theory of Computation‖ Second Edition, Prentice Hall, 1997.
2. **A.V. Aho, Monica S. Lam, R. Sethi, J.D. Ullman**, ―Compilers: Principles, Techniques and Tools ―, Second Edition, Addison-Wesley, 2007.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand basic concepts in Lattices , formal language and automata theory	K2
CO2	demonstrate abstract models of computing, including deterministic (DFA), non-deterministic (NFA), Push Down Automata(PDA)	K3
CO3	apply theoretical knowledge relate practical problems to languages and automata	K4
CO4	analyze the logic and methods behind grammars and recognizers for different formal languages	K5
CO5	formalize the structure of a given formal language using regular expressions and context free grammars and implementation of a lexical analyzer.	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M	M	M	M	S	S
CO2	S	M	S	S	S	S	M	M	M	S
CO3	M	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTE423	CHOICE III	L	T	P	C
ELECTIVE -II		KNOWLEDGE FOR INDUSTRY	3	-	-	3

Objectives:

- ❖ To knowledge for Industry, need for digital transformation and the following Industry tools:

1. Artificial Intelligence 2. Big Data and Data Analytics 3. Internet of Things

Unit–I: Industry 4.0:

Need – Reason for Adopting Industry 4.0 - Definition – Goals and Design Principles - Technologies of Industry 4.0 – Big Data – Artificial Intelligence (AI) – Industrial Internet of Things - Cyber Security – Cloud – Augmented Reality.

Unit–II: Artificial Intelligence:

Artificial Intelligence (AI) – What & Why? - History of AI - Foundations of AI -The AI - environment - Societal Influences of AI - Application Domains and Tools - Associated Technologies of AI - Future Prospects of AI - Challenges of AI.

Unit–III: Big Data And IOT:

Evolution - Data Evolution - Data : Terminologies - Big Data Definitions - Essential of Big Data in Industry 4.0 - Big Data Merits and Advantages - Big Data Components : Big Data Characteristics - Big Data Processing Frameworks - Big Data Applications - Big Data Tools - Big Data Domain Stack : Big Data in Data Science - Big Data in IoT - Big Data in Machine Learning - Big Data in Databases - Big Data Use cases Big Data in Social Causes - Big Data for Industry - Big Data Roles and Skills -Big Data Roles - Learning Platforms; Internet of Things (IoT) : Introduction to IoT - Architecture of IoT - Technologies for IoT - Developing IoT Applications - Applications of IoT - Security in IoT

Unit–IV: Applications And Tools Of Industry 4.0:

Applications of IoT – Manufacturing – Healthcare – Education – Aerospace and Defense – Agriculture – Transportation and Logistics – Impact of Industry 4.0 on Society: Impact on Business, Government, People: Tools for Artificial Intelligence, Big Data and Data Analytics, Virtual Reality, Augmented Reality, IoT, Robotics

Unit–V: Jobs 2030+:

Industry 4.0 – Education 4.0 – Curriculum 4.0 – Faculty 4.0 – Skills required for Future - Tools for Education – Artificial Intelligence Jobs in 2030 – Jobs 2030 - Framework for aligning Education with Industry 4.0

Text Book:

1. **P.Kaliraj& T. Devi**, ―Higher Education for Industry 4.0 and Transformation to Education 5.0‖, 2020

Reference Book:

https://nptel.ac.in/courses/106/105/106105195/

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	know the reason for adopting Industry knowledge 4.0 and Artificial Intelligence	K1
CO2	understand the need for digital transformation	K2
CO3	apply the industry 4.0 tools	K3
CO4	analyze the applications of Big Data	K4
CO5	examine the applications and security of IoT Applications	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	S	S	S	M	S	S
CO2	S	M	M	S	S	S	M	M	M	S
CO3	S	S	S	M	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	M	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER - V

COURSE CODE	U21MTT51	DYNAMICS	L	T	P	C
CORE - VIII			5	-	-	4

Objectives:

- Proficient in Newton's laws of motion and projectiles
- Proficient in collision of elastic bodies
- Proficient in motion under action of central forces
- To defines the path of orbiting body around central body relative to, without specifying position as a function of time.

Unit-I: Newton Laws of Motion and Applications:
Introduction- Momentum- Newton's law of motion-Explanation and illustration of the first law-Explanation of the second law of motion-Composition of Forces- Parallelogram law of forces-Absolute Units of forces-Weight- gravitational units of force

Unit-II: Projectiles:
Definition- Two fundamental Principles-Path of the projectile is a parabola- Characteristics of the motion of a projectile– Equation of path range etc. –Range of a particle projected on an inclined plan etc. – Motion on the surfaces of a smooth inclined planes- Enveloping Parabola.

Unit-III: Impulsive Forces-Impulses:
Impulsive force-Impact of two bodies-Loss of kinetic energy in impact-Motion of shot and guns-Impact of water on a surface- worked examples – Impact in a fixed plane – Direct and Oblique impact – Solved Problems.

Unit-IV: Simple harmonic motion:
Introduction-Simple harmonic motion in a straight line- Definition-General solution of the Simple harmonic motion—Geometrical representation of a Simple Harmonic Motion – Equation of motion – composition of two simple harmonic motions – simple pendulum.

Unit-V: P-R Equation:
Introduction - Velocity and acceleration in polar coordinates – Equation of motion in Polar coordinates – Motion under a central force – Differential equation of central Orbits – Perpendicular from the pole on the tangent formulae in polar coordinates – Pedal equation of central orbit – Pedal equation of some well-known curves – Velocities in central orbit – Two fold problems in central orbits – Apses and apsidal distances – Law of the inverse square – Law of the inverse cube.

Text Book:

1. **M.K.Venkatraman**, –Dynamics‖, 9th edn, Agasthiar Publications, Trichy,1997. Unit I – Chapter 4 – Sec. 4.1 to 4.37
   Unit II – Chapter 6 – Sec. 6.1 to 6.17.
   Unit III – Chapter 8 – Sec. 8.1 to 8.10.
   Unit IV – Chapter 10 – Sec. 10.1 to 10.16.
   Unit V – Chapter 11 – Sec. 11.1 to 11.15.

Reference Books:

1. **A.V.Dharmapadam**, –Dynamics‖, S.Viswanathan Printers and Publisher Pvt.,Ltd.,Chennai 1993.
2. **K.Viswanntham Naik and M.S.Kasi**, –Dynamics‖, Emerald Publishers, 1999
3. **Narayanamurthy and N.Nagarathnam** , –Dynamics‖, National Publishers, New Delhi,1991.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	determine the path and range of a projectile in any direction.	K1
CO2	understand the concept of enveloping parabola.	K2
CO3	knowledge about collision of elastic bodies.	K2
CO4	compute equation of simple harmonic equation.	K3
CO5	understand the motion under the central forces.	K2, K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	M	S	S	M
CO2	M	M	S	M	M	M	M	M	S	M
CO3	S	S	S	S	M	M	M	S	S	M
CO4	S	S	S	M	M	M	M	S	S	M
CO5	M	M	M	M	M	S	M	M	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT52	ABSTRACT ALGEBRA	L	T	P	C
CORE - IX			5	-	-	4

Objectives:

- ❖ To provide some knowledge about various algebraic structures.
- ❖ Recognize the basic properties of groups and subgroups.
- ❖ Understand the types of homomorphism and use them to classify groups.
- ❖ Apply the theorems to study the structure of groups.
- ❖ Recognize the basic properties of rings, fields and integral domains.
- ❖ Using the algebraic methods for solving problems**.**

Unit-I: Groups:

Definition and Examples – Elementary Properties of a Group – Additive group of integers – Group of residue classes – The Generalised Associative Law - Power and Index law - Quaternion group - Groups of symmetries - Order of an Element – Alternative definitions of a group.

Unit-II: Complexes and Subgroups:

Union and intersection of Subgroups – Properties of Subgroup – Homomorphism – Elementary propertied of Homomorphism – Types of Homomorphism – Some results on isomorphism – Structure of isomorphic groups – Non-isomorphic groups - Cayley‘s Theorem - Group of Permutation - Cyclic Groups - Automorphism.

Unit-III: Coset’s and Lagrange’s Theorem:

Properties of Cosets – Index of a subgroup – Consequences of Lagrange‘s theorem - Normal Subgroups and Quotient Groups – Examples - Quotient Structure – Quotient Group - A Counting Principle - Fundamental theorem of homomorphism.

Unit-IV: Rings:

Definitions and Examples - Elementary properties of rings – division rings and fields – Integral Domains – Zero Divisor - Ordered integral domain – Characteristic of a ring - sub ring and sub field – Properties of sub ring and subfield - prime fields.

Unit-V: Homomorphism of Rings and their types:

Elementary properties of homomorphism – Types of homomorphism - Ideals ring – Quotient structure and Isomorphism theorems - Maximal and Prime Ideals - Field of quotient of an integral domain.

Text Book:

1.T.K.Manickavasagampillai and Narayanan, –Modern Algebra volume I & II– Viswanathan printers and publishers Pvt Ltd., Edition 1982

Unit I- Chapter 6 – 6.1 to 6.2
Unit II- Chapter 6 – 6.3 to 6.7
Unit III- Chapter 6 – 6.8 to 6.10
Unit IV- Chapter 7 – 7.1 to 7.4
Unit V- Chapter 7 – 7.5 to 7.9

Reference Books:

1.**Arumugam S and Thangapandi Issac**, –Modern Algebra|, SCITECH Publications, Chennai, Edition 2003.

2.**A.R.Vasishtha,** –Modern Algebra|, Krishna Prakashan Mandir, Meerut, 1994 – 95.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	Knowledge of elementary concepts in Abstract Algebra	K1
CO2	Use appropriate techniques and reasoning to prove the properties of groups	K2
CO3	Understanding the concept of homomorphism and isomorphism in groups	K1,K2
CO4	Extend the results of groups to rings	K3
CO5	Extend the results of rings to fields	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M	S	M	M	S	M
CO2	S	S	S	S	M	M	M	S	S	M
CO3	M	M	M	M	S	S	S	M	S	S
CO4	S	S	S	M	M	S	S	M	S	S
CO5	M	M	M	M	M	S	M	M	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT53	REAL ANALYSIS	L	T	P	C
CORE - X			5	-	-	4

Objectives:

- Understand the basic concepts of sets
- To provide knowledge about Metric Spaces
- The learner will acquire knowledge of open/closed sets and its properties
- The learner will acquire knowledge of Continuity, Connectedness, and Compactness and apply theorem

Unit-I: Metric Spaces:
Preliminaries- sets and functions - Countable sets- Uncountable sets- Inequalities of Holder and Minkowski- Metric spaces: Definition and Examples-Bounded set in a metric spaces- Open balls in a metric spaces- open sets-subspaces- Interier of a set.

Unit-II: Metric Spaces and Complete metric space:
Closed sets – Definition – Closure of a set- Limit point in set- Dense sets- summary questions - Metric Spaces –definition –examples -Complete metric space: Introduction- Completeness- Baire‘s Category theorem- summary questions.

Unit-III: Continuity:
Introduction- Continuity-Solved problems -Homeomorphism-Uniform continuity – examples – Uniformly continuous –solved problems - Discontinuous function on R- right limit – left limit – point of discontinuity-discontinuity of the second kind- oscillation.

Unit-IV: Connectedness:
Introduction- Definition and Examples –connected and continuous – solved problems- component - Connected subset of R –solved problems- connectedness and continuity- intermediate value theorem.

Unit-V: Compactness:
Introduction - compact metric spaces – (0,1) with usual metric is not compact- $(0, \infty)$ with usual metric is not compact- discrete metric not compact - compact subsets of R-equivalent characterization for compactness – Compactness and continuity - solved problems.

Text Book:

1. **Arumugam S and Thangapandi Issac ,"** Modern Analysis‖, New gamma Publishing house , Edition 2013.
   Unit I – Chapter 1& 2 – 1.2 to 2.6 Unit II – Chapter 2 & 3 – 2.7 to 3.2
   Unit III – Chapter 4 – 4.1 to 4.4 Unit IV –Chapter 5
   Unit V – Chapter 6

Reference Books:

1. **Walter Rudin**, –Principles of Mathematical Analysis|, McGraw-Hill International. Editions (3rd) – 1976.
2. **V.Karunakaran**, –Real Analysis|, Pearson Publications, Edition-2012.
3. **Appostol**, –Mathematical Analysis|, Narosa Publishing House-Second Edition-2002.

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Understand the fundamental properties of real numbers to the formal development of real analysis	K2
CO2	Extended real number system in the complex field developing the theory of real analysis	K3
CO3	Demonstrate an understanding limit and how they are use being sequences and series.	K3
CO4	Analysis various mathematical proofs of basic results in connectedness.	K4
CO5	Evaluate various mathematical proofs of basic results in continuity.	K4,K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	S	S	S	M	S	S
CO2	M	M	M	M	M	S	S	M	S	S
CO3	S	S	S	M	S	S	M	S	S	M
CO4	S	M	M	S	S	S	M	S	S	S
CO5	M	M	S	M	M	S	S	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT54	OPERATIONS RESEARCH I	L	T	P	C
CORE - XI			-	5	-	4

Objectives:

- To impart the basic concepts and applications of linear programming.
- The leaner will formulate a linear programming problem and solve them graphically and simplex method
- The leaner will be able to understand the concepts of duality programming
- The leaner will analyze the different aspects of transportation problems and also assignment problems
- Students will be able to identify the basic analysis of various inventory models.
- The leaner will develop, organize, evaluate short, long term processes and solve problems

Unit-I: Linear Programming:

Introduction- Mathematical formulation of linear programming problem-Graphical solution-solved problems- Unbounded solution- Infeasible solution –Canonical form –Standard form - Introduction - Simplex method - Use of Artificial Variables: – Big M Method -problems– Two Phase Simplex method- problems.

Unit-II: Degeneracy in Linear Programming:

Introduction- Degeneracy in Linear Programming – Introduction about Duality - Duality Theorem – Finding solution for Linear Programming problem using Duality and Simplex Method – Dual Simplex Method for Linear Programming problem . Finding solution for Linear Programming problem using Dual Simplex Method.

Unit-III: Transportation Problem:

Introduction of Transportation Problem – Definition of Transportation Problem- Mathematical formulation of the problem - Finding Initial Basic Feasible Solution using North - West Corner Rule - Row Minima method- Column Minima method-Matrix Minima Method - Vogel‘s Approximation Method - Optimum solution – MODI method .

Unit-IV: Assignment Problem:

Introduction – Definition of Assignment problem -Mathematical formulation of Assignment Problem-Assignment Algorithm-problems solving using assignment algorithm- Minimizations case Routing problem- problems using Routing problem- Application of Assignment problem-Traveling salesman problem .

Unit-V: Inventory Control:

Introduction- Definition – Need for inventory Various Cost in : Inventory Control -Types of Inventories – The inventory decisions -Economic order quantity – Deterministic Inventory Problems: EOQ Problem with no shortages – EOQ Problem with price break – EOQ Problem with two price break – EOQ Problem with n price break.

Text Book:

1. **Kantiswarup, P.K.Gupta, Manmohan** –Operations Research‖, Sultan chand and sons , Edition 2000.

   Unit I- Chapter 2.3 and 4 - 4.1 to 4.5
   Unit II- Chapter 5 -5.1 to 5.7
   Unit III- Chapter 10
   Unit IV- Chapter 11
   Unit V- Chapter 19 – 19.1 to 19.10, 19.12

Reference Books:

1. **J.K.Sharma**, –Operations Research‖,Macmillan India Ltd. 1997.
2. **Prem Kumar Gupta, D.S. Hijra**, –Operations Research‖, S. Chand & Company Ltd,2002.
3. **P.R.Vittal**, –Operations Research‖, Margham Publications, 2002.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the application of OR and frame a LP Problem with solution – graphic and through solver add in excel	K1
CO2	analyze and interpret results of transportation and problem using appropriate method	K2
CO3	evaluate simple model of L.P.P.	K3
CO4	solutions of assignment and problem using appropriate method	K3
CO5	evaluate the dynamics of inventory managements principles, concepts of customer demand, distribution and product transformation process	K4, K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	M	M	M	S	S
CO2	S	S	S	M	M	M	M	S	M	M
CO3	M	M	S	M	M	M	S	M	M	M
CO4	S	S	S	S	M	M	M	S	S	M
CO5	M	S	S	S	M	M	M	S	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT55	THEORY OF NUMBERS	L	T	P	C
CORE - XII			5	-	-	4

Objectives:

- The learner will acquire knowledge of basic concepts of number theory
- The learner will become proficient in various types of functions
- The learner will be know the primitive roots
- Apply the theorems to study the numbers.

Unit-I: Principle of Finite Induction:

Well – Ordering Principle(WOP)- Principle of Finite Induction- The Division Algorithm – Basis Representation Theorem- Binomial Coefficients- Divisibility Theory : Greatest Common Divisor-Least common Multiple- Linear Diophantine Equations- Fundamental Theorem of Arithmetic - Some Question Regarding Primes.

Unit-II: Congruencies:

– Residue System – Test of Divisibility – Linear congruence‘s - Solving Polynomial congruence‘s – An Application of Congruence‘s to Diophantine Equations - Fermat‘s Little theorem –Euler‘s Generalization of FLT_1 .

Unit-III: Functions and Theorem:

Wilson‘s Theorem- Euler‘s Φ-Function- Arithmetic Functions:-The Function τ and σ – The Möbius Function- Multiplicative Arithmetic Functions- Inversion Formula- Greatest Integer Function.

Unit-IV: Primitive Roots:

Exponents – Primitive roots Modulo a Prime – Determination of Integers having Primitive roots – Indices – Euler‘s Criterion – Legendre Symbol and its Properties – Gauss Lemma.

Unit-V: Quadratic Reciprocity Law and its applications:

Jacobi Symbol – Perfect Numbers – Mersenne Primes-Fermat Numbers - Phythagorean Triples-Fermat‘s Last Theorem.

Text Book:

1. **S.B.Malik ,** ‘‘Basic Number Theory‖,Second Revised Edition, Vikas Publishing House PVT LTD, 2009

   Unit I – Chapter: 1&2
   Unit II – Chapter: 3, Chapter: 4 – 4.1, 4.2
   Unit III – Chapter: 4 – 4.3, 4.4 & Chapter: 5
   Unit IV – Chapter: 6, 7- 7.1 to 7.3
   Unit V – Chapter: 7- 7.4 to 7.6, Chapter : 8

Reference Books:

1. **Ivan Niven and Herbert S Zuckerman**, –An Introduction to the theory of Numbers‖, 3rd Edition, Wiley Eastern Ltd., New Delhi, 2000.
2. **David M.Burton**,‖Elementary Number Theory‖, W.M.C.Brown Publishers, Dubuque, Lawa, 1989.

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Understand factual knowledge including the mathematical notation and terminology of number theory.	K2
CO2	Construct mathematical proofs of statement and find counter examples to false statements in Number Theory.	K2
CO3	Apply theoretical knowledge to problem of computer security	K3
CO4	Analyze the logic and methods behind the major proofs in number theory	K4
CO5	Determine multiplicative inverses , modulo n and use to solve linear congruences	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	M	M	M	M	M	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	M	M	M	M	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	S	S	S	S	M	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTE531	CHOICE -I	L	T	P	C
ELECTIVE III		FUZZY SETS AND FUZZY NUMBERS	3	-	-	3

Objectives:

- Recognize the concept of fuzzy sets and its properties.
- Distinguish fuzzy sets from crisp sets.
- Perform various types on fuzzy sets.
- Understand the fuzzy numbers and fuzzy Lattice relations.

Unit-I: From classical (crisp) sets to Fuzzy sets:

A Grand Paradigm Shift : – Introduction – Crisp sets: An overview – Fuzzy sets: Basic types - Fuzzy sets: Basic concepts Characteristics and significance of the Paradigm Shift.

Unit-II: Fuzzy Sets versus Crisp Sets:

Additional properties of alpha(α)-cuts – Representations of fuzzy sets- Extension Principle for fuzzy sets- Notes and Exercise.

Unit-III: Operations On Fuzzy Sets:

Types of operations – Fuzzy complements- Fuzzy intersections: t – Norms- Fuzzy unions : t – Conorms - Combinations of operations- Aggregation Operations- Notes and Exercises.

Unit-IV: Aggregation operations and Fuzzy Arithmetic:

Aggregation operations - Fuzzy Numbers – Linguistic Variables-Arithmetic Operations on Intervals - Arithmetic Operations on Fuzzy numbers- Lattice of Fuzzy numbers - Fuzzy equations.

Unit-V: Fuzzy Relations:

Crisp versus Fuzzy Relations – Projections and Cylindric Extensions – binary Fuzzy Relations – Binary Relations on a Single Set- Fuzzy Equivalence Relations.

Text Book:

1. **George J. Klir / Bo Yuan, "**Fuzzy sets and Fuzzy Logic, Theory and Applications **"**, Prentice Hall of India Pvt. Ltd., New Delhi, 2008.

   Unit – I: Chapter 1: Sections 1.1 – 1.5
   Unit – II: Chapter 2: Sections 2.1 - 2.3
   Unit – III: Chapter 3: Sections 3.1 - 3.6
   Unit – IV: Chapter 3: Sections 3.6 and Chapter 4: Sections 4.1 -4.6
   Unit – V: Chapter 5: Sections 5.1 – 5.5

Reference Books:

1. **George J. Klir & Tina A. Folger** –Fuzzy Sets, Uncertainty & Information‖ PHI Learning Private Limited, 2012.
2. **D. Driankov, Hellendoorn & M. Reinfrank** –An Introduction to Fuzzy Control‖ Narosa Publishing House, Reprint 2001.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand concepts between classical sets and fuzzy sets.	K1
CO2	understand the membership functions.	K1
CO3	understand and Apply of basic operations on fuzzy sets.	K1,K3
CO4	analyze the properties and principles of fuzzy sets.	K4
CO5	evaluate arithmetical ability on fuzzy numbers.	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	M	S	S	S	S	M
CO2	M	S	M	S	M	S	S	M	M	M
CO3	M	M	M	S	S	M	M	M	M	M
CO4	S	M	S	M	M	M	S	S	M	M
CO5	S	M	M	M	S	M	S	S	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTE532	CHOICE -II	L	T	P	C
ELECTIVE III		MATHEMATICAL MODELLING	3	-	-	3

Objectives:

- To study the mathematical models through ode and difference equations
- To train the students to develop mathematical models in real life problems

Unit-I: First Order Differential Equations in Mathematical Modelling:

Through Ordinary Differential Equations Of First Order- Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models.

Unit-II: Geometrical Problems:

Mathematical Modelling Through Systems Of Ordinary Differential Equations Of First Order: Dynamic problems – Geometrical problems- Population Dynamics – Epidemics – Compartment Models.

Unit-III: Applications:

Mathematical Modeling through Systems of Ordinary Differential Equations of First Order in Economics – Medicine, Arms Race, Battles and International Trade – Dynamics.

Unit-IV: Mathematical Modeling Through Difference Equations:

Simple Models – Basic Theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics.

Unit-V: Mathematical Modelling:

Mathematical Modelling Through Graphs: Solutions that can be Modeled Through Graphs – Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

Text Book:

1. **J.N. Kapur**, ―Mathematical Modelling―, Wiley Eastern Limited, New Delhi, 1988.
   Unit 1: Chap 2, Sec 2.1 – 2.4
   Unit 2: Chap 2, Sec 2.5 – 2.6 Chap3, Sec 3.1 – 3.3
   Unit 3: Chap 3, Sec 3.4 – 3.6
   Unit 4: Chap 5, Sec 5.1 – 5.5
   Unit 5: Chap 7, Sec 7.1 – 7.5

Reference Book:

1. **J.N. Kapur**, ―Mathematical Models in biology and Medicine―, EWP, New Delhi, 1985.
2. Michael Alder,‖ An Introduction to Mathematical Modelling, Heaven For Books.com , 2001.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand basic definitions from Mathematical Modelling through Ordinary Differential Equations of First order	K2
CO2	understand Mathematical Modelling through Ordinary Differential Equations of First order problems	K2,K3
CO3	apply Mathematical Modelling through Ordinary Differential Equations of First order to applications	K2,K3
CO4	understand simple models through Difference Equations	K2
CO5	evaluate models through Graphs	K2,K3,K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	M	S	M	S	M
CO2	S	M	S	S	M	S	S	M	M	S
CO3	S	M	S	S	M	S	S	M	M	S
CO4	S	S	M	M	M	S	M	S	M	M
CO5	M	S	S	M	M	M	M	M	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTE533	CHOICE -III	L	T	P	C
ELECTIVE III		DATA STRUCTURES AND ALGORITHMS	3	-	-	3

Objectives:

- Impart the basic concepts of data structure, array and its operations.
- Introduce the concept of linked list and its operations.
- Understand the concept of Stack & Queue, its representation and operations.
- Understand the concept of Tree & Graph, its representation and operations.
- Study the basic concepts of algorithms and step by step approach in writing algorithms with help of fundamental data structures

Unit-I: Data Structures:

Definition of a Data structure – Data structure operations- primitive and composite Data Types, Arrays-Linear Arrays-Representation of Linear Array in Memory-Traversing Linear Array-Inserting and Deleting in Linear Arrays.

Unit-II: Linked list:

Representation of Linked lists in Memory-Insertion into a linked list-Deletion from a linked list.

Unit-III: Stack in Array:

Array Representation of stack- Array representation of stack-Linked representation of Stack-difference between Array representation and Linked representation of stack

Unit-IV: Trees:

Definition - Binary trees-Representing Binary tree in Memory-Traversing Binary trees. Graph - Graph terminology- Sequential representation of graph: Adjacency matrix, Linked representation-Traversing a graph (Breadth First Search & Depth First Search).

Unit-V: Algorithms:

Definitions-examples, Complexity of Algorithms- Bubble sort – linear Search- worst case- average case- rate of growth: Big O notation- Other Asymptotic Notations for Complexity of Algorithms.

Text Book:

1. **Seymour Lipschutz**, ―Data Structures‖, TataMcGraw-hill Publications, 2006. Unit I: Chapter 1: 1.3-1.4 & Chapter 4: 4.1-4.5
   Unit II: Chapter 5: 5.1-5.3, 5.7-5.8
   Unit III: Chapter 6: 6.1-6.4
   Unit IV: Chapter 7: 7.1-7.4 Chapter8: 8.1-8.5
   Unit V: Chapter 1: 1.5 Chapter 2: 2.5 Chapter 4: 4.6-4.7

Reference Books:

1. **L. MathuKrithigaVenkatesh, "** Data Structures and Algorithms –, , Margham Publications.2005
2. **R. Kruse C.L. Tondo and B. Leung**, –Data Structures and Program design in C|, PHI. 1997,
3. **Cangsam,Auguenstein, Tenenbaum**, –Data Structures using C & C++|,PHI
4.**D.Samantha**, –Classic Data Structures –, PHI,New Delhi, 2005
5.**A.Puntambekar**, –Data Structures And Algorithms –, Technical Publications, Pune,2005

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	identify the data and apply the suitable concepts of data structure in programming.	K2
CO2	demonstrate linked list and its operations for programming.	K2
CO3	explain and utilize the concepts of stack and queue for programming.	K2,K3
CO4	compare the data in the required format using search and sort techniques.	K3
CO5	ability to analyze and check the algorithms.	K3,K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	S	M	S	M	S	M
CO2	M	S	S	S	M	S	S	M	M	S
CO3	M	S	S	S	M	S	S	M	M	S
CO4	M	S	S	S	M	S	M	S	M	M
CO5	M	S	S	S	M	M	M	M	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTS53	MATHEMATICAL APTITUDE	L	T	P	C
SKILL BASED ELECTIVE III			2	-	-	2

Objectives:

- To impart skills in numerical and quantitative techniques.
- Able to critically evaluate various real life situations by resorting to Analysis of key issues and factors.
- Able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

Unit- I : Numbers system:
HCF – LCM – Problems on numbers. (Chapters 1, 2 & 7)

Unit- II : simplification:
Decimal Fractions and Simplification. (Chapter 3 & 4)

Unit- III : Profit and Loss :
Surds and Indices – Percentage – Profit and Loss. (Chapters 9, 10 & 11)

Unit- IV: Ratio:
Ratio and Proportion – Partnership – Allegation or Mixture. (Chapters 12, 13 & 20)

Unit -V : Average :
Average – Problems on Age. (Chapters 6 &8)

Text Book:

R.S.Aggarwal, ‒Scope and treatment as in ‒Quantitative Aptitude‖ , S.Chand & Company Ltd., Ram Nagar, New Delhi -2007.

Reference Book:

Dr.J.Jayaprakash, ‒Quantitative Aptitude‖, 2nd edition, Dr.JP Publication, 2017.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the basic concepts of Quantitative Ability	K2
CO2	understand the basic concepts of Logical Reasoning Skills.	K2
CO3	acquire satisfactory competency in use of Verbal Reasoning	K2
CO4	solve campus placements aptitude papers covering Quantitative Ability, Logical Reasoning and Verbal Ability	K3,K4
CO5	compete in Various competitive exams	K3, K4

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate; K6- create

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	S	S	M	M
CO2	S	M	S	M	M	M	M	S	S	M
CO3	S	S	S	S	S	S	M	S	S	S
CO4	M	M	S	M	S	S	S	M	S	S
CO5	M	S	S	S	S	M	S	S	S	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

SEMESTER - VI

COURSE CODE	U21MTT61	LINEAR ALGEBRA	L	T	P	C
CORE XIII			5	-	-	4

Objectives:

- To introduce the vector space
- Recognize the basic properties of vector spaces
- Understand the concepts of linear algebra in geometric point of view
- Visualize linear transformations as a matrix form
- Formulate the importance and applications of linear algebra in many branches of Mathematics

Unit-I: Vector Spaces:

Definition and examples – General properties of vector space – Subspace – Direct sum – Definition and theorems - Linear combination –linear span – – Subspace spanned or generated - Definition – Finite dimension - linear dependence and independence.

Unit-II: Basis and Dimension:

Maximally linearly independent definition – Minimal generating function - Quotient space – Isomorphism of vector spaces – Direct sums Direct sums : Internal direct sum and External direct sum – Dual space - Anihilator.

Unit-III: Matrix of a linear transformation:

Rank and nullity of a Linear transformation – Singular and non singular definition – Regular transformation - characteristic equation of a matrix- Matrix Polynomial – Elementary matrix and transformations – Cayley Hamilton Theorem.

Unit-IV: Rank of a matrix:

Row rank, column rank and rank of a matrix – Echelon matrix - Row space and column space – Determinant of a matrix - linear equation –consistency of equation – non homogeneous linear system – Consistency of equation – Invariant under T.

Unit-V: Inner product spaces:

Definition and examples of Similar and Congregant matrices - Inner product spaces- Orthogonality – Norm of v – Orthonormal - Orthogonalization – Gram Schmidt Orthogonalization process - Orthogonal complement.

Text Book:

1. **T.K.Manickavasagampillai and Narayanan, "**Modern Algebra‖ volume II Viswanathan printers and publishers Pvt Ltd., Edition 1982.
   Unit I- Chapter 8 -8.1 to 8.5

Unit II- Chapter 8 -8.6 to 8.10
Unit III- Chapter 8 -8.14 to 8.18
Unit IV- Chapter 8 -8.20, 8.21
Unit V-Chapter 8 -8.22 to 8.24

Reference Books:

1. **Arumugam S and Thangapandi Issac** ,‖ Modern Algebra‖, SCITECH Publications, Chennai, Edition 2003.
2. **A.R.Vasishtha, "**Modern Algebra**",** Krishna Prakashan Mandir, Meerut, 1994 – 95

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand Vector Space, Quotient space Direct sum, linear span and linear independence, basis and inner product.	K1,K2
CO2	apply the linear transformations, rank, nullity.	K3
CO3	find the characteristic equation, eigen values and eigen vectors of a matrix.	K3
CO4	prove Cayley- Hamilton theorem, Schwartz inequality, Gramschmidt orthogonalisation process.	K3
CO5	evaluate the system of simultaneous linear equations.	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	M	S	S	S	S	M
CO2	S	S	S	M	M	S	S	S	M	M
CO3	S	S	S	M	M	S	S	S	M	M
CO4	S	S	S	M	S	S	S	M	M	S
CO5	S	S	S	M	S	S	S	M	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTT62	COMPLEX ANALYSIS	L	T	P	C
CORE XIV			5	-	-	4

Objectives:

- To introduce the concepts of complex numbers and analytic functions.
- The learner will acquire basic concepts of analytic function and its properties
- The learner will acquire basic knowledge about conformal and bilinear transformation
- The learner will gain knowledge of integration of complex valued function
- The learner will become proficient in series of analytic function
- The learner will acquire skills of finding integral values of complex function using residues

Unit-I: Analytic functions:

Cauchy-Riemann equations – Definition of Analytic functions- Sufficient conditions – Harmonic functions – Cauchy- Riemann equations in polar co-ordinates – Theorems and exercise in this method- Milne Thomson‘s method. - Conformal Mapping- Bilinear Transformation.

Unit-II: Complex integration:

Introduction of Complex integration Cauchy‘s integral theorem – Cauchy‘s integral formula – Derivatives of analytic functions – Morera‘s theorem – Cauchy‘s inequality – Liouville‘s theorem – Fundamental theorem of algebra.

Unit-III: Taylor’s theorem:

Expansion of functions in power series –Introduction about Taylor‘s theorem – Taylor‘s theorem- Taylor‘s series – Maclarins‘ series – Laurent‘s Theorem - Laurent‘s series.

Unit-IV: Singularity:

Zeros of an analytic function - Singularity definition- singular points – removable singularity - essential singularity – poles - study of the function for the infinite value of Z - Argument Principle – Rouche‘s theorem - Fundamental theorem of algebra.

Unit-V: Calculus of Residues:

Introduction about Calculus of Residues - Residues - Cauchy‘s Residue Theorem – Application of Cauchy‘s Residue Theorem -Argument theorem – Rouche‘s theorem – Fundamental theorem of algebra - evaluation of definite integrals.

Text Book:

1. **Arumugam S and Thangapandi Issac** ,‖ Complex Analysis‖, Scitech Publication pvt Ltd, Edition 2014.

   Unit I – Chapter 2 & 3
   Unit II – Chapter 6
   Unit III – Chapter 7 -7.0 to 7.2
   Unit IV – Chapter 7 -7.3, 7.4
   Unit V – Chapter 8

Reference Books:

1. **Santhinarayan**, –Theory of functions of Complex Variable –, S.Chand and Company, Meerut, 1995
2. **T.K.M.Pillay, Dr.S.P.Rajagopalan & Dr.R.S. Sattanathan**, ‖Complex Analusis‖, S. Viswanathan (Printers & Publisers),Pvt.Ltd. Revised Edition 2007 Reprint 2013
3. **Lars V Ahlfors** –Complex Analysis‖ , McGraw – Hill Kogakusha, Ltd. 3rd Edition, 1999.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	remember sums, products, quotients, conjugate, modulus, and argument of complex numbers and exponentials and integral powers of complex numbers	K1
CO2	understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.	K2
CO3	find residues and evaluate complex integrals, real integrals using the residue theorem.	K3
CO4	apply Cauchy‘s residue functions and problem.	K3,K4
CO5	determine whether a given function is analytic.	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	S	M	M	M	M
CO2	S	M	S	S	M	S	S	S	M	S
CO3	S	S	S	S	M	S	S	S	M	S
CO4	S	S	S	S	M	S	S	S	M	S
CO5	S	M	M	S	M	M	S	S	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT63	OPERATION RESEARCH II	L	T	P	C
CORE XV			5	-	-	4

Objectives:

- To impart mathematical modeling skills through operations research techniques.
- The learner will become proficient in sequence modeling and processes in mathematics and engineering.
- The leaner will acquire the knowledge of Simulation
- The leaner will acquire the knowledge of basics in game theory and replacement problems
- The learner will become to understand the role and application of PERT/CPM for project scheduling.

Unit-I: Sequencing Models and Related Problems:

Sequencing Problems- assumption in Sequencing Problems – processing n jobs through one machine - processing n jobs through two machines - processing n jobs through three machines - processing 2 jobs through m machines - processing n jobs through m machines – solution of complicated Sequencing Problems- problems related to sequencing(routing problem in networks) – minimal path problem(shortest acyclic route models).

Unit-II: Simulation:

Introduction-when to use Simulation- what is Simulation?- advantage of the Simulation technique- limitation of the Simulation- application of Simulation- Monte Carlo Simulation – generation of random numbers – Simulation languages- Examples and applications in simulation method.

Unit-III: Theory of Games:

Introduction- Definition of Game -Two person zero sum game- examples-The maxmini and minimax principle-Example and exercise problems in maxmini and minimax principle- Games without saddle points- Example and exercise problems in Games without saddle points -Mixed strategies-Dominance property-solution of 2×2 rectangle game- Graphical Method.

Unit-IV: Replacement Problem:

Replacement problem introduction - System Reliability – Various Types of replacement - Replacement of Equipment that Deteriorates Gradually- Algorithm – Problems in Replacement of Equipment that Deteriorates Gradually -Replacement of Equipment the Fails Suddenly-. Problems in Replacement of Equipment the Fails Suddenly

Unit-V: Network Scheduling By PERT/CPM:

Introduction network and Network Scheduling -Basic Components- Rules of Construction – Critical Path Analysis –problems in critical path method-Definition for various times in Program me Evaluation and Review Techniques - Definition of Probability Considerations in PERT – Distinction between PERT and CPM.

Text Book:

1. **Kantiswarup, Gupta, P.K.Manmohan**, ―Operations Research‖, Sultan chand and sons Edition 2002 ,Reprint 2017.

Unit I – Chapter 12
Unit II – Chapter 22
Unit III – Chapter 17
Unit IV – Chapter 18
Unit V – Chapter 25

Reference Books:

1. **P.K.Gupta and D.Shira,"** Operations Research‖ (S. Chand and Company Ltd New Delhi-.1992, Reprint 1994.
2. **Taha H.A., "**Operations Research An introduction‖ Prence Hall of India Private Ltd 1st Edition New Delhi (2008) .

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	remember the nature and feature of Operations Research	K1
CO2	find the replacement period of equipment that fails suddenly/gradually	K2
CO3	find EOQ problems with price breaks	K2,K3
CO4	find inventory decisions costs using deterministic inventory problems with no shortages /with shortages	K3
CO5	understand and evaluate of CPM and PERT Define basic components of Network and find critical path	K1, K3,K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	S	S	M	M	M	M
CO2	S	S	M	S	M	S	S	S	S	S
CO3	S	S	S	S	M	S	S	M	S	M
CO4	S	S	S	S	S	S	S	M	S	M
CO5	S	S	S	S	S	S	S	M	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTT64	GRAPH THEORY	L	T	P	C
CORE XVI			5	-	-	4

Objectives:

- To acquire knowledge of different types of graphs
- To understand different Models of a graph
- To understand how to solve different real life problems
- To understand many techniques to solve a particular problem
- To understand directed graphs.

Unit-I: Graphs:

Definition of Graph – Examples for Graph- various definitions in Graph - Pictorial representation - sub graphs definition –examples- Isomorphism between Graphs – degree of Graph - Walks and connected graphs - cycles in graphs – cut vertices and cut edges definition and examples ..

Unit-II: Eulerian and Hamiltonian Graphs:

Introduction of Eulerian graphs - definition and examples of Eulerian graphs -Fleury's Algorithm for Graph – introduction of Hamiltonian Graphs – Definition and example of Hamiltonian Graphs -Weighted graphs definition and examples ,

Unit-III: Bipartite Graphs:

Introduction and definition of Bipartite graphs-Marriage problem -Trees.- Definition –Example- Incident matrix in Graph algorithm and examples -adjacent matrix in Graph algorithm and examples - path matrix in Graph algorithm and examples and circuit matrix in Graph algorithm and examples

Unit-IV: Planar Graphs:

Defining of Planer graphs – Examples for Planer graphs -Euler's Formula for: Planar Graph – Platonic solids-Dual of a plane graphs- definition and examples of dual of a plane graphs Characterization of planer graphs.

Unit-V: Directed Graphs:

Introduction and definition of directed graphs - Examples of directed graphs- Connectivity in digraphs – examples- Strong orientation of graphs –Eulerian digraphs- examples for Eulerian digraphs - Tournaments.

Text Book:

1. **S.A.Choudum**, –A first Course in Graph Theory, Macmillan india limited,1999.
   Unit I: Chapter 1
   Unit II: Chapter 2
   Unit III: Chapter 3 -3.1 to 3.3 &4-4.1
   Unit IV: Chapter 5
   Unit V: Chapter 7

Reference Books:

1 **Arumugam S and Thangapandi Issac** ,‖ Graph theory‖, Sci tech Publication pvt ltd, Edition 2014.

2 **S.A.Choudum**, –A first Course in Graph Theory|, Macmillan India limited, 2007.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	remember and understand the theoretical knowledge of graph theory to solve problems.	K1,K2
CO2	understand theories and concepts to test and validate intuition and independent mathematical thinking in problem solving.	K2
CO3	apply networks using the main concepts of graph theory.	K3
CO4	use definitions in graph theory to Analyze examples and to distinguish examples from non-example.	K4
CO5	evaluate graph theory in a coherent and technically accurate manner.	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	M	S	S	M	M	M
CO2	S	S	M	M	M	S	M	S	S	M
CO3	S	M	S	M	M	M	M	M	S	S
CO4	S	M	M	S	M	S	S	M	S	S
CO5	S	S	M	M	M	M	S	M	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTT65	DISCRETE MATHEMATICS	L	T	P	C
CORE XVII			5	-	-	4

Objectives:

- To study and, or and not logics by truth tables.
- To study of normal forms.
- Analysis Free and Bound variable formulas.
- Understand Types of Grammar, function of Pushdown automata.

Unit-I: Mathematical Logic Statement and Notation:

Connection – Negation Conjunction – Disjunction – Statement Formulas and Truth Tables – Logical Capabilities of Programming Languages – Conditional and Bi Conditional – Well Formed Formula – Tautologies –Equivalence of Formula – Duality Law Tautological Implication.

Unit-II: Normal Forms:

Normal Forms-decision problem- Examples- Disjunctive Normal Forms – Examples- Conjunctive Normal Forms -examples– Principal Disjunctive Normal Forms priniciple disjunction normal form- sum–of-products canonical form – Principal Conjunctive Norms.

Unit-III: Theory of Inference:

Theory of Inference introduction -Truth Table Technique – Rules of Inference – Definition and examples - Inconsistent Premises – Indirect Method of Proof – Predicate calculus- Free and Bound Variables – Valid Formulas and Equivalences – Inference Theory of Predicate Calculus- examples and exercise problems .

Unit-IV: Grammar:

Definition –Alphabets- string- length of the sting- Concatenation of string- Grammar-Types of Grammar – Definition and examples - Phrase Structure Grammar definition- Examples for Phrase Structure Grammar -Context Sensitive Grammar definition- Examples for Context Sensitive Grammar – Context Free Grammar definition- Examples for Context Free Grammar – Regular Grammar definition- Examples for Regular Grammar – Languages Generated by these Grammars.

Unit-V: Automata:

Definition – Deterministic Automation – Non-Deterministic Automates – Conversion of Non-Deterministic Automates to Deterministic Automation - Algorithm for Conversion of Non-Deterministic Automates to Deterministic Automation- Pushdown automata – Algorithm for Pushdown automata

Text Books:

1. **J.P.Tremblay**, **R. Manohar** – ―Discrete Mathematical Structures with Applications to Computer Science‖, Tata McGraw – Hill Edition 1997.
   Unit I- Chapter: 1- 1-1, 1-2:1-2.1 to 1-2.11.
   Unit II-Chapter: 1-3.1 to 1-3.4
   Unit III- Chapter: 1-4.1to 1- 4.3 .1-5 to1-5.4,1-6:1-6.1 -1-6.4
2. **Dr.Rani Siromoney, "**Formal Languages and Automata‖, The Chiristian Literature Society**,** Revised Edition 1979.
   Unit IV-Chapter2: 2.1 to 2.6
   Unit V-Chapter 5: 5.1 and Chapter 6

Reference Books:

1. **B.S.Vatssa**, ―Discrete Mathematics‖,WISHWA PRAKASHAN,1993.
2. **V.Sundaresan,K.S.Ganapathy Subramanian, K.Ganesan**, ―Discrete Mathematics‖, A.Rd.Publications, 1998.

3.**T.Veerarajan**, ―Discrete Mathematics‖, McGraw Hill Education (India)Pvt.Ltd,NewDelhi, 2014.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understanding of some Logic truth tables	K2
CO2	prove / define basic normal forms	K3
CO3	to analyses the concepts of free and bound variable formulas	K4
CO4	understanding the concepts of Grammars	K4
CO5	basic concepts of Languages and basic definitions of Automata	K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate; K6- create

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	S	S	S	M	M
CO2	M	M	S	M	S	M	S	M	M	S
CO3	S	S	S	M	S	S	M	S	M	M
CO4	S	M	M	S	S	M	S	S	M	M
CO5	M	S	S	M	S	M	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTE641	CHOICE -I	L	T	P	C
ELECTIVE -IV		ASTRONOMY	3	-	-	3

Objectives:

- The learner understands basic knowledge about natural science.
- The leaner will acquire the knowledge of the celestial objects and origin of those objects and phenomena and their evolution
- The learner will acquire basic knowledge about morning , evening stars , circumpolar stars
- Knowledge of equation of Time, seasons from earth rotation
- Calculation to prepare calendar and conservation of Time.
- It applies mathematics, physics, and chemistry.

Unit-I: Spherical Trigonometry:

Sphere - Great circles and small circles- Axis and poles of circle – distance between two points on a sphere-angle between two circles-secondary‘s-angular radius or spherical radius – spherical figures –spherical triangles –polar triangle –theorems - Relation between spherical triangles and its polar triangle- Some properties of Spherical triangles- principal of duality-colunar and anti podal triangles –Relation between sides and angles of a spherical triangle- Cosine formulas-cotangent formula-supplemental cosine formula.

Unit-II: Functions of half an angel:

Functions of half a side – Delambre‘s analogies –Napier‘s analogies- right angled spherical triangle –Napier‘s rules- Spherical Coordinates – relation between the Spherical and rectangular coordinates – general proof of the cosine formula – formula in plane trigonometry –Important note.

Unit-III: Sideral time:

West hour angle of a body expressed in time units – theorem- latitude of a place – theorem- to determine – tee R.A. and Declination of a body- to find the hour angle of a body at rising or setting – to find the duration of day time –to trace the changes in the azimuth of a star in the course of a day. (With worked examples)- Morning and evening stars –circumpolar stars – to find the condition that a star is circumpolar. (With worked examples)

Unit-IV: Equation of Time:

Introduction- Dynamical mean sun- equation of time – analytical expression for the equation of time –effect of equation of time on the lengths of morning and evening-to prove that the equation of time vanishes four times a year –seasons –causes of seasons.

Unit-V: Calendar:

Different kinds of year –civil year, Julian calendar – Gregorian calendar – Julian date –Besselian year -Conversion of Time: Relation between sidereal and mean times –to convert mean solar time into sidereal time - to convert sidereal time into mean solar time – to find the sidereal time at a given instant of mean solar time on a given date at Greenwich – to find the mean time

corresponding to a given instant of sidereal time at Greenwich – the difference between local times – to find the sidereal time from local mean time for a given place- to find the mean time from the sidereal time for a given place- given the right ascensions of a star and the mean sun, to find the mean time of transit of the star.

Text Book:

1. **S.Kumaravelu and Susheela Kumaravelu**, ―Astronomy for degree classes‖, Rainbow Printers, Nagarcoil, Reprint 2000.(Copies can be had of S.Kumaravelu, Muruga Bhavanam, Chidambaranager, Nagercoil)

   Unit I – Chapter I: Subsection 1- 24
   Unit II – Chapter I: Subsection 25 -38
   Unit III – Chapter II: Sub sections 70-86
   Unit IV - Chapter VII: Subsection 166- 170 and 172-174
   Unit V – Chapter VII: Subsection 175- 184 and 186- 189.

Reference Book:

1. **Prophet Muhammad**, ―Astronomy: Supplemental Guide‖, Core Knowledge Foundation, 2013
2. **Jeff Becan, "Astronomy: for Beginners", Illustrted by Sarah Began,**
3. Aldnonymous ,‖**General Astronom**‖, y, en.wikibooks.org, 2015

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understanding about natural science	K2
CO2	knowledge about the celestial objects	K3
CO3	to analyses the equation of time and seasons	K4
CO4	categorize various means in solving Time	K4
CO5	basic concepts of calendar and conservation Time	K6

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	S	S	S	M	M
CO2	M	M	S	M	S	M	S	M	M	S
CO3	S	S	S	M	S	S	M	S	M	M
CO4	S	M	M	S	S	M	S	S	M	M
CO5	M	S	S	M	S	M	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTE642	CHOICE -II	L	T	P	C
ELECTIVE -IV		MATHEMATICAL CRYPTOGRAPHY	3	-	-	3

Objectives:

- To offer number theoretic preliminaries for widely used public-key cryptosystems.
- To teach public-key cryptographic primitives and their role in communication.

Unit-I: Introduction to Cryptography:

Cryptanalysis of Simple substitution ciphers-Divisibility and Greatest Common Divisors (without proofs) – Modular arithmetic: Modular arithmetic and Shift Ciphers- Prime numbers :Prime numbers, unique factorization and finite fields-Powers and primitive roots in finite fields.

Unit-II: Discrete Logarithms and Diffie–Hellman Key Exchange:

The birth of public key cryptography- Discrete Logarithm Problem-Diffie-Hellman key exchange- Elgamal public key cryptosystem-The Chinese remainder theorem- The Chinese remainder theorem describes the solutions to a system of simultaneous linear congruences.

Unit-III: Integer Factorization and RSA:

Euler‘s formula and roots modulo □□ – The RSA public key cryptosystem-Implementations and security issues- Primality testing-The Distribution of the set of Primes- Pollard‘s p-1 factorization algorithm - Quadratic residues and Quadratic reciprocity Probabilistic encryption.

Unit-IV: Elliptic Curves and Cryptography:

Elliptic Curves (Theorems without proofs)- Elliptic Curves over finite fields-Elliptic Curve Discrete Logarithm Problem: The double –and-Add Algorithm- Elliptic Curve Cryptography and Lenstra‘s Elliptic Curve Factorization Algorithm.

Unit-V: Digital Signatures:

Digital Signatures – An Over View and Definitions-RSA Digital Signatures Key Creation-signing exponent and is her verification exponent- RSA Signing- RSA Verification.

Text Book:

1. **Jeffrey Hoffstein, Jill Pipher and Joseph H. Silverman**, ―An Introduction to Mathematical Cryptography―, ISBN : 978-1-4419-2674-6, Springer, 2010.
   Chapters: 1.1-1.5, 2.1-2.4, 2.8, 3.1-3.5 (excluding 3.4.1 & 3.4.2), 3.9-3.10, 5.1-5.4,5.6, 7.1-7.2.

Reference Books:

1. **Neal Koblitz, "**A Course in Number Theory and Cryptography―, Springer, 1994.
2. **Jonathan Katz and Yehuda Lindell**, ―Introduction to Modern Cryptography―, Second edition, CRC Press, 2015.
3. **Douglas R.Stinson**, ― Cryptography Theory and Practice―, CRC Press, Third edition, 2005

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	appreciate the role of mathematics in cryptography.	K1
CO2	understand how secure communications happen over insecure channels.	K2
CO3	appreciate how computational complexities form the basis of public-key cryptography.	K3
CO4	understand the importance of data secrecy, data integrity, and data authentication and the ways to achieve them.	K2,K3
CO5	understand key-agreement, public-key encryption and digital signatures.	K2,K4

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate; K6- create

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	S	S	S	M	M
CO2	M	M	S	M	S	M	S	M	M	S
CO3	S	S	S	M	M	S	M	S	M	M
CO4	S	M	M	S	S	M	S	S	M	M
CO5	M	S	S	M	S	M	S	M	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21MTS64	OPERATIONS RESEARCH LAB	L	T	P	C
SKILL BASED ELECTIVE -IV			2	-	-	2

Objectives:

To familiarize students with the basic concepts, models and techniques for effective decision making, model formulation and applications.

Prerequisites: Operations Research – I

Use of Operations Research Software such as LINDO, LINGO, TORA etc., to solve

- Linear programming Problems
- Sensitivity analysis in LPP problems
- Integer Programming Problems
- Transportation Problems
- Assignment problems
- Problems on CPM/PERT
- Non Linear Programming problems
- Queuing problems

Reference Books :

1. **Hamdy A. Taha, "** Operations Research – An Introduction‖, Eight Edition – Pearson Education – Prentice Hall.
2. LINDO User's Manual – LINDO Systems, Inc.
3. Optimization Modeling with LINGO - 5 th edition – LINDO Systems, Inc.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the basic concepts and application of operations research in various fields	K1
CO2	know principles of construction of mathematical models of conflicting situations.	K2
CO3	analyze the relationship between a linear program and its dual	K3
CO4	techniques constructively to make effective decisions in business and solve problems in industry	K4
CO5	build and solve all problems by using software.	K4

K1- Remember: K2- Understand : K3-Apply, K4- Analyse, K5- Evaluate; K6- create

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	S	S	S	M	M
CO2	M	M	S	M	S	M	S	M	M	S
CO3	S	S	S	M	S	S	M	S	M	M
CO4	S	M	M	S	S	M	S	S	M	M
CO5	M	S	S	M	S	M	S	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

NON MAJOR ELECTIVE-

FOR OTHER DEPARTMENT

COURSE CODE	U21MTN31	RESOURCE MANAGEMENT TECHNIQUES	L	T	P	C
SEMESTER - III			2	-	-	2

Objectives:

- To impart the basic concepts and applications of linear programming.
- The leaner will analyze the different aspects of transportation problems, assignment problems and also sequencing problem.
- The leaner will develop, organize, evaluate short, long term processes and solve problems
- The leaner will acquire the knowledge of basics in game theory

Unit–I: Linear Programming Problem:
Definition-Mathematical formation of the Linear Programming Problem— Basic Solution-Degenerate Solution- Basic Feasible Solution of the Linear Programming Problem.

Unit–II: Transportation Problem:
Introduction and Definition-Mathematical form of L.P.P-Table-Find Intial Basic Feasible Solution – North West Corner Rule -Row Minima-Colum Minima- Least Cost Method- Vogel‘s Approximations Method(VAM) - Un balanced Transportation problem- Only upto Initial Basic Feasible Solution.

Unit–III: Assignment Problem:
Introduction and Definition of Assignment Problem -Mathematical formulation of the problem–Hungarian Algorithm – Simple Problem.

Unit–IV: Sequencing Problem:
Introduction and Definition of Sequencing Problem -Problem of Sequencing- Basic Terms Used in Sequencing- Processing n jobs & Two machine- Processing n jobs Through two Machines.

Unit–V: Game Theory:
Definition- Two-Person Zero-Sum Games- Some basic terms- The Maximin-Minimax Principle-Game without Saddle point- Mixed Strategies - Graphic Solution of 2 × n and m × 2 games.

Text Book:

Kanti Swarup, P.K .Gupta,Man Mohan–Operations Research, Sultanchand and sons , Edition - 2017.

Unit I – Chapter 2 and 4
Unit II – Chapter 10
Unit III – Chapter 11
Unit IV - Chapter 12
Unit V – Chapter 17

Reference Book :

1.**P.R.Vittal and V.Malini,** –Operations Research– Margham Publishers – 2002.

2.**Taha**, –Operation Research‖, Printice Hall, New Delhi,2011

3. **Kalavathy** , –Operations Research‖, Vikas Publishing House Pvt .Ltd. 2003

4. **Gupta P.K &Hira D.S** ,‖Problems in Operations Research‖, S.Chand& Co, Delhi , 2006

5.**V.Sundaresan, K.S. Ganapathy Subramanian, &K.Ganesan**, –Resource Management Techniques‖ (Operations Research), A.R. Publications, Nagapattinum District

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	formulate the real life problems as Linear programming problem.	K1
CO2	use to solve Linear programming problems	K2
CO3	identify degeneracy in transportation problem	K3
CO4	calculate the optimal solution from the feasible solution using MODI method	K3
CO5	obtain the optimal solution for Assignment problems, Sequencing problem , Game Theory .	K4

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	S	S	S	S	S	M
CO2	S	S	S	S	S	M	M	S	M	S
CO3	S	S	S	M	S	S	M	S	S	S
CO4	M	S	S	S	S	M	S	M	S	S
CO5	M	S	S	S	M	S	M	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MTN42	NUMERICAL METHODS	L	T	P	C
SEMESTER - IV			2	-	-	2

Objectives:

- The learner will analyze the different aspects of numerical solution of algebraic and transcendental equations.
- The learner will understand the several methods to solve the simultaneous equations.
- The leaner will derive numerical methods for various mathematical operations and tasks on interpolation.

Unit-I: Solution of Algebraic and Transcendental Equations:
Introduction and advantages of solution of algebraic and Transcendental Equations- Bisection Method – Iteration Method – Condition for Convergence.

Unit-II: Solution of Algebraic and Transcendental Equations:
Deviation and advantage of Solution of Algebraic and Transcendental Equations-Regular Folsi Method -Newton‘s Raphson Method.

Unit-III: Solutions of Simultaneous Linear Algebraic Equations:
Method of elimination in Simultaneous Linear Algebraic Equations- Gauss Elimination Method for Solutions of Simultaneous Linear Algebraic Equations – Gauss Jordan Method Solutions of Simultaneous Linear Algebraic Equations.

Unit-IV: Solutions of Simultaneous Equations:
Introduction of Jacobi methods of Simultaneous Equations - Algorithm - Gauss Jacobi – Gauss Seidel Method.

Unit-V: Finite Differences:
Introduction of forward and backward Difference of Finite difference: First and Higher Order Differences –Forward and Backward Differences.

Text Book:

1. **P.Kandasamy, K.Thilagavathi and K. Gunavathi**, ―Numerical Methods‖, S.Chand and Company Ltd , New Delhi 2013.

Unit I – Chapter 3 -3.1 to 3.2
Unit II – Chapter 3 -3.3 to 3.4
Unit III – Chapter 4 -4.1- 4.2
Unit IV – Chapter 4 - 4.8 - 4.9
Unit V – Chapter 5 – 5.1 – 5.2

Reference Books:

1. **Arumugam , Issac, Somasundaram**,‖Numerical Analysis‖, New Gamma Publishing House, Palayam Kottai 2003.
2. **G. Balaji**, –Numerical Methods|, G.Balaji Publishers, Chennai 2007.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the fundamentals in finding the roots of the equation using bisection method and iteration method.	K2
CO2	approximate solutions of algebraic and transcendental equations.	K3
CO3	analyze and evaluate the accuracy of numerical methods	K4
CO4	evaluate numerical solution to a system of linear equation by Gauss-Seidal method.	K5
CO5	evaluate the problems in interpolation.	K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	S	S	M	S	M
CO2	M	S	M	S	S	M	S	M	M	M
CO3	M	S	M	M	M	M	M	S	M	S
CO4	S	M	S	M	S	M	S	M	S	M
CO5	S	S	M	S	M	S	M	S	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

VALUE ADDED PROGRAMME

COURSE CODE	U21MAV51	NUMERICAL METHODS LAB USING C++	L	T	P	C
SEMESTER - V			-	-	-	2

Objectives:

- To develop programming skills in C and its object oriented concepts.
- The learner will become proficient in object oriented programming concept and proficient in C tokens
- Proficient in C operators , class declaration and definition and its objects
- Proficient in conditional statements and loop concept

1. Write a Program to find the smallest positive / Largest negative root using simple iteration method
2. Write a Program to find the smallest positive / Negative root using Regula Falsi method.
3. Write a Program to find the Smallest positive / Negative root using Newton-Raphson_s i method.
4. Write a Program to find the solution of system of equation using Gauss Jacobi method..
5. Write a Program to find the Matrix inversion using Gauss Jordan method
6. Write a Program to interpolate y for given x from the given sets of values of x and y by Newton_s forward method.
7. Write a Program to find interpolate y for given x from the given sets of values of x and y by Newton_s backward method.
8. Write a Program to find interpolate y using the Lagrange_s method
9. Write a Program to derivative at initial point by Newton_s forward method
10. Write a Program to integration using Trapezoidal & simpson‘s method

Text Book:

1. **T.Veerarajan and T.Ramachandran**, –Theory and Problems in Numerical Methods with Programs in C and C++‖, Tata McGraw Hill Publishing Company Ltd,2004.

COURSE CODE	U21MAA11	SEMESTER -I	L	T	P	C
B.Sc. Physics / Chemistry		ANCILLARY MATHEMATICS I	5	-	-	4

Objectives:

- The learner will become proficient in expansion and summation of function
- The learner will acquire knowledge of solving problems in matrices
- The learner will capable of solving the interpolation problems.
- The learner will gain knowledge of trigonometric functions and related problems
- The learner will become proficient in various types of hyperbolic functions

Unit-I: Partial Fractions:

Introduction of Partial Fractions- Binomial Theorem: The General Term – Expansion of Rational Fractions – Summation of Series. Exponential Theorem: Summation of Series, The Logarithmic Series- Problems.

Unit-II: Theory of Equations:

Introduction of the general Equations- Fundamental Theorem of Algebra – Symmetric Function of Roots – Relation between Roots and Coefficient of Equation – Formation of Equation – Diminish the Roots of the Equation – Reciprocal Equation. Newton - Raphson Method problems.

Unit-III: Matrices:

Fundamental Concepts of Special Types of Matrices –Addition and Subtraction of Matrices – Matrix Multiplication – Associated Matrices. Rank of a Matrix: Elementary Operations or Transformation. Linear Equations: Homogeneous linear Equation – Non-Homogeneous Equation Characteristic Roots and Vectors: Eigen Value and Eigen Vectors – Properties of the Eigen Vectors – Cayley - Hamilton theorem.

Unit-IV: Interpolations:

Introduction about Interpolations: Newton‘s Forward Method - Newton‘s Backward Method- Lagrange‘s Interpolation Formula: Different form of Lagrange‘s Interpolation Formula- problems.

Unit-V: Trigonometry:

Basic ideas in Trigonometry: Expansions: $\cos^n\theta$, $\sin^n\theta$ – cos $n\theta$ and sin $n\theta$ –Expansion of sin θ ,cosθ and tanθ in powers of θ.Hyperbolic Function: Relation between Hyperbolic Functions and Circular Functions – Periods of Hyperbolic Functions – Inverse Hyperbolic Functions. Logarithm of Complex Quantities

Text Book:

1. **P.Kandasamy, K.Thilagavathy**,—Allied Mathematics Paper II, 1st Semester, S. Chand Publishing . A Division of S. Chand & Company Pvt. Ltd, Edition 2013

Reference Books:

1. **G.C.Sharma and Madhu Jain**, Algebra and Trigonometry, 1st Edition, Galgotia Publications Pvt.Ltd.2003
2. **Dr.S.Arumugam, A.Thangapandi Isaac and A.Somasundaram**, Numerical Methods, 2nd reprint, Scitech Publication India Pvt, Ltd., 2004.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	remember numbers, sequences, series, basic summaries from partial fraction, equations, matrices	K1
CO2	understand trigonometric values and Interpolations	K2
CO3	solve problems by using theorems.	K3
CO4	analyze homogeneous and non-homogeneous linear equations.	K4
CO5	analyze and Evaluate inverse functions.	K4, K5

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

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	S	S	S	M	M
CO2	M	M	S	M	S	M	S	M	M	S
CO3	S	S	M	M	S	S	M	S	M	M
CO4	S	M	M	S	M	M	S	S	M	M
CO5	M	S	S	M	S	M	S	M	M	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21MAA22	SEMESTER -II	L	T	P	C
B.Sc. Physics / Chemistry		ANCILLARY MATHEMATICS II	5	-	-	4

Objectives:

- To learn methods of integration and properties and its solving related problems.
- Understand the basic concepts of first order differential equation and it applications.
- Find solutions by applying Laplace transform methods.
- Vectors and its product and its integrations.

Unit-I: Vector Calculus:

Introduction about Vector Calculus – Gradient, Divergence and curl (problems only). Integration of vectors: Integration of vector functions, Line integrals – Surface integrals – Green's theorem in the plane (statement only) – Gauss Divergence theorem (statement only) – Problems – Stoke's theorem (statement only) – Problems

Unit-II: Partial differential equation

Introduction of Partial differential equation from differential equations - Formation of Partial differential equations by eliminating arbitrary constants and arbitrary functions* – Solutions of standard types of first order equations- f (p, q) = 0, f(x, p, q)=0, f(y, p, q)=0, f(z, p, q)=0, $f_1(x, p) = f_2(y, q)$, z = px+qy+f (p, q) , Clairaut's form– Lagrange method of solving linear partial differential equations P p + Q q = R. (problems only)

Unit-III: Total differential equations:

Introduction of total differential equations - Bessel's equations: Bessel's equations – Solutions of Bessel's general differential equations (derivations not included) – General solution of Bessel's equations - Recurrence formulae (derivations not included) – Simple problems using Recurrence relation.

Unit-IV: Laplace Transforms:

Introduction of Laplace Transforms- Definition – Laplace Transform of e^{at}, cos at, sin at, cosh at, sinh at, t^n, n, a positive integer – e^{at} f (t) , $t^n f(t)$, f (t), f:(t) – Inverse Laplace Transform of standard functions – Solving differential equations of Second order with constant coefficients using Laplace Transform.

Unit-V: Fourier Series:

Introduction of Fourier Series: Definition- Dirchlet's conditions- Fourier series of periodicity 2π and 2l - Odd and even functions –Root mean square value of a function Half range series: Introduction- Half range series – Cosin series - sin series – Parseval's theorem - Harmonic analysis

Text Book:

1. **P.Kandasamy and K.Thilagavathy**. "Mathematics for B. Sc., Br. -I, Volume-II and Volume-III", S. Chand & Company Ltd, First edition, 2004.(UNIT I and III)
2. **S.Narayanan and T.K. Manickavasagam Pillai**," Calculus Vol. III ", S.Viswanathan (Printers and Publishers, (P)Ltd, Chennai, 2010. (UNIT II and V)
3. **S. Narayanan and T. K. Manickavasagam Pillai**, "Calculus Vol. III " S.Viswanathan (Printers and Publishers, (P)Ltd, Chennai, 1997. (UNIT IV)

References Book

1.P. Kandasamy and K.Thilagavathy, "Mathematics, Vol IV", S.Chand And Company Ltd.,- 2004

2.**Shanti Narayan**, "Differential Calculus", Shyamlal Charitable Trust, New Delhi, 2004.

3.**P.N.Chatterji**,"Vector Calculus ", 1st Edition, Rajhans Prakahan Publishers, Chennai, 1998.

Course Outcome:

On the successful course completion, students will be able to		Cognitive Level
CO1	understand the I and II integrals	K2
CO2	understand properties of integrals, Laplace transform.	K2
CO3	understand first order differential equations.	K2
CO4	analysis Theorems and proves.	K3,K4
CO5	evaluate the importance of shifting properties.	K3, K4

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate; K6- create

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	S	M	S	S	S	M	M
CO2	M	M	S	M	M	M	S	M	M	S
CO3	S	M	S	M	S	S	M	S	S	M
CO4	S	M	M	S	M	M	S	S	M	M
CO5	M	S	S	M	S	M	S	S	M	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

DEPARTMENT OF PHYSICS

B.Sc. PHYSICS

SYLLABUS TO BE IMPLEMENTED FROM THE ACADEMIC YEAR 2021-2022

(CHOICE BASED CREDIT SYSTEM)

Mother Teresa Women's University, Kodaikanal
Department of Physics
Choice Based Credit System (CBCS)
(2021-2022 onwards)
B.Sc Physics

1. About the Programme

B.Sc.Physics is a three- year undergraduate program comprising of theory and experimental courses mainly from Physics and few interdisciplinary courses from Mathematics, Chemistry and Computer Science. The program emphasises on the fundamentals of Physics while introducing modern concepts such as Quantum Mechanics and Relativity proceeding over to Classical Mechanics, Electrodynamics taking forward the courses like Electricity and Magnetism, Optics and Waves similarly Statistical Mechanics and Thermodynamics.

The undergraduate degree programme paves a solid ground for students to further acquire mastery in Physics concentration areas. The programme trains graduate to establish entry-level careers in the government and private sectors.

2. Programme Educational Outcomes (PEO)

The Programme has been designed to enable the learners to

PSEO1	pursue their Higher Studies in Leading Institutes
PSEO2	attain significant position in Academics with proficiency
PSEO3	cultivate their research acumen for resolving challenging research issues, and secure a position in Research Organization.
PSEO4	create inclusive society with gender equality.
PSEO5	work in Defence Organization with shrewdness, courage, and confidence.
PSEO6	imbibe communicative skills and value system and work ethically in a multidisciplinary environment.

3. Eligibility

A strong foundation in Physics with Mathematics subject at the HSC level passed students

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	10	25	10	25
External	30	75	30	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade
(Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

9. Programme Outcomes (POs):

PO1	To get a thorough understanding of the nature, principles, methods, approaches, and goals of the core subjects
PO2	Solve the problem and get to a logical conclusion by thinking carefully and independently.
PO3	To improve students' problem-solving skills so that they can compete in national level competitive examination.
PO4	To comprehend the connections between physics and other disciplines, as well as societal challenges
PO5	Students will be taught how to improve their employability and entrepreneurship abilities.
PO6	To instills a scientific mindset among students and others outside of the scientific community.

10. Program Specific Outcomes:

PSO1	Demonstrate, solve, and comprehend major topics in all physics fields.
PSO2	Students will show mastery of mathematics and the mathematical principles required for a thorough grasp of physics.
PSO3	Design, carry out, record, and analyse the outcomes of Physics experiments using critical thinking and scientific knowledge.
PSO4	Provide essential foundations, as well as a thorough understanding of underlying principles and contemporary advances.
PSO5	Ability to plan and carry out their own creative ideas in the form of projects, product development, and design.

B.Sc. PHYSICS

S. No.	Course Code	Course Title	Credits	Hours		CIA	ESE	Total
				L	P			
	Semester I							
1	U21LTA11	Part I– Tamil–I	3	6	-	25	75	100
2	U21LEN11	Part II– English –I	3	6	-	25	75	100
3	U21PHT11	Core I-Properties of Matter and Sound	4	5	-	25	75	100
4	U21PHP11	Core II- Practical I	4	-	6	25	75	100
5	U21MAA11	Allied Mathematics I (Theory)	4	5	-	25	75	100
6	U21EVS11	Environment Studies	2	2	-	25	75	100
7	U21PEPS11	Professional English I	4	6	-	25	75	100
		Total	**24**	**36**				**700**
	Semester II							
8	U21LTA22	Part I– Tamil–II	3	6	-	25	75	100
9	U21LEN22	Part II– English –II	3	6	-	25	75	100
10	U21PHT21	Core III- Mechanics	4	5	-	25	75	100
11	U21PHT22	Core IV- Heat and Thermodynamics	4	5	-	25	75	100
12	U21MAA22	Allied Mathematics II (Theory)	4	5	-	25	75	100
13	U21VAE21	Value Education	3	3	-	25	75	100
14	U21PEPS22	Professional English II	4	6	-	25	75	100
		Total	**25**	**36**				**700**
	Semester III							
15	U21LTA33	Part I– Tamil–III	3	6	-	25	75	100
16	U21LEN33	Part II– English –III	3	6	-	25	75	100
17	U21PHT31	Core V- Optics and Spectroscopy	4	5	-	25	75	100
18	U21CHA33	Allied Chemistry	4	5	-	25	75	100
19	U21PHE311/ U21PHE312	Elective I-Energy Physics/ Waves and Oscillations	3	4	-	25	75	100
20	U21MSS31	SBE I-Managerial Skills	2	2	-	25	75	100
21	U21PHN311/ U21PHN312	NME-I	2	2	-	25	75	100
		Total	**21**	**30**				**700**
	Semester IV							
22	U21LTA44	Part I– Tamil–IV	3	6	-	25	75	100
23	U21LEN44	Part II–English–IV	3	6	-	25	75	100
24	U21PHT41	Core VI - Electricity and Electromagnetism	4	4	-	25	75	100
25	U21PHP42	Core VII-Practical II	4	-	4	25	75	100
26	U21CHA44	Allied Chemistry Practical	4	-	4	25	75	100
27	U21PHE431/ U21PHE432	Elective II- Medical Physics / Materials Science	3	3	-	25	75	100
28	U21CSS42	SBE II-Computer Skills for Office Management	2	-	2	25	75	100

29	U21PHN421/ U21PHN422	NME-II	2	2	-	25	75	100
		Total	**25**	**31**				**800**
	Semester V							
30	U21PHT51	Core VIII-Atomic and Nuclear Physics	4	5	-	25	75	100
31	U21PHT52	Core IX- Classical and Statistical Mechanics	4	5	-	25	75	100
32	U21PHT53	Core X - Basics of Data Communication and Programming in C	4	5	-	25	75	100
33	U21PHT54	Core XI-Basic Electronics and Communication	4	5	-	25	75	100
34	U21PHP53	Core XII- Practical III	4	-	5	25	75	100
35	U21PHE531/ U21PHE532	Elective III- Numerical methods/ Basic Instrumentation	3	3	-	25	75	100
36	U21PHS531/ U21PHS532	SBE III-Microprocessor Fundamentals / Television Transmission and Receiver	2	2	-	25	75	100
		Total	**25**	**30**				**700**
	Semester VI							
37	U21PHT61	Core XIII – Relativity and Quantum Mechanics	4	5	-	25	75	100
38	U21PHT62	Core XIV-Solid State Physics	4	5	-	25	75	100
39	U21PHT63	Core XV- Mathematical Physics	4	5	-	25	75	100
40	U21PHT64	Core XVI-Nanophysics	4	5	-	25	75	100
41	U21PHP64	Core XVII-Practical IV	4	-	5	25	75	100
42	U21PHE641/ U21PHE642	Elective IV-Astrophysics / Atmospheric Physics	3	3	-	25	75	100
43	U21PHS641/ U21PHS642	SBEIV- Problems Solving Skills in Physics / Weather Forecasting	2	2	-	25	75	100
44	U21EAS61	Extension Activities (NSS/NCC/RRC/YRC/Physical Education)	3	-	-	100	-	100
		Total	**28**	**30**				**800**
		Grand Total	**148**	**193**				**4400**

Non Major Elective

The candidates, who have joined the UG Programme, can also undergo Non Major Elective offered by other Departments.

Non Major Elective offered by Department of Physics

U21PHN311	NME-I House Hold Appliance
U21PHN312	NME-I How Things Work
U21PHN421	NME-II Digital Photography
U21PHN422	NME-II Physics in Musical Instrument

Additional Credit Courses (Two Credit courses)

1. **U21PHO31 Online course 3rd Semester**
2. **U21PHI41 Internship 4th Semester**
3. **U21PHV51 Value added course 5th Semester (Solar Energy Technology)**

SEMESTER-I

COURSE CODE	U21PHT11	PROPERTIES OF MATTER AND SOUND	L	T	P	C
CORE -I			5	-	-	4

Objective:

To expose students to the fundamental properties of matter and sound.

Unit I: Elasticity

Elasticity – Hooke's law – Elastic moduli – Poisson's ratio – Beams – bending of beams – Expression for bending moment–Cantilever-Theory of uniform and non–uniform bending - Determination of Young's modulus -Koenig's method –Torsion of a body – Expression forcouple per unit twist – Work done in twisting a wire – Torsional oscillations of a body – Rigidity modulus by dynamic torsion method (Torsional pendulum) and static torsion method.

Unit II: Surface Tension

Surface tension – definition – Molecular forces – Explanation of surface tension on kinetictheory – Surface energy – work done in increasing the area of as surface – Excess pressure inside a curved liquid surface – Excess pressure inside a spherical and cylindrical drops and bubbles-drop weight method-variation of surface tension with temperature-experimental determination- Jaegar's method.

Unit III: Viscosity

Viscosity–Coefficient of viscosity–Stream lined and turbulent motion–critical velocity–Rate of flow of liquid in a capillary tube – Poiseuille's formula–viscosity of highly viscous liquid-terminal velocity - Stoke's method- Ostwald Viscometer – viscosity of gas -Mayer's formula- Rankine 's method

Unit IV: Sound

Simple Harmonic Motion –Composition of two S.H.M in a straight line - at right angles - Lissajous's figures - Free, Damped, Forced Vibrations-Resonance-Fourier theorem-application.

Unit V: Ultrasonics and Acoustics

Ultrasonics –Production– Piezo electric crystal method–Magnet ostriction method–Properties and Applications. Acoustics of building – Reverberation- Sabine's Reverberation formula (No derivation) - Factors affecting acoustics of building-Sound distribution in an auditorium-Requisitesfor goodacoustics.

Text Books:

1. D.S.Mathur, Elements of Properties of Matter, S.Chand & Co., 2010.
2. R.Murugesan, Properties of Matter, S.Chand & Co., 2004.
3. Brijlal and Subramanian, Properties of Matter, S.Chand & Co., 2006.
4. D.R.Khanna and R.S.Bedi, Textbook of Sound, Atmaram and Sons, 1971.
5. N.Subrahmanyam and Brijlal, A Text Book of Sound, Vikas Publishing House - Second Edition, 2018.

Books for Reference:

1. H.R.Gulati, Fundamentals of General Properties of Matter, S.Chand & Co., 1982.
2. D.Halliday, Resnick and J Walker, Fundamental of Physics, 6th Edition,Wiley,2001.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Evaluate modulus of different materials	K3
CO2	Acquire knowledge on properties of liquids	K2
CO3	Understand the physics of sound and its applications	K2
CO4	Learn about different methods of producing Ultrasonic waves and its applications	K1
CO5	Apply the theories in building acoustics	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	2	3	3	3	3	2
CO2	3	3	3	3	2	2	3	3	3	3	2
CO3	3	3	3	3	2	2	3	3	3	3	2
CO4	3	3	3	3	2	2	3	3	3	3	2
CO5	3	3	3	3	2	2	3	3	3	3	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHP11	PRACTICAL-I	L	T	P	C
CORE -II			-	-	6	4

Objective:

It is aimed at exposing the undergraduate students of the physics department to the techniques of handling equipment's, making error free measurements and error analysis.

ANYFOURTEEN

1. Estimation of Errors
2. Young's modulus- Uniform bending pin and Microscope Method.
3. Young's modulus- Non uniform bending pin and Microscope Method.
4. Young's modulus-Uniform bending opticall ever Method.
5. Young's modulus-Non uniform bending opticall ever Method.
6. Compound Pendulum-gandk.
7. Spectrometer–Angle of prism.
8. Potentiometer–Low range Voltmeter Calibration.
9. Potentiometer–Low range Ammeter Calibration.
10. Sonometer –Law's verification.
11. Melde's -Frequency of the Vibrator.
12. Determination of coefficient of Viscosity– Stoke's Method.
13. Potentiometer–Ammeter Calibration.
14. Torsional oscillation sn, I
15. Thermal conductivity of a bad conductor -Lee's disk Method.
16. Newton's law of cooling.
17. Focal Length of a Convex lens.
18. Focal Length of Concave lens.
19. Comparison of Viscosities by Capillary Flow Method.
20. Comparison of Radii by Capillary Flow Method.
21. Specific heat capacity by Joule's Calorimeter.

TEXT BOOKS:

1. C.C.Ouseph, G.Rangarajan, A Text Book of Practical Physics, S.Viswanathan Publisher – Part I, 1990.
2. C.COuseph, G.Rangarajan, R.Balakrishnan, A Text Book of Practical Physics, S.Viswanathan Publisher-PartII, 1996.
3. S.L.Gupta and V.Kumar, Practical Physics, Pragati Prakashan,25th Edition, 2002.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Able to Estimate Errors	K3
CO2	Calculate the change in dimension of bar	K4
CO3	Determine focal length of different lenses	K4
CO4	Determine co-efficient of viscosity of liquids	K3
CO5	Compare and measure the potential difference of EMF	K4

K1-Remember K2- Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating (S)	3
Moderately correlating (M)	2
Weekly correlating (W)	1
No correlation (N)	0

SEMESTER-II

COURSE CODE	U21PHT21	MECHANICS	L	T	P	C
CORE -III			5	-	-	4

Objective:

To give the students fundamental ideas on conservation laws, rotational and vibrational motion of rigid bodies, gravitational fields and some idea about fluid mechanics

Unit I: Laws of Motion

Laws of conservation of energy, linear momentum and angular momentum -work energy theorem - work done by gravitational force - work done by spring force - potential energy - conservative and non-conservative forces – potential energy curve–Collision – Elastic and inelastic collision – (Fundamental laws of impact) –Newton's law of impact – coefficient of restitution–Impact of a smooth sphere on a fixed plane – Direct impact between two smooth spheres – Oblique impact between two smooth spheres–Calculation of final velocities of the spheres –Loss of K.E due to impact.

Unit II: Dynamics of Rigid body

Moment of inertia–Theorems of perpendicular and parallel axes –M.I of a circularring, disc, solid sphere, hollow sphere and cylinder about all axes–Compound pendulum–theory – equivalent simple pendulum – reversibility of centers of oscillation and suspension– determination of g and k

Unit III: Gravitation

Newton's law of gravitation – Kepler's laws of planetary motion – G by Boy's method – Mass and density of earth – Acceleration due to gravity – Variation of g with altitude, depth and rotation of earth-Value of G at poles and equator. Gravitational field – Gravitational potential – Gravitational potential due to spherical shell – Gravitational potential due to a solid sphere (inside and outside)

Unit IV: Central Force Motion

Angular velocity, angular momentum and K.E of rotation – Torque and angular acceleration – Relation between them – Expression for acceleration of a body rolling down an inclined plane without slipping. Center of mass –velocity and acceleration of Centre of mass – determination of motion of individual particle – system of variable mass. Rocket motion-Satellite

Unit V: Statics and Hydro dynamics

Friction-laws of friction-angle of friction-cone of friction-Centre of gravity-solid and hollow tetrahedron-solid and hollow hemisphere –Centre of pressure –vertical rectangular lamina– vertical triangular lamina. Hydrodynamics- Equation of continuity–Pitot's tube and Venturimeter–Euler's equation of unidirectional flow – Torricelli's theorem – Bernoulli's theorem and its applications.

Text Books:

1. Narayana Moorthy, Mechanics – Part I and II, National Publishing Company,1990.
2. D.S.Mathur, Mechanics, S.Chand & Co.,2nd Edition, 2001.
3. P.Duraipandian, Laxmi Duraipandi, Jayapragasam, Mechanics, S.Chand & Co., NewDelhi, 1988.
4. R.Murugesan, Properties of Matter, S.Chand & Co., New Delhi, 2001.

Books for Reference:

1. Halliday, Resnick and J.Walker, Fundamentals of Physics 6th edition, Wiley,NY,2001.
2. David Kleppner, Robert Kolenkow, Introduction to Mechanics, McGraw Hill Education; 1stedition (2017)

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Learn about laws involved in mechanics	K1
CO2	Understand the forces imposed on a dynamic rigid body	K2
CO3	Determine gravitational field and potential value	K3
CO4	Apply conservation laws in collision experiments.	K3
CO5	Understand the concepts of static and hydrodynamics	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	2	3	3	3	3	2
CO2	3	3	3	3	2	2	3	3	3	3	2
CO3	3	3	3	3	2	2	3	3	3	3	2
CO4	3	3	3	3	2	2	3	3	3	3	2
CO5	3	3	3	3	2	2	3	3	3	3	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHT22	HEAT AND THERMO DYNAMICS	L	T	P	C
CORE -IV			5	-	-	4

Objective:

To understand the phenomena connected with various units of measurement of temperature, knowing the concept of specific heat capacities of matter, transmission of heat, concept of flowering the temperature, liquefying gases and process of making heat to do mechanical work.

Unit I: Thermometry and Calorimetry

Specific heat capacity of solids–Regnault's method of mixtures (solid)–specific heat capacity of liquids–Callendar and Barnes method –Specific heat capacity of gases – C_p and C_v – Meyer's relation – C_v by Joly's differential steam calorimeter method – C_p by Regnault's method.

Unit II: Kinetic Theory of Gases

Kinetic Theory of gases - assumptions – Molecular collisions –mean free path–expression forme an free path – Transport phenomenon – Brownian motion and its features-expression for viscosity, Diffusion and thermal conductivity of gas. Experimental verification-Vander Walls equation of state–Determination of Vander Walls constant- Relation between Vander Wall's constant and critical constants.

Unit III: Low Temperature Physics

Joule-Kelvin Effect- Lique faction of Air- Linde's Process – liquefaction of hydrogen - liquefaction of helium-Kamerlingh - Onne's method -Helium I and II-Lambda point-production of low temperatures-adiabatic demagnetization -practical applications of low temperature - refrigerators and air-conditioning machines-super fluidity-application of super fluidity.

Unit IV: Transmission of Heat

Conduction–coefficient of thermal conductivity–Rectilinear flow of heat along a bar – convection – lapse rate – Stability of the atmosphere –Newton's law of cooling – determination of specific heat capacity of liquid - Radiation -blackbody – Kirchhoff's law – Stefan – Boltzmann law - energy distribution in black body spectrum - Wien's law – Rayleigh Jean's law–Planck's law –solar constant–water flow pyrheliometer.

Unit V: Thermodynamics

Zeroth and first law of thermodynamics – reversible and irreversible processes –isothermal process-a diabatic process-gas equation during adiabatic process –work done Entropy–change of entropy in reversible an irreversible processes–temperature – entropy diagrams – physical significance of entropy - change of entropy when ice converted into steam-third law of thermodynamics –Extensive and Intensive thermodynamic variables–distinction between them–Maxwell thermo dynamical relations–derivation and application -Clausius–Clapeyron equation and specific heat relation.

Text Books:

1. Brijlal and Subramanyam, Heat and Thermodynamics,S.Chand& Co,16th Edition, NewDelhi, 2005.
2. D.S.Mathur, Heat and Thermodynamics, S.Chand &Sons, 5th Edition, New Delhi, 2014.
3. R. Murugesan and Kiruthiga Sivaprasath, Thermal Physics, S.Chand& Co, II Edition, New Delhi, 2008

Books for Reference:

1. J.B.Rajan, Heat & Thermo dynamics, SC Publisher, New Delhi,1985.
2. H.C.Varma, Concepts of Physics–Volume I and II, Bharati Bhawan Publishers, New Delhi, 2015
3. M.Narayana Moorthy and N.Nagarathinam, Heat, National publishing Co, Chennai, Eight Edition, 1987.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Understand the basics of thermodynamics and their applications	K2
CO2	Learn the basics of low temperature and how to construct a successful experiment using low temperature.	K2
CO3	Learn experimental Methods To Determine The transmission of heat.	K2
CO4	Understand the kinetic theory of gas	K2
CO5	Analyze the laws of thermodynamics and maxwell's Thermo dynamical relations	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	3	2	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

SEMESTER-III

COURSE CODE	U21PHT31	OPTICS AND SPECTROSCOPY	L	T	P	C
CORE -V			5	-	-	4

Objective:

To understand the basics of Spectroscopy, interference, Michelson's Interferometer and phenomenon like interference, diffraction, polarization through wave nature of light and its applications and to gain knowledge in spectroscopy.

Unit I: Geometrical Optics

Lens–Spherical aberration in lenses–Methods of minimizing spherical aberration –condition for achromatism of two thin lenses (in and out of contact) –Aplanatic lens –Dispersion – Angular and Chromatic dispersion – combination of prisms to produce i) dispersion without deviation ii) deviation without dispersion–Direct vision spectroscope–Eyepieces–Ramsden's and Huygens's eyepieces–simple microscope (magnifying glass)–compound microscope.

Unit II: Interference

Conditions for interference – Theory of interference fringes – interference due to reflected light (thin films) -colors of thin films –wedge shaped thin film –theory – determination of diameter of a thin wire by Air wedge – test for optical flatness – Newton's rings by reflected light– Determination of wavelength of light - Michelson's Interferometer – theory and its Application (Measurement of wavelength) – Jamin's interferometers – determination of refractive index of gases.

Unit III: Diffraction

Fresnel's diffraction –Rectilinear propagation of light – zone plate –action of zone plate - diffraction at circular aperture – opaque circular disc – Fraunhofer diffraction at single slit– Double slit–Plane diffraction grating– theory of plane transmission grating- experiment to determine wavelength (Normal incidence method)–resolving power–Rayleigh's criterion for resolution–resolving power of a telescope – resolving power of a microscope – resolving power of a prism-resolving power of grating.

Unit IV: Polarization

Double refraction Nicol Prism Nicol Prism as polarizer and analyzer Huygens's explanation of double refraction in uniaxial crystals–Plane, elliptically and circularly polarized light– Quarter wave plates and Halfwave plates – Production and detection of plane, circularly and elliptically polarized light-Optical activity–Fresnel's explanation of optical activity–Specific rotator power–Lorentzhalf shade polarimeter.

Unit V: Spectroscopy

Infrared spectroscopy–sources and detector–uses–ultraviolet spectroscopy–sources–quartz spectrograph-applications-Raman Spectroscopy–Quantum theory of Raman effect–applications–Nuclear magnetic resonance – Nuclear quadrupole resonance–Electron spin resonance spectroscopies-(Qualitative study)

Text Books:

1. Subramanyam and Brijlal, A text book of Optics, S.Chand and co., 25th Edition, New Delhi 2004.

2. R.Murugeshan, Optics and Spectroscopy, S.Chand and Co.,6 th Edition, New Delhi, 2008.
3. S.L.Gupta,V.Kumar and R.C.Sharma, Elements of Spectroscopy, Pragati Prakashan, 13th Edition, Meerut,1997.
4. G.Aruldhass, Molecular Structure and Spectroscopy, PHI Pvt Ltd, II Edition, New Delhi, 2007.

Books for Reference:

1. Sathyaprakash, Ratan Prakashan Mandhir, Optics, VII Edition, NewDelhi, 1990.
2. C.N.Banewell, Introduction to Molecular Spectroscopy, TMH publishing co.IV Edition, New Delhi, 2006.
3. Ajoy Ghatak, Optics, (TMH), New Delhi, Fourth edition, 2009.
4. Singh & Agarwal, Optics and Atomic Physics, Pragati Prakashan Meerut, Nineth edition, 2002.
5. Halliday, R.Resnick and J.Walker, Fundamentals of Physics, Wiley, 6thEdition, NewYork, 2001.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Learn about various lens and its aberrations	K1
CO2	Acquire knowledge about interference and interferometers	K2
CO3	Understand about the diffraction phenomenon and resolving power in optical instruments	K3
CO4	Study about polarization	K2
CO5	Apply different spectroscopic technique to obtain information about the molecule	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3
CO3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	3	2	3	3	3	3	3	3

Correlating	Marks
Strongly correlating (S)	3
Moderately correlating (M)	2
Weekly correlating (W)	1
No correlation (N)	0

COURSE CODE	U21PHE311	CHOICE I	L	T	P	C
ELECTIVE-I		ENERGYPHYSICS	4	-	-	3

Objective:

To provide an understanding of the present energy crisis and various available energy sources.

UNIT I: Introduction to Energy Sources

World's reserve of Commercial energy sources and their availability -India's production and reserves - Conventional and non-conventional sources of energy, comparison–Coal- Oil and natural gas –applications –merits and demerits.

UNIT II: Solar Thermal Energy

Solar constant -Solar Spectrum- Solar radiations outside earth's atmosphere – at the earth surface- on tilted surfaces -Solar Radiation Geometry-Basic Principles of Liquid flat plate collector -Materials for flat plate collector -Construction and working- Solar distillation - Solar disinfection - Solar drying-Solar cooker (box type)- Solar water heating systems – Swimming pool heating.

UNIT III: Photo voltaic Systems

Introduction-Photovoltaic Principle - Basic Silicon Solar cell- Power output and conversion efficiency-Limitation to photo voltaic efficiency-Basic photo voltaic system for power generation – Advantages and disadvantages – Types of solar cells-Application of solar photovoltaic systems - PV Powered fan – PV powered area - lighting system - A Hybrid System.

UNIT IV: Biomass Energy

Introduction-Biomass classification- Biomass conversion technologies-Bio-gas generation-Factors affecting bio-digestion-Working of bio gas plant- floating and fixed dome type plant -advantages and disadvantage of -Bio-gas from plant wastes-Methods for obtaining energy from biomass- Thermal gasification of biomass-Working of down draft gasifier- Advantages and disadvantages of biological conversion of solar energy.

UNITV: Wind Energy and other Energy Sources

Wind Energy Conversion-Classification and description of wind machines, wind energy collectors- Energy storage - Energy from Oceans and Chemical energy resources-Ocean thermal energy conversion-tidal power, advantages and limitations of tidal power generation-Energy and power from waves- wave energy conversion devices- Fuel cells- and application of fuel cells- batteries advantages of battery for bulk energy storage- Hydrogen as alternative fuel for motor vehicles.

Text Books:

1. Kothari D.P., K.C. Singal and Rakesh Ranjan, Renewable energy sources and emerging Technologies, Prentice Hall of India, 2008.
2. S.P.Sukhame, Solar Energy, Principles of thermal collection and storage TATA, McGraw, Hill publishing company ltd. 1984

Books for References:

1. Chetan Singh Solanki, Solar Photovoltaics Fundamentals, Technologies and Applications,2nd Edition, PHI Learning Private Limited, 2011.
2. Rai G. D, Non-conventional Energysources, 4th Edition, Khanna Publishers, 2010.
3. Jeffrey M. Gordon, SolarEnergy: The State of the Art, Earth scan, 2013.
4. KalogirouS.A., Solar Energy Engineering: Processes and Systems, 2nd Edition, Academic Press, 2013.
5. Zobaa A.F. and Ramesh Bansal, Handbook of Renewable Energy Technology, World Scientific, 2011.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Know about conventional and non-conventional sources of energy	K1
CO2	Understand about solar energy and its appliances	K3
CO3	Know about Photovoltaic Systems and Point out the types of solar cells and its applications	K2
CO4	Understand about Biomass	K2
CO5	Examine the different wind energy sources	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	3	3	2	3	3	3
CO2	3	2	2	3	3	3	3	2	3	3	3
CO3	3	2	2	3	3	3	3	2	3	3	3
CO4	3	2	2	3	3	3	3	2	3	3	3
CO5	3	2	2	3	3	3	3	2	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHE312	CHOICE II	L	T	P	C
ELECTIVE-I		WAVES AND OSCILLATIONS	4	-	-	3

Objectives:

To impart knowledge about waves and oscillations and sound. To make them understand the principles and methods of finding the properties.

UNIT I: **Simple Harmonic Motion**

Characteristics of S.H.M., Differential equation of S.H.M.,K.E.,P.E.and Total Energy of a vibrating particle, Energy of Vibration, Oscillations with one degree of freedom, Linearity and super position principle, Simple pendulum, Compound pendulum, Bar pendulum, Composition of two SHM(s) of frequencyratio2:1,

UNIT II: Free, Forced and Resonant Vibrations

Free Vibrations, Undamped Vibrations, Damped Vibrations, Damped S.H.M. in an electrical circuit, Forced Vibrations, Resonance and Sharpness of Resonance, Phase of Resonance, Quality Factor, Examples of Forced and Resonant Vibrations.

UNIT III: Wave motion

Characteristics of wave motion, Transverse wave, motion ,Longitudinal wave motion, Differential equation of wave motion, Particle velocity, Wave velocity, Principle of superposition, Interference of Sound waves, Beats, Decibel, Doppler effect, Applications.

UNIT IV: Reflection of Sound

Reflection of a plane wave at plane surface, Experimental determination of reflection of sound, Echo, Refraction of plane wave front at plane surface, Diffraction of sound, Fresnel's Assumptions, Intensity of sound at a point due to plane wave front, Doppler effect, Applications.

UNIT V: Ultrasonics

Production of Ultrasonics by magnet ostriction and piezo electric methods, detection of Ultrasonic waves, Acoustic grating, Applications of Ultrasonic waves.

Text Book:

1. Brijlal & Subramanyam "Waves & Oscillations", S.Chand &Co., 1974,Unit1-V

Books for Reference:

1. M. Narayanamurti, N. Gosakan and T. Rajagopalan, Sound, The National Publishing Co, Madras, First Edition, 1978.
2. D. R. Khanna and R.S.Bedi, A Textbook of Sound with Theory of Oscillation and Waves, Atma Ram &Sons, Delhi, 1984

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Understand the concept of SHM	K2
CO2	Analyze the different types of vibration	K4
CO3	Acquire the knowledge of wave motion	K3
CO4	Know the properties of sound	K3
CO5	Apply the knowledge to ultrasonic waves	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	1	3	3	3	2	2
CO2	3	3	3	3	1	1	3	3	3	2	2
CO3	3	3	3	3	1	1	3	3	3	2	2
CO4	3	3	3	3	1	1	3	3	3	2	2
CO5	3	3	3	3	1	1	3	3	3	2	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weakly correlating(W)	1
No correlating (N)	0

SEMESTER- IV

COURSE CODE	U21PHT41	ELECTRICITY AND ELECTRO MAGNETISM	L	T	P	C
CORE - VI			4	-	-	4

Objectives:

- To provide comprehensive knowledge and understanding of the basics of Electricity and Magnetism.
- To expose the students to the applications of Electricity and Magnetism.

UNIT I : **Magnetic Effect of Electric current**

Magnetic flux and magnetic induction- Biot Savart law-magnetic induction at a point due to a straight conductor carrying current - magnetic induction at a point on the axis of a circular coil carrying current- amperes circuital law-magnetic field inside a long solenoid –toroid-Lorentz force on a moving charge-direction of force-torque on a current loop in a uniform magnetic field–Moving coil Ballistic galvanometer-theory-experiment to find charge sensitivity and absolute capacity of a capacitor-De-Sauty's bridge

UNIT II: Capacitance

Capacitance-Principle of capacitor-Expressions for the capacitance of i) spherical capacitor ii) Cylindrical capacitor and iii) parallel plate capacitor with and without partly filled dielectrics- Energy of a capacitor- Loss of energy when two charged conductors share the charges- Types of capacitors- fixed capacitor, variable capacitor, electrolytic capacitor and sliding capacitor.

UNIT III: Electromagnetic Induction

Faraday's laws of electromagnetic induction -self-induction –self-inductance of a longsolenoid –toroidal solenoid-determination of L by Anderson's and Rayleigh's methods-Owen's bridge – mutual induction – mutual inductance between two co-axial solenoids-experimental determination of mutual inductance –co-efficient of coupling- energy stored in a coil-eddy currents-uses.

UNIT IV: AC and DC Circuits

Growth and decay of current in LC,LR and CR circuits with DC voltages –determination of high resistance by leakage–growth and decay of charge in LCR circuit-conditions for the discharge to be oscillatory–frequency of oscillation.

Alternating Current-j operator method–use of operator in the study of AC circuits-Resistance in an AC circuit-Inductance in an AC circuit-Capacitance in an AC circuit-AC through an inductance and resistance in series-capacitance and resistance in series – LC R series resonance circuit-sharpness of resonance-parallel resonance circuit-power in an AC circuit-power factor.

UNIT V: Maxwell's Equation & Electro magnetic Waves

Introduction-Maxwell's equations—Displacement current-Poynting Vector-Electromagnetic waves in free space-Hertz experiment for production and detection of EM waves- Wave equations for Electric field and Magnetic field-monochromatic plane waves-EM waves in a

Matter - Reflection and Transmission at normal incidence and oblique incidence– Polarization by reflection.

Text Books:

1. R.Murugesan, Electricity and Magnetism, S Chand & Co, 2008.
2. Brij Lal& Subramanyam, Electricity and Magnetism, Ratan Prakashan Mandir Publishers, 2005.
3. M.Narayanamurthy & N.Nagarathnam, Electricity & Magnetism, NPC pub., Revised edition, 1992.

Books for Reference:

1. D.N.Vasudeva, Electricity and Magnetism, S.Chand & Co, 2011
2. K.K.Tewari, Electricity and Magnetism, S.Chand & Co,2002.
3. E.M.Pourcel, Electricity and Magnetism- Berkley Physics Course,Vol.2 McGrawHill Education; 2nd edition 2017.
4. D.C. Tayal, Electricity and Magnetism, Himalaya Publishing Co., Fourth Edition2019.
5. D. Halliday, R.Resnick and J.Walker, Fundamentals of Physics–Electricity andMagnetism(2011), Wiley India,PvtLtd
6. David Griffith, Introduction to Electrodynamics, Pearson Education India Learning Private Limited; 4th edition 2012.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Study about magnetic field produced in electric circuits	K1
CO2	Learn about capacitor and its type	K1
CO3	Acquire knowledge about electromagnetic induction	K2
CO4	Analyses and solves electrical circuits with dc and ac source	K4
CO5	Gain knowledge about Maxwell Equation	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHP42	PRACTICAL-II	L	T	P	C
CORE - VII			-	-	4	4

Objective:

It is aimed at exposing the under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical and optical properties of matter.

ANY FOURTEEN

1. Spectrometer–Grating Minimum Deviation
2. Spectrometer-Dispersive Power, Resolving of Prism Grating.
3. Spectrometer–Diffraction Grating-Normal Incidence
4. Newton's Ring.
5. Air wedge.
6. LCR –Resonance parallel and Series.
7. LCR.
8. Potentiometer–E.M.F.
9. Meter bridge.
10. De Morgan's theorem using Integrated Chips.
11. Verify Basic gates using IC's.
12. Characteristics of a Junction Diode.
13. Characteristics of a Zener Diode.
14. NAND as a universal gate.
15. NOR as a universal gate.
16. Basic gates using discrete Components.
17. RS, D, JK, flip flop.
18. Figure of merit-galvanometer

TEXT BOOKS:

1. C.COuseph, G.Rangarajan–A Text Book of Practical Physics-S.Viswanathan publisher – part I, 1990.
2. C.COuseph, G.Rangarajan, R.Balakrishnan– A Text Book of Practical Physics-S.Viswanathan publisher-partII 1996.
3. S.L.Gupta and V.Kumar–Practical Physics–Pragati Prakashan–25th, Edition, 2002.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Able to characterize diodes	K3
CO2	Determine dispersive and resolving power of prism	K4
CO3	Determine wave length of Sodium vapor light	K4
CO4	Analyze working of different flip flop	K3
CO5	Verify bridges and LCR connections	K4

K1-RememberK2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	**Marks**
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHE431	CHOICE -I	L	T	P	C
ELECTIVE-II		MEDICAL PHYSICS	3	-	-	3

Objective:

To understand the basics about the biological systems in our body, their behavior and the diagnostic devices.

Unit 1: Basic Anatomical Terminology

Standard anatomical position, Planes, Familiarity with terms like – Superior, Inferior, Anterior, Posterior, Medial, Lateral, Proximal, Distal. Forces on and in the Body – Physics of the Skeleton – Heat and Cold in Medicine- Energy work and Power of the Body.

Unit 2: Pressure system of the body

Physics of Cardiovascular system- Electricity within the Body – Applications of Electricity and Magnetism in Medicine. Sound in medicine-Physics of the Ear and Hearing- Light in medicine- Physics of eyes and vision.

Unit 3: Transducers

performance of characteristics of transducer- static and dynamic active transducers-(a) magnetic induction type (b) piezo electric type (c) photo voltaic type (d) thermo electric type. Passive transducer - (a) resistive type- effect and sensitivity of the bridge (b) capacitive transducer (c) linear variable differential transducer (LVDT).

Unit 4: X-rays

Production of X-rays- X-ray spectra- continues spectra and characteristic spectra-Coolidge tube-Electro Cardio Graph(ECG)- Block diagram-ECG Leads-Unipolar and bipolar-ECG recording set up.

Unit 5: Electro Encephalography (EEG)

Origin- Block diagram- Electromyography (EMG) – Block diagram- EMG recorder-Computer Tomography (CT) principle Block diagramof CT scanner.

Text Books:

1. John R.Cameron and James G.Skofronick, Medical Physics, John Willy& Sons,1978,
2. DrM. Arumugam, Biomedical instrumentation, EDII,AnuradhaAgencies1997.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Understands Basic Anatomical Terminology	K2
CO2	Applies medical physics to know the different aspects of the body	K3
CO3	Analyze the performance of transducer	K4
CO4	Learn about Electro Cardio Graph(ECG)and its application	K3
CO5	Study about EEG and EMG and its application	K3

K1-Remember K2- Understand K3-Apply K4- Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3
CO3	3	2	2	3	3	3	3	3	3	3	3
CO4	3	2	2	3	3	3	3	3	3	3	3
CO5	3	2	2	3	3	3	3	3	3	3	3

Correlating	**Marks**
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHE432	CHOICE -II	L	T	P	C
ELECTIVE-II		MATERIALS SCIENCE	3	-	-	3

Objective: The objective of this course is to predict and control material properties through an understanding of atomic, molecular, crystalline, and microscopic structures of materials

UNIT–I: Materials Science

Classification of materials – Properties of Engineering materials – Materials Structure – Types of Bonds – Bonds Formation–Ionic Bond –Covalent Bond – Metallic Bond – Comparison of Bonds – Secondary Bonds.

UNIT – II: Phase diagram and transformation

Basic terms – Solid Solution – Hume –Rothery's rule – Intermediate Phase – Phase Diagrams – Gibb's Phase Rule – Time –Temperature cooling curves –Construction of Phase Diagrams–The Lever Rule – Equilibrium Binary System – Eutectic System – Mechanism of Phase Transformation.

UNIT – III: Vacuum and oxidation

History of vacuum technology – units of Vacuum –Kinetic aspects of Gases–Application of Vacuum– Gas flow in vacuum systems – production of vacuum – Measurement of vacuum – Thermal conductivity gauges – Penning Gauge– Oxidation – Oxidation Resistant Materials.

UNIT–IV: Non-destructive testing

(NDT) NDT and its advantages–Defects in materials – Selection of the NDT Method – Liquid Penetration Testing – Physical Principle –Magnetic Particle Testing (MPT) – Principle of MPT – Sensitivity – Limitation – Eddy Current Testing (ECT)–Principle– Instrument for ECT–Applications –Limitations.

UNIT – V: Electrical and magnetic properties of materials

Dielectrics – Polarization –Temperature and frequency effects–Electric Break down–Ferro electric materials– Electrostriction– Piezo electricity–Uses of Dielectrics–Magnetic Properties–Classification– Magnetostriction – Soft and Hard Magnetic Materials.

Text Books:

1. G.K.Narula, K.S.Narula, V.K.Gupta, Materials Science, Tata McGraw Hill Publishing, 1994.
2. V.Raghavan, Materials Science and Engineering Prentice Hall of India, 2004.

Books for reference:

1. Baldevraj,T. Jayakumar, M. Thanvasimuthu, Practical Non-Destructive Testing, Narosa Publishing House, Chennai, 2002.
2. A.V.K. Suryanarayana, Testing of Metallic Materials, B.S. Publications, Giriraj lane, Sultan Bazar, Hyderabad– 95, 2003.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Classify the materials based on their bonding	K2
CO2	Learn phase diagram to understand material phase transformation	K2
CO3	Understand the conducting, semiconducting, superconducting, dielectric, ferro-electric and piezo electric behavior of material	K2
CO4	Gain knowledge on vacuum technology for application in material synthesis	K3
CO5	Characterize materials using nondestructive testing	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weakly correlating(W)	1
No correlating (N)	0

SEMESTER-V

COURSE CODE	U21PHT51	ATOMIC AND NUCLEAR PHYSICS	L	T	P	C
CORE - VIII			5	-	-	4

Objective:

- To provide an introductory account about the atomic structure
- To acquire knowledge on static properties of nuclei and its stability.
- To know about different modes of decay and interaction of nuclear radiations with matter

UNIT I: Positive Rays:

Discovery-properties- analysis – Thomson's parabola method – Aston's mass spectrograph –Bainbridge's mass spectrograph – Dempster's mass spectrograph – Dunning ton's method of determining e/m.

UNIT II: Atomic Structure

Early atomic spectra-Thomson model-Alpha particle scattering-Rutherford 's nuclear model-drawbacks-Bohr atom model –Bohr's interpretation of the Hydrogen spectrum-correction for nuclear motion-evidences in favor of Bohr's theory- Ritz combination principle -correspondence principle-Sommer field's relativistic atom model-drawbacks- the vector atom model – Quantum numbers associated with the vector atom model — the Pauli's exclusion principle–periodic classification of elements

UNIT III: Fine Structure of Spectral Lines

Coupling schemes-L-S Coupling-j-j Coupling- Hund rules- magnetic dipole moment due to orbital motion of the electron- due to spin of the electron -Stern and Gerlach experiment-spin-orbit coupling-optical spectra-spectral terms-spectral notation- selection rules- intensity rules- interval rule- fine structure of sodium D line- hyperfine structure- Normal Zeeman effect- theory and experiment-quantum mechanical explanation- Larmor's theorem-Anomalous Zeeman effect- Paschen –Bach effect-Stark effect.

UNITIV: Properties and Structure of Nuclei

General properties of nucleus- binding energy–BE/A curve - significance-proton electron theory-proton neutron theory-Nuclear forces–characteristics–Meson theory of nuclear forces– Yukava Potential- Nuclear models –Liquid drop model-Shell model.

UNIT V: Radio Activity & Nuclear Reactions

Fundamental laws of radio activity –theory of α ,β and ϒ decay- properties of alpha, beta and gamma rays - Kinematics of nuclear reaction-Nuclear fission–Nuclear fusion–Nuclear reactor-uses - atom bomb - hydrogen bomb-fusion reactor –plasma confinement –artificial transmutation-Q value of nuclear reaction-types of nuclear reaction

Text Books:

1. Modern Physics, R.Murugeshan, Kiruthiga Sivaprasath, S.Chand & Co., New Delhi(2008).

2. Modern Physics, D.L.Sehgal, K.L.Chopraand N.K.Sehgal.Sultan Chand & Sons Publication, 7th Edition, New Delhi (1991).
3. Atomic Physics, J.B. Rajam,S. Chand & Co., 20th Edition,New Delhi (2004).
4. Atomic and Nuclear Physics, N.Subrahmanyam and BrijLal, S.Chand & Co.5th Edition, New Delhi (2000).
5. Nuclear Physics, Tayal D.C., Himalaya Publishing House, Mumbai (2006).
6. Nuclear Physics, R.C.Sharma, K.Nath & Co.,Meerut (2000)
7. Nuclear Physics, Irving Kaplan, Narosa Publishing house, New Delhi.

Books for Reference:

1. Modern Physics, J.H.Hamilton and Yang, McGraw-Hill Publication (1996).
2. Concepts of Modern Physics, A. Beiser,Tata McGraw-Hill, New Delhi (1997).
3. Fundamentals of Physics, D.Halliday, R.Resnick and J. Walker, Wiley, 6th Edition, New York (2001).
4. Modern Physics, Kenneth S.Krane, John Willey & sons, Canada (1998).
5. Nuclear Physics, R.R.Roy and B.P.Nigam, New Age International (P) Ltd., New Delhi(1997).

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Acquire knowledge on the fundamental principles governing the structure of the atom	K1
CO2	Gain knowledge in atomic physics to follow courses at the Advanced level.	K2
CO3	Obtain knowledge about fine structure of spectral lines	K2
CO4	Understanding on the basics of nuclear physics that treats atomic nuclei as self-bound many-body quantum systems	K2
CO5	Learn about nuclear reaction and radio activity	K1

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHT52	CLASSICAL AND STATISTICAL MECHANICS	L	T	P	C
CORE - IX			5	-	-	4

Objective:

- To understand the mechanics of systems of particles and their equations of motion
- To study the concept of statistics of molecules.

UNITI: Mechanics of a System of Particles

External and internal forces, centre of mass-Conservation of linear momentum-Conservation of angular momentum-Conservation of energy-work-energy theorem-Conservative forces-examples-Constraints-Types of constraints - Examples-Degree of freedom – Generalized coordinates (transformation equations) – Generalized velocities-Generalized Momentum.

UNIT II: Lagrangian Formulations

Principle of virtual work, D'Alembert's principle, Lagrange's equation of motion for conservative and non-conservative systems - Simple applications-simple pendulum-Atwood's machine-compound pendulum- Hamilton's Principle-Deduction of Lagrange's equation of motion from Hamilton's Principle-Deduction of Hamilton's principle from D'Alembert's principle.

UNIT III: Hamiltonian Formulations

Phase space-The Hamiltonian function H -Hamilton's Canonical equation of motion-Physical significance of H-Deduction of Canonical equation from a variational principle-Applications-Harmonic Oscillator- Planetary Motion- Compound pendulum

UNIT IV: Classical Statistics

Micro and macrostates - Themu-space and gamma space –fundamental postulates of statistical mechanics – Ensembles – different types – Thermo dynamical probability – entropy and probability - Boltzmann's theorem – Maxwell – Boltzmann statistics – Maxwell – Boltzmann energy distributive law – Maxwell - Boltzmann velocity distributive law.

UNIT V: Quantum Statistics

Development of Quantum statistics- Bose - Einstein and Fermi –Dirac statistics – Derivation of Planck's radiation formula from Bose – Einstein statistics - Free electrons in metal- Fermi gas – Difference between classical and quantum statistics.

Text books:

1. J.C.Upadhyaya, Classical Mechanics, Published by Himalya Publishing House, Mumbai (2005).
2. Brijlal & Subramaniam, Heat & Thermodynamics, S.Chand & Company Ltd (1998).
3. Agarwal, 'Statistical Physics' S.Chand & Co New Delhi (1996).

BooksforReference:

1. Gupta B.D., Satyaprakash, Classical Mechanics, 9th ed., Kadernath Ramnath Publ., Meerut (1991)
2. Gupta, Kumar, Sharma, Classical Mechanics, Pragati Prakashan Publ., Meerut (2005).

3. Murray R.Spiegal, Theoretical Mechanics, Schaum's outline series, Mc Graw Hill Publ. Co., New Delhi (1981).

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Knowledge about mechanics of the particles	K1
CO2	Differentiate Lagrangian equation of systems for conservative and non-conservative systems	K3
CO3	Apply Hamiltonian function for various application	K3
CO4	Understand about classical and quantum statistics	K1
CO5	Acquire knowledge to apply the principles of statistical mechanics to selected problems.	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	1	1	3	3	2	2	2
CO2	3	3	3	3	1	1	3	3	2	2	2
CO3	3	3	3	3	1	1	3	3	2	2	2
CO4	3	3	3	3	1	1	3	3	2	2	2
CO5	3	3	3	3	1	1	3	3	2	2	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHT53	BASICS OF DATA COMMUNICATION AND PROGRAMMING IN C	L	T	P	C
CORE - X			5	-	-	4

Objective:

To introduce to data communication and Programming in C

Unit I: Data Communication

Introduction to Data Communication - Network, protocols and standards standard organizations – line configuration -topology-transmission mode–classification of network.

Unit II: Multiplexing

Parallel and serial transmission – Interface standards – modems – guided media-types of error -multiplexing - Types of multiplexing-multiplexing application - Telephone system– Ethernet.

Unit III: Network

Analog and digital network: Access to ISDN - broadbandISDN-X.25Layers-Atm-Repeaters–Bridges–Routers–Gateway-TCP/IPNetwork-World Wide Web.

Unit IV: Introduction to Programming in C

Basic structure of C Program – character set – identifiers and key words –constants and variables - data types – operators and expressions – Relational, Logical and Assignment operators – increment and decrement operators – Arithmetic expressions –Mathematical functions.

Unit V: Input and Output functions

Data input and output – getchar, putchar, scan f, print f, gets, puts functions –Decision making – branching and looping – if, if-else, else if ladder, switch, break, continue, go to– while, dowhile–for, nested loops–Arrays (one dimensional and two dimensional) – declaration–initialization–simple programs.

Text book:

1. Balagurusamy. E, Programming in ANSIC, Second Edition, Tata McGraw Hill, 2008.
2. Brijendra Singh, Data Communications and Computer Networks, 4th Edition, 2014

Books for References:

1. Kamthane Ashok. N, “Programming in C”,2nd Edition, Pearson Education.2013.
2. Yashvant P.Kanetkar, “LetusC”, 8thEdition, Infinity Science Press-2008.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Gains knowledge about network and transmission mode	K1
CO2	Understand about series and parallel transmission	K2
CO3	Differentiate analog and digital network	K4
CO4	Study about basic structure of C Programming	K2
CO5	Understand about statement and commands used in C programming	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	3	2	3	2	3	3	3
CO2	3	3	2	2	3	2	3	2	3	3	3
CO3	3	3	2	2	3	2	3	2	3	3	3
CO4	3	3	2	2	3	2	3	2	3	3	3
CO5	3	3	2	2	3	2	3	2	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHT54	BASIC ELECTRONICS AND COMMUNICATION	L	T	P	C
CORE - XI			5	-	-	4

Objectives:

1. To enable the students to understand the aspects of analog electronics in a lucid and comprehensive manner.
2. To understand the fundamental concepts of logic gates, counters , registers, fibre Optics etc.
3. To develop skill to build and trouble shoot combinational digital circuits.

Unit I: Linear circuit analysis and semi conductor diodes

Constant voltage source – constant current source – The venin's theorem-procedure for finding The venin Equivalent circuit - PN junction theory - V-I characteristics of a PN junction diode – Half-wave rectifier - Bridge rectifier - Efficiency - filters - Shunt capacitor filter–pi filter- Zener diode-equivalent circuit-voltage regulator-LED-V-I characteristics–advantages - applications -photodiode- characteristics-applications.

Unit III: Transistor Amplifier

Transistor - Different modes of operations-CB mode &CE mode – Two port representation of a transistor-h parameter-AC equivalent circuit using h parameters- analysis of amplifiers using h parameters (CE only) - RC coupled amplifier - transformer coupled amplifier-power amplifier.

Unit III: Digital Fundamentals

Number Systems and Conversions – Binary, Decimal, Octal, Hexa-BCD Code-Gray code - 1's and 2's complements, 9's complements, 10's complements – Basic logic gates - NAND, NOR and EX- OR gates -NAND and NOR as Universal Building blocks-Laws and theorems of Boolean algebra–NAND-NAND circuits- Karnaugh's map-SOP and POS-applications

Unit IV: Sequential Logic

RS flip flop, Clocked RS flip flop, D flip flop, J-K flip flop and J-K Master-Slave Flip-flop - Shift registers and Counters-Multiplexers and Demultiplexers – Decoders and Encoders-Memory Circuits-D/A and A/Dconverters-IC555 monostable and a stable multi-vibrators.

Unit V: Modulation and Demodulation

Amplitude modulation-Frequency modulation, Phase Modulation and Pulse Width Modulation - Detectors of AM, FM, PM and PWM, PLL-Noise in Communication Systems - ASK, FSK, PSK Modulation and Demodulation, Advantages and disadvantages of digital communication

Text Books:

1. Gupta and Kumar, Hand Book of Electronics – Pragati Prakashan–Meerut, 2002.
2. V.K. Mehta, Principles of Electronics, Rohit Mehta S.Chand & Co., 2006.
3. M. Arul Thalapathi, Electronics, Comptek Publishers (2005).
4. M.K. Bagde and Singh S.P., Elements of Electronics, S.Chand & Co.,New Delhi,1990.

5. A. Subramanyam – Applied Electronics, National Publishing Co. 1997.
6. Ramakant A.Gayakwad, OP-AMPs and Linear Integrated Circuits, Prentice Hall of India,1994.
7. Malvino Leach, Digital Principles and Application, Tata McGraw Hill, 4TH Edition 1992.
8. Thomas L. Floyd, Digital Fundamentals, Universal Book Stall, New Delhi (1998).
9. V.Vijayendran, S.Viswanathan, Introduction to Integrated Electronics (Printers and Publishers) Pvt.Ltd., Chennai, 2005.

Books for Reference:

1. Mittal.G.K., Electronic Devices by G.K.Publishers Pvt.Ltd.,1993.
2. B.L.Theraja, Basic Electronics S.Chand & Co., 2008.
3. Ambrose and Vincent Devaraj, Solid State Electronics, Meera Publication.
4. R.S.Sedha, Applied Electronics, S.Chand & Co.1990.
5. Thomas L. Floyd, Digital Electronics Practice Using Integrated Circuits- R.P.Jain– Tata McGraw Hill, 1996.
6. D.Roy Choudhury and Shail Jain, Linear Integrated Circuits –New AgeInternational(P)Ltd. 2003.
7. I.J.Nagrath - Electronics-Analog and Digital, Prentice-Hall of India, NewDelhi1999.
8. J.Millman and C.Halkias, Integrated Electronics, Tata McGraw Hill, New Delhi 2001.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Acquire knowledge on transistor and its applications	K2
CO2	Study about linear circuit theorems and diode	K1
CO3	Study about different number systems and basics of logic gates	K1
CO4	Understand the operation of sequential logic circuits	K2
CO5	Design communication system with different modulation	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHP53	PRACTICAL-III	L	T	P	C
CORE - XII			-	-	5	4

Objective:

It is aimed at exposing the under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical, electrical and optical properties of matter.

ANYFOURTEEN

1. Spectrometer-i-d curve–i-I' curve.
2. Galvanometer Comparison of capacitances
3. L- Owen's bridge.
4. L-Anderson's Bridge.
5. L.Maxwell's Bridge.
6. L.Rayleigh's Bridge.
7. Spectrometer–Cauchy's Constant.
8. Field along the axis of the Coil.
9. Small angle Prism.
10. Cary Foster's bridge.
11. Mutual Inductance.
12. Absolute Capacity of condenser.
13. Hallow prism.
14. Ballistic Galvanometer
15. Solar Spectrum-Light wavelength.
16. Spot Galvanometer– Comparisons of Voltmeter
17. Spot Galvanometer –Charge sensitivity
18. Potentiometer Comparisons of EMF.

Text Books:

1. C.C.Ouseph, G.Rangarajan–A Text Book of Practical Physics-S.Viswanathan publisher - partI, 1990.
2. C.C.Ouseph, G.Rangarajan, R.Balakrishnan – A Text Book of Practical Physics-S.Viswanathan publisher - partII. 1996..
3. S.L.Gupta andV.Kumar–Practical Physics–Pragati Prakashan–25th, Edition 2002.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Able to fabricate bridges and measure inductance	K3
CO2	Compare EMF value using potentiometer	K4
CO3	Determine wave lengths of visible light	K4
CO4	Compare voltmeter and charge sensitivity using spot galvanometer	K3
CO5	Determine Cauchy's constant	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHE531	CHOICE -I	L	T	P	C
ELECTIVE-III		NUMERICALMETHODS	3	-	-	3

Objectives:

To understand various approximation methods to find solution to problems which don't have exact solutions.

UNITI: Errors and Root of Equations

What is Numerical analysis-numbers and their accuracy – errors-measurement of errors-round off error-truncation error-absolute error-relative error-percentage error-inherent error-accumulated error-general error formulae-convergence Roots of equations-Iteration method-Maclaurin's series method-Newton-Raphson method-Von- Moises Formula-Bisection method.

UNIT II: Matrix and Linear Equations

Introduction- pivotal condensation method- system of linear equations- Gauss Elimination Method-Gauss Seidel Iteration Method-Gauss Jordan elimination method-Matrix Inversion method.

UNITIII: Interpolation and Approximation

Linear Interpolation–Quadratic Interpolation - Lagrange's Interpolation–Richardson's Extrapolation–Aitken's iterated Interpolation

UNIT IV: Numerical Differentiation and Integration

Numerical differentiation – approximation of derivatives using interpolation polynomials-Taylor series method. Numerical Integration-trapezoidal rule-Simpson's 1/3 and 3/8 rules

UNIT V: Differential Equations

Introduction-Euler's method (Adams Bashforth first order method)-backward Euler method-Taylor's series method-Runge-Kutta method-predict or corrector methods

Learning Outcomes:

☐ On completion of the course the students will have the ability to solve equation using an appropriate numerical method.

Books for Reference:

1. S.S.Sastry, Introductory methods of numerical analysis –Prentice Hall of India, New Delhi, 2000.
2. A.Singaravelu, Numerical methods – Meenakshi Agency, Chennai, 2001.
3. M.K.Venkataraman, Numerical Method in Science and Engineering –PHI New Delhi 1997.
4. R.Murugesan, Mechanics and Mathematical Methods, S.Chand & Co, New Delhi 1999.
5. P.Kandasamy, K.Thilagavathy and K. Gunavathy, Numerical Methods, S.Chand & Co. (2002).

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Understand basics of Errors and Root of Equations	K2
CO2	Solve problem using Matrix and Linear Equations	K3
CO3	Interprets Numerical Differentiation and Integration	K3
CO4	Able to apply Differential Equations for different problems	K4
CO5	Enhance problem solving skill using Interpolation and Approximation	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	2	3	3	2	2	1
CO2	3	3	3	3	2	2	3	3	2	2	1
CO3	3	3	3	3	2	2	3	3	2	2	1
CO4	3	3	3	3	2	2	3	3	2	2	1
CO5	3	3	3	3	2	2	3	3	2	2	1

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHE532	CHOICE -II	L	T	P	C
ELECTIVE-III		BASIC INSTRUMENTATION	3	-	-	3

Objective

To make students skilled in using basic laboratory instruments to carry out their practical and project in efficient manner.

UNIT-I Basic of Measurement

Instrument's accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects.

UNIT II Multi meter

Principles of measurement of dc voltage and dc current, ac volt- age, ac current and resistance. Specifications of a multimeter and their significance. Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagramonly). Specifications of an electronic Voltmeter / multimeter and their significance. AC millivoltmeter:Type ofAC millivoltmeters: Amplifier-rectifier,andrectifieramplifier.

UNIT-III Cathode Ray Oscilloscope

Block diagram of basic CRO. Construction of CRT,Electron gun, electrostatic focusing and acceleration (Explanation only no mathematicaltreatment), Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance. Use of CRO for the measurement of voltage (dc and ac frequency, time period. Digital storage Oscilloscope: Block diagram and principle of working.

UNIT-IV Signal Generators and Analysis Instruments

Block diagram, explanation and specifications of low frequency signal generators, pulse generator, and function generator, Brief idea for testing, specifications, Distortion factor meter, wave analysis.

UNIT-V Digital Instruments

Principle and working of digital meters, Comparison of analog and digital instruments, Characteristics of a digital meter, Working principles of digital voltmeter. Digital Multimeter: Block diagram and working of a digital multimeter, working principle of time interval, frequency and period measurement using universal counter / frequency counter, time-base stability, accuracy and resolution.

Text Books:

1. B.L.Theraja,ATextBooksbookofElectricalTechnology-(S.ChandPublishing),Volume 1, 1959.
2. Venugopal, Digital circuits and Systems, Tata McGraw Hill Education Private Limited,2011.

Reference Books:

1. Subrata Ghoshal, Digital Electronics- Blue King fisher publishing, 24July2012
2. S. Salivahanan and N. S.Kumar, Electronic Devices and Circuits - (Tata Mc-Graw Hill),2011.
3. Thomas L.Floyd, Electronic Devices-(Pearson Education),2013.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Understand CRO as a versatile measuring device	K2
CO2	Learn to trace circuits of electronic equipment's	K2
CO3	Use Digital multimeter / VTVM to measure voltages	K3
CO4	Apply knowledge to troubleshoot the circuit	K3
CO5	Skilled in winding a coil /transformer	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	2	3	3	3	3	3	3	3
CO2	3	3	2	2	3	3	3	3	3	3	3
CO3	3	3	2	2	3	3	3	3	3	3	3
CO4	3	3	2	2	3	3	3	3	3	3	3
CO5	3	3	2	2	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weakly correlating(W)	1
No correlating (N)	0

COURSE CODE	U21PHS531	CHOICE -I	L	T	P	C
SKILLBASED ELECTIVE-III		MICRO PROCESSOR FUNDAMENTALS	2	-	-	2

Objective:

This course deals with the basic concepts of microprocessor, programming instructions and interfacing concepts.

Unit 1: Architecture

Architecture of 8085–registers, flags, ALU, address and databus, demultiplexing address/data bus – control and status signals – control bus, Programmer's model of 8085 – Pinout diagram– Functions of different pins.

Unit 2: Programming Techniques

Instruction set of 8085 – data transfer, arithmetic, logic, branching and machine control group of instructions – addressing modes – register indirect, direct, immediate and implied addressing modes. Assembly language & machine language – programming techniques: addition, subtraction, multiplication, division, ascending, descending order, largest and smallest (single byte)

UNIT 3: Interfacingmemoryto8085

Memory interfacing – Interfacing 2kx8 ROM and RAM, Timing diagram of 8085 (MOVRd,Rs – MVIRd, data.

Unit4: Interfacing I/O Ports to 8085

Interfacing input port and output port to 8085– Programmable peripheral interface 8255– flashing LEDs.

Unit5: Interrupts

Interrupts in 8085- hardware and software interrupts–RIM, SIM instructions–priorities– simple polled and interrupt-controlled data transfer.

Text Books:

1. R.S.Gaonkar, Microprocessor Architecture programming and application with 8085 / 8080A., Wiley Eastern Ltd. 1992.
2. V.Vijayendran, Fundamental of Microprocessor 8085, S.Viswanathan Publishers, Chennai, 2003.
3. B.Ram, Fundamentals of Microprocessors and Microcomputers - Dhanpat Raipublication2012.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Know the basic ideas on microprocessor ,memory and I/O devices	K2
CO2	Familiar with the basic concepts of microprocessor architecture and interfacing	K2
CO3	Acquire skills in the programming instruction sets of microprocessors	K4
CO4	Acquire skills in interrupts	K2
CO5	Apply the programming instructions to perform simple programs using microprocessor	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	2	1	3	3	3	3	3
CO2	3	3	2	3	2	1	3	3	3	3	3
CO3	3	3	2	3	2	1	3	3	3	3	3
CO4	3	3	2	3	2	1	3	3	3	3	3
CO5	3	3	2	3	2	1	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHS532	CHOICE -II	L	T	P	C
SKILLBASED ELECTIVE-III		TELEVISION TRANSMISSION & RECEIVER	2	-	-	2

Objective

The course deals with theoretical and practical knowledge on TV functioning and its servicing skill are incorporated.

UNIT–I: Elements of a Television System:

Picture transmission – sound transmission – picture reception – sound reception – picture synchronization–Basic monochrome transmitter and receiver–gross structure, image continuity, number of scanning lines, flicker, fine structure, total gradation – composite video signal – horizontall synchronization details–vertical synchronization details–function of vertical pulse train.

UNIT– II: Signal Transmission:

AM: Channel band – vestigial side band transmission – transmission efficiency – complete channel band width – reception of vestigial side band signals - demerits of vestigial side band transmission– FM:FMChannelbandwidth–channelbandwidthforcolourtransmission– Televisionsignalstands–monochrome picture tube–beam deflection screen phosphor faceplate-picture tube characteristics – picture tube circuit controls.

UNIT–III: Camera:

Camera principle–photo electric effect–image storage principle–electron scanning beam – video signal electron multiplier – image orthicon – vidicon – plumbicon – CCD. TV receiver Block diagram-antenna-RF section – IF section – vestigial side band correction – choice of IF – sound separation – sound section – sync processing – vertical deflection – EHT supply.

UNIT – IV: Colour Television:

Compatibility – natural light – colour perception – three colour theory – luminance, Hue and saturation–colour TV camera–luminance signal–production of colour difference voltage – compatibility considerations – Delta gun picture tube – purity and convergence PIL colour picture tube pin cushion correction- Auto Degaussing circuit– greyscale tracking.

UNIT –V: Television applications:

Cable television MATV & CATV – closed circuit (CCTV) theatre television – Video tape recording play back–Television via satellite. Fault finding: Trouble shooting in monochrome receivers.

TEXTBOOK:

1. R.R.Gulati, Monochrome and Colour Television, WileyEastern22nd Reprint (1983).

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Learn about components present in TV system	K1
CO2	Differentiate AM and FM Channel band	K3
CO3	Gain knowledge about different types of Camera	K2
CO4	Acquire knowledge about colour television	K3
CO5	Analyze the transmission of TV using different media	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	2	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3	3
CO3	3	3	2	3	3	3	3	3	3	3	3
CO4	3	3	2	3	3	3	3	3	3	3	3
CO5	3	3	2	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

SEMESTER-VI

COURSE CODE	U21PHT61	RELATIVITY AND QUANTUM MECHANICS	L	T	P	C
CORE - XIII			5	-	-	4

Objectives:

The aim of this course is to acquire sufficient knowledge in the concept of Relativity, dual nature of matter waves, Evolution of Quantum mechanics, Schrodinger equation and its applications and Operator formalism

Unit I: Relativity

Frames of reference-Galilean transformation-Michelson-Morley experiment-Postulates of special theory of relativity - Lorentz transformation –length Contraction – time dilation - Relativity of simultaneity - addition of velocities -variation of mass with velocity– Mass energy relation –Elementary ideas of general relativity.

Unit II: Wave Nature of Matter

Phase and group velocity - wave packet - expression of De Brogile's wave length-Davisson and Germer's experiment - G.P.Thomson's experiment - Heisenberg's uncertainty principle and its consequences.

Unit III: Schrodinger Equation

Inadequacy of classical mechanics - Basic postulates of quantum mechanics –Schrodinger equation - Properties of wave function - Probability interpretation of wave function – linea operators - self adjoint operators- expectation value –eigen values and eigen functions – commutativity and compatibility.

Unit IV: Angular Momentum in Quantum Mechanics

Orbital angular momentum operators and their commutation relations -separation of three dimensional Schrodinger equation into radial and angular parts - Elementary ideas of spin angular momentum of an electron –Paulimatrices.

Unit V: Solutions of Schrodinger Equation

Free particle solution - Particle in a box - Potential well of finite depth (one dimension) – linear harmonic oscillator – rigid rotator and hydrogen atom.

Text Books:

1. A Text book of Quantum mechanics by P.M.Mathews and S.Venkatesan, Tata McGraw-Hill, New Delhi(2005).
2. Quantum Mechanics by V.K.Thankappan, New Age International (P) Ltd.Publishers, New Delhi (2003).
3. Quantum mechanics by K.K.Chopra and G.C.Agrawal, Krishna Prakasam Media (P)Ltd., Meerut First Edition (1998).
4. Modern Physics by R.Murugeshan and Kiruthiga Sivaprasath, S.Chand & Co.,(2008).

Books for Reference:

1. Mechanics and Relativity by Brijlal Subramanyam, S.Chand & Co.,New Delhi,(1990).

2. Concepts of modern physics by A.Beiser. Tata McGraw - Hill,5th edition,NewDelhi(1997).
3. Introductiontoquantum mechanicsbyPauling andWilson, McGraw–Hill(1935).
4. QuantummechanicsbyA.GhatakandLoganathan,MacmillanIndiaPvt.Ltd(2012).

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Gain knowledge in the concepts of special and theory of relativity	K1
CO2	Evolve ideas about dual nature of matter	K2
CO3	Understand about Schrodinger equation	K2
CO4	Learn about different operator mechanism	K2
CO5	Apply of Schrödinger's equation to micro system	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	2	3	3	3	3	2
CO2	3	3	3	3	2	2	3	3	3	3	2
CO3	3	3	3	3	2	2	3	3	3	3	2
CO4	3	3	3	3	2	2	3	3	3	3	2
CO5	3	3	3	3	2	2	3	3	3	3	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHT62	SOLID STATE PHYSICS	L	T	P	C
CORE - XIV			5	-	-	4

Objective:

- To understand the different types of bonding in solids
- To understand the magnetic and dielectric properties of crystalline structures.
- To acquire knowledge on the basics of magnetic phenomena on materials and various types of magnetizations.
- To know the properties of super conducting materials.

UNIT I: Crystal Structure

Crystal Lattice-Primitive and unit cell-seven classes of crystal-Bravais Lattice-Miller Indices - Structure of crystals -Simple cubic, Face centered cubic, Body centered cubic and Hexagonal close packed structure -Sodium Chloride, Zinc Blende and Diamond Structures.

UNIT II: Crystal Diffraction and Defects

Crystal Diffraction – Bragg's Law-Experimental methods-Laue method, powder method and rotating crystal method-Reciprocal lattice- Point defects - Frenkel and Schottky defects - Equilibrium concentrations - Line defects – Edge dislocation and screw dislocation - Surface defects - Grain boundary - Effects of Crystal imperfections

UNIT III : Bonding in Solids

Types of bonds in crystals-Ionic, covalent, Metallic, Vanderwaal's and Hydrogen Bonding - Bond energy of sodium chloride molecule –variation of inter atomic force with inter atomic spacing -cohesive energy - cohesive energy of ionic solids-application to sodium chloride crystal.

UNITIV: Magnetic Properties

Spontaneous Magnetization–WeissTheory–Temperature dependence of Magnetization-classical Theory of Diamagnetism–Weiss theory of Paramagnetism–Ferro magnetic domains–Blochwall–Basic ideas of anti-ferro magnetism–Ferrimagnetism.

UNIT V: Dielectric Properties

Dielectrics, polarization, polar and non-polar dielectrics–dielectric constant, Polarizability Clausius Mossottirelation–Different types of Polarization – electronic, ionic, orientational, space charge –Dependence of polarization on frequency and temperature; Dielectric loss sources; Dielectric strength and break-down–contributing

Text Books:

1. M.Arumugam, Materials Science, Anuradha Agencies,Publishers.,2002.
2. RLSinghal, Solid State Physics, Kedarnath Ram Nath & Co.,Meerut 2003.
3. Kittel, Introductionto Solid State Physics, Willey Eastern Ltd.2003.
4. V.Raghavan, Materials Science and Engineering, Prentice Hall of India Private Limited, New Delhi, 2004.

Books for Reference:

1. S.O.Pillai, Solid State Physics, New Age International (P) Ltd.,2002.
2. A.J.Dekker, Solid State Physics, Macmillan India,1985.
3. HCGupta, Solid State Physics, Vikas Publishing House Pvt. Ltd., NewDelhi,2001.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Understand about different crystal structure	K1
CO2	Analyze structure of different crystalline material and defects	K4
CO3	Able to know about the inter atomic forces and bonds between solids	K2
CO4	Analyze the various kinds of magnetic materials	K4
CO5	Understand the dielectric properties of crystalline structures.	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	2	3	3	3	3	3
CO2	3	3	3	3	2	2	3	3	3	3	3
CO3	3	3	3	3	2	2	3	3	3	3	3
CO4	3	3	3	3	2	2	3	3	3	3	3
CO5	3	3	3	3	2	2	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHT63	MATHEMATICAL PHYSICS	L	T	P	C
CORE - XV			5	-	-	4

Objective:

To understand the various mathematical methods used in Physics.

UNIT1: Vectors

Vectors and scalars-Vector algebra-The scalar product-The vector (cross or outer) product-The triple scalar product-The triple vector product-The linear vector space Vn- Vector differentiation -Space curves - Motion in a plane - A vector treatment of classical orbit theory - Vector differential of a scalar field and the gradient- Conservative vector field -The vector differential operator - Vector differentiation of a vector field - The divergence of a vector- Theoperator∇^2, the Laplacian- The curl of a vector.

UNIT 2: Differential Equation

First-order differential equations - Separable variables -Exact equations Integrating factors - Bernoulli's equation- Second-order equations with constant coefficients - Nature of the solution of linear equations - General solutions of the second-order equations - Finding the complementary function - Finding the particular integral - Rules for D operators - The Euler linear equation - Solutions in power series.

UNIT 3: Matrix

Definition of a matrix - Four basic algebra operations for matrices - Equality of matrices - Addition of matrices - Multiplication of a matrix by a number - Matrix multiplication - Thecommutator-Powersofamatrix-Functionsofmatrices-transposeofamatrix-Symmetric and skew-symmetric matrices - The matrix representation of a vector product -The inverse of a matrix - A method for finding A-1 - Systems of linear equations and theinverseofamatrix-Complexconjugateofamatrix-Hermitianconjugation-Hermitian/anti-Hermitianmatrix-Orthogonal matrix(real)- Unitary matrix- Rotation matrices- Trace of a matrix.

UNIT 4: Laplace Transformation

Definition of the Laplace transform - Existence of Laplace transforms - Laplace transforms of some elementary functions-Shifting (ortranslation) theorems-The first shifting theorem - The second shifting theorem - The unit step function - Laplace transform of a periodic function - Laplace transforms of derivatives - Laplace transforms of functions defined by integrals – A note on integral transformations.

UNIT 5 : Partial Differential Equations

Linear second-order partial differential equations-Solutions of Laplace's equation: separation of variables- Solutions of the wave equation: separation of variables- Solution of Poisson's equation. Green's functions - Laplace transform solutions of boundary-value problems

Text Books:

1. Mathematical Methods for Physicists: A concise introduction,-TAIL.CHOW– Cambridge University Press 1995.

Books for Reference:

1. Piyoosh KumarTyagi, Mathematical Physics- RBSA Publishers 2018
2. Satya Prakash-Mathematical Physics-Sultan Chand &Co: 2021
3. R.Murugesan-Mechanics and Mathematical Physics - Sultan Chand & Co: 2014
4. Gupta-Mathematical Physics-Sultan Chand & Co: 2014

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Able to apply vector and scalar operator in different applications	K3
CO2	Understand different orders of differential equation	K2
CO3	Able to apply Matrix and functions of matrices in different problems.	K4
CO4	Enhance problem solving skill using Laplace transform	K3
CO5	Solve different problems using Partial Differential equations	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	2	3	3	3	3	2
CO2	3	3	3	3	2	2	3	3	3	3	2
CO3	3	3	3	3	2	2	3	3	3	3	2
CO4	3	3	3	3	2	2	3	3	3	3	2
CO5	3	3	3	3	2	2	3	3	3	3	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHT64	NANO PHYSICS	L	T	P	C
CORE - XVI			5	-	-	4

Objectives:

- To create the basic knowledge in nano materials.
- To understand the scientific perspective of nano materials.
- To identify the techniques suitable for nanomaterial synthesis.
- To know the significance of nano materials.

UNIT I: Nano Materials

History of Nano technology- Nanostructures- synthesis of oxide nanoparticles-Synthesis of semi conductor nano particles-Synthesis of metallic nanoparticles

UNITII: Quantum Hetero Structure

Super lattice -preparation of Quantum nanostructure- Quantum well laser-Quantum cascade laser-Quantum wire- Quantum dot-Application of Quantum dots.

UNIT III : Carbon Nano tubes

Discovery of Nano tubes- Carbon Allotropes- Types of carbon Nanotubes -Graphenesheet to a single walled nanotube -Electronic structure of Carbon Nanotubes -Synthesis of Carbon Nanotube.

UNIT IV: Application of Nanotechnology I

Nanocrystalline soft material- Permanent magnet material-Theoretical background-Super paramagnetism-Coulomb blockade-Quantum cellular Automata.

UNITV: Application of Nanotechnology II

Chemistry and Environment–Energy applications of nanotechnology-Information and Communication – Heavy Industry – Consumer goods- Nano medicine- Medical application of Nanotechnology

Text Books:

1. Textbook of Nanoscience and Nanotechnology– B. S. Moorthy, P. Sankar, Baldev Raj, B.B. Rathand James Murdy University Press –IIM(2013).
2. Nanophysics, Sr.Geradin Jayam, Holy Cross College, Nagercoil (2010).

Books for Reference:

1. ‘Nano science and Nanotechnology: Fundamentals to Frontiers’, M.S. Ramachandra Rao, Shubra Singh, Wiley Indiapvt. Ltd., New Delhi(2013).
2. ‘Nano the Essentials’- T. Pradeep, TataMc. Graw Hill company Ltd(2007)
3. ‘The Chemistry of Nano materials : Synthesis, Properties and Applications’,Volume1 C. N. R. Rao,A. Mu¨ller, A.K. Cheetham, ,Germany(2004).

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Identify the Nano particles and apply physics concepts to the nano – scale and nano continuum domain.	K4
CO2	Identify the Quantum hetero structure and acquire the knowledge in application of Quantum dots	K4
CO3	Understands about Nano tubes, Allotropes and its structure and synthesis	K2
CO4	Acquires knowledge about the Nano crystalline soft materials, Super-paramagnetism, Quantum cellular automata	K2
CO5	Apply Nano technology in different fields	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	3	3	3	2	3	3	3
CO2	3	2	2	3	3	3	3	2	3	3	3
CO3	3	2	2	3	3	3	3	2	3	3	3
CO4	3	2	2	3	3	3	3	2	3	3	3
CO5	3	2	2	3	3	3	3	2	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHP64	PRACTICAL-IV	L	T	P	C
CORE-XVII			-	-	5	4

Objective:

Provide opportunity for students to learn about basic concepts of electronics through practical settings e.g.test conductors, insulators and semiconductors for their various properties and characteristics.

ANYFOURTEEN

1. Zener diode Characteristics.
2. Transistor Characteristics – CE mode.
3. Single stage amplifier.
4. Two stage amplifier –without feedback.
5. LC–II filters.
6. Clippers and clampers using diode and CRO.
7. Construct Colpitts's Oscillator and measure its frequency.
8. Construct Hartley oscillator and measure its frequency.
9. UJT relaxation oscillator.
10. Voltage doubler.
11. Construct Dual power supply using–IC 7812 and IC 7912.
12. A stable multi vibrator using transistors.
13. Mono stable multi vibrator using transistors.
14. Bi stable multi vibrator – RS flip flop (transistors).
15. Op-ampIC741–characteristics.
16. Op-ampIC741–differentiatorandintegrator.
17. Op-ampIC741–adderandsubtractor.
18. Construct Logic Gates–using discrete components.
19. XOR and XNOR gates–using IC's and verify their truth table.
20. Verification of Demorgan's theorem
21. Design of Half adder and Full adder.
22. Design of Half subtractor and Full subtractor.

TEXT BOOKS:

1. Adrian C.Melissions, Jim Napolitano, Experiments in Modern Physics, 2003.
2. Paul B.Zbar andAlbertB.Malvino, Basic Electronics (AText–Lab Manual),Tata McGrawHill, Edition,5.Publisher,1983.
3. A.P.Malvino, Electronics ,Cybergear,2010.
4. JohnMorris, Analog Electronics, Import,1999.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Design Half and Full subtractor	K3
CO2	Study the characteristics of diode and transistor	K4
CO3	Analyze arithmetical operation using OP-Amp	K4
CO4	Construct oscillator and multivibrator and determine its frequency.	K3
CO5	Verify Demorgan's theorem	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHE641	CHOICE -I	L	T	P	C
ELECTIVE-IV		ASTROPHYSICS	3	-	-	3

Objective:

To understand the basics about the universal bodies and other object in the universe.

Unit 1: **Birth of Modern Astronomy**

Geocentric and Heliocentric theories – Kepler'slaws of planetary motion – Newtonian gravitation – Celestial sphere – Planets – Terrestrial and Jovian planets (Planets individual description is not required in detail) - Asteroids-Meteorites –Comets.

Unit 2: Telescopes

Elements of telescope – Properties of images – Types of Optical telescopes–Refracting and Reflecting telescopes-Radio telescope–Spectrograph–Limitations – Photographic photometry – Photoelectric photometry – Spectro photometry –Detectors and image processing.

Unit 3: Sun–Physical properties Composition–Core–NuclearReactions–Photosphere–Chromospheres–Corona–Sunspots– Sunspotcycle–SolarWind–Auroras – space weather effects – History of the Earth – Temperature of a planet – The atmosphere–Pressure and Temperature distribution– Magnetosphere–Eclipses–Solar and Lunar Eclipses.

Unit 4 : Classification of Stars

The Harvard Classification system–Luminosity of a Star Hertzsprung -Russel Diagram – Stellar evolution using the HR diagram – Theoretical evolution of stars – White Dwarfs – Neutron Stars-Black holes – Event horizon – Basic physics of Black Holes.

Unit 5: Galaxy nomenclature

Types of Galaxies–Spiral–Elliptical–irregular galaxies Milky Way Galaxy and its structure – Rotation and Mass Distribution – Rotation curve and Doppler shift – Star clusters – Galactic clusters – Pulsars – Cosmological Models – Big bang theory– Steady state theory–Hubble's law –Olber's paradox.

Text Books:

1. Niclolas. A. Pananides and Thomas Arny, Introductory Astronomy, Addison WesleyPubl.Co., 1979.
2. A.Mujiber Rahman,Concepts to Astrophysics,, Scitech Publications, Chennai, 2018.

Books for References:

1. Abell, Morrison and Wolf, Exploration of the Universe, 5th ed., Saunders College Publ.1987,
2. Carrol and Ostlie, Introduction to Modern Astrophysics, 2nd ed., Pearson International.2007

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Assess the design of physical nature of celestial bodies through co-ordinates of space and time	K2
CO2	Apply various optical instruments and explore the observable universe	K3
CO3	Understand about Structure and properties of Sun and Earth.	K2
CO4	Relate to the stellar observations, the properties, their environment and even the presence of planets with appropriate theories.	K3
CO5	Evaluate the structure of milky way galaxy and all its contents with cosmology for the study of the character and evolution of the universe.	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping:

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	2	3	3	3	3	3	3
CO2	3	3	1	3	2	3	3	3	3	3	3
CO3	3	3	1	3	2	3	3	3	3	3	3
CO4	3	3	1	3	2	3	3	3	3	3	3
CO5	3	3	1	3	2	3	3	3	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHE642	CHOICE -II	L	T	P	C
ELECTIVE-IV		ATMOSPHERIC PHYSICS	3	-	-	3

Objective:

This paper aims to describe the characteristics of earth's atmosphere and also its dynamics. Atmospheric waves along with the basic concepts of atmospheric Radar and Lidar are discussed in detail.

Unit I: General features of Earth's atmosphere

Thermal structure of the Earth's Atmosphere, Composition of atmosphere, Potential temperature, Atmospheric Thermodynamics, Greenhouse effect, Local winds, monsoons, fogs, clouds, precipitation, Atmospheric boundary layer, Sea breeze and land breeze.

Unit II: Atmospheric Dynamics

Scale analysis, Fundamental forces, Basic conservation laws, The Vectorial form of the momentum equation in rotating coordinate system, scale analysis of equation of motion, Applications of the basic equations, Circulations and vorticity, Atmospheric oscillations, annual and semi-annual oscillations.

Unit III: Atmospheric Waves

Surface water waves, wave dispersion, acoustic waves, buoyancy waves, propagation of atmospheric gravity waves (AGWs) in a non-homogeneous medium, Lamb wave, Rossby waves and its propagation in three dimensions and in sheared flow, wave absorption, non-linear consideration

Unit IV: Atmospheric Radar and Lidar

Radar equation and return signal, Signal processing and detection,Various type of atmospheric radars, Applications of radars to study atmospheric phenomena, Lidar and its applications,

Unit V: Atmospheric Aerosols

Spectral distribution of the solar radiation, Classification and properties of aerosols, Production and removal mechanisms, Concentrations and size distribution, Radiative and health effects, Observational techniques for aerosols, Absorption and scattering of solar radiation, Rayleigh scattering and Mie scattering.

Text Book

1. Fundamental of Atmospheric Physics, M.L Salby; Academic Press,Vol 61,1996 Unit I-V

Book for Reference

1. The Physics of Atmosphere – John T. Houghton; Cambridge University press; 3rd edn.2002.
2. An Introduction to dynamic meteorology– James RHolton; AcademicPress,2004
3. Radar for meteorological and atmospheric observations – S Fukao and K Hamazu, Springer Japan, 2014

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Understand the characteristic of earth's atmosphere	K2
CO2	Study about the fundamental forces and conservation laws governing the earth	K2
CO3	Acquire knowledge about atmospheric waves	K2
CO4	Use the radar theory in data analysis and tool techniques	K4
CO5	Evaluate the application of aerosols	K5

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	3	2	3	3	2	3	3	2
CO2	3	2	2	3	2	3	3	2	3	3	2
CO3	3	2	2	3	2	3	3	2	3	3	2
CO4	3	2	2	3	2	3	3	2	3	3	2
CO5	3	2	2	3	2	3	3	2	3	3	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weakly correlating(W)	1
No correlating (N)	0

COURSE CODE	U21PHS641	CHOICE -I	L	T	P	C
SKILLBASED ELECTIVE-IV		PROBLEMS SOLVING SKILLS IN PHYSICS	2	-	-	2

Objective:

Main objective of this course is to make the student to solve problems in core physics. Minimum of 20 problems based on various principles of Physics are required in each unit.

Unit 1: Problems in Mechanics

Newton laws of motion for various systems (1,2and3dimension), Conservation laws and collisions, Rotational mechanics, central force, Harmonic oscillator, special relativity

Unit II: Problems in Thermal Physics

Kinetic theory – MB distribution-Laws of thermodynamics – Ideal Gas law-Various Thermo dynamic process - Entropy calculation for various process-Heat engine-TS and PV diagram-Free energies various relations

Unit III: Problems in Electricity & Magnetism

Electrostatics- calculation of Electrostatic quantities for various configurations- Conductors, Magnetostatics-Calculation of Magnetic quantities for various configuration, Electro magnetic induction, Poynting vector, Electromagnetic waves.

Unit IV: Problems in Quantum mechanics

Origin of Quantum mechanics- Fundamental Principles of Quantum mechanics- potential wells and harmonic oscillator-Hydrogen atom.

Unit V: Problems in General Physics& Mathematics

Plotting the graphs for various elementary and composite functions-Elasticity- Viscosity and surface tension-fluids-Buoyancy-pressure-Bernoulli's theorem applications-waves and oscillations, Errors and propagation of errors.

Text books

1. Charles Kittel, Walter D knight, Mechanics (in SI units) (Berkeley Physics course-volume1), Tata McGraw Hill Publication, Second Edition (2007).
2. S.C.Garg, RM Bansal &CK Ghosh, Thermal Physics, Tata McGraw Hill Publications, 1stEdition (2013).
3. E.M. Purcell, Electricity & Magnetism (in SI units), Tata Mc Graw Hill Publication, 2nd Edition (2016).
4. N.Zettili, Quantum Mechanics, Wiley Publishers, Second Edition (2009).
5. David. J.Griffith, Introduction to Quantum Mechanics, Pearson Publications, Second edition (2015).
6. Halliday & Resnick, Fundamentals of Physics, Wiley Publications, 8thEdition (2007).

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Develop problem solving skill in mechanics	K3
CO2	Apply thermodynamics principle to solve entropy related problem	K3
CO3	Determine electrostatic quantities using theorem	K4
CO4	Develop problem solving in Quantum Mechanics	K3
CO5	To appear for research oriented competitive examinations	K3

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	2	3	2	3	3	2
CO2	3	3	3	3	2	2	3	2	3	3	2
CO3	3	3	3	3	2	2	3	2	3	3	2
CO4	3	3	3	3	2	2	3	2	3	3	2
CO5	3	3	3	3	2	2	3	2	3	3	2

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

COURSE CODE	U21PHS642	CHOICE -II	L	T	P	C
SKILLBASED ELECTIVE-IV		WEATHER FORECASTING	2	-	-	2

Objective:

The aim of this course is to impart theoretical knowledge and develop an awareness and understanding regarding the causes and effects of different weather phenomenon and basic forecasting techniques

Unit I: Introduction to atmosphere

Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement; cyclones and anticyclones: its characteristics.

Unit II: Measuring the weather

Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.

Unit III: Weather systems

Global wind systems; air masses and fronts: classifications; jet streams; local thunder storms; tropical cyclones: classification; tornadoes; hurricanes.

Unit IV: Climate and Climate Change

Climate: its classification; causes of climate change; global warming and its outcomes; airpollution;aerosols,ozonedepletion, acidrain, environmental issues relatedto climate.

Unit V: Basics of weather forecasting

Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.

Text Book:

1. Aviation Meteorology, I.C. Joshi, Himalayan Books,3rd edition 2014.
2. The Weather Observers Hand book, Stephen Burt, Cambridge University Press, 2012.

Reference books:

1. Meteorology, S.R.Ghadekar, Agromet Publishers, Nagpur, 2001.
2. Text Book of Agrometeorology, S.R. Ghadekar, Agromet Publishers, Nagpur, 2005.
3. Atmosphere and Ocean, JohnG. Harvey, The Artemis Press, 1995.

Course Outcomes (CO):

CO	Learning outcome	Remarks
CO1	Learn elementary ideas about atmosphere i.e., temperature, cyclone etc.	K1
CO2	Understand about weather measurement	K2
CO3	Gain Knowledge about climatic change	K2
CO4	Acquire ideas about weather system	K2
CO5	Analysis on weather forecasting	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

Outcome Mapping

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	1	3	2	3	3	2	3	3	3
CO2	3	3	1	3	2	3	3	2	3	3	3
CO3	3	3	1	3	2	3	3	2	3	3	3
CO4	3	3	1	3	2	3	3	2	3	3	3
CO5	3	3	1	3	2	3	3	2	3	3	3

Correlating	Marks
Strongly correlating(S)	3
Moderately correlating(M)	2
Weekly correlating(W)	1
No correlation(N)	0

NON-MAJOR ELECTIVE(NME)

OURSE CODE	U21PHN311	CHOICE -I	L	T	P	C
SEMESTER III		HOUSE HOLD APPLIANCES	2	-	-	2

OBJECTIVE

To understand the working principles of different household domestic appliances and to repair the electrical appliances for the general troubleshoots and wiring faults.

UNIT-I

Voltage, Current, Resistance, Capacitance, Inductance, Electrical conductors and Insulators,Ohm'slaw,Seriesandparallelcombinationsofresistors,Galvanometer,Ammeter,Voltmeter,Multimeter,Transformers,Electricalenergy,Power,Kilowatthour(kWh),consumptionof electrical power

UNIT-II

Direct current and alternating current, RMS and peak values, Power factor, Single phase and three phase connections, Basics of House wiring, Electric shock, First aid for electric shock, Overloading, Earthing and its necessity, Short circuiting, Fuses, MCB, ELCB, Insulation, Inverter, UPS

UNIT-III

Principles of working, parts and servicing of Electric fan, Electric Iron box, Water heater; Induction heater, Microwave oven; Refrigerator, Concept of illumination, Electric bulbs, CFL, LED lights, Energy efficiency in electrical appliances, IS codes& IE codes.

UNIT IV

1. Studying the electrical performance and power consumption of a given number of bulbs connected in series and parallel circuits.
2. Measuring parameters in combinational DC circuits by applying Ohm’s Law for different resistor values and voltage sources
3. Awareness of electrical safety tools and rescue of person in contact with live wire.
4. Checking the specific gravity of lead acid batteries in home UPS and topping-up with distilled water.
5. Identifying Phase, Neutral and Earth on power sockets.

UNIT V

1 Identifying primary and secondary windings and measuring primary and secondary voltages in various types of transformers.
2. Observing the working of transformer under no-load and full load conditions.
3. Observing the response of inductor and capacitor with DC and AC sources.
4. Observing the connections of elements and identify current flow and voltage drops.
5. Studying electrical circuit protection using MCBs, ELCBs

Text Books:

1. B.L.Theraja, A.K. Theraja, A Text book on Electrical Technology, S.Chand & Co.,Reprint (2018)
2. M.G.Say,The Performance and Design of Alternating Current Machines**,**2002

COURSE CODE	U21PHN311	CHOICE -II	L	T	P	C
SEMESTER III		HOW THINGS WORK	2	-	-	2

OBJECTIVES

The Course aims to give the basic function of domestic Appliance, Music Instruments , Aircraft & Camera.

UNIT I: DOMESTIC APPLIANCES

Electric bell - Door locks - Fans, Blowers and Centrifugal compressors - Refrigerator – Air conditioning - Vacuum cleaner - Sewing machine - Flat iron- Tape recorder – Washing machine–Fuse

UNIT II: LIGHT AND MUSIC

Compact Fluorescent lamp - Incandescent lamp - Colour television - Pianoforte - Piano tone and tuning-Accordion -Electric organ- Electronic music.

UNIT III: METALLURGY

Powder metallurgy - Forging - Cutting and machining of metals - Pressure welding – Fusion welding-Soldering –Metal spraying.

UNIT IV: AIRCRAFT

Present day method of aircraft construction - Airfoils and airflow - Wind tunnel – Hydraulic power system – Vertical takeoff and landing aircraft (VTOC).

UNIT V: CAMERA

Cameras: General Introduction - Focal length and size of image - Interchangeable lenses - Diaphragm shutters - Depth of field - Range finder - Video camera - Projectors – Color photography.

TEXT BOOK

1. The Universal Encyclopedia of Machines – How Things Work 1 & 2 –Harper Collins Publishers India- Volume I, 1992.

COURSE CODE	U21PHN421	CHOICE -I	L	T	P	C
SEMESTER IV		DIGITAL PHOTOGRAPHY	2	-	-	2

Objective:

To understand the function and basic concept of digital camera, Photography and editing.

Unit I: Introduction to Digital Photography

Understanding film and paper photography – Learning about the digital revolution- Advantages and disadvantages of digital photography over film photography - Computers as photographic tools

Unit II Digital Basics

Digital image method of storing and processing digital image: Raster and Vector method - Representation of digital image: Resolution – Pixel Depth – Pixel Aspect Ratio – Dynamic Colour Range–FileSize–ColourModels–ImageCompression–FileFormats–Calculating image resolution for outputs

Unit III Digital Capture

Digital Image formation–Image Sensors–Different Capturing Method: Digital camera– Scanner–Frame Grabber- DIGITAL CAMERA: Understanding how digital cameras work – Digital camera types: Floppy Disc type, Flash Card type, Hard Disc type –Overview of current digital cameras

Unit IV: Image Editing

Image editing through image editing softwares like Adobe Photoshop – Adjustment of Brightness, Contrast, Tonal and Colour Values–Experimenting with Level and Curve.

Unit V: Digital Retouching & Image Enhancement

Image size – Resolution – Selection tools and techniques – History – Retouching tools – Layers–Photo mounting techniques–Incorporation of text into picture - Digital Manipulation: Applying selective effects to images and filters with masks and different digital darkroom effects.

Text Books

1. Phillip K rejcarek, Digital Photography-A handson Introduction, Delmer Publishers 1996
2. Jon Torrant, Understanding Digital Cameras, Focal Press,2002

COURSE CODE	U21PHN422	CHOICE -II	L	T	P	C
SEMESTER IV		PHYSICS IN MUSICAL INSTRUMENT	2	-	-	2

Objectives:

The course aims to relate applications of Physics concepts on various musical phenomena.

UNIT – I: Basic Ideas of Sound

Wave motion – types of waves-simple Harmonic motion – Properties of sound waves – reflection, refraction, diffraction and interference of sound velocity of sound standing waves-Beats-Resonance.

UNIT – II: Basic Idea of Music

The ear-pitch loudness and quality of musical notes-just noticeable difference in pitch-barrel hearing-aural or combination tones-subjective tones - subjective music-vibrato and tremolo-pitch range of musical instruments.

UNIT–III: Musical Instruments

String instruments-frequency of stretched strings-longitudinal vibration in strings-plucked, bowed and struck stringed instruments-one example for each from carnatic Hindustani and western. Wind Instruments modes of oscillation in open and closed pipes-Different types of wind instruments-examples from carnatic and western. Vibrations in Stretched Membranes and Plates. Drums, cymbals etc.

UNIT– IV: Electronics of music

Microphones (carbon & crystal) – pickup – Loud speaker, Amplifiers. Addition of sound - santoors.

UNIT –V: Electronic systems

Tape recording and play back equalizers, Recording and reproduction of sound in cine films. Acoustic of Buildings: Acoustics-Reverberation and Reverberation time – Acoustic measurements: A coustic intensity level– Acoustic pressure level-Factors affecting the acoustics of buildings–sound distribution in an Auditorium– Requisites for good acoustics.

TEXT BOOKS:

1. A skill. J,Physics of Musical Sounds, Van Nostrand Rein hold Inc.,U.S. (1979).
2. Johnson.K,Physics for you,OUP Oxford;5th edition(2016)
3. Berkely,Waves, McGraw Hill Education (2017)
4. Krishnasami.S,Musical Instruments of India, Publications Division (30August2017)

VALUE ADDED PROGRAMME

COURSE CODE	U21PHV51	SOLAR ENERGY TECHNOLOGY	L	T	P	C
SEMESTER - V			30			2

OBJECTIVES

Give knowledge about Renewable Energy.

UNIT 1: Need for Solar Energy

The need for alternate energy sources – The Sun – Basic parameters of the Sun– Energy source of the Sun– Estimate of energy emitted by Sun and energy that reaches the Earth – Solar radiation – Solar constant – Solar Radiation calculation - Geographical location of India.

UNIT 2: Physics of Solar Energy

Interaction of sunlight with Earth– Absorptivity–Reflectivity–Transmittivity–Emissivity – Interaction of sunlight with atmosphere–Beam and diffuse solar radiation–Pyranometer – Energy storage–Salt hydrates– Solar energy and electric vehicles.

UNIT 3: Solar Thermal Devices

Heat transfer and losses – Conduction – Convection – Radiation – Collectors – Flat plate collectors–Tracking collectors– Concentrating collectors–Tilted collectors–Constructionof different types of solar heating devices- Solar Air Heaters.

UNIT 4 : Basics of Solar Photo voltaics

Solar Cells – Applications and advantages of photovoltaic(PV) devices.

UNIT 5: National Solar Energy Programmes

Short notes on National Solar Mission – Notes on: Green Energy corridors – Solar Parks and Ultra Mega Solar Power Projects – Surya mitra Programme - other schemes: Canal bank & Canal Top–NISE–National Institute of Solar Energy : About Training Programmes-ISA–International Solar Alliance- objective- vision: One World, One Sun, One Grid.

Books for Study:

1. Zekai Sen. Solar Energy Fundamentals and Modeling Techniques, Springer-Verlog,London2008
2. Chen CJ.Physics of Solar Energy, Wiley2011.

COURSE CODE	U21MAA11	SEMESTER-I	L	T	P	C
B.Sc.Physics /Chemistry		ANCILLARY MATHEMATICS I	5	-	-	4

Objectives:

- The learner will become proficient in expansion and summation of function
- The learner will acquire knowledge of solving problems in matrices
- The learner will capable of solving the interpolation problems.
- The learner will gain knowledge of trigonometric functions and related problems
- The learner will become proficient in various types of hyperbolic functions

Unit-I: Partial Fractions

Introduction of Partial Fractions- Binomial Theorem: The General Term – Expansion of Rational Fractions – Summation of Series. Exponential Theorem: Summation of Series, The Logarithmic Series- Problems.

Unit-II: Theory of Equations

IntroductionofthegeneralEquations-FundamentalTheoremofAlgebra–SymmetricFunction of Roots – Relation between Roots and Coefficient of Equation – Formation of Equation – Diminish the Roots of the Equation – Reciprocal Equation. Newton – Raphson Method problems.

Unit-III: Matrices

Fundamental Concepts of Special Types of Matrices –Addition and Subtraction of Matrices – Matrix Multiplication – Associated Matrices. Rank of a Matrix: Elementary Operations or Transformation. Linear Equations: Homogeneous linear Equation – Non-Homogeneous Equation Characteristic Roots and Vectors: Eigen Value and Eigen Vectors – Properties of the Eigen Vectors– Cayley -Hamilton theorem.

Unit-IV: Interpolations:

Introduction about Interpolations : Newton's Forward Method-Newton's Backward Method-Lagrange's Interpolation Formula: Different form of Lagrange's Interpolation Formula-problems.

Unit-V: Trigonometry:

Basic ideas in Trigonometry: Expansions: $\cos^n\theta$, $\sin^n\theta$ – cos nθ and sin nθ –Expansion of sin θ , cosθ and tanθ in powers of θ. Hyperbolic Function: Relation between Hyperbolic Functions and Circular Functions – Periods of Hyperbolic Functions – Inverse Hyperbolic Functions. Logarithm of Complex Quantities

Text Book:

1. **P.Kandasamy, K.Thilagavathy**,"Allied Mathematics Paper I", 1st Semester, S. Chand Publishing. A Division of S. Chand & Company Pvt.Ltd, Edition 2013

ReferenceBooks:

1. **G.C.Sharma and Madhu Jain**, Algebra and Trigonometry, 1st Edition, GalgotiaPublicationsPvt.Ltd.2003
2. **Dr.S.Arumugam, A.Thangapandi Isaac and A.Somasundaram**, Numerical

Methods, 2nd reprint, Scitech Publication India Pvt, Ltd., 2004.

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Remember numbers, sequences, series,basic summaries from partial fraction, equations, matrices	K1
CO2	Understand trigonometric values and Interpolations	K2
CO3	Solve problems by using theorems.	K3
CO4	Analyze homogeneous and non-homogeneous linear equations.	K4
CO5	Analyze and Evaluate inverse functions.	K4,K5

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

COURSE CODE	U21MAA22	SEMESTER-II	L	T	P	C
B.Sc.Physics /Chemistry		ANCILLARY MATHEMATICS II	5	-	-	4

Objectives:

- To learn methods of integration and properties and its solving related problems.
- Understand the basic concepts of first order differential equation and its applications.
- Find solutions by applying Laplace transform methods.
- Vectors and its product and its integrations.

Unit-I: Vector Calculus:

Introduction about Vector Calculus–Gradient, Divergence and curl(problems only).Integration of vectors: Integration of vector functions, Line integrals – Surface integrals –Green's theorem in the plane (statement only) – Gauss Divergence theorem (statement only) –Problems– Stoke's theorem(statement only) – Problems

Unit-II : Partial differential equation

Introduction of Partial differential equation from differential equations - Formation of Partial differential equations by eliminating arbitrary constants and arbitrary functions* – Solutions of standard types of first order equations- f (p, q) = 0, f(x, p, q)=0, f(y, p, q)=0, f(z, p, q)=0, $f_1(x,p) = f_2(y, q)$, z = px+qy+f (p, q) , Clairaut's form– Lagrange method of solving linear partial differential equations P p + Qq = R. (problems only)

Unit-III: Total differential equations

Introduction of total differential equations - Bessel's equations : Bessel's equations – Solutions of Bessel's general differential equations (derivations not included) – General solution of Bessel's equations - Recurrence formulae (derivations not included) – Simple problems using Recurrence relation.

Unit-IV: Laplace Transforms

Introduction of Laplace Transforms- Definition – Laplace Transform of e^{at}, cos at, sin at, coshat, sinhat,t^n, n, a positive integer–$e^{at}f$ (t) , $t^nf(t)$, f (t), f (t) – Inverse Laplace Transform of standard functions–Solving differential equations of Second order with constant coefficients using Laplace Transform.

Unit-V: Fourier Series

Introduction of Fourier Series: Definition-Dirchlet's conditions- Fourier series of periodicity 2π and 2l - Odd and even functions –Root mean square value of a function Halfrange series: Introduction- Half range series –Cosin series- sin series – Parseval's theorem –Harmonic analysis

Text Book:

1. **P.Kandasamy and K.Thilagavathy**. "Mathematics for B. Sc., Br. -I, Volume-II and Volume-III", S.Chand & Company Ltd, First edition, 2004.(UNIT I and III)
2. **S.Narayanan and T.K. Manickavasagam Pillai**," Calculus Vol. III ", S.Viswanathan (Printers and Publishers, (P)Ltd, Chennai,2010.(UNIT II and V)
3. **S. Narayanan and T. K. Manickavasagam Pillai**, "Calculus Vol. III " S.Viswanathan (Printers and Publishers, (P)Ltd, Chennai, 1997.(UNITIV)

ReferencesBook

1. **P. Kandasamy and K.Thilagavathy**, "Mathematics, Vol Iv", S.Chand And CompanyLtd.,-2004
2. **Shanti Narayan**, "Differential Calculus", Shyamlal Charitable Trust, New Delhi, 2004.
3. 3.**P.N.Chatterji**,"VectorCalculus",1st Edition,RajhansPrakahanPublishers,Chennai,199

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Understand the I and II integrals	K2
CO2	Understand properties of integrals, Laplace transform.	K2
CO3	Understand first order differential equations.	K2
CO4	Analysis Theorems and proves.	K3,K4
CO5	Evaluate the importance of shifting properties.	K3,K4

K1-Remember: K2- Understand:K3-Apply, K4- Analyse,K5-Evaluate;K6-create

COURSE CODE	U21PHA33	SEMESTER III	L	T	P	C
ALLIED-3		ALLIED CHEMISTRY THEORY PHYSICAL SCIENCES	5	-	-	4

Objectives

1. To understand the handling of chemicals and errors in chemical analysis
2. To get knowledge in chemical bonding and hybridization
3. To acquire knowledge in volumetric analysis
4. To understand the basic concept of chemistry of Thermodynamics and Kinetics

Unit-I Handling of Chemicals and Data Analysis

a) Storage and handling of chemicals: Handling of acids, ethers, toxic chemicals. Antidotes, threshold vapour concentration and first aid procedure.
b) Errors in chemical analysis: Accuracy, precision. Types of error-absolute and relative errors. Methods of eliminating and minimizing errors.
c) Separation techniques –Solvent extraction. Principle of adsorption and partition chromatography, column chromatography, thin layer chromatography (TLC), paper chromatography and their applications.

Unit-II ChemicalBonding

a) Ionic Bond: Nature of Ionic bond. Structure of NaCl, KCl and CsCl. Factors influencing the formation of ionic bond.
b) Covalent Bond: Nature of covalentbond. Structure of CH_4,NH_3,H_2O based on hybridization.
c) Coordinate Bond: Nature of coordinate bond. Coordination complexes. Werner's theory. Geometrical and optical isomerism in square planar and octahedral complexes. Mention of structure and functions of chlorophyll and hemoglobin
d) Hydrogen Bond: Theory and importance of hydrogen bonding.Types of hydrogen bonding. Hydrogen bonding in carboxylicacids, alcohol, amides, polyamides, DNA and RNA.

Unit- III Volumetric Analysis

a) Methods of expressing concentration: normality, molarity, molality, ppm.
b) Primary and secondary standards: preparation of standard solutions c) Principle of volumetric analysis : end point and equivalence points.
c) Strong and weak acids and bases-Ionic product of water, pH, pKa, pKb. Buffer solutions -pH of buffer solutions. Mention of Henderson equation & its significance.

Unit-IV Kinetics

a) Chemical Kinetics: Rate, rate law, order and molecularity. Derivation of rate expressions for I and II order reactions.
b) Catalysis-Homogeneous and heterogeneous catalysis. Enzyme catalysis, enzymes in biological system and in industry.

Unit- V Thermodynamics

a) Introduction: Scope and importance of thermodynamics – system and surrounding-isolated, closed and open systems-state of the system-intensive andextensive variables. Thermodynamic process- reversible and irreversible, isothermal and adiabatic process
b) First law of thermodynamics-statement-definition of internal energy(E), enthalpy(H),

applications of first law of thermodynamics.

The second law of thermodynamics: Limitations of first law and the need for the second law, different ways of stating II law and its significance, Spontaneous or irreversible process.

The concept of entropy–definition and physical significance of entropy.

Text Books:

1. A.Bahl and B.S. Bahl, Advanced Organic Chemistry, I Multicolor Edition, S.Chand & Company, New Delhi,2010.
2. Satya Prakash, Advanced Inorganic Chemistry, R.D.Madan, VolI, 5th Edition, S.Chand and Sons, New Delhi, 2012.
3. B.R. Puri, L.R.Sharma and M.S.Pathania, Principles of Physical Chemistry, 46thEdision,Vishal Publishing Company, New Delhi, 2013.

Reference Book:

1. R.Gopalan, S. Sundaram,*Allied Chemistry*, Sultan Chand and Sons, 1995.

CO	Course outcomes	Remarks
CO1	Students can gain the knowledge on the handling of chemicals and errors in chemical analysis.	K2, K3
CO2	Learn Chemical Bonding and Hybridization	K2
CO3	Learn the calculations of preparing standard solutions	K2, K3
CO4	Understand and appreciate the advanced concepts and rate equations in chemical kinetics.	K2
CO5	Calculate change in thermodynamic properties, equilibrium constants, partial molar quantities, chemical potential	K2

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

COURSE CODE	U21PHA44	SEMESTER IV	L	T	P	C
ALLIED-4		ALLIED CHEMISTRY PRACTICAL-PHYSICAL SCIENCES	4	-	-	4

Objectives

1. To enable the students to acquire knowledge in Organic Estimation
2. To understand basics and gain knowledge inorganic analysis
3. At the end of the course, the students should be able to plan experimental projects and execute them.

Acidimetry and alkalimetry: Titration acids used: hydrochloric acid, sulphuric Standard solutions prepared: sodium carbonate, sodium bicarbonate, oxalic acid.
Oxidation and reduction titration: Oxidising agents: Potassium permanganate (permanganimetry) Reducing agents: Ferrous sulphate, ferrous ammonium Sulphate, oxalic acid
Standard solutions prepared: Ferrous Sulphate, ferrous ammonium Sulphate and oxalic acid.
Iodometry titrations: titrations of liberate diodine against sodium thiosulphate using acidified potassium permanganate, potassium dichromate and copper Sulphate solutions.
Standard solutions: potassium dichromate, copper sulphate.

Text Books

1. Sundaram, Krishnan, Raghavan, Practical Chemistry (PartII), S.Viswanathan Co. Pvt., 1996.
2. B.S.Furniss, A.J.Hannaford, P.W.G.Smith, A.R.Tatchell, Vogel's Text Book of Practical Organic Chemistry. 5th Edn., Pearson Education, 2005.

Reference Books

1. Practical Chemistry by A.O. Thomas, Scientific Book Centre, Cannanore, 2003.
2. Basic Principles of Practical Chemistry, V.Venkateswaran, R.Veeraswamy, A.R.Kulandaivelu, Sultan Chand & Sons, New Delhi,2nd Edn., 2004.

CO	Course outcomes	Remarks
CO1	Learn the concept of Titration methods and various Titrations	K2
CO2	Understand the Acidimetry and alkalimetry titrations	K2
CO3	The preparation of standard solutions and methods of analyze the various salts	K2, K4
CO4	Understand the calculations of molarity, molality and Normality of the solutions	K2
CO5	Understand the concept of Iodometry titrations	K2

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

ALLIED PHYSICS (for B.Sc Mathematics / B.ScChemistry)

Objective:

To impart preliminary knowledge on basic concepts of physics to chemistry and mathematic students to make them understand the fundamentals of core physics.

UNITI: **Mechanics**

Centre of Gravity – Centre of Gravity of a solid hemisphere – Hollow hemisphere – Centre of Gravity of a solid cone – Centre of Gravity of a solid tetrahedron. States of Equilibrium: Equilibrium of a rigid body – Stable, unstable and neutral equilibrium – Example. Stability of Floating bodies – Meta center– Determination of Metacentric height of a ship.

UNIT II: Properties of Matter

Stress – Strain – Young's modulus – Behavior of wire under progressive tension –Bending of beams – Expression for the bending moment – Measurement of Young's modulus by bending of a beam – Non uniform bending and Uniform bending. Viscosity: Stream line flow and Turbulent flow–critical velocity -Poiseuille's formula–Determination of coefficient of viscosity of a liquid (Variable pressure head). Surface Tension: Drop weight method of determining the surface tension of a Liquid – Experiment to determine the interfacial tension.

UNIT III: Electronics

Intrinsic and extrinsic semiconductor – PN Junction diode – Biasing of PN junction – V-I characteristics of junction diode–Rectifiers–Half wave–Full wave and bridge rectifiers – Zener diode – Characteristics of Zener diode–Voltage regulator–Transistor–Characteristics of transistor–CB,CEmode–Transistors as an amplifier.

Digital: Decimal– Binary – Octal and Hexa Decimal number systems and their Mutual Conversions – 1'sand 2's complement of a Binary number and Binary arithmetic (Addition, Subtraction, Multiplication and Division) – Binary Subtraction by 1's and 2's complement method –Basic logic gates – AND, OR, NOT, NAND, NOR and EXOR gates – NAND and NOR as universal building gates – Boolean Algebra – Laws of Boolean Algebra – De Morgan's Theorems– Their verifications using truth tables.

UNITIV: Optics

Geometrical Optics: Spherical aberration of a thin lens – Methods of reducing spherical aberration – Coma – A planatic surface – Astigmatism – Curvature of the field – Distortion. Interference: Introduction – Air wedge – Newton's rings – Colors of thin films. Diffraction: Plane diffraction Grating – Theory of plane transmission Grating

UNIT V: Modern Physics

Atomic Physics Atom Models: Sommerfield's and Vector atom Models–Pauli's exclusion Principle–Various quantum numbers and quantization of orbits. X-rays: Continuous and Characteristic X-rays – Mosley's Law and importance – Bragg's law –Miller indices.

Nuclear Physics Introduction–Nucleus–Classification of Nuclei–Nuclear Size–Charge – Mass and Spin -Nuclear Radiations and their properties, Laws of Radioactivity-Decay Constant-Half life and mean life- age of the earth-carbon Dating.

Text Books:

1. R.Murugeshan, Properties of Matter, S.Chand&Co.Pvt.Ltd.,Revised edition,2012.
2. Narayanamoorthy and N.Nagarathinam, Mechanics– Part II, The National Publishing Company, Chennai, 2005.
3. N.Subramaniyam, Brijlal and M.N.Avathanulu, Optics, S.Chand & Co.Pvt.Ltd.25 th revised edition, New Delhi,2012.
4. V.Vijayendran,S.Viswanathan, Digital Fundamentals, Printers & Publishers Private Ltd, Chennai, 2004.
5. MehtaV.K.,Principles of Electronics, S.Chand and company Ltd,2014.
6. Albert Paul Malvino, Digital Principles and Applications, Mc Graw-Hill International Editions, New York, 2002.
7. Puri V.K.,Digital Electronics Circuits and Systems, TATA McGraw Hill Publications, New Delhi, 2011.
8. R. Murugeshan, Kiruthiga Sivaprasath, Modern Physics, S. Chand & Co, New Delhi, First edition, 1984.
9. R.S.Sedha, A Text Book of Digital Electronics, S.Chand & Co, New Delhi, First edition,2004

Books for Reference:

1. D.S Mathur. Revised by: Dr.P.S.Hemne, Mechanics–S.Chand and Co. New Delhi. First edition 1981, Reprint2015.
2. BrijLal and Subramanyam, Properties of Matter–Eurasia publishing house (Pvt.) LTD. New Delhi. Sixth Edition 1991
3. B.L.Theraja, Basic Electronics(Solid State),S.Chand and Co.NewDelhi2006
4. R.Murugesan, Optics and Spectroscopy-S.Chand Publishing,1997.
5. J.B.Rajam, Atomic Physics.,S. Chand & Company Limited, New Delhi, First edition, 1990.
6. B.N. Srivastava, Basic Nuclear Physic, Pragati Prakashan, Meerut, 2005.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Analyze center of gravity	K4
CO2	Learn about modulus, viscosity and surface tension of materials	K2
CO3	Study the characteristics of diode and transistor	K1
CO4	Understand about aberration and different properties of lenses	K2
CO5	Gain knowledge about atomic model and basic nuclear properties	K2

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

ALLIED PRACTICALS

Objective:

It is aimed at exposing the non-physics under graduate students to the technique of handling simple measuring instruments and also make them measure certain mechanical, electrical and optical properties of matter

Any Twelve experiments

1. Estimation of Error
2. Compound Pendulum–g and unknown mass determination
3. Young's Modulus – Uniform bending–pin and microscope method
4. Young's Modulus–Cantilever–Pin & Microscope
5. Young's Modulus –Uniform bending–Opticlever method
6. Young's Modulus – Non-Uniform bending–pin and microscope method
7. Viscosity–Stoke's Method
8. Viscosity– Poiseuille's method
9. Sonometer–frequency of a lining fork
10. Calibration of Voltmeter – potentiometer
11. Comparison of capacitances– B.G
12. Dispersive power of prism– Spectrometer
13. Logic Gates–AND, OR, NOT using discrete components
14. Logic Gates–NAND,NOR–using IC's
15. Diode Characteristics
16. Zener diode Characteristics
17. Newton's rings of a liquid
18. Spectrometer–Prism-i-d curve to find μ
19. NAND as Universal gate: IC
20. NOR as Universal gate: IC
21. Surface Tension–Capillary Rise
22. Newton's Law of cooling

TEXT BOOKS

1. C.COuseph, G.Rangarajan-ATextBookofPracticalPhysics,-S.ViswanathanPublisher-PartI(1990).
2. C.COuseph, Rangarajan, R.Balakrishnan,A Text Book of Practical Physics, S.Viswanathan Publisher- Part II (1996).
3. S.LGupta and V.Kumar –Practical Physics, Pragati Prakashan –25th, Edition(2002).
4. A.P.Malvino, Electronics, Cybergear, 2010.
5. John Morris, Analog Electronics, Import,1999.
6. S.K. Bhattacharya, Electrical Machines (TTTI Chandigarh) - TMH1998.

Course Outcomes(CO):

CO	Learning outcome	Remarks
CO1	Able to Estimate Errors	K3
CO2	Analyze dimensional change of bar	K4
CO3	Determine viscosity of liquid	K4
CO4	Study the characteristics of diode and ICs	K3
CO5	Determine surface tension of liquid	K4

K1-Remember K2-Understand K3-Apply K4-Analyze K5-Evaluate

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MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

B.Sc. COMPUTER SCIENCE

UNDER CBCS
(2021-2022 ONWARDS)

DEPARTMENT OF COMPUTER SCIENCE

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL
DEPARTMENT OF COMPUTER SCIENCE
Choice Based Credit System (CBCS)
(2021-2022 onwards)
B.SC COMPUTER SCIENCE

1. About the Programme

BSc Computer Science is a 3-year undergraduate program that deals with the subjects and topics related to Computer Science, Computer Application, and its services. The main aim of this program is to create quality professionals and research fellows who can work in every sector of the world by implementing the technology of Computer Systems and Software.

This degree can lead them to profiles like computer scientist or an information systems manager or a networking specialist. It ensures efficient management of the available computer facilities, handle smooth functioning of the local area and wide area networking, implement cyber security systems, maintain software and hardware system upgradation, and manage system designing and technical analysis for the organisation.

It has been specifically designed for aspirants looking for a career in computers. The course covers all aspects of computers right from the basic fundamentals of computers to database systems & advanced courses like Cloud Computing, Artificial Intelligence, Internet of Things etc.

2. Program Educational Objectives [PEOs]

PEO1: To enrich knowledge in the core areas of computer science

PEO2: To provide opportunities for acquiring in depth knowledge on tools and techniques of advanced computing systems

PEO3: To enable career and entrepreneurial opportunities in IT sector among graduates

PEO4: To inculcate team spirit for handling complex problems in data analysis and research work

PEO5: To realize the impact of computing systems in societal development

3. Eligibility

The procedure for B.Sc. Computer Science admission is mostly done on the basis of merit. The basic B.Sc. Computer Science eligibility is a minimum aggregate of 50% in Class 12 with Mathematics compulsory subject.

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	10	25	10	25
External	30	75	30	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade

(Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average

40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

Programme Outcomes

On successful completion of the Programme, the student will be able to

PO1: Understand the basic and advanced concepts involved in real world computing systems

PO2: Apply the algorithmic principles and computer fundamentals for computer based systems

PO3: Analyze, formulate and solve the problems in different domains using computing techniques

PO4: Understand the impact of computing systems for societal development

PO5: Collaborate with team members in developing projects and to accomplish a common objective

Programme Specific Outcomes

The students at the time of graduation will be able to

PSO1: Impart the fundamental principles and methods of Computer Science in a wide range of applications

PSO2: Apply domain knowledge and problem solving skills to solve real time problems

PSO3: Ensure career opportunities and empower good employability skills in IT sector

PSO4: Identify and utilize the tools and techniques in the design and development of Software products

PSO5: Ability to work and communicate effectively in interdisciplinary environment

B.Sc. COMPUTER SCIENCE

Course Code	Title of the Course	Credits	Hours		CIS	EIS	Total
			L	P			
FIRST SEMESTER							
U21LTA11	TAMIL I	3	6	-	25	75	100
U21LEN11	ENGLISH I	3	6	-	25	75	100
U21CST11	**Core-1**: Programming in C	4	5	-	25	75	100
U21CSP11	**Core-2**: Programming in C Lab	4	-	6	25	75	100
U21CSA11	**Allied – 1**: Discrete Mathematics	4	5	-	25	75	100
U21EVS11	Environmental Studies	2	2	-	25	75	100
U21PEPS11	Professional English for Physical Sciences – I	4	6	-	25	75	100
	Total	**24**	**36**		**-**	**-**	**700**
SECOND SEMESTER							
U21LTA22	TAMIL II	3	6	-	25	75	100
U21LEN22	ENGLISH II	3	6	-	25	75	100
U21CST21	**Core-3**: Fundamentals of Data Structures	4	5	-	25	75	100
U21CSP22	**Core-4**: Data Structures using C Lab	4	-	5	25	75	100
U21CSA22	**Allied-2**: Digital Principles & Computer Organization	4	5	-	25	75	100
U21VAE21	Value Education	3	3	-	25	75	100
U21PEPS22	Professional English for Physical Sciences – II	4	6	-	25	75	100
	Total	**25**	**36**		**-**	**-**	**700**
THIRD SEMESTER							
U21LTA33	TAMIL III	3	6	-	25	75	100
U21LEN33	ENGLISH III	3	6	-	25	75	100
U21CST31	**Core-5**: Object Oriented Programming with Java	4	5	-	25	75	100
U21CSA33	**Allied-3**: Statistical Methods	4	5	-	25	75	100
U21CSE311/ U21CSE312	**Elective I**: Object Oriented Programming using Java Lab / Graphics using C++ Lab	3	-	4	25	75	100
U21MSS31	**SBE-1**: Managerial Skills	2	2	-	25	75	100
	NME – I:	2	2	-	25	75	100
	Total	**21**	**30**		**-**	**-**	**700**
FOURTH SEMESTER							
U21LTA44	TAMIL IV	3	6	-	25	75	100
U21LEN44	ENGLISH IV	3	6	-	25	75	100

U21CST41	**Core-6**: Web Technology	4	4	-	25	75	100
U21CSP43	**Core-7**: Web Technology Lab	4	-	4	25	75	100
U21CSA44	**Allied-4:** Fundamentals of Computer Algorithms	4	4	-	25	75	100
U21CSE421 / U21CSE422	**Elective II** **1.** System Software **2.** PHP with MySQL	3	3	-	25	75	100
U21CSS42	**SBE II –** Computer Skills for Office Management	2	-	2	25	75	100
	NME – II:	2	2	-	25	75	100
	Total	**25**	**31**		-	-	**800**
FIFTH SEMESTER							
U21CST51	**Core-8**: Relational Database Management System	4	5	-	25	75	100
U21CST52	**Core-9**: Operating System Concepts	4	5	-	25	75	100
U21CST53	**Core-10**: Computer Networks	4	5	-	25	75	100
U21CST54	**Core-11:** Computer Graphics	4	5	-	25	75	100
U21CSP54	**Core-12**: Relational Database Base Management Systems Lab	4	-	5	25	75	100
U21CSE531 U21CSE532	**Elective III** 1.Multimedia & Applications 2. Cloud Computing	3	3	-	25	75	100
U21CSS53	**SBE III** -Operating System Lab	2	-	2	25	75	100
	Total	**25**	**30**		-	-	**700**
SIXTH SEMESTER							
U21CST61	**Core-13**: Software Engineering	4	5	-	25	75	100
U21CST62	**Core-14**: Mobile Application Development	4	5	-	25	75	100
U21CST63	**Core-15**: Artificial Intelligence	4	5	-	25	75	100
U21CSP65	**Core-16**: Mobile Application Development Lab	4	-	5	25	75	100
U21CSR61	**Core-17**: Project	4	-	5	25	75	100
U21CSE641 / U21CSE642	**Elective IV** 1.Internet of Things 2.R Programming	3	3	-	25	75	100
U21CSS64	**SBE IV** – Image Processing Lab	2	2	-	25	75	100
U21EAS61	Extension Activities	3	-	-	100	-	100
	Total	**28**	**30**		-	-	**800**
	Grand Total	**148**	**193**				**4200**

Non-Major Elective (NME)

The candidates, who have joined the UG Programme, can also undergo Non Major Elective offered by other Departments.

Non-Major Electives (NME) offered by Computer Science Department

Course Code	Title of the Course
U21CSN31	NME I: Web Designing using HTML
U21CSN42	NME II: Photo Designing Tools

ADDITIONAL CREDIT COURSES

COURSE CODE	COURSE	SEMESTER	CREDITS
U21CSO31	Online Course	III	2
U21CSI41	Internship	IV	2
U21CSV51	Quantitative Aptitude - Value Added Course	V	2

SEMESTER I

CODE	U21CST11	PROGRAMMING IN C	L	T	P	C
CORE - I			5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze					

OBJECTIVES:

1. To understand and develop well-structured programs using C language.
2. To learn the implementation of data structures through C language.
3. To deal with efficient memory allocation & input/output methods.
4. To improve the Problem-solving skills through computer programming.

UNIT I - INTRODUCTION

Overview of C: Introduction - character set - C tokens - keyword & identifiers –constants – variables - data types – Declarations of variables – Arithmetic, Relational, Logical, Assignment, conditional, Bit wise, special, increment and decrement operators - Arithmetic expressions - Evaluation of expression - Operator Precedence & Associativity -Mathematical functions - Reading & writing a character - Formatted input and output.

UNIT II – DECISION MAKING

Decision Statements: If, if else, switch, break, continue –the ?Operator - The GOTO statement – Loop Control Statements: Introduction – for, nested for loops – while, do-while statements – Arrays: One-dimensional - Two dimensional - Multidimensional arrays.

UNIT III – STRING HANDLING

Character string handling - Declaring and initializing string variables – Reading strings from terminal - Writing strings to screen - String handling functions - User-defined functions: Need for user defined functions – Types of functions - calling a function category of functions - no arguments and no return values – Arguments but no return values-Arguments with return values– Recursion - functions with arrays - functions with arrays -The scope and lifetime of variables in functions

UNIT IV - STRUCTURES

Structure: Definition- Structure initialization - Comparison of structure variables -Arrays of structures - Arrays within structures - Structures within structures – unions. Pointers: understanding pointers - accessing the address of a variable - declaring and initializing pointers - accessing a variable through its pointers - pointer expressions – pointers and arrays - pointers and character strings - pointers and functions - pointers and structures.

UNIT V – FILE MANAGEMENT

File Management in C: defining and opening a file - closing file - I/O operations on files - error handling during I/O operations - Random access to files - command line arguments. Dynamic memory allocation: Introduction- dynamic memory allocation –MALLOC – CALLOC – REALLOC- The pre-processor

TEXT BOOK

1. E.Balagurusamy- Programming in ANSI C - Tata McGraw Hill 7th Edition, 2017.

REFERENCE BOOKS

1. Byron Gottfried - Programming with C - Tata McGraw Hill, 3rd Edition, 2013.
2. V.Rajaraman - Computer Programming in C - Prentice Hall of India Pvt. Ltd,1st Edition, 2004.
3. SmarajitGhosh - Programming in C - Prentice Hall of India Pvt. Ltd.,1st Edition, 2004
4. YashwvantKanetkar - Let us C - BPB Publications, 13th Edition, 2014.

Webliography

1.www.tutorialspoint.com
2.www.fresh2fresh.com
3.www.cprogramming.com
4. www.spoken-tutorial.org

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Apply the syntax and semantics of C language – K3
CO2: Utilize the concept of functions and arrays in solving real world problems – K3
CO3: Demonstrate structures, union and pre-processing techniques in C - K1
CO4: Designreal world problems using pointers and file concept - K3
CO5: Develop problem solving skills using C language – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	M	S	S	M	M
CO2	S	W	M	S	M	S	W	M	S	S
CO3	S	S	W	M	M	S	S	M	S	M
CO4	S	S	S	M	M	S	S	M	S	M
CO5	M	S	S	M	M	S	S	M	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

CODE	U21CSP11	PROGRAMMING IN C LAB	L	T	P	C
CORE - II			-	-	6	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. Imbibe the in-depth practical experience in 'C' programming.
2. To impart knowledge on basic concepts in C
3. To make them familiar with Structure and Files in C
4. To develop C programs for real world problems

LIST OF PROGRAMS

1. Finding the Largest and Smallest of three numbers using if, if-else.
2. Checking for an Armstrong number using if, if-else
3. Solving Quadratic equations using switch statement
4. Finding the area of different shapes using switch statement.
5. Ascending and descending order of numbers using arrays.(Largest and smallest numbers)
6. Sorting of names in alphabetical order.
7. Program to search the given element by using linear search.
8. Matrix operations i) Addition ii) Subtraction iii) Multiplication iv) Transpose
9. Finding factorial of a number Using Recursive function
10. Generating Fibonacci series Using Recursive function
11. String manipulations using string functions

i) String length ii) String comparison iii) String copy

12. String manipulations without using string functions

i) String length ii) String comparison iii) String copy

13. Palindrome checking Using function
14. Counting characters, words and lines Using function
15. Generate salary slip of employees using structures.
16. Program to generate student mark list using array of structures
17. Programs for file handling (Sequential, Random)

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Develop and execute programs using Operators and control Structures – K2
CO2: Develop programs in C to solve any kind of real world problem - K2
CO3: Apply the programming concepts of C in the standalone applications. - K3
CO4: Have a depth understanding in C program features – K2
CO5: Develop programming skills in C language – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	M	M	M	M	M
CO2	W	S	S	S	S	S	S	S	S	S
CO3	S	M	M	S	S	S	W	M	S	S
CO4	S	S	W	M	M	M	S	S	M	M
CO5	S	S	M	M	S	S	M	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

CODE	U21CSA11	DISCRETE MATHEMATICS	L	T	P	C
ALLIED - I			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the problem solving method.
2. To Understand the concept of logical implications and equivalences
3. To learn about the importance of groups and its properties
4. To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.

UNIT I - SET

Review of theory of sets – Relations – Equivalence Relations – partial Order – Function – Binary Operations.

UNIT II – LOGIC CONNECTIVES

Logic – Introduction – connectives – Truth Table – Tautology – Implications – Equivalences.

UNIT III - GROUPS

Groups – Definitions & Examples – Elementary – Properties –Equivalent definitions of a group- Sub Groups – Cosets and Lagrange's Theorem.

UNIT IV - MATRIX

Matrices – Special type of Matrices – operations – Inverse of a Matrices – Elementary Transformation – Rank of Matrix – Simultaneous Linear Equation – Eigen values and Eigen vectors – Cayley Hamilton theorem.

UNIT V – POSETS AND LATTICES

Partial Ordering – Posets – Representation of finite posets by diagrams (Hasse Diagram) - Lattices – Properties – Sub Lattices -Distributive Lattices–Modular Lattices- Boolean Algebra.

TEXT BOOKS

S.Arumugam&ThangapandiIssac - Modern Algebra - Scitech Publications (India) PvtLtd ., 2015.

REFERENCE BOOKS:

1. Oscar Levin, Discrete Mathematics – An Open Introduction, 3rd Edition 2015
2. Arumugam S, Satya S.K. Jayanty - Modern Algebra - Scitech Publications (India) Pvt .Ltd, 2003

COURSE OUTCOMES:

After successful completion of the course, student shall be able to:

CO1: Understand the complexity of computational problems – K2
CO2: Think about the design of formal language which would be able to address any real time problem – K1
CO3: Improve the working flow of computational models – K2.
CO4: Evaluate Boolean functions using the properties of Boolean algebra – K2
CO5: Simplify Boolean expressions using Boolean algebra – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO 4	PSO5
CO1	S	S	M	M	M	M	M	W	M	M
CO2	S	S	S	M	M	W	M	M	S	M
CO3	S	S	S	M	M	S	M	M	S	M
CO4	S	S	S	S	M	M	M	M	S	M
CO5	S	S	W	M	M	S	M	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

sEMESTER – II

Course Code	U21CST21	FUNDAMENTALS OF DATA STRUCTURES	L	T	P	C
CORE III			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand about the operations of Stack & Queue.
2. To understand about Tree & its traversal techniques.
3. To Understand about Graphs and its components.
4. The student can get the In-depth Knowledge in dealing with Data and its Structures.

UNIT I - ARRAYS

ARRAY: Axiomatization – Ordered Lists – Sparse Matrices – Representation of Arrays.

UNIT II – STACKS AND QUEUES

STACKS AND QUEUES: Fundamentals – Amazing Problem – Evaluation of expressions – Multiple Stack and Queues.

UNIT III – LINKED LIST

LINKED LIST: Singly Linked List, Linked Stacks and Queues – The Storage Pool - Polynomial Addition – Doubly Linked list and Dynamic Storage Management – Garbage Collection and Compaction.

UNIT IV - TREES

TREES: Basic Terminology – Binary Trees – Binary Tree Representations – Binary Trees Traversal – More on Binary Trees – Threaded Binary trees –Binary Trees Representation of Trees

UNIT V - GRAPHS

GRAPHS: Terminology and Representations: Introduction – Definitions and Terminology – Graph representations – Traversal, connected components and Spanning Trees.

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TEXT BOOK

1. Ellis Horowitz SartajSahni - Fundamentals of Data Structure - Galgotia Publications, 1998.
2. Seymour Lipschutz-, Data Structures with C -Schaum's Outline Series, 2017

REFERENCE BOOKS

1. SartajSahni - Data Structures, Algorithms and Applications in C++ - McGraw Hill 1998.
2. A.Chitra, P.T.Rajan - Data Structures - Vijay Nicol Imprints Pvt Ltd, Mc,Graw Hill Education of India Pvt. Ltd., 2006.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Describe the basics of Ordered Lists and Representation of Arrays – K1
CO2: Apply the knowledge of Linked list for solving problem in the real world. – K3
CO3: Demonstrate the usage of Binary trees and Representation of Trees – K2
CO4: Illustrate the performance of Graphs representation and spanning Trees – K4

CO5: Understand the procedures for tree traversal techniques – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	M	S	M	M
CO2	S	S	S	S	M	S	S	W	S	S
CO3	S	S	S	W	M	S	S	S	S	S
CO4	S	M	M	S	M	M	M	M	M	M
CO5	S	S	W	S	M	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSP22	DATA STRUCTURES USING C LAB	L	T	P	C
CORE - IV			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To impart knowledge on Data Structures
2. To implement and differentiate single and double linked list
3. To illustrate stack to convert infix to postfix.
4. To develop programs for De queue and Dictionary

LAB EXERCISES

1. Program using array based stack push (), pop (), stack_Full() and stack_Empty() functions.
2. Program to evaluate the given postfix expression using the stack
3. Program that uses stack operations to convert a given infix expression into its postfix equivalent
4. Program to add two polynomials using linked list.
5. Program to find Union of two single Linked Lists.
6. Program to Create a singly linked list of integers.
7. Program to Delete a given integer from the above linked list.
8. Program to Display the contents of the above list after deletion.
9. Program to eliminate duplicates from Linked List
10. Program to implement all the functions of a dictionary (ADT) using hashing
11. Program to implement a double ended queue ADT an array, using a doubly linked list.
12. Program that uses functions to perform the following:
13. Program to Create a doubly linked list of elements.
14. Program to Delete a given element from the above doubly linked list.
15. Program to Display the contents of the above list after deletion.

COURSE OUTCOMES:

Upon successful completion of the course the students will be able to

CO1: Apply the concepts to solve problems using C programming language - K3

CO2: Implement the basic data structures using C – K1

CO3: Solve real world problems using C programming language – K3

CO4: Recognize the importance of Data Structure features – K4

CO5: Create linked list using stack operations – K5

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	M	M	S	S	S	W	S	S	S
CO3	S	S	W	S	S	S	S	S	W	S
CO4	S	M	M	S	M	M	S	M	M	M
CO5	S	M	M	S	S	S	S	S	S	S

S – Strongly Correlating - 3 Marks

M – Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSA22	DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION	L	T	P	C
ALLIED II			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the fundamentals of computer and its role in problem solving.
2. To acquire the concept of flow of control and program structures.
3. To learn the operation of latches, flip-flops, counters, registers and register transfers in the Computer organization.
4. To design two-level logic functions with AND, OR, NAND, NOR and XOR gates with minimum number of gate delays or literals

UNIT I: NUMBER SYSTEM

Number Representation - Number System: Binary, Hexadecimal - Octal Codes - BCD - Excess-3 - Gray Code - ASCII - EBCDIC - Binary Arithmetic - 1's Complement - 2's Complement Representation - Error Detecting Codes - Hamming Codes. Introduction - Boolean Algebra - Demorgan's Theorem - Sum Of Product method - Product of Sum method - Karnaugh Map.

UNIT II: GATES

Introduction - Logic Gates – Universal Gates – Decoder – Encoder – Multiplexer – De-multiplexer - Half Adder - Full Adder - Half Subtractor - Full Subtractor. Flip-Flops - S-R Flip-flop - J-K Flip Flops.

UNIT III: INSTRUCTIONS

Introduction: Machine Language - Assembly language – Assembler - Programming Arithmetic & Logic Operations – Input - Output Programming. Basic Computer Organization and Design Instruction Codes - Computer Registers - Computer Instruction - Timing & Control Instruction Cycles-Memory Reference Instruction.

UNIT IV:

I/O Organization - Peripheral Devices - I/O Interface - Mode of Transfers – DMA- RAM- ROM- Memory Decoding – Error detection and correction – Programmable Logic Array – Programmable Array Logic

UNIT V:

Memory Organization - Memory Hierarchy - Main Memory - Auxiliary Memory -Associative Memory - Cache Memory - Virtual Memory – Dynamic Storage management – Data Management Concepts – Programmable Logic devices

TEXT BOOKS:

1. Albert Paul Malvino& Donald P.Leach - Digital Principles and Applications - IV Edition, Tata McGraw Hill Company Limited, 2006.
2. Morris Mano - Computer System Architecture - Pearson Publication, Third Edition,1981.

REFERENCE BOOKS:

1. P. K. Sinha&PritiSinha - Computer Fundamentals - BPB Publications, 2007.
2. Dr. Anita Goel - Computer Fundamentals- Pearson Education, 2010.
3. Alexis Leon - Fundamentals of Information Technology - Vikas Publication, 2009
4. P.S.Manoharan - Digital Principles & System Design –-Revised Edition-Charulatha Publication, 2017.

COURSE OUTCOMES:

Upon successful completion of the course the students will be able to

CO1: Understand the hardware and software types and components of the computer – K2
CO2: Recognize the problem-solving fundamental key points. – K1
CO3: Sketch out the representation of numbers and codes in the computer – K1.
CO4: Know the digital computers internal components and the execution of the instructions – K2
CO5: Understand the hierarchy of memory management and usage – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	M	W	M	S
CO2	S	M	M	S	M	M	M	M	M	M
CO3	S	M	M	W	M	M	M	M	M	M
CO4	S	S	S	S	M	S	M	M	S	S
CO5	S	M	M	S	M	M	M	M	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

SEMESTER: III

COURSE CODE	U21CST31	OBJECT ORIENTED PROGRAMMING WITH JAVA	L	T	P	C
CORE - V			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the object-oriented paradigm in the Java programming language.
2. To know about the Package and Interfaces.
3. To Understand about Applets.
4. To write Java application programs using proper program structure

UNIT I - Introduction

Fundamentals of Object Oriented Programming - Basic Concepts of Object-Oriented Programming – Benefits of OOP –Applications of OOP. Java Evolution – overview of Java Language

UNIT II - Basics

Constants, Variables and Data types. Operators and Expressions – Decision Making and Branching

UNIT III - Looping

Decision Making and Looping - Classes, Objects and Methods – Arrays, Strings and Vectors. Interfaces: Multiple Inheritance

UNIT IV - Packages

Packages: Putting classes together – Multithreaded Programming – Managing errors and Exception.

UNIT V - Applets

Applet Programming – Graphics Programming – Introduction to AWT packages – Introduction to Swings - Managing Input Output in Files in Java.

TEXT BOOK

E.Balagurusamy - Programming with Java, Sixth Edition – McGraw Hill Education Private Limited. 2019

REFERENCE BOOKS

1. Patrick Naughton, Herbert Schildt - The Complete Reference Java 2 - India: McGraw Hill, 5th Edition. (2006).
2. Dr.K.Somasundaram - Introduction to Java Programming -India: Jaico Publishing House. (2013).

COURSE OUTCOMES:

Upon successful completion of the course the students will be able to

CO1: Know the basics of OOP and the syntax of Java language – K1
CO2: Empower the knowledge of Input/Output functions with file manipulations using I/O – K2
CO3: Analyze GUI programming applications using AWT packages – K4
CO4: Develop Java based Applications using GUI and database Connectivity - K4

CO5: Create knowledge about the file concept in Java – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	M	M	W	M	M
CO2	S	W	M	S	M	S	M	S	S	S
CO3	S	S	S	S	S	S	S	W	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	M	S	M	M	M	M	M	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSA33	STATISTICAL METHODS	L	T	P	C
ALLIED -III			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To have a broad background in Statistics fundamentals and techniques.
2. To recognize the importance and value of mathematical and statistical thinking, training, and approach to problem solving, on a diverse variety of disciplines.
3. To become familiar with a variety of examples where mathematics or statistics helps accurately explain abstract or physical phenomena.
4. Creating confidence to have the versatility to work effectively in a broad range of analytic, scientific, government, financial, health, technical and other positions.

UNIT I:Organizing data:

RawData-Frequency distribution-percentage- bar graph- pie graph-histogram-cumulative frequency distributions- Arithmetic Mean – Median – Mode – Geometric Mean – Harmonic Mean.

UNIT II: Regression

Regression – Principles of Least Square – Correlation – Rank Correlation.

UNIT III:Assignment Problem

Experiments, sample space – compound events- probability- marginal and continuous probability- mutually exclusive events- Baye's Theorem – permutation and combination.

UNIT IV: Simplex Method

Binomial Distribution – Poisson Distribution – Normal Distribution (Problems only) – Some more continuous distribution.

UNIT V: Transportation Problem

χ^2 – Distribution - χ^2 Test - χ^2 test to test the goodness of fit – Test for independence of attributes.

TEXT BOOK:

1. S.ArumugamIssac - Statistics - New Gamma Publishing House, Palayamkottai, 2014.
2. Larry.J.Stephens - Beginning statistics - Schaum's Outline Series, McGraw-Hill Education; 2nd edition, January 2006

REFERENCE BOOKS:

1. S.C.Gupta, V.K.Kapoor - Element of Mathematical Statistics - Sultan Chand &Sons, 2014.
2. Dr.S.P.Gupta - Statistical Methods - Sultan Chand & Sons, 2012.

COURSE OUTCOMES:

After successful completion of the course, student shall be able to:

CO1: Acquire the knowledge of Statistics fundamentals and techniques – K1

CO2: Solve the Regression and Correlation problems – K3

CO3: Describe the solution methods using Bayes theorem – K1

CO4: Evaluate problems using various distributions – K4
CO5: Understand the importance of mathematical and statistical thinking – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	W	M	S	S	S	M	S
CO2	S	M	S	S	M	M	M	W	M	M
CO3	S	S	S	M	M	M	M	M	M	M
CO4	S	M	S	S	M	M	M	S	M	M
CO5	S	M	M	S	M	M	M	M	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE311	CHOICE I	L	T	P	C
ELECTIVE -I		OBJECT ORIENTED PROGRAMMING USING JAVA – LAB	-	-	4	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
2. To understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.
3. To Understand the principles of inheritance, packages and interfaces
4. The Student can develop software in the Java programming language.

Exercise:

1. Arrays and flow control statements.
2. Run time exception And I/O exception.
3. Multi- Threading.
4. Layout Management.
5. GUI Components (Labels, Check box, Menus, Text, etc.)
6. Event Handling (Focus Events, Key Events, Paint Events, Text Events, Mouse Events, Window Events, Etc.)
7. Animation and Images.
8. Java Applet.
9. Java files management methods.
10. Java Streams.
11. JDBC (Java Database Connectivity).
12. Arithmetic Operation Using Java Script
13. Prime Number Using Java Script
14. Find Largest Number in Array Using Java Script
15. Palindrome Using Java Script

TEXT BOOK

E. Balagurusamy - Programming with Java, Sixth Edition – McGraw Hill Education Private Limited. 2019

REFERENCE BOOKS

1. Patrick Naughton, Herbert Schildt - The Complete Reference Java 2 - India: McGraw Hill, 5th Edition. (2006).
2. Dr.KSomasundaram - Introduction to Java Programming -India: Jaico Publishing House. (2013).

COURSE OUTCOMES:

On successful completion of the course, students will be able to

CO1: Solve problems using OOPs concept in Java – K2
CO2: Implement simple software using JAVA – K3
CO3: Implement the Input/Output functions with file manipulations using I/O Streams – K3
CO4: Implement the GUI programming applications using AWT packages – K3
CO5: Solve problems using java script operations – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	M	M	M	M	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE312	CHOICE II	L	T	P	C
ELECTIVE -I		GRAPHICS USING C++ - LAB	-	-	4	3

Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze

Objectives:

1. To apply the fundamentals of Graphics primitives using C++
2. To create a program using 2D & 3D Transformations
3. To understand the features of line, circle and ellipse algorithms
4. To emphasize the properties of composite transformations in Graphics

Program List

1. Draw a Line using DDA Algorithm
2. Draw a Line using Bresenham's Line Drawing Algorithm
3. Draw a Circle using Mid Point Circle Algorithm
4. Draw an Ellipse using Mid Point Ellipse Algorithm
5. Implement various attributes of Output primitives
6. Implement 2D Transformation
7. Implement 2D Composite Transformation
8. Clip a Line using Cohen Sutherland Clipping Algorithm
9. Implement 3D Transformation
10. Implement 3D Composite Transformation

COURSE OUTCOMES:

Upon successful completion of the course the students will be able to

CO1: Apply the concepts to solve graphical primitives using C++ programming language – K3
CO2: Implement the 2D & 3D transformations using C++ - K2
CO3: Solve the real world problems using the features of clipping algorithm – K2
CO4: Recognize the importance of Composite transformations & its features – K1
CO5: Realize the importance of composite transformations and its properties – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	W	S	S	S
CO2	S	M	M	S	S	W	S	S	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	M	M	S	M	M	S	M	M	M
CO5	S	M	M	S	S	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

SEMESTER IV

COURSE CODE	U21CST41	WEB TECHNOLOGY	L	T	P	C
CORE VI			4	-	-	4

OBJECTIVES:

1. To understand the concept of Tables, Forms, Files, Basic Web server Controls.
2. Able to know Internet Basics and HTML.
3. To understand the concept of OLEDB connection class & Cookies.
4. Knowledge of solving web &client/server problems.

UNIT-I: Introduction to Web Designing

Internet Basic - Introduction to HTML - List - Creating Table - Linking document Frames - Graphics to HTML Doc - Style sheet - Style sheet basic - Add style to document - Creating Style sheet rules - Style sheet properties - Font - Text - List - Color and background color - Box - Display properties.

UNIT-II: Active Server Pages

ASP.NET Language Structure – Page Structure – Page event, Properties & Compiler Directives. HTML server controls – Anchor, Tables, Forms, Files. Basic Web server Controls- Label, Textbox, Button, Image, Links, Check & Radio button, Hyperlink.

UNIT-III: Designing Controls

Data List - Web Server Controls - Check box list, Radio button list, Drop down list, List box, Data grid, Repeater.

UNIT-IV: Database Connectivity

Request and Response Objects, Cookies, Working with Data - OLEDB connection class, command class, transaction class, data adaptor class, data set class. Advanced Issues - Email, Application Issues, Working with IIS and page Directives.

UNIT-V: Security

Error handling. Security - Authentication, Internet protocol (IP) Address, Secure by Secure Socket Layer (SSL) and Client Certificates

TEXT BOOK

Deitel&Deitel - Internet & World Wide Web - How to program, Pearson Education, 2012.

REFERENCE BOOKS

1.I.Bayross - Web Enabled Commercial Application Development Using HTML, DHTML, Javascript, Pen CGI - BPB Publications, 2000
2. J.Jaworski - Mastering Javascript - BPB Publications, 1999
3. T.A.Powell - Complete Reference HTML (Third Edition) - TMH, 2002
4. G.Buczek - ASP.NET Developers Guide - TMH, 2002

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO1: Learn to design web pages using HTML– K1

CO2: To gain knowledge on creating interactive web pages using ASP.Net – K2

CO3: To understand how to use Cookies and DOM – K2

CO4: To develop server-side scripting using OLEDB – K3

CO5: To gain knowledge of handling client – server programs – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	S	S	M	S
CO2	S	S	S	S	S	W	S	S	S	S
CO3	S	M	M	M	M	M	M	M	M	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	M	M	W	S	S	S	S	S	M

S – Strongly Correlating - 3 Marks

M – Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSP43	WEB TECHNOLOGY LAB	L	T	P	C
CORE VII			-	-	4	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. Apply the knowledge of the internet and related internet concepts that are vital in understanding web application development and analyze the insights of internet programming to implement complete application over the web.
2. To understand, analyze and apply the role of markup languages in the workings of the web applications
3. To automate the real time problems by developing & analyzing a web project and identify its elements and attributes in comparison to traditional projects.
4. The Students can choose best technologies for solving web client/server problems.

Programs using the following concepts

VB.NET

1. Enumeration
2. Exception handling
3. Constructor
4. Destructor
5. Inheritance
6. Polymorphism
7. Interface

ASP.NET

1. Designing simple Form
2. Data Grid
3. Request and Response Object
4. Cookies
5. Ad Rotator Control
6. Validator Control
7. String Functions
8. OLEDB
9. Generate the Hotspots in the image

VB SCRIPT

1. branching statements
2. Sorting
3. Looping through Arrays
4. Functions
5. Forms

TEXT BOOK

Deitel&Deitel - Internet & World Wide Web - How to program, Pearson Education, 2012.

REFERENCE BOOKS

1. I.Bayross - Web Enabled Commercial Application Development Using HTML, DHTML, Javascript, Pen CGI - BPB Publications, 2000

2. J.Jaworski - Mastering Javascript - BPB Publications, 1999
3. T.A.Powell - Complete Reference HTML (Third Edition) - TMH, 2002
4. G.Buczek - ASP.NET Developers Guide - TMH, 2002

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: To perform the basic functions of VB.NET – K2
CO2: Perform tests, resolve defects and revise existing code – K2
CO3: Develop dynamic web applications, create and consume web services – K3
CO4: Use appropriate data sources and data bindings in VB.NET / ASP.Net – K3
CO5: To develop &analyse web based projects using web technology tools – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	M	S	M	M
CO2	S	S	S	M	S	W	S	M	S	S
CO3	S	S	W	S	S	S	S	S	S	S
CO4	S	S	S	S	M	M	M	S	M	M
CO5	S	S	S	M	S	S	S	M	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSA44	FUNDAMENTALS OF COMPUTER ALGORITHMS	L	T	P	C
ALLIED -IV			4	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To write rigorous correctness proofs for algorithms.
2. To understand about the major algorithms and data structures.
3. To apply important algorithmic design paradigms and methods of analysis.
4. To analyze the complexities of various problems in different domains.

UNIT I: Introduction

Introduction: Divide and conquer: General Method-binary search-finding the maximum and minimum – Merge sort – Quick sort – Selection sort.

UNIT II: Greedy Approach

The greedy method: General method –Prim's Algorithm – Kruskal Algorithm- Minimum spanning trees- Single Source Shortest path (Dijkstra's Algorithm).

UNIT III: Dynamic Programming

Dynamic Programming: General method – Multistage graphs – All pairs shortest paths – Optimum Binary search Trees –0/1 Knapsack – the travelling salesman problem

UNIT IV: Traversal Techniques

Basic search and Traversal Techniques: The techniques – Code optimization – AND/OR graphs – Bi-connected components and Depth first search – Breadth first search.

UNIT V: Backtracking

Backtracking: General Method- 8 Queens Problem – Hamiltonian cycles – Knapsack problem – Euler circuit. Branch and bound: Assignment Problem - Travelling Salesman

TEXT BOOKS:

1. AnanyLevitin – Introduction to the Design and Analysis of Algorithms – Pearson Education 2003

REFERENCE BOOKS

1. Ellis Horowitz, SartajSahni&SanguthevarRajasekaran - Fundamentals of Computer Algorithms - India: Galgotia Publications. (2005).
2. Clifford Stein, Thomas H. Cormen, Charles E. Leiserson& Ronald L.Rivest - Introduction to Algorithms - India: Prentice Hall of India. (2006).

COURSE OUTCOMES

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

CO1: Understand the concepts of Divide and Conquer technique and have the skills to write efficient procedures like sorting, searching etc. – K3

CO2: Understand the concepts and working procedure for Greedy techniques – K3

CO3: Acquire the knowledge to solve backtracking and Branch-and-Bound techniques – K1

CO4: Analyze the algorithms based on time complexity – K4

CO5: Acquire the knowledge to develop optimal procedures for problems like minimum spanning tree construction, single source shortest paths – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	M	S	M
CO2	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	W	S	S	S	S	S	S
CO4	S	M	S	S	S	S	S	M	S	M
CO5	S	S	S	S	S	S	S	W	S	S

S – Strongly Correlating - 3 Marks

M – Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE421	CHOICE I	L	T	P	C
ELECTIVE II		SYSTEM SOFTWARE	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the relationship between system software and machine architecture.
2. To know the design and implementation of assemblers, macro processors, loaders, linkers and compilers.
3. To understand the process of scanning and parsing of a program.
4. To have clear knowledge about system software like assemblers, loaders, linkers, macro processors and compilers.

UNIT I: Background

Introduction – System Software and Machine Architecture – The Simplified Instructional Computer (SIC) – Traditional (CISC) machines – RISC Machines

UNIT II: Assemblers

Basic Assembler Functions – Machine-Dependent Assembler Features – Machine-Independent Assembler Features – Assembler Design Options

UNIT III:Loaders and Linkers

Basic Loader Functions – Machine-Dependent Loader Features - Machine-Independent Loader Features - Loader Design Options

UNIT IV:Macro Processors

Basic Macro Processor Functions – Machine-Independent Macro Processor Features – Macro Processor Design Options

UNIT V: Compilers

Basic Compiler Functions – Machine-Dependent Compiler Features - Machine-Independent Compiler Features

TEXT BOOK

1. Leland L. Beck &Manjula. D - System Software - An Introduction to Systems Programming - 3rd Edition. India: Pearson Education (2009)..

REFERENCE BOOKS

1. Dhamdhere.D.M - System Programming and Operating Systems - India: Tata McGraw Hill Education Private Limited. (2006)
2. Donovan.J.J - Systems Programming - India: Tata McGraw Hill Education Private Limited. (2001).

COURSE OUTCOMES

On the Successful completion of the course, students will be able to

CO1: Understand the relationship between System Software and Machine Architecture - K2

CO2: To know the design and implementation of assemblers, macro processors, loaders, linkers and compilers – K3
CO3: Interpret various concepts of scanning and parsing of a program – K2
CO4: Discuss the processing of a HLL program for execution on a computer system – K1
CO5: Familiar with system software components like compiler, loader & linker – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	S	S	M	S	S
CO2	S	S	M	W	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	M	W	S
CO4	M	S	M	S	S	M	S	S	S	S
CO5	S	S	M	M	S	S	S	M	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE422	CHOICE II	L	T	P	C
ELECTIVE II		PHP with MySQL	3	-	-	3

Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze

OBJECTIVES:

1. To study the Web Programming concepts
2. To make use of PHP elements
3. To examine the working environment with WAMP, LAMP and XAMPP
4. To interpret the concepts of MySQL

UNIT I: GENESIS OF PHP

Introducing PHP: Use of PHP – the evolution of PHP. First PHP script: Installing PHP – other ways to run PHP - creating first script. PHP Language Basics: Using variables – data types – operators and expression – constants. Decision and loops: Making decisions – doing repetitive tasks with loops – making decision and looping. Strings: Creating and accessing strings – searching strings – replacing text within strings – *dealing with upper and lowercase – formatting strings.

UNIT II: ARRAYS AND FUNCTIONS

Arrays: Creating arrays – accessing array elements – looping through arrays with foreach – multidimensional arrays – manipulating arrays. Functions: Calling functions – working with variable functions – writing our own functions. Objects: Object oriented programming – advantages of OOP – understanding basic OOP concepts – creating classes and objects in PHP – creating and using properties – working with methods – automatically loading class files – storing objects as strings.

UNIT III: USING PHP WITH HTML

Handling HTML forms with PHP: Capturing form data with PHP - dealing with multi-value fields - generating web forms with PHP - storing PHP variables in forms - creating file upload forms - redirecting after a form submission. Preserving state with query strings, cookies, and sessions: Saving state with query strings - *working with cookies - using PHP sessions to store data. Working with files and directories: Getting information on files - opening and closing files - reading and writing to files - working with file permissions - copying, renaming, and deleting files - working with directories - building a text editor.

UNIT IV: PHP WITH MySQL

Introducing databases and SQL: Setting up MySQL - connecting to MySQL from PHP. Retrieving data from MySQL with PHP: Setting up the book club database - *retrieving data with select - creating a member record viewer. Manipulating MySQL data with PHP: Inserting records - updating records - deleting records - building a member registration application - creating a members' area - creating a member manager application.

UNIT V: PHP AND OUTSIDE WORLD

Generating images with PHP: Creating images - manipulating images - using text in images. String matching with regular expressions: Regular Expression - pattern matching in PHP - replacing text -

altering matching behavior with pattern modifiers - splitting a string with a regular expression. Working with XML: XML Document Structure – reading XML Documents with PHP – writing and manipulating XML documents with PHP - doing XML the easy way with simple XML – working with XSL and XSLT.

TEXT BOOK

1. Doyle. M., - Beginning PHP 5.3 - First Edition - Wiley Publications Ltd., Indianapolis, 2010.

REFERENCE BOOKS

1. Bayross.I., and S. Shah. - PHP 5.1 for Beginners -Tenth reprint, Shroff Publishers and Distributors, Mumbai, 2011.
2. Nixon.R. - Learning PHP, MySQL, JavaScript and CSS - Second Edition, O'Reilly Media, Sebastopol, 2012.
3. Rao.M.N. - Fundamentals of Open Source Software - First Edition, Prentice Hall of India Pvt Ltd., New Delhi, 2014.
4. Sklar.D. - Learning PHP 5 - First Edition, O Reilly Media, Sebastopol, 2004.
5. Ullman.L. - PHP and MySQL for Dynamic websites: Visual Quick Pro Guide - Fourth edition, Dorling Kindersley India Private Ltd, New Delhi, 2011.

COURSE OUTCOMES :

On the Successful completion of the course, students will be able to

CO1: Summarize Web Programming concepts – K1
CO2: Apply PHP elementsto solve real world problems – K3
CO3: Examine the working environment with WAMP, LAMP and XAMPP – K1
CO4: Interpret the concepts of MySQL with PHP – K2
CO5: Knowledge to develop PHP using XML documents – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	M	M	S
CO2	S	W	M	S	M	S	S	M	S	S
CO3	S	S	S	S	S	S	W	S	S	S
CO4	S	S	S	S	M	S	S	M	S	S
CO5	S	S	M	M	S	S	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

SEMESTER – V

COURSE CODE	U21CST51	RELATIONAL DATA BASE MANAGEMENT SYSTEM	L	T	P	C
CORE -VIII			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the overview of Data Base systems & Data Models.
2. To modify and maintain the database structure.
3. To Understand about the PL/SQL &QL.
4. The students can able to handle the Database.

UNIT I: Introduction

Introduction: Purpose of Data Base Systems – View of Data – Data Models – Database Languages – Transaction Management – Storage Management – Database Administrator – Database Users – Overall System Structure.

UNIT II: E-R Model

Entity – Relationship Model - Basic Concepts – Design Issues – Mapping Cardinalities – Keys – E-R Diagrams – Weak Entity Sets – Extended E-R features – Design of an E-R Database scheme – Reduction of an E-R scheme to table.

UNIT III: Relational Model

Relational Model: Structure of relational databases – Relational algebra – The tuple relational calculus – The Domain Relational Calculus – Extended Relational Algebra operations – Modification of the Database – Views.

UNIT IV: Integrity Constraints

Other Relational Languages & Integrity Constraints: Query by Example – Quel – Datalog – Domain Constraints – Referential Integrity – Assertions – Triggers – Functional Dependencies.

UNIT V: PL/SQL

PL/SQL – Relationships between SQL & PL/SQL – Advantages of PL/SQL – Arithmetic & Expressions in PL/SQL – Loops and Conditional Statements in PL/SQL – Exceptions Handling – Cursor Management – Triggers – Functions & Procedures.

TEXT BOOK

1. Abraham Silberschatz, Henry F.Korth, S.Sudarshan, Database System Concepts (third edition)- McGraw - Hill international editions, 1997.

REFERENCE BOOKS

1. S.Atre - Database Structured Techniques for Design, Performance & Management - John Wiley & sons, 1988.
2.James W, Martin N - Principles of database management - Prentice hall,1979.
3.C.J.Date - An Introduction to Database System - addition Wesley,1981.

COURSE OUTCOMES

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

CO1: Understand the fundamentals of database system – K2
CO2: Design and create tables in database and execute queries - K3
CO3: Have knowledge in network and hierarchical data base system – K2
CO4: Design a database based on a data models using normalization – K3.
CO5: Understand the important features available in PL/SQL – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	M	M	S	M	M
CO2	S	M	M	M	S	S	W	M	M	M
CO3	S	S	S	S	W	S	S	S	S	S
CO4	S	M	M	S	M	M	M	M	S	S
CO5	S	M	M	M	S	S	S	M	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CST52	OPERATING SYSTEM CONCEPTS	L	T	P	C
CORE -IX			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To introduce various components of Computer Hardware and Operating Systems.
2. To discuss the structure of Operating System, its functions and algorithms.
3. To understand the working of operating system, its structures and functioning
4. To Learn various algorithms used in operating systems.

UNIT I: Introduction

Introduction — What is operating system do-operating System structure-operating system services-user operating system interface -system calls-Operating system design and implementation—operating –system structure. Process Management- Process scheduling-operations on processes Inter-process communication –Threads and concurrency-overview- multithreading models.

UNIT II: CPU Scheduling

CPU scheduling - Basic concepts-scheduling criteria - scheduling algorithms – Multiprocessor scheduling. Process Synchronization: Critical-Section Problem-Hardware support for Synchronization- Semaphores-Synchronization Examples-Classical Problems of Synchronization

UNIT III: Deadlock

Deadlocks: Deadlock Characterization- Methods for Handling Deadlocks-Deadlock Prevention-Avoidance-Detection-Recovery. Main Memory: Background-Contiguous Memory Allocation-paging- Structure of the page table-swapping

UNIT I V: Memory Management

Virtual Memory: Demand Paging-Copy on Write-Page Replacement-Allocation of Frames-Thrashing- Mass Storage Structure- RAID structure

UNIT V: File System

File System Interface: File Concepts- Access Methods Directory Structures –Protection-File System Implementation-File System Structures–Allocation Methods-Free Space Management. System Security: Security Problems – Program Threats –System and Network Threats

TEXT BOOK

1. Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts, Wiley Publications, 10th Edition, 2018.

REFERENCE BOOKS

1. Andrew S Tanenbaum, Herbert Bos - Modern Operating Systems - 4e Fourth Edition, Pearson Education, 2016
2. Abraham Silberschatz, Peter Galvin, Greg Gagne - Operating System Concepts - Wiley, 8th Edition, 2008.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Understand the types, design, implementation of operating system and I/O programming concepts – K2

CO2: Recognize the management of main and virtual memory schemes - K1

CO3: Analyze different scheduling algorithms and the management of devices – K3

CO4: Understand and manage the information system using OS – K2

CO5: Realize the importance of file systems and its properties in OS – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	S	S	S
CO2	S	S	M	S	S	S	W	M	S	S
CO3	S	S	S	M	W	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	S
CO5	S	S	M	S	S	S	S	M	S	S

S – Strongly Correlating - 3 Marks

M – Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	U21CST53	COMPUTER NETWORKS	L	T	P	C
CORE -X			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To build an understanding of the fundamental concepts of Computer Networking
2. To identify various components in data communication system
3. To understand the working principles of various application protocols
4. Tobefamiliarwiththeconceptsofnetworkinterfaces, anddesign/performanceissuesin local areanetworks and wideareanetworks

UNIT I: Introduction

Introduction: Uses of Computer Networks–Types of Computer Networks-Network Technology – Examples of Networks – Network protocols-Reference Models – Network Standardization.

UNIT II: Physical Layer

Physical Layer: Guided Transmission Media – Wireless Transmission – The public switched Telephone system – Cellular Networks – Communication satellites.

UNIT III: Data Link Layer

Data Link Layer & Medium Access Layer – Data Link Layer – Design Issues – Elementary Data link protocols – Multiple Access Protocols – Ethernet, Wireless LAN, Bluetooth

UNIT IV: Network Layer

Network Layer & Transport Layer: Network Layer Design Issues – Routing Algorithms – Transport Layer- The Transport Service – Elements of Transport Protocol.

UNIT V: Application Layer

Application Layer &Security: DNS- E-Mail – Security – Cryptography – Digital Signature – Social Issues.

TEXT BOOK

1. Andrew S. Tanenbaum, Amsterdam, Nick Feamster, David J. Wetherall - Computer Networks - 6th Edition, Pearson, 2021

REFERENCE BOOKS

1) BehrouzA.Forouzan - Data Communications and Networking - Fifth Edition, TMH, 2013.
2) Andrew S. Tanenbaum, David J. Wetherall - Computer Network - Fifth Edition, Pearson Education, 2011.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Explain the concepts of various reference models, Internet and protocols – K1
CO2: Identify different transmission media and topologies - K1
CO3: Distinguish error detection and error correction of data - K2
CO4: Implement routing algorithms to determine the optimal path – K3
CO5: Recognise the performance issues in LAN & WAN- K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	M	S	S	M	M
CO2	S	S	M	S	M	S	S	M	S	M
CO3	S	M	S	S	M	W	S	M	S	S
CO4	S	M	S	S	S	S	S	S	S	S
CO5	S	S	M	S	S	S	W	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CST54	COMPUTER GRAPHICS	L	T	P	C
CORE XI			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand computational development of graphics
2. To analyze the concept of Line attribute & curve attribute
3. To design animation with rotation, translation and scaling
4. The student can gain in-depth knowledge about the current 3D graphics.

UNIT I: Overview of graphics systems

Overview of graphics systems: Video display devices – Raster-scan systems – Random-scan systems – Graphics monitors and workstation – Input devices – Hard-copy devices – Graphics software.

UNIT II: Output primitives

Output primitives: Points and lines – Line-drawing algorithms – DDA algorithm – Bresenham's line algorithm – Attributes of output primitives: Line attributes – Area-fill attributes – Character attributes – Bundled attributes.

UNIT III: Geometric transformations

Two-dimensional Geometric transformations: Basic transformations – Matrix representations – Composite transformations – Other transformations.

UNIT IV: Windowing and Clipping

Windowing and Clipping – Windowing concepts – Clipping Algorithms – Window to view port Transformations – segments – Interactive input methods – Physical input devices – logical classification of input devices – interactive picture construction techniques – input functions.

UNIT V: 3-D Concepts

Three dimensional concepts – 3D Display Methods – 3D Object representations – polygon surfaces-curved line and surfaces – 3D transformations- Translation-Rotation-Scaling- Other Transformations-Composite Transformations

TEXT BOOK

Donald Hearn and M.Pauline Baker - Computer Graphics - C Version - Second Edition, Pearson Education, 2006.

REFERENCE BOOKS:

1. William M.Neuman and Robert F Sproul - Principles of Interactive computer Graphics - McGraw Hill International Edition, 2nd Edition, 2014.
2. Foley, van Dam, Feiner, and Hughes - Computer Graphics: Principles and Practice - 3rd edition, 2002.

COURSE OUTCOMES:

On the Successful completion of the course, students will be able to

CO1: Have a broad knowledge about the overview of Graphics System – K2

CO2: Analyse and design algorithms using attributes in graphics – K4

CO3: Recognise the properties of Two and Three-dimensional geometric transformations – K1

CO4: Understand the importance of Windowing and Clipping – K2

CO5: Gain in depth knowledge about 3D transformations – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	S	M	S
CO2	S	S	M	S	M	S	S	S	M	S
CO3	S	M	M	S	S	M	M	S	S	S
CO4	S	S	S	M	M	S	S	M	M	M
CO5	S	M	M	S	S	M	M	S	S	S

S – Strongly Correlating - 3 Marks

M – Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSP54	RELATIONAL DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
CORE XII			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES

1. To become familiar with SQL fundamental Concepts.
2. To apply Normalization techniques to summarize a database
3. To know the connectivity of databases with controls (DAO,ADO& RDO)
4. The Student can Gain a good understanding of the architecture and functioning of Database Management Systems as well as associated tools and techniques.

LIST OF PROGRAMS

1. Queries using DDL commands
2. Queries using DML commands
3. Program using conditional control, interactive controls & sequential controls.
4. Program using excepting handling
5. Programs using explicit cursors & implicit cursors
6. Program using PL/SQL tables & records
7. Programs using database triggers
8. Program to design procedures using In, Out, Parameter
9. Program to design procedures using functions
10. Program to design procedures using packages
11. Program using ADO connectivity.
12. Program using DAO connectivity.
13. Program using RDO connectivity.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO1: Describe the concepts of database technologies – K1
CO2: Discuss PL/SQL including stored procedures, stored functions, cursors, packages – K1
CO3:Apply constraints on a database using RDBMS – K3
CO4:Demonstrate the concept of Triggers and Subroutines – K3
CO5:Recognise the concepts of ADO, DAO & RDO – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	S	M	M	S
CO2	S	S	M	S	M	S	W	S	S	S
CO3	S	S	S	S	M	W	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	M
CO5	S	M	M	S	S	M	M	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE531	CHOICE -I	L	T	P	C
ELECTIVE -III		MULTIMEDIA & APPLICATIONS	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the concept of Multimedia & its Architecture
2. To Design & apply various Authoring Tools
3. To Gain the importance of Internet in multimedia.
4. The student can able to work with the current multimedia applications

UNIT I: INTRODUCTION

Introduction- Brief history of Multimedia – Resources for multimedia developers – Types of products – Multimedia Computer Architecture

UNIT II: AUDIO AND VIDEO

Digital Audio – Characteristics of sound and Digital Audio – Digital Audio Systems – MIDI – Audio File Formats - Using Audio in Multimedia Applications – Digital Video – Background on Video – Characteristics of Digital Video – Digital Video Data Sizing – Video Capture and Playback Systems – Computer Animation – Using Digital Video in Multimedia Applications.

UNIT – III: AUTHORING

Product Design – Building Blocks – Classes of products – Content Organizational Strategies – Story Boarding – Authoring Tool – Categories of Authoring Tools – Selecting the right Authoring paradigm

UNIT IV: MULTIMEDIA

Multimedia and the Internet – The Internet – HTM Land Web Authoring – Multimedia Considerations for the Internet – Design Considerations For Web Pages – Multimedia Development Team – Team Approach – Assembling a Multimedia Production Team.

UNIT V: TEXT

Text – Elements of Text – Text Data Files – Using Text in Multimedia Applications – Hypertext – Graphics – Element of Graphics – Images and Color – Graphics file and Application Formats – Obtaining Images for Multimedia Use – Using Graphics in Multimedia Applications.

TEXT BOOKS:

1. David Hillman, Multimedia Technology and Applications — Galgotia Publications Pvt. Ltd., 1998.

REFERENCE BOOKS:

1. Tay Vaughan -Multimedia making it work –TMH 1996.

COURSE OUTCOMES

After completing the course, the students can able to

CO1: Define multimedia to potential clients – K1

CO2: Identify and describe the function of the general skill sets in the multimedia industry – K1

CO 3: Identify the basic components of a multimedia project- K1

CO 4: Work with text files and graphics files - K2

CO5: Knowledge about the applications of Multimedia – K1

MAPPING OF COS WITH POS AND PSOS :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	S	W	S	M	S	M
CO2	S	S	M	S	S	S	S	S	S	S
CO3	S	S	M	M	S	W	S	M	S	M
CO4	M	S	M	S	S	M	S	S	S	S
CO5	S	S	M	M	S	S	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE532	CHOICE -II	L	T	P	C
ELECTIVE -III		CLOUD COMPUTING	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the cloud computing concepts & its benefits
2. To analyze the implementation of virtualization in Cloud Computing
2. To interpret the security issues and threats in Cloud
3. To explore various web services in Cloud Computing

UNIT I: Introduction

Cloud Computing – An Overview: Introduction – History of Cloud Computing – Characteristics of Cloud – Cloud Computing Model. Issues and Challenges for Cloud Computing – Advantages and Disadvantages of Cloud computing – Security, Privacy and Trust – Virtualization – Threats to Cloud Computing – Next Generation of Cloud Computing. Cloud Computing Architecture: Introduction – Cloud Architecture – Cloud Computing models – Comparisons of Service models – Deployment Models – Identity as a Service (IDaaS).

UNIT II: Virtualization

Virtualization in Cloud: Introduction – Virtualization – Implementation of Virtualization– Virtualization support at the OS level – Middleware Support for Virtualization –Advantages of Virtualization – Application Virtualization – Virtualization Implementations Techniques – Hardware Virtualization – Types of virtualization – Load balancing in Cloud Computing – Logical Cloud Computing Model – Virtualization for Data-Centre.

UNIT III: Security Issues and Challenges

Security Issues and Challenges in Cloud Computing: Introduction – Security Challenges in Cloud Computing – Information Security in Cloud Computing – Security, Privacy and Trust. Security Management: Introduction – Security Reference Architecture – Security Issues in Cloud Computing – Classification of Security Issues – Types of Attackers – Security Risks in Cloud Computing – Security Threats against Cloud Computing – Novel Security Approaches.

UNIT IV: Web Services

Web Services: Introduction – Amazon Web Services – Microsoft Azure – Google App Engine. Data Security and Privacy: Introduction – Data Security – Privacy.

UNIT V: Applications

Cloud Computing Applications: Introduction – Business Applications – Finance and Banking Application – Cloud Computing in Education. Mobile Cloud Computing: Introduction – Need of Mobile Cloud Computing – Mobile Computing Architecture – Technologies of MCC – MCC Applications – Issues in MCC – Challenges in Building Applications – Platforms.

TEXT BOOK

1. Pachghare .V.K. - Cloud Computing - PHI Learning Private Limited, 2016

REFERENCE BOOKS

1. Anthony T.Velte, Toby J.Velte& Robert Elsenpeter - Cloud Computing - A Practical Approach, 5th Reprint. New Delhi: Tata McGraw-Hill Education Private Limited, 2011.
2. Barrie Sosinsky - Cloud Computing Bible, Wiley India Private Limited, 2011.

COURSE OUTCOMES

On the Successful completion of the course, students will be able to
CO1: Understand the need for cloud computing– K2
CO2: Comprehend virtualization concept in cloud – K2
CO3: Get an idea of security threats in cloud – K2
CO4: Know the available web services in cloud computing – K1
CO5: Understand and use the web services available in Cloud Computing – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	M	S	S
CO2	S	S	M	S	M	S	S	S	S	S
CO3	S	S	M	M	S	M	S	M	S	M
CO4	S	S	S	M	S	S	M	S	M	M
CO5	S	S	M	M	S	M	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSS53	OPERATING SYSTEM LAB	L	T	P	C
SKILL BASED ELECTIVE III			-	-	2	2
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To write shell script programs to solve problems.
2. To implement some standard Linux utilities using system calls.
3. To run various UNIX commands on a standard UNIX/LINUX Operating system.
4. To do shell programming on UNIX OS.

LIST OF EXERCISES:

1. Creation of a child, orphan and Zombie process.
2. Execution of various file/directory handling commands.
3. Shell scripts to check various attributes of files and directories.
4. Shell scripts to perform various operations on given strings.
5. write a shell script to find the factorial of given integer
6. Shell scripts to explore system variables such as PATH, HOME etc.
7. Shell scripts to check and list attributes of processes.
8. Execution of various system administrative commands.
9. Write a shell script to display list of users currently logged in.
10. Write a shell script to delete all the temporary files.
11. Simulation of FCFS process scheduling.
12. Simulation of ROUND ROBIN process scheduling.
13. Simulation of SJF process scheduling.
14. Demonstration of process synchronization using signals.
15. Demonstration of process synchronization using semaphores.
16. Deadlock avoidance using banker's algorithm.

COURSE OUTCOMES:

On successful completion of the course, students will be able to

CO1: Learn basic Linux commands – K1
CO2: Understand the basic behaviour of operating system – K2
CO3: Demonstrate different process scheduling and executing algorithm – K3
CO4: Do shell programming on LINUX OS – K3
CO5: Simulate FCFSprocess scheduling in Linux – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	S	S	M	S
CO2	S	S	M	W	M	S	S	M	S	M
CO3	S	S	S	S	M	S	S	M	S	S
CO4	S	S	S	S	S	S	W	S	S	S
CO5	S	S	M	S	M	S	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

SEMESTER VI

COURSE CODE	U21CST61	SOFTWARE ENGINEERING	L	T	P	C
CORE -XIII			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To describe the processes of software development
2. To develop software design and modules for real time system
3. To analyze verification & validation techniques
4. To identify, formulate, and solve engineering problems.

UNIT I: Introduction

Introduction to Software engineering some definitions – some size factors – quality to productivity factors – managerial Issue. Planning a software project: defining the problems developing a solution strategy – planning on organization structure – other planning activities.

UNIT II: Cost estimation

Software cost estimation: Software cost factors – Software cost estimation techniques – staffing – level estimation – estimative software maintenance costs.

UNIT III: Requirements

Software requirements, definition: the software requirements specifications – formal specification techniques – language and processors for requirements specification.

UNIT IV: Design

Software Design: fundamentals Descartes concepts – Modules and Modularizing criteria - Design techniques – detailed design considerations – real time and distributed system design – test plan – mile – stones walk through and inspection – design guide line.

UNIT V: Verification and validation

Verification and validation techniques: Quality Assurance – static analysis – symbolic execution – unit testing and debugging system - testing formal verification.

Software maintenance: enhancing maintainability during developments managerial aspects of software maintenance – configuration management – sources code metrics – other maintenance tools and techniques.

TEXT BOOK:

Richard E. Fairley - Software Engineering Concepts - McGraw Hill pvt ltd, 2001

REFERENCE BOOKS:

1. Roger S, Pressman - Software Engineering, A Practitioner's Approach,.(2014).
2. PankajJalote - An Integrated Approach to Software Engineering - Narosa, 3rd Edition, 2005

COURSE OUTCOMES:

After Completion of this Course, Students will be able to

CO1: Understand the factors and strategies in Software Engineering – K3

CO2: Recognize the cost metrics and feasibility study in Software estimation - K1

CO3: Create software design using real time applications – K3

CO4: Analyze the quality based on validation and verification techniques in Software development – K4

CO5: Develop & design Software modules for real world environment – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	M	S	M	S
CO2	S	S	M	S	M	M	W	S	M	S
CO3	S	S	S	M	M	S	M	M	M	M
CO4	S	W	S	S	W	S	S	S	S	S
CO5	S	S	M	S	M	M	S	S	M	S

S – Strongly Correlating - 3 Marks

M – Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	U21CST62	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
CORE -XIV			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the requirements of Mobile programming environment.
2. To Learn about basic methods, tools and techniques for developing Apps
3. To Explore and practice App development on Android Platform
4. To develop working prototypes of Mobile systems for various uses in daily lives.

UNIT I: **Introduction to Android Operating System**:
Definition of Android – Open Handset Alliance – Android Ecosystem – Need for Android – Android Versions – Features of Android – Android Architecture – Stack Linux Kernel. Configuration of Android Environment: Operating System – Java JDK – Android SDK – Android Development Tools (ADT) – Android Virtual Devices (AVDs) – Emulators – Steps to install and configure Eclipse and SDK.

UNIT II: **Creating the First Android Application**
Directory Structure. Android User Interface: Understanding the components of a screen – Linear Layout – Absolute Layout – Frame Layout – Relative Layout – Table Layout. Designing Your User Interface with View: TextView – Button – A standard push button – ImageButton – EditText.

UNIT III: Designing Your User Interface with View:
CheckBox – ToggleButton – RadioButton and RadioGroup – Progress Bar – AutoComplete TextView – Spinner – ListView – GridView – ImageView – ScrollView – Custom Toast Alert – Time and Date Picker.

UNIT IV: Inactivity:
Introduction – Intent – Intent filter – Activity Life Cycle – Broadcast Life Cycle – Service.

UNIT V: SQLite Database in Android:
SQLite Database – Need for SQLite – Creation and connection of the database – Extracting value from Cursors – Transactions.

TEXT BOOK :
1.Prasanna Kumar Dixit – Android - Vikas Publishing House Private Ltd. ,2014

REFERENCE BOOKS
1. Reto Meier - Professional Android 4 Application development - John Wiley & Sons Inc. , 2012
2. John Horton - Android programming for beginners - 2nd edition, 2018
3. Dawn Griffiths- Head first android Development: A brain- friendly guide, 2nd edition, 2017

COURSE OUTCOME:
On the successful completion of the course, students will be able to
CO1: Gain basic idea of XML and using it to develop an Android application – K1
CO2: Familiarize themselves with the concept of UI components and SQLite Database – K1
CO3: Implement GUI concepts in Android Platform – K3
CO4: Build any application for Android devices – K3
CO5: Knowledge to design mobileapp development on Android APP – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	M	S	M	M
CO2	S	S	M	W	M	M	S	S	M	M
CO3	S	S	S	M	M	S	M	M	M	M
CO4	S	S	S	S	S	S	S	S	W	S
CO5	S	S	M	S	M	M	S	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSP65	MOBILE APPLICATION DEVELOPMENT LAB	L	T	P	C
CORE -XVI			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To learn the basics of Android app
2. To understand how to create an android app
3. To practice the various features of android application
4. To practice mobileapp with SQLite database

Develop ANDROID programs for the following

1. Install Android Studio and Run Hello World Program.
2. Create an application with login module. (Username and Password).
3. Create spinner with strings taken from resource folder (res>>value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all subjects in your course and on selecting a particular subject teacher – in - charge of that subject should appear at the bottom of the screen.
6. Create an application with three option buttons. On clicking a button, color of the screen will change.
7. Create an application for hotel menu card using CheckBox widget and provide toast message for displaying item names with quantity ordered and total price of the items.
8. Create an application for rating two images and display highest rating value using RatingBar.
9. Create a Login application. On successful login, pop up the message.
10. Create an application using Date and Time Component display your Birthdate and Birth time
11. Create an application to perform create, insert, update, delete and retrieve operations on SQLite database.
12. Create an application to perform update operation on SQLite database.
13. Create an application to perform delete and retrieve operations on SQLite database.

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1: Design and develop applications for mobile devices – K3
CO2: Develop applications with various UI components using Java and XML – K3
CO3: Build an application using SQLite Database – K3
CO4: Know how to launch developed applications in mobile devices – K1
CO5: Design an application using SQlite database – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	M	M	S	M	S
CO2	S	S	M	S	M	M	S	S	M	S
CO3	S	S	W	M	M	S	M	M	M	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	M	W	M	M	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CST63	ARTIFICIAL INTELLIGENCE	L	T	P	C
CORE -XV			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To summarize the basics of AI and Machine learning.
2. To understand different search methods in AI
3. To analyze the various logics and applications of Machine Learning
4. To interpret the different learning methods in Expert Systems

UNIT I: Definition

Artificial intelligence meaning- The AI problems – The underlying assumption – What is an AI Techniques? – The level of the model. Problems, problem spaces, and search: Defining the system – problem characteristics – production system characteristics.

UNIT II: **Heuristic search techniques**

Heuristic search techniques: Generate and Test – Hill climbing – Best –first search – Problem reduction – Constraint satisfaction – Means –ends analysis. Knowledge representation issues: Representations and mappings – Approaches to knowledge representation.

UNIT III: **Predicate logic**

Using predicate logic: Representing simple facts in logic – Representing instance and ISA relationships – computable functions and predicates resolution – natural deduction. Representing Knowledge using rules: Procedural versus declarative knowledge – Logic programming – Forward versus Backward reasoning – Matching – Control Knowledge.

UNIT IV: **Game playing**

Game playing: Overview – The minimax search procedure – Adding alpha – beta cutoffs – Additional refinements – Iterative Deepening – References on specific games. Understanding: What understands? What makes understanding hard? Planning- The blocks world- components of a planning system –Good stack planning-Coral Stack planning-Non linear planning using constraint posting.

UNIT V: Expert systems

Expert systems: Representing & using domain knowledge – Expert system shells – Knowledge acquisition. Perception and Action: Real-time search – perception- Action – Robot Architectures.

TEXT BOOK:

1. Elaine rich, Kevin Knight, Shivashankar B Nair - Artificial Intelligence - Tata McGraw Hill 3rd Edition, 2011

REFERENCE BOOKS:

1. Stuart Russell - Artificial Intelligence: A Modern Approach - Pearson 3rd Edition, 2013
2. Deepak Khemani - A First Course in Artificial Intelligence - McGraw Hill 2013
3. Mishra R. B. - Artificial Intelligence - Prentice Hall of India 2010

COURSE OUTCOMES:

On the Successful completion of the course, students will be able to

CO1: Learn about the artificial intelligence problem and its characteristics – K1

CO2: Demonstrate the fundamentals of heuristic search techniques and reasoning for problem solving – K3

CO3: Understand the problem-solving using predicates – K2

CO4: Describe the concepts of expert systems with case studies for various applications – K1

CO5: Interpret different learning methods in expert systems – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	M	S	S
CO2	S	S	M	S	M	S	S	S	M	M
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	M	S	S	M	S	S	M	M

S – Strongly Correlating - 3 Marks

M – Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE641	CHOICE I	L	T	P	C
ELECTIVE IV		INTERNET OF THINGS	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To explore various components of Internet of things such as Sensors, inter-networking and cyber space.
2. To design and implement IoT circuits and solutions.
3. To understand the concepts of Internet of Things
4. To build IoT applications.

UNIT I: Introduction to IoT

Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs

UNIT II: IoT& M2M

Machine to Machine, Difference between IoT and M2M, Software define Network

UNIT III: Network& Communication aspects

Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.

UNIT IV: Challenges in IoT

Design challenges, Development challenges, Security challenges, Other challenges - Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications.

UNIT V: DevelopingIoTs

Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python.

TEXT BOOK

Vijay Madisetti, ArshdeepBahga - Internet of Things: A Hands-On Approach - Orient Blackswan Private Limited - New Delhi, 2014

REFERENCE BOOKS:

1. Samuel Greengard, The Internet of things, The MIT Press, 2015.

COURSE OUTCOMES:

On Successful completion of the course, students will be able to

CO1: Explain the components of IoT – K1

CO2: Make use of IoT Circuits to obtain solutions – K3

CO3: Interpret different design challenges faced in IoT– K2

CO4: DevelopIoTapplications in Python – K3

CO5: Deign sensor based application using Python – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	S	M	S	S
CO2	S	S	S	S	M	W	S	S	S	S
CO3	S	W	S	M	S	S	S	S	S	M
CO4	S	S	S	S	S	S	W	S	S	S
CO5	S	S	S	M	S	S	S	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSE642	CHOICE II	L	T	P	C
ELECTIVE IV		R PROGRAMMING	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To learn R-Programming environment and libraries
2. To understand the basics in R programming in terms of constructs, control statements and built-in functions
3. To analyze to apply R programming for matrix and vector processing
4. To visualize data using graphs and chart

UNIT I INTRODUCTION:

Getting R - Downloading R - R Version -32-bit vs. 64-bit - Installing - Installing on Windows - Installing on Mac OS X - Installing on Linux - Microsoft R Open - Conclusion. The R Environment - Command Line Interface - RStudio - RStudio Projects - RStudio Tools - Git Integration - Microsoft Visual Studio - R Packages - Installing Packages - Uninstalling Packages - Loading Packages - Unloading Packages - Building a Package

UNIT II BASICS OF R:

Basics of R –Basic Math–Variables–Variable Assignment– Removing Variables–Data Types–Numeric Data–Character Data–Dates–Logical. Vectors–Vector Operations–Factor Vectors.Calling Functions–Function Documentation–Missing Data– Pipes–Advanced Data Structures–dataframes–Lists–Matrices–Arrays.

UNIT IIIREADING DATA INTO R:

Reading Data into R - Reading CSVs - read_delim- fread. Excel Data - Reading from Databases - Data from Other Statistical Tools- R Binary Files- Data Included with R - Extract Data from Web Sites - Simple HTML Tables - Scraping Web Data - Reading JSON Data

UNIT IVGRAPHICS IN R:

Statistical Graphics - Base Graphics - Base Histograms - Base Scatterplot -Boxplots. ggplot2 - ggplot2 Histograms and Densities- ggplot2 Scatterplots - ggplot2 Boxplots and Violins Plots - ggplot2 Line Graphs - Themes. Writing R functions - Hello, World! - Function Arguments- Default Arguments - Extra Arguments- Return Values- do call.

UNIT VCONTROL STATEMENTS:

Control Statements - if and else - switch–ifelse - Compound Tests. Loops, the Un-R Way to Iterate - for Loops - while Loops - Controlling Loops. Group Manipulation - Apply Family - aggregate - Speed versus Convenience–datatable - Keys–data table Aggregation.

TEXT BOOK

1. Jared P. Lander - R for Everyone: Advanced Analytics and Graphics - Addison-Wesley Professional, 2nd Edition, 2017

REFERENCE BOOKS:

1. Gardener. M -Beginning R: The Statistical Programming Language - Wiley India Pvt. Ltd., New Delhi, First Edition, 2017.

2. Kabacoff, R.I. - R in Action: Data analysis and graphics with R - Manning publications company, Shelter Island, Second Edition, 2011.
3. Andrie de Vries, JorisMeys - R Programming for Dummies - Wiley India Private Ltd., New Delhi, Second Edition, 2015.

COURSE OUTCOMES:

On the Successful completion of the course, students will be able to

CO1: Explain the basic R programming concepts – K1
CO2: Make use of functions and packages in R – K3
CO3: Interpret various statistical models in R Program – K2
CO4: Develop functions and control statements in R – K3
CO5: Knowledge to apply R programming for matrix and vector processing – K1, K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	S	S	M	S
CO2	S	S	S	W	M	S	S	M	S	M
CO3	S	S	S	M	S	S	W	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSS64	IMAGE PROCESSING LAB	L	T	P	C
SKILL BASED ELECTIVE -IV			2	-	-	2
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To understand the spatial image enhancement functions on Bitmap image
2. To practice filter operations in image processing
3. To perform Smoothening & sharpening concepts in image processing
4. To expertise in performing image processing tools with various techniques

List of Programs

1. Implement the spatial image enhancement functions on a bitmap image – mirroring(Inversion)
2. Implement the spatial image enhancement functions on a bitmap image – notation(Clockwise)
3. Implement the spatial image enhancement functions on a bitmap image – Enlargement (Double Size)
4. Implement (a) Low Pass Filter (b) High Pass Filter
5. Implement (a) Arithmetic Mean Filter (b) Geometric Mean Filter
6. Implement Smoothing and Sharpening of an eight bit color image
7. Implement (a) Boundary Extraction Algorithm (b) Graham & #39; Scan Algorithm
8. Implement (a) Edge Detection (b) Line Detection
9. Display an image and its histogram
10. Write a Program to Perform Shrinking, Zooming and Cropping of an image
11. Write a Program to perform the experiment for histogram equalization.
12. Write a Program to Perform blurring and de-blurring on an image.
13. Write a Program to Remove salt and pepper noise in an image.
14. Write a Program to Perform Edge detection using Operators.
15. Write a Program to Perform2-D DFT and DCT.
16. Write a Program to Perform DWT of images.
17. Implement a function for image segmentation.
18. Implement a function for image morphology that analyze the form and shape detail of image structures.
19. Implement a function for Image Restoration.
20. Models for representing the color and methods of processing the color plane

COURSE OUTCOMES:

On the Successful completion of the course, students will be able to

CO1: Explain the spatial image enhancement concept – K1
CO2: Make use of filter and sharpening techniques in image processing – K2
CO3: Interpret zooming and cropping methods inimage processing – K2
CO4: Implement image enhancement, restoration and segmentation techniques – K3
CO5: Create models & methods for processing color pane – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	M	S	S	M	S
CO2	S	S	S	S	M	S	W	M	S	S
CO3	S	S	S	M	W	S	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	M	S	S	S	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

NON-MAJOR ELECTIVE
(OFFERED BY PARENT DEPARTMENT)

COURSE CODE	U21CSN31	WEB DESIGNING USING HTML LAB	L	T	P	C
NME - I			2	-	-	2
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To Use formatting tags in HTML
2. To recognize How to Insert the Image file in web pages.
3. To understand How to navigate through web pages.
4. To become Master in creating Web pages using basic HTM tags.

LAB Exercises

1. Web page creation using head, title, body, h1 – h6.
2. Web page creation using formatting tags (bold, italic, underline etc)
3. Ordered list
4. Unordered list
5. Definition list
6. Marquee creation
7. Web page with images
8. Web page creation with various font styles and body colors.
9. Hyper link
10. Tables
11. Frames
12. Forms

COURSE OUTCOMES:

On the Successful completion of the course, students will be able to

CO1: Understand the concepts of webpage - K2
CO2: Analyze various tags in HTML – K4
CO3: Gain knowledge in creating webpage – K1
CO4: Design new webpages using HTML – K3
CO5: Recognize to navigate the web pages using HTML – K2

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	S	S	S
CO2	S	S	M	S	M	W	S	S	S	S
CO3	S	W	M	S	S	S	S	S	S	S
CO4	S	S	S	M	S	S	M	M	M	M
CO5	S	S	S	M	S	S	S	W	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21CSN42	PHOTO DESIGNING TOOLS	L	T	P	C
NME - II			2	-	-	2
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					

OBJECTIVES:

1. To navigate Photoshop's Workspace, Create & setup documents
2. To Understand about the Layers and Masking.
3. To work with effects, filters and adjustments
4. To create a broad range of design skills pertaining to publication & web design.

Exercises

1. Album preparation
2. Invitation Preparation
3. Wall Papers
4. Visiting Card
5. Background Changing and Removing
6. Birthday Card
7. Friendship Card
8. Wedding invitation Card
9. Cloning an Image
10. Flex Designing
11. Photo Editing
12. Book Cover

COURSE OUTCOMES

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

CO1: Design real world applications using photoshop – K3
CO2: Analyze new features in Photoshop – K4
CO3: Develop new drawings using Photoshop – K3
CO4: Expertise to work with Photoshop – K1
CO5: Design skills pertaining to publication & web design – K3

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	M	S	S	M	S
CO2	S	S	M	S	M	W	S	S	M	S
CO3	S	S	M	S	S	S	S	S	S	S
CO4	S	S	W	M	S	S	S	M	S	M
CO5	S	S	M	S	S	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

Value Added Course

COURSE CODE	U21CSV51	QUANTITATIVE APTITUDE	Hours	C
SEMESTER V			30	2
Cognitive Level	K1: Recall	K2: Understand K3: Apply K4: Analyze		

OBJECTIVES:
1. To equip with the relevant skills to appear for various competitive examinations.
2. To acquire right skills to tackle aptitude problems.
3. To improve the speed of solving problems
4. To solve problems with ease and confidence.

UNIT I: Numbers - HCF & LCM of numbers – Decimal fraction
UNIT II: Average - Problems on numbers – Problems on Ages
UNIT III: Percentage – Profit &loss - Ratio& Proportion
UNIT IV: Time &work – Time & Distance – Problems on Trains
UNIT V: Simple Interest – Compound Interest - Permutation & Combination. (13 Hours)

TEXT BOOK
1. Aggarwal, R.S. - Quantitative Aptitude for Competitive Examinations, New Delhi: S.Chand Publications, Seventh Revised Edition, Reprint 2008.

COURSE OUTCOMES
After Completion of this Course, Students will be able to
CO1: Acquire right skills to tackle aptitude problems – K1
CO2: Improve mental calculations – K2
CO3: Solve problems with ease and confidence – K3
CO4: Improve the speed of solving problems and equip them employable – K2
CO5: Realize the importance of quantitative aptitude methods – K1

MAPPING OF CO'S WITH PO'S AND PSO'S

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	M	S	S	S	M	S
CO2	S	S	M	S	S	M	W	S	S	M
CO3	S	S	M	S	S	S	S	S	S	S
CO4	S	M	S	M	S	W	S	M	S	W
CO5	S	S	M	S	S	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

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MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

B.SC INFORMATION TECHNOLOGY

UNDER CBCS
(2021-2022 ONWARDS)

DEPARTMENT OF COMPUTER SCIENCE

B.SC. INFORMATION TECHNOLOGY

1. About the Programme

B.Sc. IT (Information Technology) is a three years undergraduate degree programme. Information technology is all about storing, processing and managing information of an organization. B.Sc. IT course is designed to help students understand the process of managing huge data and information of an organization, analyze the performance of the computer system and servers and ensures secure transfer of data in a network.

Students who have interest in networking, network security system, communication, database management, Information technology systems can join the course. The course is designed keeping in mind the need of the industry and the need to manage bulk data that is produced in an organization on a daily basis.

B.Sc. IT graduates become professionals who have analytical and logical thinking abilities to solve real-world problems in the IT field. They have the knowledge to identify problems in the IT and infrastructure, analyze them and also find solutions for the same.

2. Programme Educational Objectives(PEOs)

PEO1: Demonstrate core competence in computing and mathematics to design& analyze software engineering problems.

PEO2: Develop insights in foundational areas of Information Technology to address real-world problems

PEO3: Collaborate with industry, academic and research institutions for product development and research.

PEO4: Inculcate a high degree of professionalism, effective communication skills and team spirit to work on multidisciplinary projects

PEO5: Practice technical standards in advanced computing and networking

3. Eligibility – Hr. Sec. Certification

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	**10**	**25**	**10**	**25**
External	**30**	**75**	**30**	**75**

  - **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
  - **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade

(Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

Program Outcomes (POs)

Upon completion of the B. Sc. Information Technology programme, students will be able to:

PO1	Apply knowledge of scientific theories and methods in advanced computing techniques
PO2	Proficiency in oral and Written Communication
PO3	Identify, analyze and design the system to solve information technology related problems
PO4	Design the System with environmental consciousness and sustainable development
PO5	Function in a multidisciplinary team by working cooperatively, creatively and responsibly as a member of a team

Programme Specific Outcomes (PSOs)

PSO1	Demonstrate logical and analytical thinking abilities in the field of IT
PSO2	Engage in lifelong learning and professional development through Higher Education and research.
PSO3	Ability to identify the resources to build and manage the IT infrastructure in order to solve real world problems
PSO4	Ability to work and communicate effectively in interdisciplinary environment

B.Sc. (Information Technology)

FIRST SEMESTER							
Course Code	**Title of the Course**	**Credits**	**Hours**		**Int**	**Ext**	**Total**
			L	**P**			
U21LTA11	TAMIL I- PART-I	3	6	-	25	75	100
U21LEN11	ENGLISH I- PART-II	3	6	-	25	75	100
U21ITT11	CORE I –Programming in C	4	5	-	25	75	100
U21ITP11	CORE II – Programming in C Lab	4	-	6	25	75	100
U21ITA11	ALLIED I – Mathematical Foundation	4	5	-	25	75	100
U21EVS11	Environmental Studies	2	2	-	25	75	100
U21PEPS11	Professional English I	4	6	-	25	75	100
	Total	**24**	**36**				**700**
SECOND SEMESTER							
U21LTA22	TAMIL II-PART-I	3	6	-	25	75	100
U21LEN22	ENGLISH II- PART-II	3	6	-	25	75	100
U21ITT21	CORE III - Fundamentals of Data Structures	4	5	-	25	75	100
U21ITP22	CORE IV - Data structures using C++ Lab	4	-	5	25	75	100
U21ITA22	ALLIED II - Digital Principles and Computer Organization	4	5	-	25	75	100
U21VAE21	Value – Education	3	3	-	25	75	100
U21PEPS22	Professional English II	4	6	-	25	75	100
	Total	**25**	**36**				**700**

THIRD SEMESTER							
Course Code	**Title of the Course**	**Credits**	**Hours**		**Int.**	**Ext.**	**Total**
			T	**P**			
U21LTA33	TAMIL III	3	6	-	25	75	100
U21LEN33	ENGLISH I	3	6	-	25	75	100
U21ITT31	CORE V - Relational Database Management System	4	5	-	25	75	100
U21ITA33	ALLIED III –Operations Research	4	5	-	25	75	100
U21ITE311/ U211IT312	ELECTIVE I - Relational Database Management System LAB/ Graphics using C++ Lab	3	-	4	25	75	100
U21MSS31	**SBE I**- Managerial Skills	2	-	2	25	75	100
	Non-Major Elective – I:	2	2	-	25	75	100
	Total	**21**	**30**				**800**
FOURTH SEMESTER							
Course Code	**Title of the Course**	**Credits**	**Hours**		**Int.**	**Ext.**	**Total**
			T	**P**			
U21LTA44	TAMIL IV	3	6	-	25	75	100
U21LEN44	ENGLISH IV	3	6	-	25	75	100
U21ITT41	CORE VI – Object Oriented Programming in Java	4	4	-	25	75	100
U21ITP43	CORE VII – Object oriented Programming in JAVA lab	4	-	4	25	75	100
U21ITA44	ALLIED IV – Management Information System	4	4	-	25	75	100
U21ITE421 / U21ITE422	**Elective II** **1.** System Software 2.Mobile Computing	3	3	-	25	75	100
U21ITS42	**SBE II**- Computer Skills for Office Management	2	-	2	25	75	100
	Non -Major Elective –II	2	2	-	25	75	100
	Total	**25**	**31**				**900**

FIFTH SEMESTER							
Course Code	**Title of the Course**	**Credits**	**Hours**		**Int.**	**Ext.**	**Total**
			T	**P**			
U21ITT51	CORE VIII- Computer Networks	4	5	-	25	75	100
U21ITT52	CORE IX – Operating System Concepts	4	5	-	25	75	100
U21ITT53	CORE X – Web technology	4	5	-	25	75	100
U211TT54	CORE XI – Computer Graphics	4	5	-	25	75	100
U21ITP54	CORE XII –Web Technology – Lab	4	-	5	25	75	100
U21ITE531/ U21ITE532	**ELECTIVE – III** 1. Multimedia Applications 2. E-Commerce	3	3	-	25	75	100
U21ITS53	**SBE III**- Operating System (OS) Lab	2	2	-	25	75	100
	Total	**25**	**30**				**700**
SIXTH SEMESTER							
Course Code	**Title of the Course**	**Credits**	**Hours**		**Int.**	**Ext.**	**Total**
			T	**P**			
U21ITT61	CORE XIII – Internet of Things	4	5	-	25	75	100
U21ITT62	CORE XIV – Data mining	4	5	-	25	75	100
U21ITT63	CORE XV – Artificial Intelligence	4	-	5	25	75	100
U21ITP65	CORE-XVI-Internet of Things (IoT) Lab	4	-	5	25	75	100
U21ITR61	CORE XVII- Project	4	-	5	25	75	100
U21ITE641 U21ITE642	ELECTIVE –IV 1. Ethical Hacking 2. Information Security	3	3	-	25	75	100
U21ITS611	**SBE IV**– Image Processing Lab	2	-	2	25	75	100
U21EAS61	Extension Activities	3	-	-	25	75	100
	Total	**28**	**30**				**800**
Grand Total		**148**	**193**		**Grand Total**		**4400**

ELECTIVE PAPERS

Course Code	Title of the Course
ELECTIVE – 1	
U21ITE311	Relational Database Management System Lab
U21ITE312	Graphics using C++ Lab
ELECTIVE – 2	
U21ITE421	System Software
U21ITE422	Mobile Computing
ELECTIVE – 3	
U21ITE531	Multimedia Applications
U21ITE532	E Commerce
ELECTIVE – 4	
U21ITE641	Ethical Hacking
U21ITE642	Information Security

Non-Major Electives

The Candidates, who have joined the UG Programme, can also undergo Non Major Elective offered by other Departments.

Course Code	Title of the Course
U21PEN31	NME I: Web Designing using HTML
U21ITN42	NME II: Photoshop

Skill Based Electives

Course Code	Title of the Course
U21ITJ31	SBE I: Managerial Skills
U21ITJ42	SBE II: Computer Skills for Office Management
U21ITS51	SBE III: Operating System Lab
U21ITS61	SBE IV: Image Processing Lab

ADDITIONAL CREDIT COURSES

SEMESTER	COURSE CODE	COURSE	CREDITS
III	U21IT031	SWAYAM - Online Course	2
IV	U21ITI41	Internship	2
V	U21ITV51	Quantitative Aptitude - Value Added Course	2

Semester – I

COURSE CODE	U21ITT11	PROGRAMMING IN C	L	T	P	C
CORE -I			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Course Objectives	1. To understand and develop well-structured programs using C language. 2. To learn how to implement basic data structures through C language. 3. To deal with different memory allocation & input/output methods. 4. Problem solving through computer programming using C Language.					

Unit I : Overview of C

Introduction - character set - C tokens - keyword & identifiers –constants – variables - data types – Declarations of variables – Arithmetic, Relational, Logical, Assignment, conditional, Bit wise, special, increment and decrement operators - Arithmetic expressions - Evaluation of expression - Operator precedence & associativity - Mathematical functions - Reading & writing a character - Formatted input and output

Unit II:Control Statements

If, if else, switch, break, continue – Operator - The GOTO statement. – Loop Control Statements: Introduction – for, nested for loops – while, do-while statements – Arrays: One-dimensional - Two dimensional - Multidimensional arrays - Recursion - functions with arrays - functions with arrays

Unit III:String Manipulation and User-Defined Functions

Declaring and initializing string variables – Reading strings from terminal - Writing strings to screen - String handling functions - User-defined functions: Need for user defined functions – Types of functions - calling a function category of functions - no arguments and no return values – Arguments but no return values- Arguments with return values–The scope and lifetime of variables in functions

Unit IV : Structures and Pointers

Definition- Structure initialization - Comparison of structure variables - Arrays of structures - Arrays within structures - Structures within structures – unions. Pointers: understanding pointers - accessing the address of a variable - declaring and initializing pointers - accessing a variable through its pointers - pointer expressions – pointers and arrays - pointers and character strings - pointers and functions - pointers and structures

Unit V : File Management in C

Defining and opening a file - closing file - I/O operations on files - error handling during I/O operations - Random access to files - command line arguments. Dynamic memory allocation: Introduction- dynamic memory allocation – MALLOC – CALLOC – REALLOC - The pre-processor.

Text Book

1. E.Balagurusamy, Programming In ANSI C, Tata McGraw Hill 7th Edition,2017

Reference Books

1. Byron Gottfried,Programming with C Tata McGraw Hill, 3rd Edition, 2013
2. YashwvantKanetkar,Let us C, BPB Publications 13th Edition, 2014

Course Outcomes:

On the successful completion of the course, students will be able to
CO1: Apply the syntax and semantics of c language
CO2: Apply the concepts of functions and arrays in solving real world problems
CO3: Demonstrate structures, union and pre-processing techniques
CO4: Analyse and develop programs using pointers and file concept
CO5: Able to create programs and applications

Mapping of COswith POsandPSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	M	M
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	S
CO5	S	S	M	S	S	M	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT12	PROGRAMMING IN C LAB	L	T	P	C
CORE -II			-	-	6	4
Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze					
Course Objectives	1. ToImbibe the in-depth practical experience in „C" programming. 2. To impart knowledge on basic concepts in C 3. To make them familiar for structure and files in C 4. To create c program for real world examples					

List of Programs

1. Finding the largest and smallest of three numbers using if, if-else.
2. Checking for an Armstrong number using if, if-else
3. Solving Quadratic equations using switch statement
4. Finding the area of different shapes using switch statement.
5. Ascending and descending order of numbers using arrays.(Largest and smallest numbers)
6. Sorting of names in alphabetical order.
7. Program to search the given element by using linear search.
8. Matrix operations i) Addition ii) Subtraction iii) Multiplication iv) Transpose
9. Finding factorial of a number Using Recursive function
10. Generating Fibonacci series Using Recursive function
11. String manipulations using string functions
    i) String length ii) String comparison iii) String copy
12. String manipulations without using string functions
    i) String length ii) String comparison iii) String copy
13. Palindrome checking Using function
14. Counting characters, words and lines Using function
15. Generate salary slip of employees using structures.
16. Program to generate student mark list using array of structures
17. Programs for file handling (Sequential, Random)

Course Outcomes

On the successful completion of the course, students will be able to
CO1: Develop and execute programs using Operators and control Structures
CO2: Develop programs in C to solve any kind of real world problem
CO3: Apply the programming concepts of C in the standalone applications.
CO4: Have a depth understanding in C program features
CO5: Develop applications in a different scenario

Mapping of COs with POs and PSOs :

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	M	M	M	M	M	S	S
CO2	S	S	S	S	S	S	S	S	S
CO3	S	M	M	S	S	S	S	S	M
CO4	S	S	S	M	M	M	S	M	M
CO5	S	M	M	S	M	S	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITA11	MATHEMATICAL FOUNDATION	L	T	P	C
ALLIED –I			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To introduce the concepts of mathematical logic 2. To introduce the concepts of sets, relations, and functions. 3. To perform the operations associated with sets, functions, and relations. 4. To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.					

Unit 1 : Basic concepts of set theory

Basic concepts of set theory – Mathematical logic-introduction-statements-connectives-negation, conjunction, disjunction- statement formulas and truth tables- conditional and bi-conditional statements- tautology-contradiction-equivalence of formulas-duality law-Predicates and Quantifiers, Arguments.

Unit II : Operations on sets

Operations on sets – power set- Venn diagram Cartesian product-relations –functions- types of functions –composition of functions. Relations: Properties of binary Relation, equivalence, compatibility and partial ordering relations, Hasse diagram. Function: Inverse function Comport of functions, recursive Functions, Lattics and its Properties

Unit III : Matrix algebra

Matrix algebra-Introduction-Types of matrices-matrix operations- transpose of a matrix – determinant of matrix – inverse of a matrix- Cramer‟s rule: Matrix: finding rank of a matrix – normal form-echelon form –Cayley Hamilton theorem – Eigen values

Unit IV: Elementary Combinatorics

Elementary Combinatorics: Basics of counting, Combinations and Permutations , with repetition, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems, the principles of Inclusion, Exclusion. Pigeon hole principle and its application. Differential Calculus – Functions and limits – Simple Differentiation of Algebraic Functions — Evaluation of First and Second Order Derivatives – Maxima and Minima

Unit V: Vector Spaces

Vector Spaces: Vector spaces; subspaces; Linearly independent and dependent vectors ; Bases and dimension;coordinate vectors- Illustrative examples. Linear transformations; Representation of transformations by matrices; linear functional; Non singular Linear transformations; inverse of a linear transformation- Problems.

Text Books

1. P.R.Vittal, Business Mathematics and Statistics, Margham Publications, Chennai, 2020.

Reference Books

1. S.Vatsa, Discrete Mathematics, New Age International Limited Publishers, New Delhi, 2009

Course Outcomes

On the successful completion of the course, students will be able to

CO1: The course will help students to develop conceptual understanding
CO2: It acquire multiple strategies for solving problems.
CO3: The course will prepare students for success in future courses
CO4: It will help them develop skills for the workplace and as productive citizens.
CO5: Learn and apply multi variant analysis necessary.

Mapping of Cos with Pos and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	M	M
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	M	S	M	M	S	M	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

Semester-II

COURSE CODE	U21ITT21	FUNDAMENTALS OF DATA STRUCTURES	L	T	P	C
CORE - III			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To Understand about Stack & Queue. 2. To understand about tree & its traversal techniques. 3. To Understand about Graphs and its components. 4. The Student can get In-depth Knowledge inefficient utilization of memory by using appropriate data structures.					

Unit I: Array

Array: Axiomatization – Ordered Lists – Sparse Matrices – Representation of Arrays: Sequential Representation of Arrays – 3D Arrays.Stacks And Queues: Fundamentals – Amazing Problem – Evaluation of expressions – Multiple Stack and Queues.Data types – primitive and non-primitive, Types of Data Structures- Linear & Non Linear Data Structures.

Unit II: Linked List

Linked List: Singly Linked List - Doubly Linked list - Circular linked list - Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.– The Storage Pool - Polynomial Addition – Linked list and Dynamic Storage Management – Data Management concepts ,Garbage Collection and Compaction.

Unit III: Sorting

Sorting : Need of sorting, Types of Sorting , Insertion Sort, Quick Sort, Merge Sort, Heap Sort, Sorting On Several Keys, List and Table Sort, Performance of sorting – Best case and Worst case of sorting. Searching - Purpose of searching – types of searching - Linear Search, Binary Search. Application of sorting and searching

Unit IV: Tree

Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees- Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance , Graph-Matrix Representation Of Graphs, Elementary Graph operations,(Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree).

Unit V:Graphs

Graphs: Terminology and Representations: Introduction – Definitions and Terminology – Graph representations – Traversal, Connected components and Spanning Trees.Hashing: The symbol table,

Hashing Functions, Collision-Resolution Techniques, File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods

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Text Books

1. Ellis Horowitz, SartajSahni, Fundamentals of Data Structure Galgotia Publications, 1998.
2. Seymour Lipschutz ,Data Structures with C, Schaum's Outline Series, 2017

Reference Books

1. SartajSahni, Data Structure, Algorithms and Applications in C++ McGraw Hill, 1998.
2. A.Chitra, P.T.Rajan, Data Structures, Vijay Nicol Imprints Pvt. Ltd, McGraw HillEducationofIndiaPvt. Ltd., 2006.

Course Outcome:

On the successful completion of the course, students will be able to

CO1: Describe the basics of Ordered Lists and Representation of Arrays

CO2: Apply the knowledge of Linked list for solving problem in the real world.

CO3: Demonstrate the usage of Binary trees and Representation of Trees

CO4: Illustrate the performance of representation of Graphs and spanning Trees

CO5: Can analyze and apply various structures in different applications.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	S	S	S	S	S	M	M
CO3	S	S	S	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	M	M	M	S	S	S	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITP22	DATA STRUCTURE USING C++ LAB	L	T	P	C
CORE - IV			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To impart knowledge on Data Structures 2. To implement and differentiate single and double linked list 3. To illustrate stack to convert infix to postfix. 4. To develop programs for De queue and Dictionary					

Lab Exercises

1. Program using array based stack push (), pop (), stackFull() and stackEmpty() functions.
2. Program to evaluate the given postfix expression using the stack
3. Program that uses stack operations to convert a given infix expression into its postfix equivalent
4. Program to add two polynomials using linked list.
5. Program to find Union of two single Linked Lists.
6. Program to Create a singly linked list of integers.
7. Program to Delete a given integer from the above linked list.
8. Program to Display the contents of the above list after deletion.
9. Program to eliminate duplicates from Linked List
10. Program to implement all the functions of a dictionary (ADT) using hashing
11. Program to implement a double ended queue ADT an array, using a doubly linked list.
12. Program that uses functions to perform the following:
13. Program to Create a doubly linked list of elements.
14. Program to Delete a given element from the above doubly linked list.
15. Program to Display the contents of the above list after deletion.

Course Outcomes:

Upon successful completion of the course the students will be able to
CO1: apply the concepts to solve problems using C++ programming language
CO2: implement the basic data structures using C++
CO3: solve real world problems using C ++Programming language
CO4: recognise the importance of Data Structure features
CO5: Can develop real time applications with features of data struture.

Mapping of COs with POs and PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	S	M	M
CO2	S	M	M	S	S	S	S	S	S
CO3	S	S	S	S	S	S	S	S	M
CO4	S	M	M	S	M	M	S	M	M
CO5	S	S	M	S	S	S	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITA22	DIGITAL PRINCIPLES & COMPUTER ORGANIZATION	L	T	P	C
ALLIED -II			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand computer fundamental and its role in problem solving. 2. Students will acquire the concept of flow of control and program structures. 3. To learn the operation of latches, flip-flops, counters, registers, and register transfers in the Computer organization. 4. To design two-level logic functions with AND, OR, NAND, NOR and XOR gates with minimum number of gate delays or literals					

Unit I: Number Representation

Number Representation-Number System: Binary, Hexadecimal-Octal Codes-BCD-Excess-3-Gray Code - ASCII - EBCDIC - Binary Arithmetic - 1"s Complement - 2"s Complement Representation-Error Detecting Codes-Hamming Codes. Introduction-Boolean Algebra- Demorgan"s Theorem-Sum Of Product method-Product of Sum method-Karnaugh Map.

Unit II: Logic Gates

Introduction - Logic Gates – Universal Gates – Decoder – Encoder – Multiplexer – De multiplexer - Half Adder - Full Adder - Half Subtractor - Full Subtractor. Flip-Flops - S-R Flip-flop - J-K Flip Flops. Sequential Circuits – Storage Elements: Latches, State Reduction and Assignment – Design Procedure – Registers and Counters – HDL Models of Sequential Circuits.

Unit III: Machine Language

Introduction: Machine Language - Assembly language – Assembler - Programming Arithmetic & Logic Operations – Input - Output Programming. Basic Computer Organization and Design Instruction Codes - Computer Registers -Computer Instruction - Timing & Control Instruction Cycles-Memory Reference Instruction.

Unit IV: I/O Organization

I/O Organization - Peripheral Devices - I/O Interface - Mode of Transfers - DMA.Analysis and Design of Asynchronous Sequential Circuits – Reduction of State and Flow Tables – Race-free State Assignment – Hazards.RAM – Memory Decoding – Error Detection and Correction – ROM – Programmable Logic Array – Programmable Array Logic – Sequential Programmable Devices

Unit V: Memory Organization

Memory Organization - Memory Hierarchy - Main Memory - Auxiliary Memory -Associative Memory - Cache Memory - Virtual Memory. Dynamic Storage Management – Data Management concepts ,Garbage Collection and Compaction.Programmable Logic devices - Programmable Logic Array - Programmable Array Logic - Sequential Programmable device - Application Specific Integrated circuits

Text Books:

1. Albert Paul Malvino& Donald P.Leach-Digital Principles and Applications- IV Edition-Tata McGraw Hill Company Limited, 1982.
2. Morris Mano,Computer System Architecture, Pearson Publication, Third Edition, 1981.

Reference Books:

1. P.K.Sinha&PritiSinha , "Computer Fundamentals", BPB Publications, 2007.
2. Dr.AnitaGoel, Computer Fundamentals, Pearson Education, 2010.
3. Alexis Leon, Fundamentals of Information Technology, Vikas Publication, 2009.
4. P.S.Manoharan, Digital Principles & System Design, Revised Edition - Charulatha Publication, 2013.

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: Understands the hardware and software, types and components of the computer
CO2: Recognizes the problem solving fundamental key points.
CO3: Sketch out the representation of numbers and codes in the computer.
CO4: Knows the digital computers internal components and the execution of the instructions
CO5: Learn and work on new operating system and different platforms

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	M	S	S	M	M	S	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT31	RELATIONAL DATABASE MANAGEMENT SYSTEM	L	T	P	C
CORE -V			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand the overview of Data Base systems & Data Models. 2. To modify and maintain the database structure. 3. To Understand about the PL/SQL / SQL. 4. The Students can able to handle the Database					

Unit I: Data base systems

Introduction: Purpose of data base systems – View of data – Data models – Database languages – Transaction management – Storage management – Database Administrator – Database users – Overall system structure.Storage Strategies: Indices, B-Trees, Hashing, Transaction processing: Recovery and Concurrency Control, Locking and Timestamp based Schedulers, Multiversion and Optimistic Concurrency Control Schemes.

Unit II: Entity – Relationship Model

Entity – Relationship Model-Basic concepts – Design issues – Mapping cardinalities – Keys – E-R Diagrams – Weak entity sets – Extended E-R features – Design of an E-R Database scheme – Reduction of an E-R scheme to table.Database System Architecture – Data Abstraction, Data Independence, Data Definitions and Data Manipulation Languages.

Unit III: Relational Model

Relational Model: Structure of relational databases – Relational algebra – The Tuple Relational Calculus – The domain relational calculus – Extended relational – Algebra operations – Modification of the database – Views.Query Processing and Optimization: Evaluation of Relational Algebra Expressions, Query Equivalence, Join strategies, Query Optimization Algorithms.

Unit IV : Other Relational Languages & Integrity Constraints

Other Relational Languages & Integrity Constraints: Query by Example – Quel – Datalog – Domain constraints – Referential Integrity – Assertions – Triggers – Functional dependencies. Relation Query Languages, Relational Algebra, Tuple and Domain Relational Calculus, SQL and QBE.

UNIT V: PL/SQL

PL/SQL – Relationships between SQL & PL/SQL –Advantages of PL/SQL – arithmetic & expressions in PL/SQL – Loops and conditional statements in PL/SQL – Exceptions Handling – Cursor management – Triggers – Functions & Procedures.Relational Database Design: Domain and Data dependency, Armstrong‟s Axioms, Normal Forms, Dependency Preservation, Lossless design, Comparison of Oracle & DB2.

Text Book

Abraham Silberschatz, Henry F.Korth, S.Sudarshan,Database System Concepts (third edition)-McGraw - Hill international editions, 1997.

Reference Books

1. Atre, Shaku, Database Structured Techniques for Design, Performance & Management - John Wiley & Sons, 1988.
2. James W Martin, Principles of Database Management - Prentice Hall, 1979.

Course Outcomes

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

CO1: Understand the fundamentals of database system.

CO2: Design and create tables in database and execute queries.

CO3: Have knowledge in network and hierarchical data base system.

CO4: Design a database based on a data models using normalization.

CO5: Can develop own database in own application

Mapping of COs with POs and PSOS:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	S	S	M	S	M	M	S	M	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITA33	OPERATIONS RESEARCH	L	T	P	C
ALLIED III			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand the Mathematical Formation of L.P.P. 2. To Understand the Simplex Method & Artificial Variables. 3. To understand the transportation Problem and Assignment Problem. 4. The Student can Formulate and solve problems as networks and graphs using special solution algorithms.					

Unit I: Introduction to Operations Research

Development of OR – Definition OR – General methods for solving OR models – main characteristics and Phases of OR study – tools, techniques and methods – scientific methods in OR – Scope of OR. Introduction to Operations Research (OR) Operations Research definition and origin. Essential features of the OR approach. Quantification of factors. Stages in OR study.

Unit II: Linear Programming Problem

Linear Programming Problem: Introduction to Foundation mathematics and statistics Linear Programming (LP), LP and allocation of resources, LP definition, Linearity requirement - Formulation of L.P.P. - Maximizing and Minimizing Problem – Mathematical– Stack and Surplus variables – Graphical Solution of L.P.P.

Unit III: Simplex Method

Simplex Method – Computational Procedure – Artificial Variables Technique - Two Phase Method – Duality in Linear Programming. Example containing mixed constraints, Minimization example for similar limitations. Example containing mixed limitations, Duality Theory, The Primal Vs- Dual Solutions

Unit IV: Transportation problem

Mathematical formulation of transportation problem – optimal solution of Transportation Problems – Methods for obtaining an Initial Feasible Solution – Optimal Solution – Degeneracy in Transportation Unbalance Transportation Problems. SolutionMethods: Feasible Solution: The Northwest Method, The Lowest Cost Method

Unit V: Assignment Problem

Mathematical Formulation of Assignment Problem - Assignment Algorithm – Optimal Solution of Assignment Problem - Unbalance Assignment Solution – Balanced Assignment Solution. .Optimal Solution: The Stepping Stone Method, Modified Distribution (MODI) Method. MSPT:- The Dijkestra algorithm, and Floyd‟s Algorithm {Shortest Route Algorithm}

Text Books:

1. KantiSwarup, P.K Gupta &Manmohan, Operations Research - Sultan Chand & Sons Publications, Sixteenth Revised Edition, 2009.
2. S.D.Sharma - Operations Research, McGraw Hill, 2013.

Reference Books:

1. Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, Resource Management Techniques – AR Publications Revised Edition, 2010.

Course Outcome

1. Solve Linear Programming Problems
2. Solve Transportation and Assignment Problems
3. Understand the usage of game theory and Simulation for Solving Business Problems
4. Solve the Problem by using special solution Algorithm
5. Solve and manipulate different complex problems in an optimized way.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	M	S	M	S	M	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	**U21ITE311**	**CHOICE –I**	**L**	**T**	**P**	**C**
ELECTIVE-I		**RELATIONAL DATABASE MANAGEMENT SYSTEM LAB**	**-**	**-**	**6**	**4**
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To become familiar with SQL fundamental Concepts. 2. To Apply Normalization techniques to normalize a database 3. To know the connectivity of databases with controls (DAO,ADO & RDO) 4. The Student can Gain a good understanding of the architecture and functioning of Database Management Systems as well as associated tools and techniques.					

List Of Programs

1. Queries using DDL commands
2. Queries using DML commands
3. Program using conditional control, interactive controls & sequential controls.
4. Program using excepting handling
5. Programs using explicit cursors & implicit cursors
6. Program using PL/SQL tables & records
7. Programs using database triggers
8. Program to design procedures using In, Out, Parameter
9. Program to design procedures using functions
10. Program to design procedures using packages
11. Program using ADO connectivity.
12. Program using DAO connectivity.
13. Program using RDO connectivity.

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Describe the concepts of database technologies

CO2 Discuss PL/SQL including stored procedures, stored functions, cursors, packages

CO3 Apply constraints on a database using RDBMS

CO4 Demonstrate the concept of Triggers and Subroutines

CO5 Learn database connectivity and apply real time applications

Mapping of Cos with Pos and PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	S	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	M	S	S	M	M
CO4	S	S	S	S	S	S	S	M	S
CO5	M	S	S	S	M	M	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

Program List

COURSE CODE	U21ITE312	CHOICE II	L	T	P	C
ELECTIVE - I		GRAPHICS USING C++ LAB	-	-	6	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To apply the fundamentals of Graphics primitives using C++ 2. To create a program using 2D & 3D Transformations 3. To understand the features of line, circle and ellipse algorithms 4. To emphasize the properties of composite transformations in Graphics					

1. Draw a Line using DDA Algorithm
2. Draw a Line using Bresenham‟s Line Drawing Algorithm
3. Draw a Circle using Mid Point Circle Algorithm
4. Draw an Ellipse using Mid Point Ellipse Algorithm
5. Implement various attributes of Output primitives
6. Implement 2D Transformation
7. Implement 2D Composite Transformation
8. Clip a Line using Cohen Sutherland Clipping Algorithm
9. Implement 3D Transformation
10. Implement 3D Composite Transformation

Course Outcomes:

Upon successful completion of the course the students will be able to

CO1: apply the concepts to solve problems using C++ programming language
CO2: implement the basic data structures using C++
CO3: solve real world problems using C ++Programming language
CO4: recognise the importance of Data Structure features
CO5: Enable user interface environment.

Mapping of COs with POs and PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	S	M	S
CO2	S	M	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S
CO4	S	M	M	S	M	M	S	M	M
CO5	M	S	S	S	M	M	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT41	OBJECT ORIENTED PROGRAMMING IN JAVA	L	T	P	C
CORE -VI			4	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand the object-oriented paradigm in the Java programming language. 2. To know about the Package and Interfaces. 3. To Understand about Applets. 4. The use of Java in a variety of technologies and on different platforms. 5. To write Java application programs using proper program structuring					

Unit I: Java Basics

Java Basics: Review of Object oriented concepts, History of Java, Java buzzwords, JVM architecture, Data types, Variables, Scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, methods, Static block, Static Data, Static Method String and String Buffer Classes, Using Java API Document.

Unit - II : Inheritance And Polymorphism

Inheritance And Polymorphism: Basic concepts, Types of inheritance, Member access rules, Usage of this and Super key word, Method Overloading, Method overriding, Abstract classes, Dynamic method dispatch, Usage of final keyword. PACKAGES AND INTERFACES: Defining package, Access protection, importing packages, Defining and Implementing interfaces, and Extending interfaces. I / O

Unit – III: Exception Handling

Exception Handling: Exception types, Usage of Try, Catch, Throw, Throws and Finally keywords, Built-in Exceptions, Creating own Exception classes.MULTI THREADING: Concepts of Thread, Thread life cycle, creating threads using Thread class and Runnable interface, Synchronization, Thread priorities, Inter Thread communication.

Unit - IV : AWT Controls

AWT Controls: The AWT class hierarchy, user interface components- Labels, Button, Text Components, Check Box, Check Box Group, Choice, List Box, Panels – Scroll Pane, Menu, Scroll Bar. Working with Frame class, Colour, Fonts and layout managers. EVENT HANDLING: Events, Event sources, Event Listeners, Event Delegation Model (EDM), Handling Mouse and Keyboard Events, Adapter classes, Inner classes.

Unit V:Swings

Swings: Introduction to Swings, Hierarchy of swing components. Containers, Top level containers - JFrame, JWindow, JDialog, JPanel, JButton, JToggleButton, JCheckBox, JRadioButton, JLabel,JTextField, JTextArea, JList, JComboBox, JScrollPane.APPLETS: Life cycle of an Applet, Differences between Applets and Applications, Developing applets, simple applet.

Text Book

E.Balagurusamy Programming with Java – Sixth Edition – McGraw Hill Education Private Limited. 2019

Reference Books

1. Patrick Naughton, Herbert Schildt, *The Complete Reference Java 2*, India:McGraw Hill, 5th Edition, 2006.
2. Dr.K.Somasundaram, *Introduction to Java Programming*, India: Jaico Publishing, House, 2013.

Course Outcomes:

At the end of the course the student will be able to:

CO1: Describe the basics of OOP and the syntax of Java language
CO2: Discuss Input/Output functions with file manipulations using I/O Streams.
CO3: Analyze GUI programming applications using AWT packages.
CO4: Plan to Develop Java based Applications using GUI and user interface and database Connectivity
CO5: Can build their own application using OOPS concept.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	M	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	S	M	M	S	M	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITP43	OBJECT ORIENTED PROGRAMMING IN JAVA LAB	L	T	P	C
CORE VII			-	-	4	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. 2. To understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. 3. To Understand the principles of inheritance, packages and interfaces 4. The Student can develop software in the Java programming language.					

Exercise:

1. Arrays and flow control statements.
2. Run time exception And I/O exception.
3. Multi- Threading.
4. Layout Management.
5. GUI Components (Labels, Check box, Menus, Text, etc.)
6. Event Handling (Focus Events, Key Events, Paint Events, Text Events, Mouse Events, Window Events, Etc.)
7. Animation and Images.
8. Java Applet.
9. Java files management methods.
10. Java Streams.
11. JDBC (Java Database Connectivity).
12. Arithmetic Operation Using Java Script
13. Prime Number Using Java Script
14. Find Largest Number in Array Using Java Script
15. Palindrome Using Java Script

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: Solve problems using OOPs concept in Java

CO2: Implement simple software using JAVA

CO3: Implement the Input/Output functions with file manipulations using I/O Streams.

CO4: Implement the GUI programming applications using AWT packages.

CO5: Apply database connectivity using JDBC

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	M	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	M
CO5	S	S	M	M	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITA44	MANAGEMENT INFORMATION SYSTEM	L	T	P	C
ALLIED IV			4	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To Understand about the Decision Making Concepts. 2. To Understand about the Decision Support System. 3. To Design Data Base Requirements 4. The Student can develop the leadership role of Management Information Systems in achieving the business competitive advantage through informed decision-making.					

Unit I: Management Information System

Management Information System: Introduction to Management Information System – Management Information Systems – Role and Importance of Management.Structure of MIS – Operating Elements of Information system – Organization structure and theory.data and information- measuring data, information as a resource, information in organisational functions, types of information technology, types of information systems- transaction processing systems-management information systems

Unit II:Organisations and Computing

Organisations and Computing: Introduction, Modern Organisation-IT enabled- Networked-Dispersed- Knowledge Organisation, Information Systems in Organisations- what are information systems?, Brief history of computing- ENIAC: Way to commercial computers- Advent of artificial intelligence- advent of personal computing-Free Software Movement- Advent of Internet, The role of internet- Internet and Web: they are different-the internet changes everything

Unit III: Basic of Information systems

Basic of Information systems – Information and its role in Business – Components of Information Systems - Management System and decision making concepts: Decision Making Process – Process and Modeling in Decision Making.

Unit IV: MIS and Decision Making Concepts

MIS and Decision Making Concepts: Decision Making – Decision support system: Programmed and Non-programmed Decisions –DSS: Attributes, Benefits, Components, Classification and Types.

The competitive environment of business- partnering for mutual benefit- bargaining power of suppliers-bargaining power of buyers and customers-barriers to entry-threat of substitutes-industry regulations, Using IT for competing-competing on low cost-competing on differentiation

Unit V: Information System Requirements

Information System Requirements: Strategies for the determination of Information Requirements – Database Requirements – User Interface Requirements.The Need for Data Management- History of data use, Challenges of Data Management- data independence- reduced data redundancy-data consistency- data access- data administration- managing concurrency-managing security- recovery from crashes-application development, Database Concepts- fields, records and files- basic architecture, Data Warehouses- data mining uses

Text Books:

1. Gorgon Davis & Margret He H.D.Dlaon, Management Information System, McGraw Hill International Editions, 1994.

Reference Books:

1. RoberG.Murdick, Joel E.Ross and R.Clasggett,-Information System for Modern Management –PHI, 1990.
2. Jawadekar, Management Information System — TMH – 1997.
3. R.Schultheis, Management Information System, The Manager View –TMH, 1994.

Course Outcomes:

Upon completion of this course, students will be able to:

CO1: Relate the basic concepts and technologies used in the field of management information systems.

CO2: Compare the processes of developing and implementing information systems.

CO3: Outline the role of the ethical, social, and security issues of information systems.

CO4: Translate the role of information systems in organizations, the strategic management processes with the implication of management

CO5: Develop and handle large amount of data in a strategic manner.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	M	M	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	S	M
CO5	S	S	M	S	M	M	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITE421	CHOICE -I	L	T	P	C
ELECTIVE II		SYSTEM SOFTWARE	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand the relationship between system software and machine architecture. 2. To know the design and implementation of assemblers, macro processors, loaders, linkers and compilers. 3. To understand the process of scanning and parsing of a program. 4. To have clear knowledge about system software like assemblers, loaders, linkers, macro processors and compilers.					

Unit I: System Software Vs. Application Software

System Software Vs. Application Software, Different SystemSoftware– Assembler, Linker, Loader, Macro Processor, Text Editor,Debugger, Device Driver, Compiler, Interpreter, OperatingSystem(Basic Concepts only)SIC & SIC/XE Architecture, Addressing modes, SIC & SIC/XEInstruction set, Assembler Directives and Programming.

Unit II: Assemblers

Assemblers: Basic Functions of Assembler. Assembler output format – Header,Text and End Records- Assembler data structures, Two passassembler algorithm, Hand assembly of SIC/XE program, Machinedependent assembler features. Machine-Dependent Assembler Features – Machine-Independent Assembler Features – Assembler Design Options

Unit III: Loaders and Linkers

Loaders and Linkers: Basic Loader functions - Design of absolute loader, Simple bootstrapLoader, Machine dependent loader features- Relocation, ProgramLinking, Algorithm and data structures of two pass Linking Loader,Machine dependent loader features, Loader Design Options. Basic Loader Functions

Unit IV: Macro Processors

Macro Processors: Basic Macro Processor Functions – Machine-Independent Macro Processor Features – Macro Processor Design Options Anatomy of a device driver, Character and block device drivers,General design of device driversCompilers: Basic Compiler Functions – Machine-Dependent Compiler Features - Machine-Independent Compiler Features

Unit V: Debugging

Debugging Functions and Capabilities, Relationship with other partsof the system, Debugging Methods- By Induction, Deduction andBacktracking.Overview of Editing, User Interface, Editor Structure.

Text Book

1. Leland L. Beck &Manjula. D - System Software - An Introduction to Systems Programming - 3rd Edition. India: Pearson Education(2009).

COURSE CODE	U21ITE422	CHOICE -II	L	T	P	C

Reference Books

1. Dhamdhere.D.M - System Programming and Operating Systems - India: Tata McGraw Hill Education Private Limited. (2006)
2. Donovan.J.J - Systems Programming - India: Tata McGraw Hill Education Private Limited. (2001).

Course Outcomes:

On the Successful completion of the course, students will be able to

CO1: understand the relationship between system software and machine architecture.

CO2: know the design and implementation of assemblers, macro processors, loaders, linkers and compilers.

CO3: interpret various concepts of scanning and parsing of a program

CO4: discuss the processing of a HLL program for execution on a computer system

CO5: learn internal operations of the compiler.

Mapping of COs with POs and PSOs:

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	S	M	M	S	S	M	S	M	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

ELECTIVE II	**MOBILE COMPUTING**	**3**	**-**	**-**	**3**
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze				
Objectives	1. To clearly understanding the mobile communications environment 2. To get clear idea about Satellite Systems. 3. To Interface a mobile computing system to hardware and networks. 4. The Student can develop their knowledge in mobile computing system and how to interact with servers and database systems.				

Unit I: Introduction

Introduction: Applications - A Simplified Reference Model. Wireless Transmission: Frequencies for radio transmission – Signals – Antennas - Signal Propagation – Multiplexing – Modulation – Spread Spectrum - Cellular System. Cellular system, Hexagonal geometry cell and concept of frequency reuse, Channel Assignment Strategies Distance to frequency reuse ratio

Unit II: Medium Access Control

Medium Access Control: Motivation for a Specialized MAC- Hidden and exposed terminals – Near and far terminals – SDMA – FDMA – TDMA - Fixed TDM – Classical Aloha – Slotted Aloha – Carrier Sense Multiple Access – Demand assigned Multiple Access – PRMA Packet Reservation Multiple Access – Reservation TDMA – Multiple Access with Collision Avoidance – Polling – Inhibit Sense Multiple Access. CDMA - Spread Aloha multiple access. Comparison of S/T/F/CDMA.

Unit III: Telecommunication Systems

Telecommunication Systems: GSM - Mobile Services – System Architecture – Radio Interface – Protocols - Localization and Calling – Handover – Security. UMTS and IMT 2000: UMTS releases and standardization - UMTS System Architecture - UMTS Radio Interface –UTRAN - UMTS Handover.

Unit IV: Satellite System

Satellite System: History – Applications – Basics - Routing– Localization – Handover. Wireless LAN: IEEE 802.11- System Architecture – Protocol Architecture - Physical Layer – Medium Access Control Layer. Bluetooth: User scenarios – Architecture – Radio Layer – Baseband Layer – Link Manager Protocol.

Unit V: Mobile Network Layer

Mobile Network Layer: Mobile IP - Goals, Assumption, and Requirements – Entities and Terminology – IP Packet delivery – Agent discovery – Registration. Dynamic Host Configuration Protocol - Mobile Transport Layer: Traditional TCP - Congestion Control – Slow Start – Fast Retransmit.

Text Book(s):

1. Jochen Schiller, “Mobile Communications”,2nd Edition, eighth impression, Pearson Education, 2011.

Reference Book(s):

1. William Stallings, "Wireless Communication and Networks", 2nd Edition, Pearson Education, 2005.
2. Theodore Rappaport, "Wireless Communications: Principles and Practice", Prentice Hall Communications, 1996.

Course Outcome

On the Successful completion of the course, students will be able to

CO1 : Understand fundamentals of wireless communications.
CO2 :Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
CO3: Demonstrate basic skills for cellular networks design.
CO4: Apply knowledge of TCP/IP extensions for **mobile** and wireless networking.
CO5: Learn and apply wired and wireless devices.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	M	M	S
CO3	S	S	M	M	S	S	S	S	S
CO4	S	S	M	S	S	M	S	M	M
CO5	M	S	M	M	S	M	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT51	COMPUTER NETWORKS	L	T	P	C
CORE- VIII			5	-	-	4
Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze					
Objectives	1. To build an understanding of the fundamental concepts of computer networking and 2. To prompt the student to learn advanced networking. 3. To understand the working principles of various application protocols 4. To know about the Working with routing algorithms.					

Unit I: Basics of Computer Networks

Introduction: Uses of Computer Networks–Types of Computer Networks-Network Technology – Examples of Networks – Network protocols-Reference Models – Network Standardization.Introduction – Uses – Network Hardware – LAN –MAN – WAN, Internetworks – Network Software – Protocol hierarchies – Designissues for the layers – Interface & Service – Service Primitives.Reference models – OSI – TCP/IP.

Unit II: Network topologies

Introduction: Network topologies; Linear Bus Topology, Ring Topology, Star Topology, Hierarchical or Tree Topology, Topology Comparison, Considerations when choosing a Topology: Switching; Circuit switching, Message switching, Packet switching, Implementation of packet switching, Relationship between Packet Size and Transmission time, Comparison of switching techniques: Multiplexing; FDM – Frequency division multiplexing, WDM – Wavelength division multiplexing, TDM – Time division multiplexing:.

Unit III: Data Link

Data Link layer Design Issues – Flow Control and ARQtechniques. Data link Protocols – HDLC. DLL in Internet.MACSub layer – IEEE 802 FOR LANs & MANs, IEEE 802.3, 802.4,802.5.Bridges - Switches – High Speed LANs - Gigabit Ethernet.Wireless LANs - 802.11 a/b/g/n, 802.15.PPPData Link Layer & Medium Access Layer – Data Link Layer - Design Issues – Elementary Data link protocols – Multiple Access Protocols – Ethernet, Wireless LAN, Bluetooth

Unit IV: Network Layer & Transport Layer

Network Layer & Transport Layer: Network Layer Design Issues – Routing Algorithms – Transport Layer- The Transport Service – Elements of Transport Protocol. Congestion control algorithms – QoS. Internetworking – Network layer in internet. IPv4 - IP Addressing – Classless and Classfull Addressing.Sub- netting.

Unit V: Application Layer &Security

Application Layer &Security: DNS- E-Mail - Security – Cryptography – Digital Signature – Social Issues.Internet Control Protocols – ICMP, ARP, RARP, BOOTP. Internet Multicasting – IGMP, Exterior Routing Protocols – BGP.IPv6 –Addressing – Issues, ICMPv6.Transport Layer – TCP & UDP. Application layer –FTP, DNS, Electronic mail, MIME, SNMP.Introduction to World Wide Web.

Text Book

1. Andrew S.Tanenbaum, Amsterdam, Nick Feamster, David J. Wetherall, Computer Networks, 6th Edition, Pearson, 2021

Reference Book

1) BehrouzA.Forouzan, Data Communications and Networking, Fifth Edition, TMH, 2013.
2) Andrew S.Tanenbaum, David J.Wetherall,Computer Network, Fifth Edition, Pearson Education, 2011.

Course Outcomes:

On the successful completion of the course, students will be able to
CO1: explain the concepts of various reference models, Internet and protocols
CO2: identify different transmission media and topologies
CO3: distinguish error detection and error correction of data
CO4: implement routing algorithms to determine the optimal path
CO5: Able to send data communication through wired and wireless mode.

Mapping of COs with POs and PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	M	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	S
CO5	S	S	S	M	M	S	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT52	OPERATING SYSTEM CONCEPTS	L	T	P	C
CORE - IX			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To introduce various components of computer hardware and operating systems. 2. To discuss the structure of operating system, its functions and algorithms. 3. To understand the working of operating system, its structures and functioning 4. To Learn various algorithms used in operating systems.					

Unit 1: Process Management

Introduction - What is operating system do-operating System structure-operating system services-user operating system interface -system calls-Operating system design and implementation--operating –system structure. Process Management- Process scheduling-operations on processes Inter-process communication –Threads and concurrency-overview- multithreading models.

Unit II: Process Scheduling & Threads

Processes – Process Concept, Process Scheduling, Operations on Processes, Inter-process Communication; CPU Scheduling – Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Real time scheduling; Threads- Overview, Multithreading models, Threading issues; Process Synchronization – The critical-section problem, Synchronization hardware, Mutex locks, Semaphores, Classic problems of synchronization, Critical regions, Monitors;

Unit III: Deadlocks

Deadlocks: Deadlock Characterization- Methods for Handling Deadlocks-Deadlock Prevention-Avoidance – Detection-Recovery. Main Memory: Background-Contiguous Memory Allocation – paging- Structure of the page table- Swapping

Unit IV: Virtual Memory

Virtual Memory: Demand Paging-Copy on Write-Page Replacement-Allocation of Frames – Thrashing- Mass Storage Structure- RAID structure Main Memory – Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with paging, 32 and 64 bit architecture Examples; Virtual Memory – Background, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory, OS Examples.

Unit V: Storage system

Mass Storage system – Overview of Mass Storage Structure, Disk Structure, Disk Scheduling and Management, swap space management; File-System Interface – File concept, Access methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation- File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

Text Book

Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts, Wiley, 10th Edition, 2018

Reference books

1. Andrew S Tanenbaum, Herbert Bos, Modern Operating Systems, 4e Fourth Edition, Pearson Education, 2016
2. Abraham Silberschatz, Peter Galvin, Greg Gagne, Operating System Concepts, Wiley,8th Edition

Course Outcomes:

On the successful completion of the course, students will be able to
CO1: Understand the types, design, implementation of operating system and I/O programming concepts.
CO2: Recognize the management of main and virtual memory schemes.
CO3: Analyze different scheduling algorithms and the management of devices.
CO4: Understand and manage the information system using OS
CO5: Learn to work on different platforms.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	M	M	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	S	M
CO5	M	S	M	S	M	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT53	WEB TECHNOLOGY	L	T	P	C
CORE -X			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand the concept of Tables, Forms, Files, Basic Web server Controls. 2. Able to know Internet Basics and HTML. 3. To understand the concept of OLEDB connection class & Cookies. 4. Knowledge of solving web client/server problems.					

Unit I: Web Essentials

Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols -The World Wide Web-HTTP request message-response message-Web Clients Web Servers. Markup Languages: XHTML. An Introduction to HTML History-Versions-Basic XHTML Syntax and Semantics-Some Fundamental HTML Elements-Relative URLs-Lists-tables-Frames-Forms-HTML 5.0.

Unit-II: Style Sheets

Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML- Style Rule Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-CSS3.0. Client-Side Programming: The JavaScript Language-History and Versions Introduction JavaScript in Perspective-Syntax-Variables and Data Types-Statements-Operators-Literals-Functions-Objects-Arrays-Built-in Objects-JavaScript Debuggers.

Unit-III: Host Objects

Host Objects: Browsers and the DOM-Introduction to the Document Object Model DOM History and Levels-Intrinsic Event Handling-Modifying Element Style-The Document Tree-DOM Event Handling-Accommodating Noncompliant Browsers Properties of window. Server-Side Programming: Java Servlets- Architecture -Overview-A Servlet-Generating Dynamic Content-Life Cycle- Parameter Data-Sessions-Cookies-URL Rewriting-Other Capabilities-Data Storage Servlets and Concurrency- Databases and Java Servlets.

Unit-IV: Separating Programming and Presentation

Separating Programming and Presentation: JSP Technology Introduction-JSP and Servlets-Running JSP Applications Basic JSP-JavaBeans Classes and JSP-Tag Libraries and Files-Support for the Model-View-Controller Paradigm- Databases and JSP. Representing Web Data: XML-Documents and Vocabularies-Versions and Declaration-Namespaces- DOM based XML processing Event-oriented Parsing: SAX-Transforming XML Documents-Selecting XML Data: XPATH-Template based Transformations: XSLT-Displaying XML Documents in Browser

Unit-V: AJAX

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods. Web Services: JAX-RPC-Concepts-Writing a Java Web Service-Writing a Java Web Service Client-Describing Web Services: WSDL- Representing Data Types: XML Schema-Communicating Object Data: SOAP Related Technologies-Software Installation-Storing Java Objects as Files

Text Book

1. Deitel&Deitel, internet & World Wide Web How to program, Pearson Education, 2018.

Reference Books

1. I.Bayross, Web Enabled Commercial Application Development Using HTML, DHTML, Javascript, Pen CGI, BPB Publications, 2000
2. J.Jaworski, Mastering Javascript, BPB Publications, 1999
3. T.A.Powell, Complete Reference HTML (Third Edition),TMH, 2002
4. G.Buczek, ASP.NET Developers Guide, TMH, 2002

Course Outcomes:

On the successful completion of the course, students will be able to
CO1: learn to design web pages using HTML.
CO2: to gain knowledge on creating interactive web pages using ASP.Net
CO3: to understand how to use Cookies and DOM.
CO4: to develop server side scripting using OLEDB

CO5: create own BLOG own webpage.

Mapping of COs with POs and PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	M	M	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S
CO3	S	M	M	M	M	M	M	M	S
CO4	S	S	S	S	S	S	S	S	M
CO5	M	M	M	S	S	M	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT54	COMPUTER GRAPHICS	L	T	P	C
CORE- XI			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To Understand computational development of graphics 2. To Analyze the Line attribute & curve attribute 3. To Design animation with rotation, translation and scaling 4. The Student can gain in-depth knowledge about the current 3D graphics.					

Unit I: Overview of graphics systems

Overview of graphics systems: Video display devices – Raster-scan systems – Random-scan systems – Graphics monitors and workstation – Input devices – Hard-copy devices – Graphics software. Introduction, What is computer Graphics?, Area of Computer Graphics, Design and Drawing, Animation Multimedia applications, Simulation, How are pictures actually stored and displayed, Difficulties for displaying pictures.

Unit II: Output primitives

Output primitives: Points and lines – Line-drawing algorithms – DDA algorithm – Bresenham‟s line algorithm – Attributes of output primitives: Line attributes – Area-fill attributes – Character attributes – Bundled attributes. Cathode Ray Tube, Quality of Phosphors, CRTs for Color Display, Beam Penetration CRT, The Shadow – Mask CRT, Direct View Storage Tube, Tablets, The light Pen, Three Dimensional Devices

Unit III: Geometric transformations

Two-dimensional Geometric transformations: Basic transformations – Matrix representations – Composite transformations – Other transformations.What is transformation?, Matrix representation of points, Basic transformation, Need for Clipping and Windowing, Line Clipping Algorithms, The midpoint subdivision Method, Other Clipping Methods, Sutherland – Hodgeman Algorithm, Viewing Transformations

Unit IV: Windowing and Clipping

Windowing and Clipping – Windowing concepts – Clipping Algorithms – Window to view port Transformations – segments – Interactive input methods – Physical input devices – logical classification of input devices – interactive picture construction techniques – input functions. Graphical Input Techniques, Positioning Techniques, Positional Constraints, Rubber band Techniques

Unit V: Three dimensional concepts

Three dimensional concepts – 3D Display Methods – 3D Object representations – polygon surfaces-curved line and surfaces – 3D transformations- Translation-Rotation-Scaling- Other Transformations-Composite Transformations, Solid Area Scan Conversion, Scan Conversion of Polygons, Algorithm Singularity,

Text Book

Donald Hearn and M.Pauline Baker, Computer Graphics C Version Second Edition, Pearson Education, 2006.

Reference Books:

1. William M.Neuman and Robert F Sproul "Principles of Interactive computer Graphics" , McGraw Hill International Edition, 2nd Edition, 1996.
2. Foley, van Dam, Feiner, and Hughes. Computer Graphics: Principles and Practice, 3rd edition, 2014.

Course Outcomes:

On the Successful completion of the course, students will be able to

CO1: Have a broad knowledge about the overview of Graphics System

CO2: Analyse and design algorithms using attributes in graphics

CO3: Recognize the properties of Two- and three-dimensional geometric transformations

CO4: Understand the importance of Windowing and Clipping

CO5: Develop user interface environment using graphics tools.

Mapping of Cos with Pos and PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S
CO3	S	M	M	S	S	M	M	M	S
CO4	S	S	S	M	M	S	S	S	S
CO5	S	S	M	S	M	M	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITP54	WEB TECHNOLOGY LAB	L	T	P	C
CORE - XII			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. Apply the knowledge of the internet and related internet concepts that are vital in understanding web application development and analyze the insights of internet programming to implement complete application over the web. 2. To understand, analyze and apply the role of markup languages in the workings of the web and web applications. 3. To automate the real time problems by developing & analyzing a web project and identify its elements and attributes in comparison to traditional projects. 4. The Students can choose best technologies for solving web client/server problems.					

Programs using the following concepts

VB.NET

1. Enumeration
2. Exception handling
3. Constructor
4. Destructor
5. Inheritance
6. Polymorphism
7. Interface

ASP.NET

1. Designing simple Form
2. data grid
3. request and response object
4. Cookies
5. Ad rotator Control
6. Validator Control
7. String Functions
8. OLEDB
9. Generate the Hotspots in the image

VB SCRIPT

1. Branching statements
2. Sorting
3. Looping through Arrays
4. Functions
5. Forms

Course Outcomes:

On the successful completion of the course, students will be able to

CO1: To perform the basic functions of VB.NET.

CO2: Perform tests, resolve defects and revise existing code

CO3: Develop dynamic web applications, create and consume web services

CO4: Use appropriate data sources and data bindings in VB.NET / ASP.Net.
CO5: Develop their own applications with database connectivity.

Mapping of COs with POs and PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	M	M	S
CO2	S	S	S	M	S	S	S	M	M
CO3	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	M	M	M	S
CO5	S	S	M	M	S	S	S	M	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITE531	CHOICE -I	L	T	P	C
ELECTIVE -III		MULTIMEDIA AND ITS APPLICATION	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand Multimedia Architecture. 2. To Design Authoring Tools. 3. To Gain the importance of Internet in multimedia. 4. The Student can able to work with the current multimedia applications.					

Unit I: Basics of Multimedia

Introduction- Brief history of Multimedia – Resources for multimedia developers – Types of products – Multimedia Computer Architecture. Analog Signal, Waves, General properties of Analog Signals, Digital Representation, Need for digital representation, Analog to digital conversion, Nyquist"s Sampling Theorem, Encoder Design, Digital to Analog conversion, Decoder design and its principles, Encoder – Decoder, Relation between sampling rate and bit depth.

Unit II: Digital Audio

Digital Audio – Characteristics of sound and Digital Audio – Digital Audio Systems – MIDI – Audio File Formats - Using Audio in Multimedia Applications – Digital Video – Background on Video – Characteristics of Digital Video – Digital Video Data Sizing – Video Capture and Playback Systems – Computer Animation – Using Digital Video in Multimedia Applications.

Unit – III: Product Design

Product Design – Building Blocks – Classes of products – Content Organizational Strategies – Story Boarding – Authoring Tool – Categories of Authoring Tools – Selecting the right Authoring paradigm. Types Of Media, Time Independent Media, Time Dependent Media, Text, Unformatted Text, Formatted Text, Hyper Text, Essential Features Of HTML, Graphics And Images,

Unit IV: Multimedia and the Internet

Multimedia and the Internet – The Internet – HTM Land Web Authoring – Multimedia Considerations for the Internet – Design Considerations For Web Pages – Multimedia Development Team – Team Approach – Assembling a Multimedia Production Team.Creation Of Computer Graphics, Digitised Documents, Digitized Pictures, Digitised Cameras, Raster Scan Principles, Image Analysis, and Image Transmission.

Unit V: Text

Text – Elements of Text – Text Data Files – Using Text in Multimedia Applications – Hypertext – Graphics – Element of Graphics – Images and Color – Graphics file and Application Formats – Obtaining Images for Multimedia Use – Using Graphics in Multimedia Applications.Compression Principles, Source Encoders and destination decoders, Lossless and Lossy Compression, Entropy Encoding, Source Encoding, Text Compression, Static Huffman coding.

Text books:

1. David Hillman, Multimedia Technology and Applications — Galgotia Publications Pvt. Ltd., 1998.

Reference books:

1. Tay Vaughan -Multimedia making it work –TMH 1996.

Course outcomes

1. After completing the course the students can
2. Define multimedia to potential clients.
3. Identify and describe the function of the general skill sets in the multimedia industry.
4. Identify the basic components of a multimedia project.
5. Learn to send lossy and lossless data.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	M	S
CO5	M	S	M	M	M	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITE532	CHOICE -II	L	T	P	C
ELECTIVE -III		E-COMMERCE	3	-	-	3
Cognitive Level	K1: Recall	K2: Understand K3: Apply K4: Analyze				

Objectives	
1	To establish knowledge about computers and to acquaint the basic concepts of e-commerce.
2	To instill idea of convergence of business relationship through recent technologies.
3	To impart the business knowledge into Computer Application students.
4	To identify, define and differentiate the various modes of electronic commerce.

Unit I: Introduction to computers

Introduction to computers- Importance of Computers- Computer Applications in various Areas of Business- General Application of Computers in Various Fields. Fundamentals of Computers: Classification of Computers- Basic Principles of operation of Digital Computer- Computer system- computer virus- Development of computers and Computer Generation- Computer Number System.

Unit II: Electronic commerce

Electronic commerce – Introduction – Business Models of e-Commerce – Business to Business e-commerce customer to customer ecommerce and EDI – Business Applications of e-commerce. Infrastructure for e-commerce – Communication networks for e-commerce. General applications of electronic commerce

Unit III: Network services

Network services: secure messaging – payment systems in e-commerce – Structured electronic documents. Cryptocurrency: Understanding Cryptocurrency - Types of Cryptocurrency - Advantages and Disadvantages.Android Applications– Introduction-Concept-Applications. V-Commerce: Introduction and Features.

Unit IV: E-online Banking

E-online Banking: Introduction Concepts and Meaning-Need for computerization-Electronic delivery channels-Automated Teller Machine(ATM)-Electronic Fund Transfer(EFT)-uses computerization in clearing houses-Telebanking-Electronic Money Transfer(EMT) - e-Cheque Financial Transactions Terminals - MICR Cheques-e-Banking in India.

Unit V: E-Commerce Technology

E-Commerce Technology – Security Issues in e-Commerce – Legal and Ethical Issues - Role of social media in e-Commerce Industry-M-Commerce and WAP - Mobile Commerce Risk, Security and Payment Methods - Mobile money-infrastructure and fraud prevention for M-payment - Current Trends in electronic world – e-Waste – e-Surveillance – e-Governance - e-Care.

Text Book:

1., R.Saravana Kumar R.ParameswaranT.Jayalakshmi, S.Chand, “Information Technology (Unit I)” , 2015.
2. V. Rajaraman , “Essentials of E-Commerce Technology(Unit II,III)”, PHI Learning Private Limited, 2015.
3. Dr.C.S.Rayudu, “e-Commerce e-Business (Unit IV)” , Himalaya publishing house, 2015.
4. Dr. U.S. PandeyEr. SaurabhShukla S. Chand, “e-Commerce and Mobile Commerce

Technologies (Unit II,V)", 2015.

Reference Books:

1. S. Jaiswal, "Doing Business on the Internet e-Commerce (Electronic Commerce for Business)", Galgotia Publications, 2015.
2. CSV Murthy, "e-Commerce– Concepts, Models, Strategies", Himalaya Publishing House, 2015.
3. Ravi Kalakota Andrew B. Whinston, "Frontiers of e-Commerce", Pearson Education, 2015.

Course Outcomes

CO1: Enumerate the technological changes in trade
CO2: Explain E-commerce on business models and strategy
CO3: Interpret various terminologies of electronic commerce.
CO4: Understand the e-commerce technology and security issues.
CO5: Create own E-Commerce blog.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	M
CO5	M	M	M	S	M	M	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITS51	OPERATING SYSTEM (OS) LAB	L	T	P	C
SBE -III			2	-	-	2

Objectives:

1. To Write Shell Script Programs To Solve Problems.
2. To Implement Some Standard Linux Utilities Such As Ls.CpEtc Using System Calls.
3. To Develop Network Based Applications.
4. To Run Various Unix Commands On A Standard Unix/Linux Operating System.

List Of Exercises:

1. Creation Of A Child, Orphan And Zombie Process.
2. Execution Of Various File/Directory Handling Commands.
3. Shell Scripts To Check Various Attributes Of Files And Directories.
4. Shell Scripts To Perform Various Operations On Given Strings.
5. Write A Shell Script To Find The Factorial Of Given Integer
6. Shell Scripts To Explore System Variables Such As Path, Home Etc.
7. Shell Scripts To Check And List Attributes Of Processes.
8. Execution Of Various System Administrative Commands.
9. Write A Shell Script To Display List Of Users Currently Logged In.
10. Write A Shell Script To Delete All The Temporary Files.
11. Simulation OfFcfs Process Scheduling.
12. Simulation Of Round Robin Process Scheduling.
13. Simulation OfSjf Process Scheduling.
14. Demonstration Of Process Synchronization Using Signals.
15. Demonstration Of Process Synchronization Using Semaphores.
16. Deadlock Avoidance Using Banker‟s Algorithm.

Course Outcomes:

On Successful Completion Of The Course, Students Will Be Able To

CO1: Learn Basic Linux Commands.
CO2: Understand The Basic Behaviour Of Operating System
CO3: Demonstrate Different Process Scheduling And Executing Algorithm
CO4: Do Shell Programming On Linux Os
CO5: Able to develop own applications in a linux environment.

Mapping of COs with POs and PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	S	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	M	S	S	S	M
CO4	S	S	S	S	S	S	S	S	S
CO5	M	S	M	M	S	S	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT61	INTERNET OF THINGS	L	T	P	C
CORE - XIII			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To explore various components of Internet of things such as Sensors, internetworking and cyber space. 2. To design and implement IoT circuits and solutions. 3. To understand the concepts of Internet of Things 4. Can able to build IoT applications.					

Unit I:Introduction to IoT

Introduction to IoT: Sensing, Actuation, Networking basics, Communication Protocols, Sensor Networks, Machine-to-Machine Communications, IoT Definition, Characteristics. IoT Functional Blocks, Physical design of IoT, Logical design of IoT, Communication models & APIsDomain specific applications of IoT: Home automation, Industry applications, Surveillance applications, Other IoT application.

Unit II:M2M to IoT

M2M to IoT-The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, 8 3 M2M vsIoT An Architectural Overview–Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. Reference Architecture and Reference Model of IoT.

Unit III:MAC protocol

Network & Communication aspects Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.IoT Reference Architecture- Getting Familiar with IoT Architecture, Various architectural views of IoT such as Functional, Information, Operational and Deployment. Constraints affecting design in IoT world- Introduction, Technical design Constraints.

Unit IV:IoT Design challenges

Challenges in IoT Design challenges, Development challenges, Security challenges, Other challenges - Domain specific applications of IoT Home automation, Industry applications, Surveillance applications, Other IoT applications.

Unit V: Developing IoT solutions

Developing IoT solutions: Introduction to Python, Introduction to different IoT tools, Introduction to Arduino and Raspberry Pi Implementation of IoT with Arduino and Raspberry, Cloud Computing, Fog Computing, Connected Vehicles, Data Aggregation for the IoT in Smart Cities, Privacy and Security Issues in IoT.

Text Book

1. Vijay Madisetti, ArshdeepBahga, “Internet of Things: A Hands-On Approach”, 2014.

Reference Book

1. WaltenegusDargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice", 2009.

Course Outcomes:

CO1: Understand the concepts of Internet of Things
CO2: Analyze basic protocols in wireless sensor network
CO3: Design IoT applications in different domain and be able to analyze their performance
CO4: Implement basic IoT applications on embedded platform.
CO5: Simulation of tools in an IOT environment.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	S
CO2	S	S	M	S	S	S	S	M	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	M	S
CO5	S	S	M	S	M	S	M	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT62	DATA MINING	L	T	P	C
CORE -XIV			5	-	-	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To Aware about the Functionalities, patterns, of operating system. 2. To Design and deploy appropriate classification techniques. 3. To Use association rule mining for handling large data set. 4. To discover interesting patterns from large amounts of data toanalyze and extract patterns to solve problems.					

Unit I: Introduction to Data mining

Introduction - What is Data mining, Data mining – On kind of data - Data mining Functionalities – Classification of Data mining Systems - Data mining Task Primitives - Integration of Data Mining System - Major issues in Data Mining.Introduction to Information Retrieval and Data Mining include Correlation, association rules, Knowledge Discovery from Databases, Classification, and Clustering.

Unit II: Data Preprocessing

Data Preprocessing : Need for pre-processing the Data - Descriptive Data Summarization – Data Cleaning - Data Integration and Transformation - Data Reduction-Data Discretization and Concept Hierarchy Generation.

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.

Unit III: Data Warehouse and OLAP Technology

Data Warehouse and OLAP Technology An overview: Data Warehouse –A Multidimensional Data Model - Data Warehouse Architecture - Data Warehouse Implementation – From Data warehousing to Data Mining.What is OLAP, Dimensional Modelling (facts, dimensions), cube, Schema, defining schema‟s star schema, snow-flakes schema and fact constellation, ETL process

Unit IV: Mining

Mining – Frequent Patterns,Associations Correlations: Basic Concepts - Efficient Scalable - Frequent Item set Mining methods - Mining Various Kinds of Association rules.Decision tree(ID3,C4.5,CART), Bayesian Classification, Rule based, Neural Network, Lazy and Eager Learners, Parameters for measuring Accuracy

UnitV: Applications and Trends in Data mining

Applications and Trends in Data mining: Data mining Applications –Data Mining System Products and Research Prototypes - Additional Themes on Data Mining - Social impact of Data mining - Trends in Data mining .Linear and nonlinear regression, Logistic Regression Use of open source data mining tool – WEKA, XLMiner, MOA.

Text Book:

1. Jiawei Han and Michelin Kamber, Data Mining (Concepts and Techniques) Second Ed Morgan Kaufmann Publishers (An imprint of Elsevier), 2006.

Reference Books:

1 Karguta, Joshi, Sivakumar - Data Mining (Next Generation Challenges and Future Directions) &Yesha Publishers : Prentice Hall of India (2007)

2.Ian H.Witten&Data Mining (Practical Machine Learning Tools and Techniques (II Edition) Eibe Frank Publishers : Morgan Kaufmann Publishers (An imprint of Elsevier], 2011.

3.Alex Benson, Stephen V.Smith- Data Warehousing, Data Mining & OLAP, Publishers: Tata McGraw – Hill, 2004.

Course Outcomes

On successful completion of the course, students will be able to

CO1: explain the concepts of data and trends of data mining

CO2: distinguish various data mining techniques such as Association rule mining, Classification and Clustering

CO3: assess the application of data mining.

CO4: apply the data mining techniques for various applications.

CO5: Learn about text and web mining.

Mapping of COs with POs and PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	M	S	M	S	S	M	S	S	S
CO5	M	M	M	S	S	M	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITP65	IOT LAB	L	T	P	C
CORE -XV			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To understand what is IoT, its importance and Application 2. To interface the Arduino with LED 3. To interface Bluetooth with Arduino/ 4. To interface Bluetooth with Rasperry pi					

Experiments:

1. Familiarization with Arduino/Raspberry Pi and perform necessary software installation.
2. To interface LED/Buzzer with Arduino/Raspberry Pi and write a program to turn ON LED for 1 sec after every 2 seconds.
3. To interface Push button/Digital sensor (IR/LDR) with Arduino/Raspberry Pi and write a program to turn ON LED when push button is pressed or at sensor detection.
4. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed.
5. To interface Bluetooth with Arduino/Raspberry Pi and write a program to send sensor data to smartphone using Bluetooth.
6. To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFF when „1"/"0" is received from smartphone using Bluetooth.
7. Write a program on Arduino/Raspberry Pi to upload temperature and humidity data to thingspeak cloud.
8. Write a program on Arduino/Raspberry Pi to retrieve temperature and humidity data from thingspeak cloud.
9. To install MySQL database on Raspberry Pi and perform basic SQL queries.
10. Write a program on Arduino/Raspberry Pi to publish temperature data to MQTT broker.
10. Write a program on Arduino/Raspberry Pi to subscribe to MQTT broker for temperature data and print it.
11. Write a program to create TCP server on Arduino/Raspberry Pi and respond with humidity data to TCP client when requested.

Course Outcomes

CO1: Investigate a variety of emerging devices and technologies such as smart sensing, pervasive connectivity, virtual interfaces & ubiquitous computing and their potential applications in consumer, retail, healthcare and industrial contexts

CO2: Collaborate on research with industry partners to address significant and complex challenges surrounding IoT technologies and applications

CO3: This may be used as a platform for conducting consultancy work required by government/Private organizations in around Coimbatore

CO4: Enable faculty learning, research and hands-on experimentation to discover and demonstrate the promise of the Internet of Things

CO5: Learn and simulate real time applications in an IOT environment.

Mapping of COs with POs and PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	M	S	M	S	S	M	S	S	M
CO5	M	S	S	S	M	M	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITT63	ARTIFICIAL INTELLIGENCE	L	T	P	C
CORE - XVII			-	-	5	4
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To learn to summarize the basics of AI and Machine learning. 2. To understand different search methods 3. To analyze the various logics and applications 4. To interpret the different learning methods					

Unit I: Artificial intelligence

Artificial intelligence meaning- The AI problems – The underlying assumption – What is an AI Techniques? – The level of the model. Problems, problem spaces, and search: Defining the system – problem characteristics – production system characteristics. Statistical analysis concepts Descriptive statistics Introduction to probability and Bayes theorem Probability distributions Hypothesis testing & scores

Unit II: Heuristic search techniques

Heuristic search techniques: Generate and Test – Hill climbing – Best –first search – Problem reduction – Constraint satisfaction – Means –ends analysis. Knowledge representation issues: Representations and mappings – Approaches to knowledge representation.

Unit III: Predicate logic

Using predicate logic: Representing simple facts in logic – Representing instance and ISA relationships – computable functions and predicates resolution – natural deduction. Representing Knowledge using rules: Procedural versus declarative knowledge – Logic programming – Forward versus Backward reasoning – Matching – Control Knowledge.

Unit IV: Game playing

Game playing: Overview – The minimax search procedure – Adding alpha – beta cutoffs – Additional refinements – Iterative Deepening – References on specific games. Understanding: What understands? What makes understanding hard? Planning- The blocks world- components of a planning system –Good stack planning-Coral Stack planning-Non linear planning using constraint posting.

Unit V: Expert systems

Expert systems: Representing & using domain knowledge – Expert system shells – Knowledge acquisition. Perception and Action: Real-time search – perception- Action – Robot Architectures. Introduction to Machine learning Paradigms: Supervised Learning Introduction to Supervised learning Supervised Learning concepts Linear Regression

Text book:

Elaine rich, Kevin Knight, Shivashankar B Nair - Artificial Intelligence - Tata McGraw Hill 3rd Edition, 2011

Reference Books:

1. Stuart Russell - Artificial Intelligence: A Modern Approach - Pearson 3rd Edition, 2013
2. Deepak Khemani - A First Course in Artificial Intelligence - McGraw Hill 2013
3. Mishra R. B. - Artificial Intelligence - Prentice Hall of India 2010

Course Outcomes:

On the Successful completion of the course, students will be able to

CO1: Learn about the artificial intelligence problem and its characteristics

CO2: Demonstrate the fundamentals of heuristic search techniques and reasoning for problem solving.

CO3: Understand the problem-solving using predicates.

CO4: Describe the concepts of expert systems with case studies for various applications

CO5: Understand different terminologies in various expert system concept.

Mapping of COs with POs and PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	S	M	M
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	S	S	S	S	S	M	M
CO4	S	S	S	S	S	S	S	M	M
CO5	S	S	M	S	S	S	S	M	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITR61	CORE XVII- Project	**L**	**T**	**P**	**C**
			-	-	5	4

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

COURSE CODE	U21ITE641	CHOICE -I	L	T	P	C
ELECTIVE -IV		ETHICAL HACKING	3	-	-	3
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To Identify the vulnerabilities in a given network infrastructure Understand 2. Implement real-world hacking techniques to test system security apply 3. Employ complex tools to identify and analyze your company's risks and weaknesses apply. 4. Apply countermeasures to secure your system against threats apply					

Unit I:Introduction to ethical Hacking

An Introduction to ethical Hacking : Security Fundamental, Security testing, Hacker and racker, Descriptions, Test Plans-keeping It legal, Ethical and Legality . What is Hacking? Introduction &Types,Potential Security Threats To Your Computer SystemsSkills Required to Become a Ethical Hacker

Unit II:Technical Foundations of Hacking

The Technical Foundations of Hacking: The Attacker‟s Process, The Ethical Hacker‟s Process, Security and the Stack. What is Social Engineering? Attacks, Techniques & PreventionCryptography Tutorial: Cryptanalysis, RC4, CrypToolHow to Crack a PasswordWorm, Virus & Trojan Horse: Ethical Hacking TutorialLearn ARP Poisoning with Examples

Unit III:Footprinting and scanning

Footprinting and scanning:Information Gathering, Determining the Network Range, Identifying Active Machines, Finding Open Ports and Access Points, OS Fingerprinting Services, Mapping the Network Attack SurfaceWireshark Tutorial: Network & Passwords Sniffer How to Hack WiFi (Wireless) Network

Unit IV:Enumeration and System Hacking

Enumeration and System Hacking: Enumeration, System Hacking. Malware Threats : Viruses and Worms, Trojans, Covert Communication, Keystroke Logging and Spyware, Malware Counter measures. DoS (Denial of Service) Attack Tutorial: Ping of Death, DDOSHow to Hack a Web ServerHow to Hack a Website: Online ExampleSQL Injection Tutorial: Learn with Example

Unit V: Sniffers, Session Hijacking and Denial of Service

Sniffers, Session Hijacking and Denial of Service : Sniffers, Session Hijacking, Denial of Service and Distributed Denial of Service .Firewalls and Honeypots: Intrusion Detection Systems, Firewalls, Honeypots Hacking Linux OS: Complete Tutorial with Ubuntu ExampleCISSP Certification Guide: What is, Prerequisites, Cost, CISSP Salary

Text Book

Michael Gregg, Certified Ethical Hacker, Version 9, Second Edition, Pearson IT Certification, 2021.

Reference Books:

1. Roger Grimes - Hacking the Hacker – Wiley, 2017.
2. AnkitFadia - The Unofficial Guide to Ethical Hacking - Premier Press, 2002.

Course Outcomes:

CO1: Introduce about the basic concepts of ethical hacking
CO2: Know about the technical foundation of hacking
CO3: Acquire about the techniques used in hacking
CO4: Know about the enumeration and threats
CO5: Learn to provide security for data.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	S
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	M	S
CO4	M	S	M	S	S	M	S	M	M
CO5	M	M	M	S	S	M	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	**U21ITE642**	**CHOICE - II**	**L**	**T**	**P**	**C**
ELECTIVE -IV		**INFORMATION SECURITY**	**3**	**-**	**-**	**3**
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To able to know the IT security concepts. 2. To able to know about the database security concepts etc. 3. Describes about Information Security. 4. Describe about Cryptography Ciphers.					

Unit I :Security

Introduction: Security, Attacks, Computer Criminals. Overview of computer networks, seven-layer architecture, TCP/IP suite of protocols, MAC protocols for high-speed LANS, MANs, and wireless LANs. (For example, FDDI, DQDB, HIPPI, Gigabit Ethernet, Wireless Ethernet, etc.), CSMA/CD, CSMA/CA, Simple performance models; WAN access methods - PPP.

Unit II`: Cryptography

Cryptography: Substitution ciphers, Transposition ciphers, Confusion, Diffusion, Symmetric, Asymmetric, Encryption, DES, Uses of Encryption, Hash Function, Key exchange, Digital Signatures, Digital Certificates.Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority,

Need for an International convention on Cyberspace.

Unit III: Program Security

Program Security: Secure Programs, Non malicious program errors, malicious codes virus, Trap doors, Salami attacks, covert channels, Control against program. Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

Unit IV: Database Security

Database Security: Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security.Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network

Session Analysis, System Integrity Validation.

Unit V:Security in Networks

Security in Networks: Threats in Networks vs. Networks security controls, Firewalls, Intrusion detection systems, Secure e-mails. Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.

Text Books:

1. W.Stallings – Network Security Essentials Applications and Standards, 4/E, 2010.

Reference Books:

1. Forouzan -Cryptography and Network Security, 2002.

Course Outcomes

After the completion of Information security The students can gain the

CO1: Knowledge of cryptography and network security

CO2: Knowledge of security management and incident response

CO3: Knowledge of security in software and operating systems

CO4: Knowledge of data security and secure system development

CO5: Analyze different threats and remove the threats.

Mapping of COs with POs and PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	M	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	S
CO4	S	S	M	S	S	M	S	S	S
CO5	M	S	M	S	M	S	M	M	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	U21ITS611	IMAGE PROCESSING LAB	L	T	P	C
SBE -IV			-	-	2	2
Cognitive Level	K1: RecallK2: UnderstandK3: ApplyK4: Analyze					
Objectives	1. To introduce the concepts of image processing and basic analytical methods to be used in image processing. 2. To familiarize students with image enhancement and restoration techniques. 3. To explain different image compression techniques. 4. To introduce segmentation and morphological processing techniques..					

List of Programs:

1. Implement the spatial image enhancement functions on a bitmap image – mirroring(Inversion)
2. Implement the spatial image enhancement functions on a bitmap image – notation(Clockwise)
3. Implement the spatial image enhancement functions on a bitmap image – Enlargement (Double Size)
4. Implement (a) Low Pass Filter (b) High Pass Filter
5. Implement (a) Arithmetic Mean Filter (b) Geometric Mean Filter
6. Implement Smoothing and Sharpening of an eight bit color image
7. Implement (a) Boundary Extraction Algorithm (b) Graham ' Scan Algorithm
8. Implement (a) Edge Detection (b) Line Detection
9. Display an image and its histogram
10. Write a Program to Perform Shrinking, Zooming and Cropping of an image
11. Write a Program to perform the experiment for histogram equalization.
12. Write a Program to Perform blurring and de-blurring on an image.
13. Write a Program to Remove salt and pepper noise in an image.
14. Write a Program to Perform Edge detection using Operators.
15. Write a Program to Perform2-D DFT and DCT.
16. Write a Program to Perform DWT of images.
17. Implement a function for image segmentation.
18. Implement a function for image morphology that analyze the form and shape detail of image structures.

19. Implement a function for Image Restoration.
20. Models for representing the color and methods of processing the color plane

Course Outcomes

After the completion of Information security. The students can gain the

CO1: Knowledge of image processing and basic analytical methods to be used in image processing.
CO2: Knowledge of Image Enhancement and Restoration technique.
CO3: Knowledge of Image Compression Technique
CO4: Knowledge of segmentation and morphological processing techniques

CO5: Knowledge about to develop new real time application.

Mapping of COs with POs and PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	S	S	S	S	M
CO2	S	S	M	S	S	S	S	S	S
CO3	S	S	M	M	S	S	S	S	M
CO4	S	S	M	S	S	M	S	S	M
CO5	S	S	M	S	M	S	M	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

NON-MAJOR ELECTIVE
(OFFERED BY PARENT DEPARTMENT)

COURSE CODE		WEB DESIGNING USING HTML	L	T	P	C
NME - I			2	-	-	2

OBJECTIVES:

1. To Use formatting tags in HTML
2. To recognize How to Insert the Image file in web pages.
3. To understand How to navigate through web pages.
4. To become Master in creating Web pages using basic HTM tags.

LAB Exercises

1. Web page creation using head, title, body, h1 – h6.
2. Web page creation using formatting tags (bold, italic, underline etc)
3. Ordered list
4. Unordered list
5. Definition list
6. Marquee creation
7. Web page with images
8. Web page creation with various font styles and body colors.
9. Hyper link
10. Tables
11. Frames
12. Forms

COURSE OUTCOMES:

On the Successful completion of the course, students will be able to

CO1: understand the concepts of webpage
CO2: analyze various tags in HTML
CO3: gain knowledge in creating webpage
CO4: design new webpages

MAPPING OF COs WITH POs AND PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	S	S	S
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	M	S	S	S	S	M	S
CO4	S	S	S	M	S	S	S	M	M
CO5	M	S	M	S	M	M	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE		PHOTOSHOP	L	T	P	C
NME – II			2	-	-	2

OBJECTIVES:

1. To navigate Photoshop‟s Workspace, Create & setup documents
2. To Understand about the Layers and Masking.
3. To work with effects, filters and adjustments
4. To create a broad range of design skills pertaining to publication & web design.

Exercises

1. Album preparation
2. Invitation Preparation
3. Wall Papers
4. Visiting Card
5. Background Changing and Removing
6. Birthday Card
7. Friendship Card
8. Wedding invitation Card
9. Cloning an Image
10. Flex Designing
11. Photo Editing
12. Book Cover

COURSE OUTCOMES

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

CO1: design Visiting card, advertisement
CO2: analyze new features
CO3: develop new drawings using Photoshop
CO4: learn to work with Photoshop
CO5: Design and deploy new drawing application.

MAPPING OF Cos WITH Pos AND PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	M	S	S	M
CO2	S	S	M	S	M	S	S	S	S
CO3	S	S	M	S	S	S	S	S	M
CO4	S	S	S	M	S	S	S	S	M
CO5	M	M	M	S	S	M	S	S	M

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

Value Added Course

COURSE CODE	U21ITV51	QUANTITATIVE APTITUDE	Hours	C
SEMESTER V			30	2

OBJECTIVES:
1. To equip with the relevant skills to appear for various competitive examinations.
2. To acquire right skills to tackle aptitude problems.
3. To improve mental calculations.
4. To improve the speed of solving problems

UNIT I: Numbers - HCF & LCM of numbers – Decimal fraction
UNIT II: Average - Problems on numbers – Problems on Ages
UNIT III: Percentage – Profit &loss - Ratio& Proportion
UNIT IV: Time &work – Time & Distance – Problems on Trains
UNIT V: Simple Interest – Compound Interest - Permutation & Combination. (13 Hours)

TEXT BOOK
1. Aggarwal, R.S. - Quantitative Aptitude for Competitive Examinations, New Delhi: S.Chand Publications, Seventh Revised Edition, Reprint 2008.

COURSE OUTCOMES
After Completion of this Course, Students will be able to
CO1: Acquire right skills to tackle aptitude problems
CO2: Improve mental calculations.
CO3: Solve problems with ease and confidence
CO4: Improve the speed of solving problems and equip them employable
CO5: Ability to solve complex problems.

MAPPING OF COs WITH POs AND PSOs

CO/PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	S	M	S	S	S	S
CO2	S	S	M	S	S	M	S	S	S
CO3	S	S	M	S	S	S	S	M	S
CO4	S	M	S	M	S	S	S	M	M
CO5	M	S	M	S	M	M	S	S	S

S – Strongly Correlating - 3 Marks
M – Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

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அன்னை தெரசா மகளிர் பல்கலைக்கழகம்

கொடைக்கானல்

தமிழியல் துறை

இளங்கலைத் தமிழ் (பி.ஏ. தமிழ்)

விருப்பம் சார் தெரிவுமுறை (CBCS)

பயன் சார்முறை (OBE)

பொது ஒழுங்குமுறை மற்றும் பாடத்திட்டம்

1. இணையவழி பாடத்திட்ட முதல் குழுக்கூட்ட நாள்: 28.04.2021 (https://meet.google.com/wgs.dvpu.jxx)

2. இணையவழி பாடத்திட்ட இரண்டாம் குழுக்கூட்ட நாள்: 11.06.2021

3. இணையவழி பாடத்திட்ட மூன்றாம் குழுக்கூட்ட நாள்: 12.06.2021 (https://meet.google.com/aex-.nmjy-awj)

கல்விக் குழுக்கூட்ட நாள்: 21.06.2021

2021-2022 கல்வியாண்டு முதல் நடைமுறைப்படுத்துவதற்கு ஒப்புதல் வேண்டிச் சமர்ப்பிக்கப்படுகிறது

Mother Teresa Women's University, Kodaikanal
Department of Tamil Studies
Choice Based Credit System (CBCS)
(2021-2022 onwards)
BA Tamil

1. About The Programme

The Course content of the B.A Tamil, degree programme has been planned carefully to offer students the best possible curricular experience and to mould them into intelligent citizens in the society. The curriculum revision has been premised on the assumption that society requires students, who will serve as its mind, heart and future. Further this course aims to provide employability skills to the graduates after completing the programme successfuly.

2. Programme Educational Objectives (PEOs)

PEO 1	தமிழ் மொழி மற்றும் தமிழ் இலக்கியம் சார்ந்த தகவல்களைப் பெறுவதால் போட்டித்தேர்வினை எதிர்கொள்ள இயலும்
PEO 2	இலக்கியங்களின் உள்ளடக்கத்தைத் தெரிந்து பல இலக்கியங்களைப் படைக்கும் படைப்பாற்றல் பெறுவர்
PEO 3	வாழ்வியல் நெறிமுறைகளைப் படிப்பதன் மூலம் பொருளாதாரத்தை மேம்படுத்தும் திறன் பெறுவர்
PEO 4	இலக்கியங்களைப் படிப்பதன் மூலம் சிறந்த இந்திய குடிமகனாக தெளிவாக சிந்திக்கும் மற்றும் எழுதும் திறன் பெறுவர்
PEO 5	தமிழின் தொன்மையையும் தமிழர்களின் வாழ்வியலையும் அறிந்து கொள்ள முடியும்.

3. Eligibility:

Candidate should have passed the Higher Secondary Examination conducted by the Board of the Higher Secondary Examination. Govt. of Tamil Nadu or any other Examination accepted by the syndicate as equivalent

4. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** Tamil

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	13	25	13	25
External	38	75	38	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
		Total Marks	**75**

*** Minimum credits required to pass: 156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/ Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

B.A TAMIL - இளங்கலைத் தமிழ்

Course code	Course Title	Credits	Hours		Maximum marks		
			L	P	Int	Ext	Total
FIRST SEMESTER / முதல் பருவம்							
U21LTA11	**Tamil - Part- I** General Tamil Ikkala Ilakkiyam **பகுதி – I** பொதுத்தமிழ் இக்கால இலக்கியம்	3	6	0	25	75	100
U21LEN11	English - Part-II	3	6	0	25	75	100
U21TAT11	**CORE I** Samakala Ilakkiyam **முதன்மைப்பாடம் - I** சமகால இலக்கியம்	4	5	0	25	75	100
U21TAT12	**CORE II** Nannool – Eluthathikaram 5 Iyalgal **முதன்மைப்பாடம் - II** நன்னூல் எழுத்ததிகாரம் - ஐந்து இயல்கள்	4	6	0	25	75	100
U21TAA11	**ALLIED I** Tamil Ilakiya Varalaru – I சார்பு பாடம் - தமிழ் இலக்கிய வரலாறு	4	5	0	25	75	100
U21EVS11	Environmental Studies சுற்றுச் சூழலியல்	2	2	0	25	75	100
U21PEPS11	**Professional English- Part I** Course – Add on course **பணித்திறன் சார் ஆங்கிலம் - பகுதி –III –** கூடுதல் பாடம்	4	6	0	25	75	100
	மொத்தம்	**24**	**36**				**700**
SECOND SEMESTER / இரண்டாம் பருவம்							
U21LTA22	**Tamil II-Part-I** General Tamil Idaikala Ilakkiyam **பகுதி – I** பொதுத்தமிழ் - II இடைக்கால இலக்கியம்	3	6	0	25	75	100
U21LEN11	English II- Part-II	3	6	0	25	75	100
U21TAT21	**CORE III** Chitrilakkiyam **முதன்மைப்பாடம் - III** சிற்றிலக்கியம்	4	5	0	25	75	100

U21TAT22	**CORE IV** Nannool Chol Atigara Iyalgal **முதன்மைப்பாடம் - IV** நன்னூல் சொல் அதிகாரம் - ஐந்து இயல்கள்	4	5	0	25	75	100
U21TAA22	**ALLIED II** Ilakiya Thiranaivu **சார்பு பாடம் -II** இலக்கியத் திறனாய்வு	4	5	0	25	75	100
U21VAE21	**Value Education** விழுமியக் கல்வி	3	3	0	25	75	100
U21PEPS22	**Professional English-Part II**	4	6	0	25	75	100
	மொத்தம்	**25**	**36**				**700**
THIRD SEMESTER / மூன்றாம் பருவம்							
U21LTA33	**Part I Tamil III** Kappiya Ilakkiyam பகுதி – I பொதுத்தமிழ் - III காப்பிய இலக்கியம்	3	6	0	25	75	100
U21LEN33	**Part II English III**	3	6	0	25	75	100
U21TAT31	**CORE V** Madurai Maiya Ilakkiyam மதுரை மைய இலக்கியம்	4	5	0	25	75	100
U21TAA33	**ALLIED III** Tamilaga Varalarum Panpadum **சார்பு பாடம் -III** தமிழக வரலாறும் பண்பாடும்	4	4	0	25	75	100
U21TAE311/ U21TAE312	**ELECTIVE – I** Nattupuraviyal **விருப்பப் பாடம் - I** நாட்டுப்புறவியல் (அல்லது) Oolai Chuvadi Vagaigal ஓலைச்சுவடி வகைகள் or MOOC Course	3	4	0	25	75	100
U21CSS31	Job oriented Course – **Paper 1- Language Skill I** – பணிசார் பாடம் **மொழித் திறன் - I** Computer skills for office management	2	3	0	25	75	100
U21TAN311	**Non-Major Elective – I**	2	2	0	25	75	100
U21PEPS33	**Professional English-Part III**	4	6	0	25	75	100
	மொத்தம்	**25**	**36**				**800**
FOURTH SEMESTER/ நான்காம் பருவம்							
U21LTA44	**Part I Tamil IV** Palanthamil Ilakkiyam **பகுதி – I பொதுத்தமிழ் - IV** பழந்தமிழ் இலக்கியம்	3	6	0	25	75	100
U21LEN44	**Part II English IV**	3	6	0	25	75	100

U21TAT41	**CORE VI** Agaporul Ilakkanam (Nambiyagapporul) **முதன்மைப் பாடம் - VI** அகப்பொருள் இலக்கணம் - நம்பி அகப்பொருள்	4	4	0	25	75	100
U21TAT42	**CORE VII** Kappiya Ilakkiyam **முதன்மைப் பாடம் - VII** காப்பிய இலக்கியம்	4	4	0	25	75	100
U21TAA44	**ALLIED IV** Tamil Mozhi Varalaru **சார்பு பாடம் -IV** தமிழ் மொழி வரலாறு	4	4	0	25	75	100
U21TAE421/ U21TAE422	**ELECTIVE - II** Oppiyalilakkiyam விருப்பப் பாடம் - II ஒப்பியல் இலக்கியம் (அல்லது) Tamil Computing (Advanced course) மேம்பட்ட கணினித் தமிழ் or MOOC Course	3	3	0	25	75	100
SBEII	Job Oriented Course – Paper II Managerial Skill	2	2	0	25	75	100
U21TAN42	Non -Major Elective –II	2	2	0	25	75	100
U21PEPS44	**Professional English-Part IV** Course – Add on course பணித்திறன் சார் ஆங்கிலம் - பகுதி –III – கூடுதல் பாடம்	4	6	0	25	75	100
	மொத்தம்	**29**	**37**				**900**
FIFTH SEMESTER/ ஐந்தாம் பருவம்							
U21TAT51	**CORE VIII** Kurinchisar (Malaipaguthi sar Ilakkiyam) முதன்மைப் பாடம் - VIII - குறிஞ்சி (மலைப் பகுதி சார் இலக்கியம்)	4	5	0	25	75	100
U21TAT52	**CORE IX** Bakthi Ilakkiyam முதன்மைப் பாடம் - IX பக்தி இலக்கியம்	4	5	0	25	75	100
U21TAT53	**CORE X** Puraporul- Ilakkanam- Puraporul Venbamalai- Muzhuvathum **முதன்மைப் பாடம் - X** புறப்பொருள் இலக்கணம் -	4	5	0	25	75	100

	புறப்பொருள் வெண்பா மாலை முழுவதும்						
U21TAT54	**CORE XI** Yappilakkanam – Yapperungala Karigai Muzhuvathum **முதன்மைப் பாடம் - XI** யாப்பிலக்கணம் - யாப்பருங்கலக்காரிகை முழுவதும்	4	5	0	25	75	100
U21TAT55	**CORE XII** Introduction to Linguistics and Computational Linguistics **முதன்மைப் பாடம் - XII** மொழியியல் மற்றும் கணினி மொழியியல் - அறிமுகம்	4	5	0	25	75	100
U21TAE531/ U21TAE532	**ELECTIVE –III** Penniyam **விருப்பப் பாடம் - தாள் -III** பெண்ணியம் (அல்லது) Inaiya Tamil Ilakkiyam இணையத் தமிழ் இலக்கியம்	3	4	0	25	75	100
U21TAS511/ U21TAS512	**Skill Based Elective Paper I** Thagaval Thodarpiyal **திறன் சார் விருப்பப் பாடம் - தாள் - 1** Thagaval Thodarbiyal தகவல் தொடர்பியல் (அல்லது) Ilakkiya Kolkaigal இலக்கியக் கொள்கைகள்	2	2	0	25	75	100
	மொத்தம்	**25**	**30**				**700**
SIXTH SEMESTER / ஆறாம் பருவம்							
U21TAT61	**CORE XIII** Sanga Ilakkiyam **முதன்மைப் பாடம் - XIII** சங்க இலக்கியம்	4	5	0	25	75	100
U21TAT62	**CORE XIV** Tamil-Neethiilakiyam **முதன்மைப் பாடம் - XIV** தமிழ் நீதி இலக்கியம்	4	5	0	25	75	100
U21TAT63	**CORE XV** Ani Ilakkanam-Thandiyalangaram Muluvathum **முதன்மைப் பாடம் - XV** அணி இலக்கணம் - தண்டியலங்காரம் முழுவதும்	4	5	0	25	75	100

U21TAT64	**CORE XVI** **முதன்மைப் பாடம் - XVI** Tamilaga Kovil Kalaigal kalvetukal Unarthum Panpaadu தமிழக கோவில் கலைகள் கல்வெட்டுகள் உணர்த்தும் பண்பாடு	4	5	0	25	75	100
U21TAT65	**CORE XVII** படைப்பிலக்கியம்	4	4	0	25	75	100
U21TAE641/ U21TAE642	**ELECTIVE –IV** Thiravida mozhigalin oppilakkanam **விருப்பப் பாடம் - தாள் - IV** திராவிட மொழிகளின் ஒப்பிலக்கணம் (அல்லது) Tamil Kalaisollakka Nerigal தமிழ் கலைச்சொல்லாக்க நெறிகள்	3	4	0	25	75	100
U21TAS61	**Skill Based Elective** கல்வெட்டியல்	3	2	0	25	75	100
U21EAS61	**Extension Activities** விரிவாக்கப் பணிகள்	2	0	0	25	75	100
	Total **மொத்தம்**	**28**	**30**		-	-	**800**
	Grand Total **மொத்த கூட்டுத் தொகை**	**156**	**205**		**Grand Total** **மொத்த கூட்டுத் தொகை**		**4600**

Non Major Elective

The candidates, who have joined the UG Programme, can also undergo Non Major Elective offered by other Departments.

<table>
<tr><td>பிறதுறை விருப்பப் பாடம் - I
பணிவாய்ப்புத் தமிழ் - I

பிறதுறை விருப்பப் பாடம் - II
பணிவாய்ப்புத் தமிழ் - II

Mozhi Peyarpiyal
பணிசார் பாடம்
மொழித் திறன் - II
மொழி பெயர்ப்பியல்</td><td>பணித்திறன் சார் ஆங்கிலம் - பகுதி –III – கூடுதல் பாடம் - கூடுதல் புள்ளிகள் - 4. – 5 மணிகள்</td></tr>
<tr><td colspan="2">ஒவ்வொன்றுக்கும் இரண்டு புள்ளிகள் - இவை கூடுதல் புள்ளிகளுக்கான பாடங்கள் - கூடுதல் புள்ளிகளாகச் சேர்க்கப்பட வேண்டும்.</td></tr>
<tr><td>U21TAO31 - Online Course - Third Semester</td><td>U21TAO31 - இணைய பாடம் - மூன்றாம் பருவம்</td></tr>
<tr><td>U21TAI41- Internship Training – Fourth Semester</td><td>U21TAI41 - உள்கட்டப் பயிற்சி – நான்காம் பருவம்</td></tr>
<tr><td>U21TAV51 - Value added programme
Journalism</td><td>U21TAV51 - மதிப்புக் கூட்டுப் பாடம
1. U21TAV511 - இதழியல்
2. U21TAV512 - தமிழ் சதக இலக்கியம்</td></tr>
</table>

PROGRAMME OUTCOMES (POs)

PO 1	இலக்கிய, இலக்கண வகைமைகளை அறிந்து கொள்ள இயலும்.
PO 2	தமிழ் மொழி அறிவினைப் பெற்று தமிழ் இலக்கியத்தின் வளர்ச்சி நிலையை அறிந்து கொள்ள முடியும்
PO 3	இலக்கணம் கற்பதால் பிழையின்றி பேசவும் எழுதவும் முடியும்
PO 4	பல்வகை இலக்கியங்களை அறிவதோடு மதிப்பிடும் திறனையும் பெறுவர்
PO 5	இலக்கியம் படைக்கும் படைப்பாளர்களை உருவாக்க முடியும்
PO 6	இலக்கண இலக்கிய நெறிமுறைகளை அறிந்து பன்முகப் படைப்பாற்றல் பெறுவர்
PO 7	வேலைவாய்ப்புக்கான திறன்களை பெறமுடியும்

PROGRAMME SPECIFIC OUTCOMES

இந்த பாடங்களைப் படிப்பதன் மூலம் மாணவியர் பெறும் பயன்கள்.

PSO	இந்த பாடங்களைப் படிப்பதன் மூலம் மாணவியர் பெறும் பயன்கள்	PO mapped
PSO1	இக்கால இலக்கிய வகைமைகளாகிய கவிதை, சிறுகதை, புதினம், நாடகம், கட்டுரை ஆகியவற்றைப் படிப்பதுடன், ஊடகத்துக்கேற்ப எழுதுநெறிகளை அறிந்துகொண்டு எழுதுதிறனைப் பெறுவதுடன், போட்டித் தேர்வுகளை எதிர் கொள்ளும் அறிவுச் செழுமை பெறுதல்	PO2 PO5
PSO2	தமிழ் இலக்கண மரபுகளைப் பயில்வதுடன் இன்றைய கணித்தமிழ் அலகுகளாகத் தமிழ் மொழியியல் நோக்குப் பகுத்துப் பரிசீலிக்கும் ஆற்றல் பெறுவதோடு பணிவாய்ப்பு பெறும் பயிற்சி பெறுதல்	PO4 PO7
PSO3	தமிழ் இலக்கியங்கள் நுவலும் வாழ்வியல் விழுமியங்களைத் தெரிந்து கொண்டு, அவற்றை இன்றைய வாழ்வில் பயன்படுத்துவதற்கு ஏற்ற செம்மைப் பண்புகளை ஆராய்ந்து அறிதல்	PO1 PO5
PSO4	காலந்தோறும் தமிழர் வளர்த்த கோயிற்கலை கல்வெட்டியல், இசை, ஓவியம், சிற்பம், கட்டிடம் நடனக்கலை, தமிழரது பண்பாடு, பாரம்பரியம் சிறப்புகளை அறிந்து பேணுதல்	PO3 PO4
PSO5	செம்மொழித் தமிழ் இலக்கியச் செவ்வியல் பண்புகளையும், மனித மேம்பாட்டுச் சிந்தனைகளையும், வாழ்வியல் விழுமியங்களையும் அறிதல்	PO4 PO6

SEMESTER – I

COURSE CODE	U21TAT11	CORE – I : சமகால இலக்கியம்	L	T	P	C
CORE I			5	-	-	4

Cognitive Level	**K1: ஆற்றல்** **K2: புரிதல் அறிவு** **K3: பயன்படுத்தல் அறிவு** **K4: படைத்தல்** **K5: மதிப்பீடு**
Learning Objectives	The course aims at ➢ providing a wide spectrum of literary texts of the great masters of contemporary period for the young minds. ➢ knowing the content of literary pieces in each genre and to be informed and inspired. ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ developing critical and creative attitude in students.

அலகு -1	**கவிதை இலக்கியம்** 1.1 பாரதியார் கவிதைகள் - பாரதி அறுபத்தாறு 1.2. பாரதிதாசன் - பாண்டியன் பரிசு 1.3. வாணிதாசன் - தமிழச்சி (கவிதை நூல்), சென்னை, மலர் நிலையம், 1949
அலகு -2	**புதின இலக்கியம்:** அகல் விளக்கு (சாகித்திய அகாதெமி பரிசு பெற்றுது)(162 பக்கங்கள்)
அலகு - 3	**சிறுகதை இலக்கியம்:** (ஜெயகாந்தன் கதைத் தொகுப்பு – 1) 1. யுக சந்தி 2. இல்லாதது எது? 3. இரண்டு குழந்தைகள் 4. நான் இருக்கிறேன் 5. பொம்மைதேவன் வருவாரா? 6. துறவுபூ 7. உதிரும் குறைப் பிறவி 8. யந்திரம்
அலகு -4	**நாடக இலக்கியம்:** பரிதிமாற் கலைஞர் - ரூபாவதி (வி.கோ.சூரியநாராயண சாத்திரியார்)
அலகு -5	உரைநடை இலக்கியம்
பார்வை நூல்கள்	1. பாரதியார் - பாரதியார் கவிதைகள் 2. பாரதிதாசன் - பாரதிதாசன் கவிதைகள் 3. கி.வா. ஜகநாதன் -அறப்போர், சங்க நூல் காட்சிகள், இலக்கிய கட்டுரைகள், சென்னை, பாரி நிலையம் - 1952. 4. மு.வரதராசன், அகல் விளக்கு (சாகித்திய அகாதெமி பரிசு பெற்றது) 5. வாணிதாசன்- தமிழச்சி (கவிதை நூல்), சென்னை, மலர் நிலையம், 1949 6. ஜெயகாந்தன் கதைத் தொகுப்பு, மதுரை மின்நூல் தொகுப்புத்திட்டம் 7. பரிதிமாற் கலைஞர் - ரூபாவதி (வி.கோ.சூரியநாராயண சாத்திரியார்) மதுரை மின்நூல் தொகுப்புத்திட்டம்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	**CO1**	know the poetic tactics of the modern writers
K1, K2	**CO 2**	understand the notable features of literary geners and flow of writing
K2, K4	**CO 3**	aware of the salient features of texts
K2, K3	**CO 4**	apply and attempt to write creatively
K4,	**CO5**	critically analyze the works of great writers and will be able to create literary pieces on their own

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark-
No Correlation (N) - 0 mark

COURSE CODE	U21TAT12	நன்னூல் எழுத்ததிகாரம் (ஐந்து இயல்கள்)	L	T	P	C
CORE II			6	-	-	4
Cognitive Level		K1: Skill in language K2: Understand K3: give citation K4: Analyse K5: To know the structure				
Learning Objectives		The Course aims to • make students obtainwriting skills with correct usage of grammar. • develop language proficiency • gain rich knowledge about structure of Tamil language through the ages • learn and brighten up their career. • strengthen the language skills through exercises.				

அலகு-1	**நன்னூல்:** நூல் அறிமுகம்- பவணந்தி முனிவர் பற்றிய குறிப்பு – சிறப்பு பாயிரம் பொதுப்பாயிரம்
அலகு-2	எழுத்து அதிகாரம், எழுத்து இயல், பத இயல்
அலகு-3	உயிர் ஈற்றுப் புணரியல்
அலகு-4	மெய் ஈற்றுப் புணரியல்
அலகு-5	உருபு புணரியல்
பாடநூல்:	நன்னூல்- காண்டிகை உரை- திருநெல்வேலி சைவசித்தாந்த நூற்பதிப்புக்கழக வெளியீடு
பயிற்சி:	மாணவர் தனக்கு விருப்பமான நூலின் ஐந்து பக்கங்களில் உள்ள தொடர்களில், வேற்றுமைப்புணர்ச்சி,அல்வழி புணர்ச்சி இடம் பெற்றுள்ள விதத்தை அடிக்கோடிட்டு, நன்னூல் நூற்பாக்களுடன் பொருத்திப்பார்த்து மூன்றுபக்க அளவில் கட்டுரை எழுதிச் சமர்ப்பிக்க வேண்டும். இது பயிற்சிக்காக மட்டுமே. இதில் தேர்வுக்கான வினா ஏதும் கேட்கப்படக் கூடாது.

Course Outcome

At the end of the course, the students will be able to:

K1, K2	CO1	acquire knowledge of linguistic conventions for reading, writing and speaking.
K1, K2	CO2	use targeted grammatical structures appropriately in oral and written production.
K5, K4	CO3	analyse the grammatical structure of sentences in Tamil texts.
K5, K1	CO4	communicate correctly in spoken and written Standard Tamil.
K3	CO5	make inferences and predictions based on comprehension of a text.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 marks—42/60
Moderately Correlating (M) - 2 marks—16/60
Weakly Correlating (W) - 2 marks
No Correlation (N) - 0 mark

COURSE CODE	U21TAA11	தமிழ் இலக்கிய வரலாறு	L	T	P	C
ALLIED I சார்பு பாடம்			5	-	-	4
Cognitive Level		**K1: Learning** **K2: Understand** **K3: Apply** **K4 : Analyze** **K5: knowing the background of the literature**				
Learning Objectives		The course aims at ➢ providing a wide spectrum of literature through the ages. ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of literature				

அலகு -1	இலக்கிய வரலாற்று மூலங்கள் - தமிழின் தொன்மை – செவ்வியல் பண்புகள் - முச்சங்க வரலாறு - தொல்காப்பியம் - சங்க இலக்கியம் - எட்டுத்தொகை – பத்துப்பாட்டு அமைப்பும் வரலாறும்
அலகு -2	சங்கம் மருவிய காலம் - பதினென் கீழ்க்கணக்கு இலக்கியம் - திருக்குறள் தனித்தன்மை - இரட்டைக் காப்பியங்கள் தமிழில் காப்பியங்கள் - சமண பௌத்தக் காப்பியங்கள் - காப்பியங்களின் வடிவமும், தனித்தன்மைகளும்.
அலகு -3	பக்தி இலக்கியத்தின் தோற்றம் - பன்னிரு திருமுறைகள் - சித்தர் இலக்கியம் – பன்னிரு ஆழ்வார்களது பாசுர நூல்கள் - அவற்றின் உரைகள் - மணிப்பிரவான நடையின் தோற்றம், வளர்ச்சி
அலகு -4	தமிழில் சிற்றிலக்கியங்களின் தோற்றம் வளர்ச்சி, வரலாறு – பரணி – கலம்பகம் பிள்ளைத்தமிழ் - உலா – குறவஞ்சி – பள்ளு – அந்தாதி – கோவை – தூது மடல் - சதகம் - நொண்டி நாடகம் - ஆகியவற்றின் அமைப்பும் இலக்கணமும் கம்பராமாயணம் - வில்லிபாரதம் - அரிச்சந்திர புராணம் - நளவெண்பா புராணங்கள் - தனிப்பாடல்கள் - நிகண்டுகள் - இடைக்கால இலக்கண நூல்கள் - கிறித்தவ இசுலாமியரது தமிழ்த் தொண்டு
அலகு -5	இயல் - இசை – நாடகத்தமிழ் வளர்ச்சி – மரபுக்கவிதை – புதுக்கவிதையின் வகைகள் - சிறுகதை – புதினம் - நாடகம் - உரைநடை ஆகியவற்றின் தோற்றம் - வளர்ச்சி – நோக்கும் போக்கும் - பெண்ணிய, தலித்திய இலக்கிய வளர்ச்சி - இன்றைய நிலை.
நூல்கள்:	மு.வ – தமிழ் இலக்கிய வரலாறு – சாகித்திய அகாதெமி வெளியீடு. தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, சென்னை, தமிழ்ப் புத்தகாலயம்.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	**CO1**	know the poetic tactics of the classical works
K1, K2	**CO 2**	understand the difference between classical Tamil literature and modern literature
K2, K4	**CO 3**	aware of the salient features of literature through the ages
K2, K3	**CO 4**	know the trend of literature
K4, K6	**C05**	critically analyze the literature with historical background

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

SEMESTER - II

COURSE CODE	U21TAT21	சிற்றிலக்கியம்	L	T	P	C
CORE III			5	-	-	4
Cognitive Level		**K1: புரிதல்** **K2: அறிவு பெறுதல், ஆற்றல் பெறுதல்** **K3: பயன்படுத்தல்** **K4: படைத்தல்** **K5: மதிப்பீடு**				
Learning Objectives		The course aims at ➢ providing a wide outline of literary texts of themedieval period. ➢ knowing the content of literary pieces in each genre and to be informed and inspired. ➢ helping the students imbibe the human and moral values through the study of literature. ➢ developing critical and creative attitude in students.				

அலகு -1	**கலிங்கத்துப்பரணி** காடு பாடியது பகுதி முழுவதும் திருக்குற்றாலக்குறவஞ்சி வசந்தவல்லியின் காதல் என்ற பகுதி முழுவதும் “வசந்தவல்லி வந்தாள்” முதல் கூடாய் கூடலே வரை
அலகு -2	**மதுரை மீனாட்சியம்மை பிள்ளைத்தமிழ்** தாலப்பருவம் முழுவதும் 10 பாடல்கள் நந்திக்கலம்பகம் நந்திவர்மன் வென்ற போர்கள் தெள்ளாற்றுப் போர் பாடல் எண்கள்:19, 23, 28, 33,49, 52, 53, 61, 64, 71, 75, 77, 80,86 கடம்பூர் வென்றது பாடல் எண்கள்: 25,80
அலகு -3	தமிழ்விடுதூது முழுவதும்
அலகு -4	முக்கூடற்பள்ளு- நாட்டுவளம், நகர்வளம் பள்ளியர்ஏசல் பகுதி முழுவதும்
அலகு -5	காரைக்காலம்மையார்- அற்புதத்திருவந்தாதி முழுவதும்.
பாட நூல்கள்	1. கலிங்கத்துப்பரணி- பாவை பப்ளிகேஷன்ஸ், சென்னை. 2. திருக்குற்றாலக் குறவஞ்சி- பாரி நிலையம், சென்னை. 3. மதுரை மீனாட்சியம்மை பிள்ளைத்தமிழ்-முல்லை நிலையம், சென்னை 4. நந்திக்கலம்பகம் -நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. 5. தமிழ் விடு தூது-நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை 6. முக்கூடற்பள்ளு-பாவை பப்ளிகேஷன்ஸ், சென்னை 7. அற்புதத்திருவந்தாதி- கழக வெளியீடு. 8. சிற்றிலக்கியச் சொற்பொழிவுகள்- கழக வெளியீடு 9. சிற்றிலக்கிய வரலாறு- தா.ஈசுவர பிள்ளை 10. சிற்றிலக்கியச் செல்வங்கள்-ந.வீ.செயராமன்.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of the medieval writers
K1, K2	CO 2	understand the notable features of literary geners and flow of writing
K2, K4	CO 3	aware of the salient features of texts
K2, K3	CO 4	apply and attempt to appreciate creatively
K4,	C05	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark-
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT22	நன்னூல் - சொல் அதிகாரம் - 5 இயல்கள்	L	T	P	C
CORE IV			5	-	-	4
Cognitive Level		**K1: Skill in language** **K2: Understand** **K3: give citation** **K4: Analyse** **K5: To know the structure**				
Learning Objectives		The Course aims to • make students obtainwriting skills with correct usage of grammar. • develop language proficiency • gain rich knowledge about structure of Tamil language through the ages • learn and brighten up their career. • strengthen the language skills through exercises.				

அலகு -1	பெயரியல்
அலகு -2	வினையியல்
அலகு -3	பொதுவியல்
அலகு -4	இடைச்சொற்கள்
அலகு -5	உரிச்சொல் இயல்
பாட நூல்கள்	நன்னூல்- காண்டிகை உரை – திருநெல்வேலி சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு
பயிற்சி	மாணவர் இருபது இக்காலப் பெயர்ச்சொற்களைத் தேர்வு செய்து, அவை நன்னூல் பெயரியல் விதிமுறைகளின்படி உள்ளனவா? மாறி உள்ளனவா என்று பொருத்திப் பார்த்துக் கட்டுரை எழுதிச் சமர்ப்பிக்க வேண்டும். பத்துத் தொடர்களைத் தேர்வு செய்து, அவற்றில் உள்ள வினைச்சொற்களின் அமைப்பைக் கண்டறிந்து, அவை நன்னூல் வினையியல் விதிகளின் படி உள்ளனவா? வேறுபட்டுள்ளனவா என்று பொருத்திப் பார்த்துக் கட்டுரை எழுதிச் சமர்ப்பிக்க வேண்டும். மாணவர் பயிற்சிக்காக உள்ளது இப்பகுதி, இதிலிருந்து தேர்வில் வினாக்கள் இடம்பெறக் கூடாது

Course Outcome

At the end of the course, the students will be able to:

K1, K2	**CO1**	acquire knowledge of linguistic conventions for reading, writing and speaking.
K1, K2	**CO2**	use targeted grammatical structures appropriately in oral and written production.
K5, K4	**CO3**	analyse the grammatical structure of sentences in Tamil texts.
K5, K1	**CO4**	communicate correctly in spoken and written Standard Tamil.
K3	**CO5**	make inferences and predictions based on comprehension of a text.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks—42/60
Moderately Correlating (M) - 2 Marks—16/60
Weakly Correlating (W) - 2 Marks
No Correlation (N) - 0 Mark

COURSE CODE	U21TAA22	இலக்கியத் திறனாய்வு	L	T	P	C
ALLIED II சார்பு பாடம் -II			5	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of literature through the ages. ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of literature				

அலகு-1	**இலக்கியத் திறனாய்வு வகைகள்**
அலகு-2	**கவிதைத் திறனாய்வு** • மரபுக்கவிதை • புதுக்கவிதை
அலகு-3	**புதினத் திறனாய்வு** புதினக் கரு- மொழிநடை-நிகழ்ச்சிக்கோவைகள்- உத்தி
அலகு-4	**சிறுகதைத் திறனாய்வு** கதைக்கரு- கதைமாந்தர்கள்- மொழிநடை- உத்தி நாடகத்திறனாய்வு
அலகு-5	**இலக்கிய இயக்கங்கள்**
பார்வை நூல்கள்:	1. சு.பாலச்சந்திரன்- இலக்கியத்திறனாய்வு 2. அரங்க சுப்பையா- இலக்கியத்திறனாய்வு இசங்கள் கொள்கைகள் 3. மு.வரதராசனார்- இலக்கிய மரபு 4. மு.வரதராசனார்- இலக்கியத்திறன் 5. அ.ச.ஞானசம்பந்தனார்- இலக்கியக் கலை 6. தா.ஏ.ஞானமூர்த்தி- இலக்கியத்திறனாய்வியல் - உலகத்தமிழ் ஆராய்ச்சி நிறுவன வெளியீடு. 7. தி.சு.நடராசன்- திறனாய்வுக் கலை.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of the writers
K1, K2	CO 2	understand the notable features of literary geners and flow of writing
K2, K4	CO 3	aware of the salient features of texts
K2, K3	CO 4	apply and attempt to appreciate creatively
K4,	C05	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

SEMESTER – III

COURSE CODE	U21TAT31	மதுரை மைய இலக்கியம்	L	T	P	C
CORE V			5	-	-	4
Cognitive Level		**K1: புரிதல்** **K2: அறிவு பெறுதல், ஆற்றல் பெறுதல்** **K3: பயன்படுத்தல்** **K4: படைத்தல்** **K5: மதிப்பீடு**				
Learning Objectives		The course aims at ➢ providing a wide outline of literary texts of Ancient Madurai city over the years. ➢ knowing the content of literary pieces in each genre and to be informed and inspired. ➢ helping the students imbibe the human and moral values through the study of literature. ➢ developing critical and creative attitude in students.				

அலகு –1	**மதுரைக் காஞ்சி** நூலமைப்பும், நுவல் பொருளும் பற்றிய சுருக்க வரைவு	
அலகு –2	**பரிபாடல்** வையை பற்றிய செய்யுட்கள் முத்தொள்ளாயிரம் - பாண்டியனைப் போற்றும் செய்யுட்கள் **சிலப்பதிகாரம்** - ஊர்காண் காதை	
அலகு –3	**குமரகுருபரர்** மதுரைக் கலம்பகம் - நூல் அமைப்பும், மதுரை பற்றிய சுருக்க வரைவும்	
அலகு –4	**குலசேகர பாண்டியன்** மதுராபுரி அம்பிகை மாலை – 30 கட்டளைக் கலித்துறைச் செய்யுட்களும்பாடப்பகுதி	
அலகு –5	**சொக்கநாதப் புலவர்** அழகர் கிள்ளை விடுதூது நூலமைப்பும், நுவல்பொருளும் சுருக்க வரைவு.	
நூல்கள்:	**1. மதுரைக் காஞ்சி** தஞ்சைத் தமிழ்ப் பல்கலைக் கழகத் தொகுப்பு நூல்	தமிழ்ச் செவ்வியல் நூல்கள்
	2. பரிபாடல் தஞ்சைத் தமிழ்ப் பல்கலைக் கழகத் தொகுப்பு நூல்	தமிழ்ச் செவ்வியல் நூல்கள்
	3. திருமுருகாற்றுப்படை தஞ்சைத் தமிழ்ப் பல்கலைக் கழகத் தொகுப்பு நூல்	தமிழ்ச் செவ்வியல் நூல்கள்
	4. **முத்தொள்ளாயிரம்** தஞ்சைத் தமிழ்ப் பல்கலைக் கழகத் தொகுப்பு நூல்	தமிழ்ச் செவ்வியல் நூல்கள்
	5. குமரகுருபரர் மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்	மதுரைக்கலம்பகம்
	6. **குலசேகர பாண்டியன்** மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம	மதுராபுரி அம்பிகை மாலை
	7. சொக்கநாதப் புலவர் மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்	அழகர் கிள்ளை விடு தூது

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of the Tamil writers to highlight the significance of Madurai city which not only serves as the capital of Pandya kingdom but also remains as the seat of Tamil sangam since Sangam Age.
K1, K2	CO 2	understand the notable features of literary geners and flow of writing
K2, K4	CO 3	aware of the salient features of texts
K2, K3	CO 4	apply and attempt to appreciate creatively
K4,	C05	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S)	-	3 Marks -42/60
Moderately Correlating (M)	-	2 Marks -16/60
Weakly Correlating (W)	-	2 Marks-
No Correlation (N)	-	0 Mark

COURSE CODE	U21TAA33	தமிழக வரலாறும், பண்பாடும்	L	T	P	C
ALLIED III சார்பு பாடம் -III			4	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of the literature**				
Learning Objectives		The course aims at ➢ providing a wide spectrum of literature through the ages. ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of literature				

அலகு –1	தமிழக நிலவியல் கூறுகள் - வரலாற்று மூலங்கள் - தொல் பழங்காலம் - பண்டைத் தமிழகம் - சிந்து வெளி நாகரீகத் தொடர்பு – தமிழ் மொழியின் தொன்மை – கீழடி அகழ்வாய்வுச் சான்றுகள் - முச்சங்க வரலாறு – சங்க காலத் தமிழகமும், மூவேந்தர் மரபும், குடிகளும், தமிழகத்துக்கும் நந்த மோரியர்களுக்கும், ரோமானிய யவனருக்கும் உள்ள தொடர்புகள், கடல் வணிகம் - சங்க கால மக்கள் வாழ்க்கை, அரசியல், போர்முறை, சமூகம், கல்வி, கலைகள், பொருளாதாரம் - சடங்குகள் - சகுனங்கள் - நம்பிக்கைகள் - திருவிழாக்கள் - வழிபாடுகள்.
அலகு –2	சங்கம் மருவிய காலம் - களப்பிரர் வருகை – பல்லவர்கள் - முற்கால, இடைக்கால, பிற்காலப் பல்லவர்கள் ஆட்சி – குடைவரைக் கோவில்கள் - தோற்றம் - பக்தி இலக்கிய எழுச்சி – சைவ வைணவ பக்தி இயக்கம் - சமய அரசியல், பொருளாதார நிலை – கோயில் கட்டிடக் கலை வளர்ச்சி,மக்கள் வாழ்வியல் - கல்வி – பண்பாடு
அலகு –3	சோழர் காலம் - பொற்காலம் - சோழர் சாளுக்கியர் உறவு நிலை - தென் கிழக்கு ஆசிய நாடுகளை வென்றமை – சோழர் ஆட்சி முறை – குடவோலை முறை –சோழர் காலச் சமூகப் பண்பாட்டு, அரசியல் சமயப், பொருளாதார நிலை – கலைகள்- கோயில்கள் தஞ்சைப் பெரிய கோயில் சார் கலைகள் பாண்டியர்களது எழுச்சி – சோழ – பாண்டியர் உறவு – அயல்நாட்டுப் பயணிகள் கண்ட தமிழகம் - நாயக்கர் காலம் - தமிழகத்தில் மாலிக் காபூர் படையெடுப்பு – விசய நகர ஆட்சியின் விளைவு – தஞ்சை மராட்டியர்கள் - கர்நாடக நவாபுகள் ஆட்சியில் தமிழகச் சூழல்
அலகு –4	ஐரோப்பியர் வருகை – ஆற்காடு, தஞ்சை அரசர்களுடன் ஆங்கிலேயர் கொள்கை – பாளையக்காரர் எழுச்சி – கிழக்கிந்திய கம்பெனி அதிகாரம் - விடுதலைப் புரட்சி – கல்வி முறை – நீதி, நிர்வாக நடைமுறை
அலகு –5	விடுதலைக்கு முந்தைய தமிழகம் இலக்கிய வளர்ச்சி – பத்திரிக்கை வளர்ச்சி –ஐரோப்பியரது தமிழத் தொண்டு - இந்திய விடுதலை இயக்கத்துக்குத் தமிழகத்தின் பங்கு – சமய, சமூகச் சீர்திருத்த இயக்கங்கள்

	- இந்திய விடுதலைக்குப் பின் தமிழகம் - மொழி வழி மாநில உருவாக்கம் - தமிழ் இயக்கங்கள் - சமூகப் பொருளாதார மாற்றங்கள் - தமிழ் இலக்கியப் போக்குகள் - தமிழ் இதழ்கள் நாடகக்கலை – திரைப்படங்கள், தமிழ் ஊடகங்கள், தமிழ் இசை எழுச்சி.
பாட நூல்	1. கே. கே. பிள்ளை, தமிழக வரலாறும் பண்பாடும் 2. வே.தி. செல்லம், தமிழக வராலாறும், பண்பாடும்.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the historical background of the literary works
K1, K2	CO 2	understand the difference between classical Tamil literature and modern literature
K2, K4	CO 3	aware of the salient features of literature through the ages
K2, K3	CO 4	know the trend of literature
K4, K6	C05	critically analyze the literature with historical ,political,socio-cultural and economicbackground of Tamilnadu.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAE311	நாட்டுப்புறவியல்	L	T	P	C
ELECTIVE – I விருப்பப் பாடம் - I			4	-	-	3
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of oral literature through the ages. ➢ helping the students to collect oral literature from all parts of the state of Tamilnadu. ➢ understanding the nuances of folkliterature				

அலகு –1	நாட்டுப்புறவியல் விளக்கம் பண்புகள் - நாட்டுப்புற இலக்கிய வகைகள் நாட்டுப்புறப் பாடல்கள் நாட்டுப்புறக் கதைகள் நாட்டுப்புறக் கதைப்பாடல்கள் பழமொழிகள் விடுகதைகள்
அலகு –2	நாட்டுப்புறக் கைவினைப் பொருட்கள் நாட்டுப்புற மருத்துவம் - புழங்கு பொருட்கள்
அலகு –3	நாட்டுப்புற இலக்கியமும், எழுத்து இலக்கியமும் - ஒற்றுமை, வேற்றுமைகள் - பழமொழிகள் - எழுத்திலக்கியத்தில் நாட்டுப்புற இலக்கியத்தின் செல்வாக்கு.
அலகு –4	நாட்டுப்புறக் கலைகள்
அலகு –5	விளையாட்டு, தொழில்கள், சடங்குகள்
பாடநூல்:	சு.சக்திவேல், நாட்டுப்புறவியல் ஆய்வு

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the emotions of common people.
K1, K2	CO 2	understand the notable features of significant events through folk literature.
K2, K4	CO 3	aware of their lifestyle, beliefs and cultural tradition.
K2, K3	CO 4	apply and attempt to know the value of folk tradition.
K4,	CO5	critically analyze the life of people.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60

Moderately Correlating (M) - 2 Marks -20/60

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 Mark

COURSE CODE	U21TAE312	ஓலைச்சுவடி வகைகள்	L	T	P	C
ELECTIVE – I			4	-	-	3
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of literature written on palmleaves through the ages. ➢ helping the students to read scripts in the form of palmleaves. through the study of manuscriptology.. ➢ understanding the nuances of manuscriptology				

அலகு –1	தமிழில் ஓலைச்சுவடிகள் - எழுத்தாணியில் எழுதுமுறை – ஓலைச்சுவடி வகைகள் - ஓலைச்சுவடி எழுதுமுறைகள் - கோர்த்தல் - பாதுகாத்தல்
அலகு –2	ஓலைச்சுவடி வாசிப்புப் பயிற்சி – சுவடித் தமிழ் - சுவடிகளில் எழுதும் பயிற்சி – பொருள் தடுமாற்றம் - பாடபேதம் நீக்க அறிஞர்கள் கையாண்ட வழிமுறைகள்
அலகு –3	ஓலைச்சுவடிகள் நூலகம்- அரசினர் கீழ்த்திசைச் சுவடிகள் நூலகம் தஞ்சை சரசுவதி மகால் நூலகத் தமிழ்ச்சுவடிகள் விளக்க அட்டவணைத் தொகுதிகள் . தமிழகச் சுவடிகள் நூலகம் - அயல் நாடுகளில் தமிழ்ச் சுவடிகள் நூலகம் - பிரான்சு - இலண்டன்
அலகு –4	தமிழ்ச் சுவடிகள் பதிப்பியல் வரலாறு – பதிப்பித்த தமிழ்ச் சான்றோர்களின் பங்களிப்பும், இலக்கியக் கொடையும்.
அலகு –5	தமிழ்ச் சுவடிகளில் காணலாகும் பாட வேறுபாடுகள் - பாடத் தெரிவு முறைகள் - விடுபாடு நிரப்புதல் - இடைச்செருகல் - இனம் காணல் - திருத்தம் செய்தல் - சுவடியியல் பதிப்புத் திறன்கள்
நூல்கள்:	1. பூ. சுப்பிரமணியம், சுவடிப் பதிப்புக் கலை, சென்னை. உலகத் தமிழ் ஆராய்ச்சி நிறுவன வெளியீடு. 2. த. கோ.பரமசிவம், சுவடிப் பதிப்பு நெறிமுறைகள் தஞ்சைத் தமிழ்ப் பல்கலைக்கழக வெளியீடு.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of the writers
K1, K2	CO 2	understand the notable features of literary geners and flow of writing in palmleaves.
K2, K4	CO 3	aware of the salient features of manuscriptology.
K2, K3	CO 4	apply and attempt to edit and print manuscripts.
K4,	CO5	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60

Moderately Correlating (M) - 2 Marks -20/60

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 Mark

SEMESTER - IV

COURSE CODE	U21TAT41	அகப்பொருள் இலக்கணம் - நம்பி அகப்பொருள் முழுதும்	L	T	P	C
CORE V முதன்மைப் பாடம் - VI			4	-	-	4
Cognitive Level		**K1: Skill in language** **K2: Understanding** **K3: giving suitable citation** **K4: Analysing the content** **K5: To know the structure**				
Learning Objectives		**The Course aims to** • make students obtain skills to analse the literary content of ahaporul.. • develop proficiency in content analysis. • gain rich knowledge about structure and content of Tamil Aham poetry. through the ages • learn and brighten up their knowledge about Tamil literary tradition.. • strengthen the language skills through exercises.				
அலகு –1		நம்பியகப் பொருள் - அறிமுகம் - ஆசிரியர் குறிப்பு - காலம் - சிறப்புப் பாயிரம் – நூலமைப்பு – அகத்திணை இயல் - ஒன்று முதல் அறத்தோடு நிலை வரையிலான நூற்பாக்கள் (1 முதல் 54 வரை)				
அலகு –2		அகத்திணை இயல் - 11 கற்பு முதல் காதல் பரத்தையர் வரையிலான நூற்பாக்கள் (55 முதல் 116 வரை)				
அலகு –3		களவு இயல் நூற்பாக்கள் 117 முதல் 170 வரை				
அலகு –4		வரைவு இயல் நூற்பாக்கள் (171 முதல் 199 வரை) கற்பு இயல் நூற்பாக்கள் (200 முதல் 209 வரை)				
அலகு –5		ஒழிபியல் நூற்பாக்கள் 210 முதல் 252 வரை				
பாட நூல்கள்		நம்பியகப் பொருள் - திருநெல்வேலி சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு				

COURSE OUTCOME

At the end of the course, the students will be able to:

K1, K2	CO1	acquire knowledge of literary conventions of Tamil Aham poetry.
K1, K2	CO2	use targeted Aham content in prescribed form of verses in standard Tamil.
K5, K4	CO3	analyse the Aham content and grammatical structure of standardised Tamil verses..
K5, K1	CO4	assess correctly the Aham content given in Standard Tamil.
K3	CO5	make inferences and predictions based on comprehension of Tamil verses.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks—42/60
Moderately Correlating (M) - 2 Marks—16/60
Weakly Correlating (W) - 2 Marks
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT42	காப்பிய இலக்கியம்	L	T	P	C
CORE VII முதன்மைப் பாடம் - VII			4	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of Tamil Epic literature through the ages. ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of literature				

அலகு – 1	**சிலப்பதிகாரம்** - புகார்க் காண்டம் - 6 காதைகள் இந்திரவிழா ஊர் எடுத்த காதை கடலாடு காதை கானல் வரி வேனில் காதை கனாத்திரம் உரைத்த காதை நாடு காண் காதை
அலகு – 2	**சிலப்பதிகாரம்** - ஊர் காண் காதை **மணிமேகலை** – 5 காதைகள் மட்டும் பளிக்கறை புக்க காதை மணிமேகலா தெய்வம் வந்து தோன்றிய காதை சக்கரவாளக் கோட்டம் உரைத்த காதை துயில் எழுப்பிய காதை மணிபல்லவத்துத் துயர் உற்ற காதை
அலகு – 3	**சீவக சிந்தாமணி** விமலையார் இலம்பகம்
அலகு – 4	**கம்பராமாயணம்** ஆரணிய காண்டம் - 12வது படலம் - சவரி பிறப்பு நீங்கு படலம்
அலகு – 5	5.1 சீறாப்புராணம். 5.2 ஹிஜிரத்துக் காண்டம் 4வது படலம் - விடமீட்ட படலம்- செய்யுள் 235 – 280 வரை 5.3 தேம்பாவணி மூன்றாம் காண்டம் ஆறாம் படலம் - மீட்சிப் படலம் - மட்டும்

நூல்கள்	1. ஐம்பெருங்காப்பியங்கள் 2. கம்பராமாயணம் 3. சீறாப்புராணம்	ச.வே.சு.(உ.ரை) மணிவாசகர் பதிப்பகம் ச.வே.சு.(ப.ஆ) மணிவாசகர் பதிப்பகம் மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்
	சிலப்பதிகாரம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம் தமிழ்	இணையக் கல்விக் கழக நூலகம்
	மணிமேகலை - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ்	இணையக் கல்விக் கழக நூலகம்
	கம்பராமாயணம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ்	இணையக் கல்விக் கழக நூலகம்
	திருவிளையாடல் புராணம்- மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம் தமிழ்	இணையக் கல்விக் கழக நூலகம்
	சீறாப்புராணம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ்	இணையக் கல்விக் கழக நூலகம்
	இரட்சணிய யாத்திரிகம்- மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ்	இணையக் கல்விக் கழக நூலகம்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the trend analysis of growth of Tamil Epic literature
K1, K2	CO 2	develop critical thinking of literary genres and content handled in Tamil epic tradition
K2, K4	CO 3	will get knowledge about the growth of Tamil Epic literature.
K2, K3	CO 4	analyze and interpret epics written in Tamil.
K4,	CO5	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark-
No Correlation (N) - 0 Mark

COURSE CODE	U21TAA44	தமிழ் மொழி வரலாறு	L	T	P	C
ALLIED IV சார்பு பாடம் -IV			4	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of the literature**				
Learning Objectives		The course aims at 1. providing a wide spectrum of usage of Tamil language through the ages. **2.** helping the students to know the structure of Tamil language through literature, inscriptions and other written sources. **3.** understanding the changes occurred in Tamil language with historical background of the society.				

அலகு – 1	தமிழ் மொழி வரலாற்று மூலங்கள்
அலகு – 2	தொல் தமிழ் வரலாறு – தொல்காப்பியத் தமிழ் சங்கத் தமிழ் வரலாறு
அலகு – 3	களப்பிரர் காலத் தமிழ் பல்லவர் காலத் தமிழ் சோழர் காலத் தமிழ்
அலகு – 4	நாயக்கர் காலத் தமிழ் மராட்டியர் காலத் தமிழ் ஆங்கிலேயர் காலத் தமிழ்
அலகு – 5	இக்காலத் தமிழ் ஊடகத் தமிழ் தமிழ் வரி வடிவ வரலாறு செந்தமிழ் - கொடுந்தமிழ் உலக வழக்கு – செய்யுள் வழக்கு இயல்பு வழக்கு –தகுதி வழக்கு வட்டார வழக்கு – கிளை மொழிகள் காலந்தோறும் சொல் பொருள் மாற்றம் கடன் வாங்கல் கடன் தருதல் கல்வெட்டுத் தமிழ் - செப்பேட்டுத் தமிழ் மெய்கீர்த்தித் தமிழ் - இன்றைய ஆட்சித்தமிழ்
நூல்கள்	தெ.பொ.மீனாட்சி சுந்தரனார், தமிழ் மொழி வரலாறு – சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	identify the changes occurred in Tamil language
K1, K2	CO 2	develop critical thinking of language structure over the ages
K2, K4	CO 3	recognize the growth of language
K2, K3	CO 4	become proficient about the growth of Tamil script
K4, K6	CO5	know the trend and coherence of language and literature over a period of time.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAE421	ஒப்பியல் இலக்கியம்	L	T	P	C
ELECTIVE - II விருப்பப் பாடம் - II			3	-	-	3
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of the literature**				
Learning Objectives		The course aims at ➢ providing a wide spectrum of literature through the ages. ➢ helping the students to know about the base for comparative literature. ➢ enable them to study the master pieces of literature of different languages. ➢ understanding the similar background of literature of two different languages.				

அலகு – 1	ஒப்பியலின் தத்துவங்கள் (ப. 1 - 22 வரை)
அலகு – 2	தமிழில் ஒப்பியல் ஆய்வு (ப. 23 - 47 வரை)
அலகு – 3	தமிழ் வீரயுகப் பாடல்கள் (ப. 48 - 60 வரை)
அலகு – 4	இரு கோட்பாடுகள்
அலகு – 5	பெரும் பெயர் உலகம்
பாட நூல்கள்	கா. கைலாசபதியின் 'ஒப்பியல் இலக்கியம் (இலக்கியக் கட்டுரைகள் – முதல் ஐந்து கட்டுரைகள் மட்டும்)மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the historical background of the literary works of Tamil and other languages..
K1, K2	CO 2	understand the difference between classical Tamil literature and modern literature
K2, K4	CO 3	aware of the salient features of literature through the ages: and Develop critical thinking of literary genres of Tamil and other languages..
K2, K3	CO 4	know the trend of literature of Tamil and other languages
K4, K6	CO5	critically analyze the literature Interpret and appreciate the format and purpose of literature at different periods of same language and also in different languages..

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAE422	Tamil Computing (Advanced course) - மேம்பட்ட கணினித் தமிழ்	L	T	P	C
ELECTIVE - II விருப்பப் பாடம் - II			3	-	-	3
Cognitive Level		K1: Learning K2: Understanding K3: Applying K4 : Analysing K5: knowing the background of Tamil computing				
Learning Objectives		The course aims at ➢ providing a wide spectrum of Computer programming languages. ➢ helping the students to know the base of Tamil language for computing.. ➢ enable them to study the Data base system and its relevance to Tamil languageparsing techniques. ➢ understanding the process of shallow parsing and deep parsing and natural language processing.				

அலகு – 1	கணினி நிரலாக்கம் - அறிமுகம் - கணினி நிரலாக்க வரையறை– கணினி நிரலாக்க மொழிகள் – கணினி நிரல் தொடர் எழுதுதல் – கணினி நிரலாக்க மொழிகளாகிய எச் டி எம் எல் (HTML) சி எஸ் எஸ் (CSS) ஜாவா (JAVA) ஆகிய மொழி வடிவங்களில் தமிழின் பயன்பாடு.
அலகு – 2	பைதான் கணினி நிரலாக்கமொழி குறித்த அறிமுகம் - அடிப்படைகள் - செயல்பாடுகள் - தரவு தளக் கோவை – மாறிகளின் நிலைபாடு – நிரலாக்க நெறிகள், பைதான் அடிப்படைகள் மாறிகள், செயற்கூறுகள், கட்டுப்பாட்டு அமைப்புகள், செயல்கள், இழைகள் மற்றும் இழை உருவகிப்பு. ஊப்ஸ் கருத்தாக்கங்கள்: நவீன தொழில்நுட்பம் மற்றும் ஊப்ஸ்: பட்டியல்கள் வெளியேறுதல், கணங்கள், அகராதி, வகைகள் மற்றும் பொருட்கள்.
அலகு – 3	பைதான் மற்றும் தரவு தள இணைப்பு : டி பி எம் எஸ் (DBMS) தரவு தள நிர்வாக அமைப்பு மற்றும் ஆர் டி பி எம் எஸ் (RDBMS) கருத்தாக்கங்கள், வடிவமைக்கப்பட்ட வினா மொழி (எஸ் க்யு எ இல், மை எஸ் க்யு எல், பைதான் மற்றும் மை எஸ் க்யு எல், பைதான் மற்றம் சி எஸ் வி கோப்புகள்) பான்டாஸ், நம்பி தளங்களில் தரவு கையாளுதல்: பான்டாஸ் தரவு சட்டக உருவாக்கம், பான்டாஸில் பூலியன் அட்டவணைப்படுத்தல், பான்டாஸில் செயல்பயன்பாடுகள், தரவு காட்சிப்படுத்துதல், மெட்லாட்லிப் பயன்படுத்தி தரவு காட்சிப்படுத்துதல், தரவு காட்சிப்படுத்துதல் அவற்றின் பயன்கள், மெட்பிலாட்லிப் பைதான் நூலகம் - கோட்டு விளக்கப்படம், பரவல் வரைபடம், பட்டை வரைபடம், சதுர வரைபடம், பெட்டி வரைபடம்
அலகு – 4	தொடரைப் பாகுபடுத்தல் - ஆழமற்ற சொல் தொடர் பாகுபடுத்தல் - ஆழமான சொல் தொடர் பாகுபடுத்தல் - பேச்சுக் கூறுகளைப் பகுத்தல் - ஒலியியல் எழுத்துக்குறி அங்கீகரிப்பு (ஓ சி ஆர்) - இயற்கை மொழி ஆய்வின் பல்வேறு பயன்பாடு - இயந்திர மொழிபெயர்ப்பு – தேடுபொறிகள்

அலகு – 5	தமிழ்க் கணினியியல் ஆய்வுக்கூடப் பயிற்சிப் பணி - தமிழ் கட்டற்ற மென்பொருள் கருவிகள் மற்றும் ஆங்கில மொழி ஆய்வுக் கருவிகள் (கட்டற்ற இயற்கை மொழி ஆய்வு , GATE மற்றும்; NLTK) கையாளும் பயிற்சி பெறல்
பாடநூல்கள்	1. Learning WebDesign: A Beginner's Guide to HTML, CSS, Javascript and Web Graphics Fourth Edition; by Jennifer Robbin, O'Reily;2012 2. HTML and CSS: Design and Build Website Paperback-Illustrated, Jon Duckett; 2011 3. Phython Programming(in Tamil); SomasundaramChenrayan; Amaxon Kindle; 2020 **4.** Phython Pocket Reference 5ed: Phython in Your Pocket (Pocket Reference (O'Reilly); Mark Lutz 2014
பார்வை நூல்கள்	1. கணிப்பொறியில் தமிழ், த. பிரகாஷ்இ சென்னை, பெரிகாம் நூல் வெளியீடு, 2005 2. இயற்கை மொழி ஆய்வு தமிழ் - Prof.கு. சுப்பையா பிள்ளை உலகததமிழ் ஆராய்ச்சி நிறுவனம் 2012 3. GATE Website: Gate.ac.UK – releases/gate-2.0alpha3-build516/doc/userguide.html 4. NLTK Website: 1.Language Processing and Phython(nltk.org) 5. AU-KBC Tools: http;//78.46.86.133:8080/aukbc-nlp/ 6. Search Engine AU-KBC: Searchko: www.searchko.co.in 7. AU-KBC Machine Translation Systems: Tamil-Malayalam MT System: http:/78.48.86.133:8080/tamMalMtsys/ 8. Tamil Virtual Academy Tool: Tamil Computing Tools (tamilvu.org)

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	get an exposure to computer programming languages HTML, CSS, JAVA, PYTHON
K1, K2	CO 2	get expertise in Tamil Computing. As per the requirements of Digital sphere..
K2, K4	CO 3	know thefundamentals of python language and writing programme. Trend analysis of growth of tamil literature with other languages
K2, K3	CO 4	apply the parsing techniques.
K4, K6	CO5	acquire skill to do Natural language processing

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

SEMESTER –V

COURSE CODE	U21TAT51	குறிஞ்சிசார் (மலைப் பகுதி சார் இலக்கியம்)	L	T	P	C
CORE VIII			5	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of Tamil classical literature to Modern literature which posess background on hilly region called kurinchi ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. understanding the historical background of kurinchi literature				

அலகு – 1	கபிலர் - குறிஞ்சிப்பாட்டு – சுருக்க வரைவு நல்லந்துவனார் - பரிபாடல்	
அலகு – 2	பெருங்கௌசிகனார் - மலைபடுகடாம் - சுருக்க வரைவு	
அலகு – 3	திருஞானசம்பந்தர் - திருக்குற்றாலப் பதிகம் - திருகூடராசப்பக் கவிராயர் - திருக்குறும்பலாப் பதிகம்	
அலகு – 4	திரிகூடராசப்பக் கவிராயர் - திருக்குற்றாலக் குறவஞ்சி – நூலமைப்பும், நுவல்பொருள் சுருக்க வரைவும்	
அலகு – 5	முத்துக் கறுப்பண்ணன் - பழனியாண்டவர் காவடிச் சிந்து	
நூல்கள்	1. குறிஞ்சிப்பாட்டு	சைவ சித்தாந்த நூல் பதிப்புக் கழக வெளியீடு
	2. மலைபடுகடாம்	சைவ சித்தாந்த நூல் பதிப்புக் கழக வெளியீடு
	3. திருக்குற்றாலப் பதிகம்	மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்
	4. திருக்குறும்பலாப் பதிகம்	மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்
	5. திருக்குற்றாலக் குறவஞ்சி	சைவ சித்தாந்த நூல் பதிப்புக் கழக வெளியீடு
	6. பழனியாண்டவர் காவடிச் சிந்து	மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of the writers
K1, K2	CO 2	understand the notable features of literary geners and kurinchi
K2, K4	CO 3	aware of the salient features of texts based on hilly region
K2, K3	CO 4	apply and attempt to analyse the life style of people at hilly region through literature
K4,	CO5	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT52	பக்தி இலக்கியம்	L	T	P	C
CORE IX முதன்மைப் பாடம் -IX			5	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of Tamil devotional literature to Modern age which posess background on Tamil Deities ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of devotional literature				

அலகு -1 **சைவ இலக்கியம்**

1.1. திருஞான சம்பந்தர் மூன்றாம் திருமுறை – திரு ஆலவாய் – 3339-3349 வரை. ‘‘செய்யனே திரு ஆலவாய் மேவிய’’ எனும் பாடல் முதல் ‘‘அப்பன் ஆலவாய் ஆதி அருளினால்’’ எனும் பாடல் வரை – 10 செய்யுட்கள்.

1.2. திருநாவுக்கரசர் - ஐந்தாம் திருமுறை – திரு இன்னம்பர் -10 செய்யுட்கள் 5433 முதல் 5442 வரை ‘‘என்னில் ஆரும் எனக்கு இனியாரில்லை’’ எனும் பாடல் முதல் ‘‘சனியும், வெள்ளியும், திங்களும், ஞாயிறும்’’ எனும் பாடல் வரை.

1.3. சுந்தரர் - ஏழாம் திருமுறை – திருக்கடவூர் - 7503 முதல் 7512 வரை பொடியார் மேனியனே புரிநூல் ஒருபால் பொருந்த எனும் பாடல் முதல் ‘காராரும் பொழில்சூழ் கடவூர் எனும் பாடல் வரை - 10 செய்யுட்கள்.

1.4. மாணிக்க வாசகர் - சிவபுராணம் மட்டும்.

1.5. காரைக்காலம்மையார் புராணம் மட்டும். சேக்கிழார் - பெரியபுராணம் - 30 காரைக்கால் அம்மையார் - 1722 முதல் 1787 வரையுள்ள செய்யுட்கள்.

1722 – மானம் மிகு தருமத்தின் வழி நின்று வாய்மையினில் முதல்
1787 – ஆதியோடு அந்தம் இல்லான் அருள்நடம் ஆடும் போது வரை

1.6 அருணகிரிநாதர் - திருப்புகழ் - மூன்றாம் தொகுதி - மூன்றாம் படை வீடு – பழநி (திருஆவினன் குடி) பகுதியில் வரும்
‘‘நாத விந்து கலாதீ நமோ நம!’’ (இரண்டாம் பாடல்)
‘‘வேத மந்திர சொரூபா நமோ நம
போதகம் தரு கோவே! நமோ நம!’’ (இரண்டாம் பாடல்)
நீதி தங்கிய தேவா நமோ நம!
வாரணம் தனை நேரான ------(மூன்றாம பாடல்)

	ஆகிய மூன்று பாடல்கள் மட்டும். (தமிழ் இணையக் கல்விக்கழக நூலகம், கிருபானந்தவாரி உரையுடன்)
அலகு -2	**வைணவம்** 3.1 பெரியாழ்வார் - ஒன்பதாம் திருமொழி – 202 முதல் 212 வரை "வெண்ணெய் விழுங்கி வெறும் கலத்தை" முதல் "வண்டு களித்து இசைக்கும" எனும் பாடல் வரை - 11 செய்யுட்கள். 2.2. ஆண்டாள் - இரண்டாம் திருமொழி – 514 முதல் 523 வரை "நாமம் ஆயிரம் ஏத்த நின்ற நாராயணா" முதல் "சீதை வாய் அமுதம் உண்டாய", எங்கள் சிற்றில் சிதையேல் வரை – 10 பாடல்கள். 2.3. திருப்பாணாழ்வார் - அமலன் ஆதி பிரான் - 927-936 வரை உள்ள 10 பாசுரங்கள் அமலன் ஆதிபிரான் என்று தொடங்கும் பாடல் முதல் கொண்டல் வண்ணனைக் கோவலனாய் எனும் பாடல் வரை. 2.4. பேயாழ்வார் - மூன்றாம் திருவந்தாதி – 2315 முதல் 2324 வரை – 10 பாசுரங்கள் "அன்று இவ்வுலகம் அசைந்த அசைவே கொல் பாடல் முதல" சினமாமத களிற்றின் திண்மருப்பைச் சாய்த்து பாடல் வரை. 2.5. திருமங்கை ஆழ்வார் -இரண்டாம் திருமொழி – 1358 முதல் 1367 வரை "தாம் தம் பெருமை அறியார் என்ற பாடல் முதல்" காவிப் பெருநீர் வண்ணன் கண்ணன் என்ற பாடல் வரை – 10 பாசுரங்கள 2.6. நம்மாழ்வார் - இரண்டாம் திருவாய்மொழி – 3128 – 3138 வரை. "பொலிக பொலிக பொலிக" எனும் பாடல் "முதல் கலியுகம் ஒன்றும் "எனும் பாடல் வரை 11 பாடல்கள்.
அலகு – 3	கம்பராமாயணம் - 6 – யுத்த காண்டம் - 39 வது படலம் - திருமுடி சூட்டுப்படலம்
அலகு – 4	சீறாப்புராணம் முதல் காண்டம் - விலாதத்துக் காண்டம் நான்காவது படலம் - தலைமுறைப் படலம் (செய்யுள் - 99 -165 வரை)
அலகு – 5	தேம்பாவணி இரண்டாம் காண்டம் - ஏழாவது படலம் - பாலை புகு படலம் - (1759-1842 வரை உள்ள 83 செய்யுட்கள்). அலகு 5:2 இராமலிங்க வள்ளலாரின் திருவருட்பா - மூன்றாம் திருமுறை - மூன்றாம் தொகுதி-12 சிவக்குமார் வணக்கம் - 2353-2360 வரை. "மண்ணாலும், மண்ணுற்ற வாழ்க்கையினாலும்" என்று தொடங்கும் 2353வது பாடல் முதல் "ஏற்றவிட்டார் கொடி கொண்டோய் விளக்கினை ஏற்ற எண்ணும்" 2360வது என்ற பாடல் வரையிலான 8 பாடல்கள் மட்டும். (தமிழ் இணையக் கலவிக்கழக நூலகம், கிருபானந்தவாரி உரையுடன்) (தமிழ் இணையக் கல்விக்கழக நூலகம், ஔவை.சு. துரைசாமி பிள்ளை உரையுடன்)
நூல்கள்	1. ச.வே. சு. (ப.ஆ) பன்னிறு திருமுறை, மணிவாசகர் பதிப்பகம் 2. நாலாயிரத் திவ்விய பிரபந்தம் (நான்கு பகுதிகள்), ஆதித்யா ஸ்ரேயா

	பதிப்பகம், சிதம்பரம் 3. ச. வே.சு. (ப.ஆ) கம்பராமாயணம், மணிவாசகர் பதிப்பகம். 4. சீறாப்புராணம் - மதுரை மின் நூல் தொகுப்புத் திட்ட நூலகம். 5. தேம்பாவணி - மதுரை மின் நூல் தொகுப்புத் திட்ட நூலகம். 6. அருணகிரிநாதர் - திருப்புகழ் - மூன்றாம் தொகுதி - மூன்றாம் படை வீடு – பழநி - 7. தமிழ் இணையக் கலவிக்கழக நூலகம், கிருபானந்தவாரி உரையுடன் 8. இராமலிங்க வள்ளலாரின் திருவருட்பா - மூன்றாம் திருமுறை - மூன்றாம் தொகுதி-12 9. சிவக்குமார் வணக்கம் தமிழ் இணையக் கல்விக்கழக நூலகம், ஔவை.சு. துரைசாமி பிள்ளை உரையுடன்.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of saints of different religions
K1, K2	CO 2	understand the notable features of literary geners of devotion
K2, K4	CO 3	aware of the salient features of texts based on different religion
K2, K3	CO 4	apply and attempt to analyse the life style of people at a given point of time through literature
K4,	CO5	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT53	புறப்பொருள் இலக்கணம் புறப்பொருள் வெண்பா மாலை முழுவதும்	L	T	P	C
CORE X முதன்மைப் பாடம் - X			5	-	-	4
Cognitive Level		**K1: Skill in language** **K2: Understanding** **K3: giving suitable citation** **K4: Analysing the content** **K5: To know the structure**				
Learning Objectives		The Course aims to • make students obtain skills to analse the literary content of puraporul. • develop proficiency in content analysis. • gain rich knowledge about structure and content of Tamil puram poetry through the ages • learn and brighten up their knowledge about Tamil literary tradition. • strengthen the language skills through exercises.				

அலகு – 1	கடவுள் வாழ்த்து சிறப்பு பாயிரம் வெட்சிப் படலம் கரந்தைப் படலம் வஞ்சிப் படலம்
அலகு – 2	காஞ்சிப்படலம் நொச்சிப் படலம் உழிஞைப் படலம்
அலகு – 3	தும்பப் படலம் வாகைப் படலம்
அலகு – 4	பாடாண் படலம் பொது இயல் படலம்
அலகு – 5	கைக்கிளைப்படலம் பெருந்திணைப்படலம்
பாடநூல்	புறப்பொருள் வெண்பா மாலை – திருநெல்வேலி சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு.

COURSE OUTCOME

At the end of the course, the students will be able to:

K1, K2	CO1	acquire knowledge of literary conventions of Tamil puram poetry.
K1, K2	CO2	use targeted puram content in prescribed form of verses in standard Tamil.
K5, K4	CO3	analyse the puram content and grammatical structure of standardised Tamil verses.
K5, K1	CO4	assess correctly the puram content given in Standard Tamil.
K3	CO5	make inferences and predictions based on comprehension of Tamil verses.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks—42/60
Moderately Correlating (M) - 2 Marks—16/60
Weakly Correlating (W) - 2 Marks
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT54	யாப்பிலக்கணம் - யாப்பருங்கலக் காரிகை முழுவதும்	L	T	P	C
CORE XI முதன்மைப் பாடம் - XI			5	-	-	4
Cognitive Level		**K1: Skill in language** **K2: Understanding** **K3: give citation** **K4: Analysis** **K5: To know the structure of Tamil verses**				
Learning Objectives		The Course aims to • make students obtainwriting skills with correct usage of grammar. • develop language proficiency • gain rich knowledge about structure of Tamil verses through the ages • learn and brighten up their capacity to write classical verses • strengthen the poetry writing skills.				

அலகு – 1	**உறுப்பியல்** சிறப்புப்பாயிரம் முதல் தளை வரையிலான நூற்பாக்கள் (1 முதல் 11 வரை)
அலகு – 2	**உறுப்பியல்** அடி முதல் தொடை விகற்பம் வரையிலான நூற்பாக்கள் (12 முதல் 20 வரை)
அலகு – 3	செய்யுளியல் பாக்களின் அடியும் ஓசையும் முதல் • வெளிவிருத்தம் • வெண் தாழிசை • வெண்துறை வரையிலான நூற்பாக்கள்(21 முதல் 27 வரை)
அலகு – 4	செய்யுளியல் நால்வகை ஆசிரியப்பாக்கள் முதல் மருட்பா வரை (28 முதல் 35 வரை)
அலகு – 5	ஒழிபியல் எழுத்துக்குப் புறனடை (36 முதல் 44 வரை)
நூல்:	யாப்பருங்காலக் காரிகை – திருநெல்வேலி சைவசித்தாந்த நூற்பதிப்புக் கழக வெளியீடு

COURSE OUTCOME

At the end of the course, the students will be able to:

K1, K2	CO1	acquire knowledge of poetic conventions of Tamil literature
K1, K2	CO2	use grammatical structures of Tamil verses.
K5, K4	CO3	analyse the grammatical structure of verses in Tamil texts.
K5, K1	CO4	analyse the format of verses written in Standard Tamil.
K3	CO5	make inferences and predictions based on comprehension of a text.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks—42/60
Moderately Correlating (M) - 2 Marks—16/60
Weakly Correlating (W) - 2 Marks
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT55	மொழியியல் மற்றும் கணினி மொழியியல் - அறிமுகம் Introduction to Linguistics and Computational Linguistics	L	T	P	C
CORE XII முதன்மைப் பாடம் - XII			5	-	-	4
Cognitive Level		K1: Learning K2: Understanding K3: Applying K4 : Analysing K5: knowing the background of Tamil computing for machine translation				
Learning Objectives		The course aims at ➢ providing a wide spectrum of Tamil Linguistics components and Structure of Tamil language with a focus on corpus development ➢ helping the students to know corpus linguistics ➢ enable them to study the Data needed to create corpus for Lexicography ➢ understanding the process computational Linguistics				

அலகு- 1	மொழியியல் அடிப்படைகள் - ஒலியியல் - ஒலியனியல் - உருபனியல் - தொடரியல் - பொருளியல் - (தமிழ் மொழியில் இருந்து சான்றுகள் தந்து அடிப்படைக் கருத்தாக்கங்கள் அறிமுகப்படுத்தப்பட்டு விளக்கப்பட வேண்டும்) மொழிபெயர்ப்பு – மொழிபெயர்ப்பு சார்ந்த மொழியியல் கொள்கை – கைப்பட மொழிபெயர்த்தலும் அதில் எதிர்கொள்ளும் சிக்கல்களும் - ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல் - தமிழில் இருந்து ஆங்கிலத்தில் மொழிபெயர்த்தல் - செய்தித்தாள் - தொழில்நுட்ப எழுத்தாக்கம் - இலக்கியம் (வகுப்பறை பயிற்சிகள், திட்டக் கட்டுரைகள்)
அலகு- 2	மொழியியல் தரவகம் - மொழியியல் தரவக அறிமுகம் - தரவுகள் சேகரிப்பு, தரவுகள் நிர்வகிப்பு, மொழித் தரவுகள் சேகரிப்பு முறைகள் - இணையத்திலிருந்து சேகரித்தல் - கைப்பட சேகரித்தல் – மின் நூலகம் பற்றி அறிமுகம், தமிழ்த் தரவுகளைத் தொடரியல், பொருளியல் வகைகளாகப் பகுப்பாய்வு செய்தல்
அலகு- 3	அகராதி – அகராதி பற்றிய அறிமுகம் - அகராதி உருவாக்கம் - மின் அகராதி உருவாக்கமும் கூட - சொல்வலை – சொல்களஞ்சியம் - விக்கிப்பீடியா போன்ற தளங்களில் தமிழ் நுவல் பொருளை பயன்படுத்தும் பல்வேறு முறைகள் - மொழி கற்பித்தல் - முதல் மொழி, இரண்டாம் மொழி கற்பித்தல் - மொழி பயிற்றுவித்தலில் பல்வேறு முறைகள். வரலாற்று மொழியியல் - தமிழ் மொழி தமிழ் எழுத்து வரி வடிவம், தோற்றம், வளர்ச்சி, பேச்சுமொழி, எழுத்து மொழி, வேறுபாடு, வட்டார வழக்கு மொழிகள்
அலகு- 4	கணினி மொழியியல் - கணினி மொழியியல் விளக்க வரையறை - இயற்கை மொழி ஆய்வு - விளக்க வரையறை – கணினி மொழியியலின் பல்வேறு பரிமாணங்கள். தமிழ்க் கணினியியல் - விளக்க வரையறை - தமிழ்க் கணினியியல் கருவிகள் - பல்வேறு தமிழ்க் கணினியியல் கருவிகள் குறித்த அறிமுகமும் விளக்கமும் - சொல் தொடர் பிரித்தல் - சொல் பகுப்பாய்வில் உருபனியல் பகுப்பாய்வில் பேச்சு கூறுகளைப் பகுத்தல்- பெயர்த்தொடர், வினைத்தொடர், மரபுத்தொடர் கண்டறிதல் - பெயர்க்கூறுகளை அங்கீகரித்தல்

அலகு- 5	தமிழ் - விசைப்பலகை – கணினி அச்சு செய்தல். தமிழ் விசைப்பலகை, கணினி அச்சு செய்தல் குறித்த அறிமுகம் - மொழி உள்ளீட்டு முறைகள் மற்றும் எழுத்துருக்கள், தமிழ் ஒருங்குறி (Tamil Unicode) (UTFS) தமிழ் தகவல் பரிமாற்ற எழுத்துக் குறியீடு (Tamil Script code for Information Interchange (TSCII) தேடு பொறிகளில் தமிழ்த் தேடல் (Search in Tamil in Search Engines**)** விக்கிபீடியா கட்டமைப்பு –விக்கிபீடியாவில் தமிழ் நுவல்பொருளை உருவாக்குதல் - விக்கிப் பீடியாவில் தமிழ் உள்ளடக்கத்தை எழுதிப் பதிவேற்றுதல் - பதிவேற்றியதைச் சீரமைத்தல்
Books:	1. Modern Linguistics: An Introduction:Verma S.K.(Author),Krishnassamy N. oxford University Press India: 1997 2. Fundamentals of Linguistics; Raj Kumar Sharma; Atlantic Publihers and Distributors Pvt. Ltd – 2019 3. An Introduction to Language and Linguistics: Ralph Fasold And Jeff Connor-Linton; Cambridge University Press; 2006 4. An_introduction_to_Language_and_Linguistics.pdf(bbg.ac.id) 5. Linguistic Theory of Translation: J C Catford; Oxford University Press, 1963 6. a-linguistic-theory-of-translation.pdf(wordpress.com) 7. Corpus Liguistics: An introduction Kindle Edition; Author : NiladriSekharDash; Pearson; 1st edition;2007 8. An introduction to Corpus Linguistics; Author-Graeme Kennedy; Routledge:1998 9. PALink: A high-end tool for sybtatic and semantic annotation for Tamil 10. Text:Customized by bAU-KBC; To download: http://78.46.86.133/PALinkA.tar.gz 11. Introduction : Lexicography in the Internet era (Introduction to The Routledge Handbook of Lexicograpohy) Pedro A.Fuertes-Olivera; October 2017 12. (3) (PDF) Introduction: Lexicography in the Internet era (Introduction to The Routledge Handbook of Lexicography)(researchgate.net) 13. Lexicography: An Introduction; Howard Jackson: The Routledge, 2002 14. Dictionary development (e-dictionary development also), Wordnet, Thesaurus; Corpus Development in Tamil: Content Development usig various methods such as Computational Approaches to Tamil Linguistics (in English) Author: Prof.VasulRenganatan; Crea Publications; 2016 15. Speech and Language Processing (in English); Dan Jurafsky and James H.Martin; Pearson Education India; 2013 16. Natural Language Processing and Information Retrieval; Tanvar Siddiqui and US Tiwary; Oxford University Press, New Delhi; 2018 .. Fifth Edition 2015 17. Kaninithamizh Tamil Computing (in Tamil); Prof.Ila.sundaram; Vikatan; 2016 18. valartamil-ariviyalinaiyatamil/வளர்தமிழில் அறிவியல்இணையத் தமிழ்;Prof Ponnavaiko, Prof.Krishna Murthi, Prof. Subbaiyapillai; அனைத்திந்திய அறிவியல் தமிழ்க்கழகம்; 2006 19. Iyarkai Mozhiyaaivu Thamizk;Prof. Subbaiyapillai / கு. சுப்பையாபிள்ளை

	உலகத்தமிழ்ஆராய்ச்சிநிறுவனம் 2012 20. Tamil Virtual Academy Tool: Tamil Computing Tools | தமிழ் இணையக் கல்விக் கழகம் TAMIL VIRTUAL AVADEMY (tamilvu.org) 21. AU-KBC tools 22. Search engines – AU-KBC	
Extra Reading	1. A course in Modern Lingisctics; Charles F Hockett; Oxford and IBH Publishing Co: 1958 2. (99+_PDF A course in modern linguistics by Hockett | HasanAmanj-Academia.edu	
நூல்கள்	1. தமிழும், கணிப்பொறியும் மா. ஆண்டோ பீட்டா	சென்னை, கற்பகம் புத்தகாலயம் 2002
	2. தமிழ் இணையம், தமிழ் வலைத்தளங்கள் பங்களிப்பும் , பயன்பாடுகளும், ம.செ. இரபிசிங்	சென்னை, நர்மதா பதிப்பகம் 2009
	3. தமிழ்க் கணினி இணையப் பயன்பாடுகள், துரை. மணிகண்டன	தஞ்சாவூர்,கமலினி பதிப்பகம்,2012
	4. தமிழும் கணினியும் இராதா செல்லப்பன்	திருச்சி, கவிதை அமுதம் வெளியீடு, 2011
	5. கணினித் தமிழ், இல. சுந்தரம்	சென்னை, விகடன் பிரசுரம்,2015
	6. ரெபிடெக்ஸ், கம்யூட்டர் கோர்ஸ், இ. இராமநாதன்	ரெபிடெக்ஸ்,புதுதில்லி,2011
	7. கணிப்பொறியில் தமிழ், த. பிரகாஷ்	சென்னை, பெரிகாம் நூல் வெளியீடு, 2005
	8. கணிப்பொறி அறிவியல், தகவல் தொடர்பு தொழில்நுட்பம். மு. பொன்னவைக்கோ	தமிழ் வளர்ச்சிக் கழகம், சென்னைப் பல்கலைக்கழகம்
	9. கி.கருணாகரன், வ.ஜெயா மொழியியல், கோயம்புத்தூர்	

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	get an exposure to Tamil computing for the creation of Lexicography and corpus development
K1, K2	CO 2	get expertise in Tamil Linguistics and computational Linguistics
K2, K4	CO 3	know the fundamentals of Tamil Linguistics, traditional Tamil language structure with a focus on computational Linguistics
K2, K3	CO 4	apply the parsing techniques for usage of syntactic and semantic annotation for Tamil
K4, K6	CO5	acquire skill in Natural language processing and computational Linguistics

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21TAE531	பெண்ணியம்	L	T	P	C
ELECTIVE –III விருப்பப் பாடம் - தாள் -III			4	-	-	3
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of literature through the ages with feminist point of you. ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of literature ➢ knowing the status of women through the portrayal of literature				

அலகு- 1	பெண்ணியம் – விளக்க வரையறை – பெண்ணியத் தோற்றம், வளர்ச்சி, வரலாறு - இன்றைய நிலை – நோக்கும் - போக்கும
அலகு- 2	மேலைநாட்டுப் பெண்ணியவாதிகள் - அவர்களது எழுத்தாக்கங்கள் - இந்தியப் பெண்ணிய வாதிகள் - இந்தியச் சமூகச் சீரமைப்பு இயக்கங்களும் பெண் மேம்பாட்டிற்கான செயல்பாடுகளும் - தமிழகத்துப் பெண்ணியவாதிகளும் அவர்களது இலக்கிய ஆக்கங்களும்.
அலகு- 3	சங்க கால மகளிர் நிலை – பணிப் பகிர்வு – மனைவாழ்க்கை – விருந்தோம்பல் - உழத்தி - ஆயமகளிர், பூவிலைப் பெண்டிர், அரச மகளிர் - புலமை நலமிக்க பெண்புலவர்கள் - உமட்டியர் - சிறு.குறு தொழில் புரியும் மகளிர் - புறவாழ்வில் மகளிர் பங்கு – ஆடை, அணிகலன்கள்,ஒப்பனைகள், கலைத்துறை நாட்டம் - மகப்பேறு – வாழ்வியல் அறங்கள் - பண்பாடு போற்றல்.
அலகு- 4	பாரதியாரின், பெண் விடுதலை சார் கட்டுரைகள் பத்து மட்டும்
அலகு- 5	பெண் நலவாழ்வு சார் சட்டங்களும், பெண் நலம் பேணும் அரசின் கொள்கைகளும், செயல் திட்டங்களும் - மகளிரை மேம்படுத்துவதில் இக்காலத் தமிழ் இலக்கியங்களின் பங்கு
நூல்கள்:	1. பெண்ணியம், இரா. பிரேமா, சென்னை, தமிழ்ப் புத்தகாலயம். 2. பெண்ணியல், அன்னை தெரசா மகளிர் பல்கலைக்கழக வெளியீடு. 3. பாரதியார் கட்டுரைகள

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the status of women through literature.
K1, K2	CO 2	understand the notable features of feminist writing.
K2, K4	CO 3	aware of the salient features of feminist concepts.
K2, K3	CO 4	apply and attempt to appreciate through feminist point of view.
K4,	CO5	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark-
No Correlation (N) - 0 Mark

COURSE CODE	U21TAE532	இணையத் தமிழ் இலக்கியம் Inaiya Tamil Ilakkiyam	L	T	P	C
ELECTIVE –III விருப்பப் பாடம் - தாள் -III			4	-	-	3
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of Tamil computing and Tamil literature in cyber space**				
Learning Objectives		The course aims at ➢ providing a wide spectrum of Tamil literature in cyber space ➢ helping the students to know the base of Tamil language for computing and downloading the needed Tamil font ➢ enable them to study Tamil literature from digital library, Wikipedia and Tamil electronic journals. ➢ understanding the process of searching for Tamil content via Tamil search engines.				

அலகு- 1	இணையத்தில் தேடுபொறிகள் - தமிழ் எழுத்துரு பதிவிறக்க முறைகள் - தமிழ் வழி இணையத்துள் புகுதல்
அலகு- 2	தமிழ் விக்கிப்பீடியா – தமிழ் விக்சனரி – தமிழ் உள்ளடக்கப் பதிவிறக்கம் - பதிவேற்ற விதிகள்
அலகு- 3	தமிழில் மின்னஞ்சல் அனுப்புதல் - தமிழில் மின்னஞ்சல் பெறுதல் - இணையத் தமிழ்த் தளங்கள் பத்தினைக் கண்டறிதல் - அவற்றின் அமைப்பு, இலக்கு, பயன் குறித்து ஒவ்வொன்றுக்கும் இரண்டு பக்க அளவில் எழுதிச் சமர்ப்பித்தல்
அலகு- 4	இணைத்தில் தமிழ் மின் இதழ்கள் ஐந்தினைப் பார்வையிடல் - அவ்விதழ்களின் உள்ளடக்கம், பின்னூட்ட நெறிகள் - நோக்கம் -பயன்பாடு குறித்து ஐந்து பக்கங்களுக்குள் எழுதிச் சமர்ப்பித்தல்
அலகு- 5	தமிழ் இணைய மின் நூலகங்கள் ஐந்தினை அறிதல்- தமிழ் இணைய நூலகங்களில் இருந்து ஒரு தமிழ் நூலைத் தேடிக் கண்டறிந்து பதிவிறக்கம் செய்ய அறிந்திருத்தல்
நூல்	டாக்டர். இராதா. செல்லப்பன், தமிழும் கணிப்பொறியும், திருச்சி, கவிதை அமுதம் வெளியீடு

Course Outcomes

Upon completion of this course the students will be able to

K1, K2	CO1	get an exposure to Tamil Literature through Tamil web sites
K1, K2	CO 2	get expertise in Tamil Computing. As per the requirements of Digital sphere.
K2, K4	CO 3	know thefundamentals of Tamil content development and publishing in web space
K2, K3	CO 4	apply the mechanics of writing for digital medium
K4, K6	C05	acquire skill to do Natural language processing

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAS511		L	T	P	C
SBE- I திறன் சார் விருப்பப் பாடம் - தாள் - 1		தகவல் தொடர்பியல் Thagaval Thodarbiyal	2	-	-	2
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the art of writing for media**				
Learning Objectives		The course aims at ➢ providing a wide spectrum of media formats and content for Tamil media ➢ helping the students to know the growth of communication media in Tamilnadu. ➢ understanding the changes needed in the mechanics of writing for media.				

அலகு – 1	கணினிவழித் தகவல் தொடர்பு – புரொட்டோகால் (Protocal)- மேலிருந்து கீழ் - கீழிருந்து மேல் அணுகுமுறை 1.1 கம்பியில்லாத் தகவல் தொடர்பு 1.2 அலைபேசித் தொடர்பு முறை – 2ஜி, 3ஜி, 4ஜி, 5ஜி அலைகற்றை 1.3 உணரித் தொடர்புமுறை • தகவல் அலகுகளின் இணைப்பு (IOT) • இணையக் கல்வித் தொடர்பு (IOE)
அலகு – 2	வானொலித் தமிழ், தொலைக்காட்சித் தமிழ், தகவல் தொடர்பியலில் தமிழ்
அலகு – 3	தொலைத் தகவல் தொடர்பியலும் தமிழ் கருத்துப் பரவலும் - சமூக மாற்றங்கள் - தமிழ் கற்றல் - கற்பித்தல் முறைகள்
அலகு – 4	மின்னூடகத் தகவல் தொடர்பியலில் தமிழ் - தமிழ்த் தகவல் பரவல் - தரப்படுத்தல் - தகவல் பாதுகாப்பு முறைகள் - சமூக ஊடகங்களில் தமிழ் - விளைவுகள்
அலகு – 5	தகவல் தொடர்பு ஊடகங்களில் தமிழ் பயன்பாட்டுப் பயிற்சி நெறிமுறைகள் • கணித் தமிழ் பயிற்சிகளுக்கான தேவை • இணையத்தமிழ் பயிற்சிகளுக்கான தேவை இன்றியமையாமை – வழிமுறைகள் - செயற்படுத்தல்
பாடநூல்	1. க.அபிராமி – தகவல் தொழில்நுட்பம் - சென்னை, தமிழ்ப் புத்தகாலயம் 2. வெ. நல்லதம்பி – மக்கள் தகவல் தொடர்பியல்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	identify the changes in the usage of Tamil language as per the media for communication
K1, K2	CO 2	develop critical analysis of language structure adopted for media communication
K2, K4	CO 3	recognize the growth of media technology over the decades
K2, K3	CO 4	become proficient in the skill of writing for different media
K4, K6	C05	know the trend and coherence of language and literature over a period of time through communication media and the impact on society.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAS512	இலக்கியக் கொள்கைகள் Ilakkiya Kolkaigal	L	T	P	C
SBE- I திறன் சார் விருப்பப் பாடம் - தாள் - 1			2	-	-	2
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background and identifying the theoretical base of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of literary theories ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of literature and theories directed literary format and content over the years				

அலகு – 1	இலக்கியக் கொள்கை – விளக்கம் - வரையரை – வகைகள் - வரலாறு – நோக்கும் - போக்கும் - இன்றைய நிலை
அலகு – 2	தமிழ் இலக்கியக் கொள்கைகள் 2.1. தொல்காப்பியரின் இலக்கிய கொள்கைகள் 2.2 சங்க இலக்கியய் கொள்கைகள் 2.3. தொல்காப்பியம் கூறும் தமிழ் இலக்கிய வகைமைகள் - நூல் - உரை – பிசி – வாய்மொழி – மந்திரம் - முதுமொழி) – குறிப்பு என்பன.
அலகு – 3	தமிழ்க் காப்பியக் கொள்கைகள் 3.1. தமிழ் நீதி இலக்கிய கொள்கைகள்
அலகு – 4	பக்தி இலக்கியக் கொள்கைகள் 4.1. சைவ இலக்கியக் கொள்கைகள் 4.2. வைணவ இலக்கிய சரணாகதிக் கொள்கைகள் 4.3. சமண இலக்கிய நிலையாமைக் கொள்கைகள் 4.4. பௌவுத்த இலக்கிய அவா அகற்றல் கொள்கைகள் 4.5. கிறித்தவ சமூக சேவைக் கொள்கைகள் 4.6. இசுலாமிய தீன் நெறி கொள்கைகள்
அலகு – 5	இக்கால இலக்கியக் கொள்கைகள் 5.1. புதுக்கவிதைக் கொள்கைகள் 5.2. தமிழ் சிறுகதைக் கொள்கைகள் 5.3. தமிழ் புதினக் கொள்கைகள் 5.4. தமிழ் நாடகக் கொள்கைகள் 5.5. தமிழ் உரைநடைக் கொள்கைகள்
நூல்கள்	1. அரங்க,சுப்பையா, இலக்கியத் திறனாய்வு - இசங்கள் - சென்னை, பாவை பதிப்பகம்.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	**CO1**	know the literary base and poetic tactics of writers
K1, K2	**CO 2**	understand the notable features of different literary theories and flow of writing
K2, K4	**CO 3**	aware of the salient features of principles of literature.
K2, K3	**CO 4**	apply and to appreciate literature from theratical perpectives
K4,	**CO5**	analyze the works of great writers and postulated theories

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -33/60
Moderately Correlating (M) - 2 Marks -26/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

SEMESTER-VI

COURSE CODE	U21TAT61	சங்க இலக்கியம் Sanga Ilakkiyam	L	T	P	C
CORE XIII முதன்மைப் பாடம் - XIII			5	-	-	4

Cognitive Level	**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**
Learning Objectives	The course aims at ➢ providing an understanding of Tamil classical literature of Ancient period. ➢ helping the students imbibe the abiding human and moral values through the study of great pieces of literature. ➢ understanding the historical background of literature

அலகு -1	1.1 நற்றிணை – 7 பாடல்கள் - ஔவையார் பாடியன. பாடல் எண் - 129 – பெருநகை கேளாய்! 187 – நெய்தல் கூம்ப நிழல் 295 – முரிந்த சிலம்பின் 371 – காயாங் குன்றத்துக் கொன்றை 381 – அருந்துயர் உழத்தலின் 390 – வாளை வாயின் பிறழ 394 – மரந்தலை புணர்ந்த..... 1.2 குறுந்தொகை – 5 பாடல்கள் அறிவுடை நம்பி - 1 பாடல் பாடல் எண் - 230 – அம்ம வாழி தோழி கொண்கன் கோப்பெருஞ்சோழன் பாடிய 4 பாடல்கள் பாடல் எண் - 20 – அருளும், அன்பும் நீக்கி பாடல் எண் - 53 – எம் அணங்கினவே மகிழ்ந! பாடல் எண் - 129 – எலுவ! சிறாஅர் ஏமுறு நண்ப! பாடல் எண் - 147 – வேனில் பாதிரிக் கூன்மலர் அன்ன! 1.3. ஐங்குறுநூறு கபிலர் பாடிய குறிஞ்சி - குறிஞ்சி 21 – அன்னாய் வாழிப்பத்து – 10 பாடல்கள் அன்னாய் வாழி வேண்டு அன்னை முதல் தணிதற்கும் உரித்து அவள் உற்ற நோயே என்று முடியும் பாடல் வரை
அலகு – 2	கலித்தொகை – 5 பாடல்கள் நல்லந்துவனார் பாடிய நெய்தல் கலி – பாடல் எண் - 141 – கண்டோர் கூற்று – அரிதினின் தோன்றிய யாக்கையுள் பாடல் எண் - 142 - கண்டோர் கூற்று – பிரிவுண்ட புணர்ச்சி புல் ஆரா பாடல் எண் - 143 - கண்டோர் கூற்று –அகல் ஆங்கண், இருள் நீங்கி பாடல் எண் - 144 - கண்டோர் கூற்று – நன்னுதா ல்! காண்டை, நினையா

	பாடல் எண் - 148 - தொல் இயல் ஞாலத்து
அலகு – 3	3.1 அகநானூறு – 5 பாடல்கள் மதுரைக் கூல வாணிகன் சீத்தலைச் சாத்தனார் பாடியன. பாடல் எண் - 53 - அறியாய் வாழி தோழி! பாடல் எண் - 134 – வானம் வாய்ப்பக் கவினி பாடல் எண் - 229 – பகல்செய் பல்கதிர்ப் பரிதி பாடல் எண் - 306 – பெரும்பெயர் மகிழ்ந! பேணாது அகன்மோ! பாடல் எண் - 320 – ஓங்குதிரைப் பரப்பின் வாங்குவிசை. 3.2. பரிபாடல் - 3 பாடல் கடுவன் இளவெளியினனார் - செவ்வேள் - பாடல் எண் - 5 – பாய்இரும் பனிக்கடல் கடுவன் இளவெளியினனார் - திருமால் - பாடல் எண் - 4- ஐந்து இருள் அறநீக்கி நல்லந்துவனார் - வையை – பாடல் எண் - 6 – நிறைகடல் முகந்து உராய்
அலகு – 4	4.1 புறநானூறு – 10 பாடல்கள் பெருஞ்சித்திரனார் பாடல்கள் பாடல் எண் - 158 – முரசு கடிப்பு இகுப்பவும், வால் வளை துவைப்பவும். பாடல் எண் - 159 – வாழும் நாளோடு, யாண்டு பல உண்மையின் பாடல் எண் - 160 – உருகெழு ஞாயிற்று, ஒண்கதிர் மிசைந்த பாடல் எண் - 161 – நீண்டு ஒலி அழுவம் குறைபட பாடல் எண் - 162 - இரவலர் புரவலை நீயும் அல்லை பாடல் எண் - 163 – நின் நயந்து உறைநர்க்கும், நீ நயந்து பாடல் எண் - 207 – எழு இனி, நெஞ்சம், செல்கம், யாரோ, பாடல் எண் - 208 – குன்றும், மலையும், பல பின் ஒழிய பாடல் எண் - 237 – நீடு வாழ்க! என்று யான் நெடுங்கடை குறுகி பாடல் எண் - 238 – கவி செந்தாழிக் குவிபுறத்து இருந்த 4.2 பதிற்றுப்பத்து – ஐந்தாம் பத்து – 5 பாடல்கள் இடல் பிறக்கோட்டிய செங்குட்டுவனைப் பரணர் பாடியது பாடல் எண் - 42 – தசும்பு துளங்கு இருக்கை பாடல் எண் - 45 – ஊன் துவை அடிசில் பாடல் எண் - 44 – நோய் தபு நோன்தொடை பாடல் எண் - 48 – போர் எழில் வாழ்க்கை பாடல் எண் - 49 – செங்கை மறவர்
அலகு – 5	பட்டினப்பாலை முழுவதும்
நூல்கள்	1. தமிழ்ச் செவ்வியல் நூல்கள் - தஞ்சைத் தமிழ்ப் பல்கலைக்கழக வெளியீடு 2. தமிழ்ச் செவ்வியல் நூல்கள் - ச.வே.சு.(ப.ஆ) மணிவாசகர் பதிப்பகம் 3. தமிழ் நூலை இணையவழித் தேடி பெறுவதற்குரிய நெறிமுறைகள் - பதிவிறக்கம் செய்தல் - விலைக்குப் பெறுதல் வணிகக் கடிதம் எழுதுதல் இரண்டு பக்க அளவில் சிறுகதை எழுதுதல் பதினைந்து அடிகளில் புதுக்கவிதை எழுதுதல் இப்பகுதி மாணவியருக்குப் பயிற்சி தருவது. இதிலிருந்து தேர்வுக்கான வினாக்கள் கேட்கக் கூடாது

பாட நூல்கள்	சங்க இலக்கியம் - மூலமும், உரையும்	ச.வே. சுப்பிரமணியம், சென்னை, மணிவாசகர் பதிப்பகம், 2014
	பத்துப்பாட்டு, மூலமும், உரையும்	ச.வே. சுப்பிரமணியம், சென்னை, மணிவாசகர் பதிப்பகம், 2014
	செவ்வியல் நூல்கள்(தொ.நூ)	தஞ்சைத் தமிழ்ப் பல்கலைக்கழகம்
	தமிழ் இலக்கிய வரலாறு	மு.வரதராசன் சாஹித்திய அகாதெமி பப்ளிகேஷன்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the poetic tactics of the ancient writers
K1, K2	CO 2	understand the notable features of literary geners and flow of writing at sangam age.
K2, K4	CO 3	aware of the salient features of classical texts
K2, K3	CO 4	attempt to appreciate the nuances of ancient literatures
K4,	CO5	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT62	தமிழ் நீதி இலக்கியம் Tamil-Neethiilakiyam	L	T	P	C
CORE XIV முதன்மைப் பாடம் - XIV			5	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of literature**				
Learning Objectives		The course aims at ➢ providing an understanding of Tamil ethical literature of Ancient period. ➢ helping the students imbibe the abiding human and moral ➢ values through the study of ethical literature. understanding the historical background of Tamil ethics handled in literature through the ages				

அலகு – 1	திருக்குறள் - 10 அதிகாரங்கள் - (அறத்துப்பால் -1) அதிகாரம் 4 அறன் வலியுறுத்தல் அதிகாரம் 8 அன்பு உடைமை அதிகாரம் 10 இனியவை கூறல் அதிகாரம் 12 நடுவு நிலைமை அதிகாரம் 20 பயனில் சொல்லாமை அதிகாரம் 21 தீவினை அச்சம் அதிகாரம் 25 அருள் உடைமை அதிகாரம் 30 வாய்மை அதிகாரம் 31 வெகுளாமை அதிகாரம் 32 இன்னா செய்யாமை
அலகு – 2	நாலடியார் - 4 அதிகாரங்கள் - 40 செய்யுட்கள் மேன்மக்கள் -10 பெரியாரைப் பிழையாமை -10 நல் இனம் சேர்தல் -10 பெருமை -10
அலகு – 3	**பழமொழி – 15 செய்யுட்கள்** பாடல் எண் -15 அம் கண் விசும்பின் அகல் நலாப் பாரிக்கும் --- பாடல் எண் - 29 – முழுதுடன் முன்னே வகுத்தவன் எனும் பாடல் வரை **3.1 இன்னா நாற்பது** – 3 செய்யுட்கள் பாடல் எண் - 15 – புல் ஆர் புரவி மணி இன்றி ஊர்வு இன்னா பாடல் எண் - 16 – உண்ணாது வைக்கும் பெரும் பொருள் வைப்பு இன்னா பாடல் எண் - 17 – ஆன்று அவிந்த சான்றோருள் பேதை புகழ் இன்னா **3.2 இனியவை நாற்பது** - 3 செய்யுட்கள் பாடல் எண் - 17 நட்டாக்கு நல்ல செயல் இனிதே பாடல் எண் - 18 மன்றன் முதுமக்கள் வாழும் பதி இனிதே பாடல் எண் - 19 நட்டார்ப்புறம் கூறான் வாழ்தல் நனிஇனிதே
அலகு – 4	சிவப்பிரகாசர் - நன்னெறி – முதல் 30 பாடல் மட்டும்
அலகு – 5	அதிவீரராம பாண்டியர் - வெற்றி வேற்கை ஔவையார் - ஆத்திசூடி

	முன்சீப் வேதநாயகம் பிள்ளையின், 'நீதிநூல்' அதிகாரம் - 44 'விலங்கினத்துக்கு இடர் செய்யாமை' என்பதில் வரும் 'விலங்கினங்கட்கு வாக்கும், வினை உணர் ஞானத்தோடும்' என்று தொடங்கும் முதல் பாடல்	
நூல்	1. திருக்குறள்	பரிமேலழகர் உரை
	2. நாலாடியார்	தமிழ் இணையக் கல்விக் கழக மின் நூலகம
	3. பழமொழி	தமிழ் இணையக் கல்விக் கழக மின் நூலகம்
	4. இன்னா நாற்பது	மின் நூலகம்
	5. இனியவை நாற்பது	மின் நூலகம்
	6. நன்னெறி	மின் நூலகம்
	7. வெற்றி வேற்கை	மின் நூலகம்
	8. ஆத்திசூடி	மின் நூலகம்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the values adhered by people all through the life for moral well-being
K1, K2	CO 2	understand the noble ethics taught through literature.
K2, K4	CO 3	aware of the values and ethics upholded by Tamil socity through Literature
K2, K3	CO 4	attempt to appreciate the suitability of values insisted by ancient scholars
K4	CO5	critically analyze the works of great writers

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT63	அணி இலக்கணம் - தண்டியலங்காரம் முழுவதும்	L	T	P	C
CORE XV முதன்மைப் பாடம் - XV		Ani Ilakkanam-Thandiyalangaram Muluvathum	5	-	-	4
Cognitive Level		**K1: Skill in poetics** **K2: Understanding** **K3: give citation** **K4: Analysis** **K5: To know the structure of Tamil verses**				
Learning Objectives		The Course aims to • make students obtain writing skills with correct usage of grammar. • develop poetic proficiency • gain rich knowledge about simily, metaphor and other beauty components of Tamil verses through the literature • learn and brighten up their capacity to write classical verses • strengthen the poetry writing skills.				

அலகு-1	பொது அணி இயல். 1.1 தற்சிறப்புப் பாயிரம் முதல் புறனடை வரையிலான 26 நூற்பாக்கள்
அலகு-2	பொருள் அணி இயல் -1 காப்பு முதல் விபாவனை அணி வரையிலான நூற்பாக்கள்(27 முதல் 51 வரை)
அலகு-3	பொருள் அணி இயல் -2 ஒட்டு அணி முதல் அவநுதி அணி வரையிலான நூற்பாக்கள்(52 முதல் 75 வரை)
அலகு -4	பொருள் அணி இயல் மற்றும் சொல் அணி இயல் சிலேடை அணி முதல் சித்திரகவி வரையிலான நூற்பாக்கள் (76 முதல் 98 வரை)
அலகு -5	சொல் அணி இயல் தொடர்ச்சி வழுக்களின் வகை முதல் புறனடை வரையிலான நூற்பாக்கள (99 முதல் 126 வரை)
நூல்கள்	தண்டியலங்காரம் - திருநெல்வேலி சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு

COURSE OUTCOME

At the end of the course, the students will be able to:

K1, K2	CO1	acquire knowledge of poetic beauty of Tamil literature
K1, K2	CO2	use grammatical structures of Tamil verses.
K5, K4	CO3	analyse the grammatical structure of verses in Tamil texts and know the impact of sanskrit literature
K5, K1	CO4	analyse the format of verses written in Standard Tamil.
K3	CO5	make inferences and predictions based on comprehension of a text.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks—42/60
Moderately Correlating (M) - 2 Marks—16/60
Weakly Correlating (W) - 2 Marks
No Correlation (N) - 0 Mark

COURSE CODE	U21TAT64	தமிழக கோவில் கலைகள் கல்வெட்டுகள் உணர்த்தும் பண்பாடு Tamilaga Kovil Kalaigal kalvetukal Unarthum Panpaadu	L	T	P	C
CORE XVI முதன்மைப் பாடம் - XVI			5	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of temple arts**				
Learning Objectives		The course aims at ➢ providing a wide spectrum of culture through the ages by temple architect, arts and inscriptions. ➢ helping the students to appreciate temple arts and culture. ➢ understanding the historical background and messages conveyed through inscriptions.				

அலகு – 1	தமிழகக் கோவில்கள் - சங்ககாலக் குறிப்புகள் - பல்லவர் காலக் குடைவரை கோயில்கள் - கற்றளிகள் - சோழர் காலக் கோயில்கள் - விமானங்கள் - நாயக்கர் காலக் கோபுரங்கள் - திருச்சுவர் – திருச்சுற்று – பிரகாரங்கள் - பிற்காலக் கோயில்கள் - கோயில்களின் அமைப்பு முறை வரலாற்று நோக்கு
அலகு – 2	கோவில்சார் கலைகள் - சிற்பக்கலை – கட்டடக்கலை – ஓவியக் கலை இசைக் கலை – வாத்தியக்கலை – நடனக்கலை – நாடகக்கலை - பிறகலைகள்
அலகு – 3	கோவில் கல்வெட்டுகள் - தமிழகக் கோவில்களில் கல்வெட்டுகள் - கோவில் கொடைகள் - நிபந்தங்கள் - திருப்பணிகள் சார் கல்வெட்டுகள் - வரலாறு
அலகு – 4	தமிழகக் கோவில்கள் சமுதாயக் கூடங்களாகத் திகழ்ந்தமை – மக்களின் வழிபாட்டுக் கூடங்கள் - மக்கள் சேவை மையங்கள் - கூட்டு வழிபாட்டு நெறிகள் - உணவளிக்கும் அறச்சாலைகள்
அலகு – 5	தமிழகக் கோவில்களும் பண்பாடும் - கோவில் திருவிழாக்கள் - ஊரார் பங்கேற்பு- பணி கொடை – பணிப்பகிர்வு – நம்பிக்கைகள் - தமிழகப் பண்பாட்டு வரலாற்றில் கோயில்கள் - பெறுமிடம்
நூல்	1. இ.கா.பெருமாள், தமிழகக் கோயில்கலைகள், கல்வெட்டுகள் உணர்த்தும் பண்பாடு தமிழகக் கோவில்கள், கல்வெட்டுகள் - பிபிசி சிறப்புக்கட்டுரை 2. முனைவர். பாக்கியமேரி, காலந்தோறும் தமிழர்கலைகள், அறிவுப் பதிப்பகம், சென்னை 2008. 3. மயிலை சீனி. வேங்கடசாமி, நுண்கலைகள், 2011 4. மயிலை சீனி. வேங்கடசாமி, தமிழர் வளர்த்த அழகுக்கலைகள், சென்னை பாவை பப்ளிகேசன், 1998 5. முனைவர்.ஆறு.இராமநாதன், நாட்டுப்புறக் கலைகள், சிதம்பரம், மெய்யப்பன், தமிழ் ஆய்வகம் 6. பொ.இராஜேந்திரன், சொ.சாந்தலிங்கம், கோயிற்கலை, சென்னை, 2014, நியூ செஞ்சுரி புக் ஹவுஸ்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the historical background of the temple arts
K1, K2	CO 2	understand the growth of temple architecture from time to time.
K2, K4	CO 3	aware of the salient features of temple culture through inscriptions
K2, K3	CO 4	know the trend of culture
K4, K6	CO5	critically analyze the inscriptions and aware of cultural, historical, political, social and economic background of Tamil society

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21TAT65	படைப்பிலக்கியம்	L	T	P	C
CORE XVII முதன்மைப் பாடம் - XVII			4	-	-	4
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the art of writing**				
Learning Objectives		The course aims at ➢ providing an understanding of Tamil creative literature ➢ helping the students to know the art of writing with moral and human values. ➢ understanding the historical background of Tamil literature and gain confidence in writing on their own.				

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

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the values to be handled in creative writing for people to live happily
K1, K2	CO 2	understand the noble ethics taught through literature and develop an attitude towards creative writing.
K2, K4	CO 3	aware of the values and ethics upholded by Tamil socity and have them in their writing
K2, K3	CO 4	attempt to appreciate the suitability of values insisted by ancient scholars and decide to go in that path or to do something innovvatively
K4	CO5	critically analyze the works of great writers and Have those works as models for their writing

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAE641	திராவிட மொழிகளின் ஒப்பிலக்கணம் Thiravida mozhigalin oppilakkanam	L	T	P	C
ELECTIVE –IV விருப்பப் பாடம் - தாள் - IV			4	-	-	3
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of Dravidian languages.**				
Learning Objectives		The course aims at ➢ providing a wide spectrum of Dravidian languages in India. ➢ helping the students to know about the base for Dravidian languages. ➢ enable them to study the similarities between protodravidian language and Tamil language ➢ understanding the place of Tamil in relation to other languages of Dravidian family.				

அலகு – 1	மொழிக் குடும்பம் - வரையறை – உலக மொழிக் குடும்பங்கள் - திராவிட மொழிக் குடும்பங்கள் - அவற்றின் தனித்தன்மைகள்
அலகு – 2	திராவிடம் என்பதன் பொருள் - மூலத் திராவிடம் - தொல் திராவிடம் - அதன் இயல்புகள் - அது தமிழுடன் ஒத்து இருத்தலைப் பரிசீலித்தல்.
அலகு – 3	திராவிட மொழிகளின் வகைபாடுகள் - தென் திராவிட மொழிகள் - அவற்றின் பொதுமைப் பண்புகள்
அலகு – 4	நடு திராவிட மொழிகள் - அவற்றின் பண்புகள் - வழங்குமிடம் - வழக்கு நிலை
அலகு – 4	வட திராவிட மொழிகள் - அவற்றின் பொதுமைக் கூறுகள் - தனித்துவப் பண்புகள்.
பாட நூல்கள்	கால்டுவெல் - திராவிட மொழிகளின் ஒப்பிலக்கணம் சைவ சித்தாந்த நூற்பதிப்புக் கழக வெளியீடு.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	Know the historical background of the languages spoken in Deccan and other parts of India.
K1, K2	CO 2	understand the differences between Dravidian and Indo-Aryan languages in India.
K2, K4	CO 3	Aware of the salient features of Dravidian languages and Develop critical thinking of place of Tamil with other languages of Dravidian origin
K2, K3	CO 4	Know the trend of changes occured in language of Dravidian family
K4, K6	C05	Critically analyze the Dravidian languages at different periods of time.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAE642	தமிழ் கலைச்சொல்லாக்க நெறிகள் Tamil Kalaisollakka Nerigal	L	T	P	C
ELECTIVE –IV விருப்பப் பாடம் - தாள் - IV			4	-	-	3
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the art of coining new words in Tamil for new technical terms**				
Learning Objectives		The course aims in ➢ providing the basics of translation and coining new terms in Tamil for new ideologies of science and technology ➢ helping the students to know the techniques of Translation. ➢ enable them to coin new words to denote new equipments in Tamil languages and its relevance be assessed and standardised ➢ understanding the process and rules of framing new technical terms.				

அலகு 1	கலைச்சொல் - விளக்க வரையறை – புதுச்சொற்களை உருவாக்குவதன் அவசியம் - மொழி பெயர்ப்பும் துறைசார் கலைச்சொல்லாக்கமும் - நைடாவின் மொழிபெயர்ப்பு விதிகள்
அலகு 2	தமிழ் கலைச்சொல்லாக்க முறைகள் - கருத்தாக்க விரிவு – சொல்லாக்கச் செறிவு - இரண்டனுக்கும் இடையிலான சமன்மை – பல் வகைச் சொற்கள் உருவாக்கம் - தரப்படுத்த நெறிகள்
ஆலகு 3	**3.1** அறிவியல் கலைச் சொல்லாக்க விதிமுறைகள் அனைத்துலகக் கலைச் சொல் உருவாக்க நெறிகள் 3.2 கலைத்துறைக் கலைச்சொல்லாக்க விதிமுறைகள் 3.3 கலைச்சொல்லாக்கத்தில் பயன்படுத்தப்படும் • ஒலிபெயர்ப்பு முறைகள் • இருமொழி கையாளல் • கணிதக் குறியீடுகள் • பன்மொழிப் பயன்பாடு சார் நெருடல்கள்
அலகு 4	ஊடகங்களும் தொழில் நுட்பத் தமிழும் - அச்சு ஊடகம் - மின் ஊடகம் - வானொலி – தொலைக்காட்சி – திரைப்படம் - தொலைவரி – தொலைநகலி – செயற்கைக் கோள் கணினி - இணையம் - வலைதளம் - முகநூல் - மின்னஞ்சல் - கைபேசி – பிற சாதனங்கள்.
அலகு 5	பாடத்துறை சார்ந்த பத்துத் தொழில் நுட்பச் சொற்களுக்குத் தக்க தமிழ்க் கலைச்சொற்களை உருவாக்குதல்
நூல்	முனைவர். இராதா செல்லப்பன், கலைச்சொல்லாக்கம், திருச்சி, கவியமுதம் வெளியீடு

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the translation tactics of framing new terms for new devices and concepts
K1, K2	CO 2	understand the notable features of new ideologies of different disciplines and found appropriate terms in source and target language
K2, K4	CO 3	aware of the salient features of translating texts with their cultural features.
K2, K3	CO 4	apply and attempt to solve problems in translation
K4,	CO5	critically analyze and coin new terminology for the translation of advanced science and technology

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

COURSE CODE	U21TAS61	கல்வெட்டியல்	L	T	P	C
SBE-I திறன்சார் விருப்பப் பாடம்			2	-	-	3

Cognitive Level	**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the art of reading Inscriptions.**
Learning Objectives	The course aims at ➢ providing a wide spectrum of messages engraved in Inscriptions through the ages. ➢ helping the students to read Inscriptions. ➢ understanding the historical background of messages conveyed through inscriptions.

அலகு -1	கல்வெட்டுக்கள் - நடுகல் - கல்வெட்டுக்களின் வகைகள் - நோக்கம் - தமிழ்க் கல்வெட்டுக்களின் தோற்றம், விளக்கம் வரலாறு
அலகு -2	கல்வெட்டுத் தமிழ் - பிராமிக் கல்வெட்டு – குகைக் கல்வெட்டுகள் - செப்பேடுகள் - சாசனங்கள் - மெய்க்கீர்த்திகள் - பதிவு செய்யும் செய்திகள்
அலகு -3	பழங்காலக் கல்வெட்டுச் செய்திகள்
அலகு -4	சோழர் காலக் கல்வெட்டுச் செய்திகள்
அலகு -5	பிற்காலக் கல்வெட்டு ஆவணங்கள் - தமிழ்க் கல்வெட்டியல் - துறை வெளியீடுகள்.
நூல்	தமிழகக் கல்வெட்டியல் துறை ஆவண வெளியீடுகள்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the historical background of the Inscriptions.
K1, K2	CO 2	understand the growth of Inscriptions in temples from time to time.
K2, K4	CO 3	aware of the salient features of temple culture through inscriptions
K2, K3	CO 4	know the trend of culture
K4, K6	CO5	critically analyze the inscriptions and aware of cultural, historical, political, social and economic background of Tamil society

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

NON MAJOR ELECTIVE – NME

COURSE CODE	U21TAN42	மொழி பெயர்ப்பியல்	L	T	P	C
SEMESTER - IV			2	-	-	2
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the fundamentals TamilTranslation**				
Learning Objectives		The course aims at ➢ providing the basics of translation ➢ helping the students to know the techniques of Translation. ➢ enable them to study the Machine language translation and its relevance to Tamil languageparsing techniques. ➢ understanding the process of shallow parsing and deep parsing and natural language processing.				

அலகு – 1	**மொழிபெயர்ப்பு** - மூலமொழி - இலக்கு மொழி – மொழிபெயர்ப்பின் தேவையும், பயனும் - மொழிபெயர்ப்பாளர் தகுதிகள் - தமிழ் மொழி பெயர்ப்பின் வரலாறு
அலகு – 2	**மொழிபெயர்ப்பு வகைகள்** - முழுநிலை மொழிபெயர்ப்பு பகுதி நிலை மொழிபெயர்ப்பு சொல் நேர் மொழிபெயர்ப்பு கட்டில்லா மொழிபெயர்ப்பு தழுவல்
அலகு – 3	படைப்பிலக்கிய மொழிபெயர்ப்பு – கவிதை, கதை, கட்டுரை அறிவியல் மொழிபெயர்ப்பு – மருத்துவ நூல்கள் மொழிபெயர்ப்பு
அலகு – 4	மொழிபெயர்ப்பு முறைகள் - மொழிபெயர்ப்புக் கருவிகள் - மொழிபெயர்ப்புச் சிக்கல்கள்
அலகு – 5	மொழிபெயர்ப்புப் பயிற்சி – உரைநடை, கதை ஐந்து வாக்கியங்கள் தந்து தமிழிலிருந்து ஆங்கிலத்துக்கு மொழி பெயர்க்கச் செய்தல் ஐந்து வாக்கியங்கள் தந்து ஆங்கிலத்திலிருந்து தமிழுக்கு மொழி பெயர்க்கச் செய்தல்
பாடநூல்கள்	1. வளர்மதி, மொழிபெயர்ப்பியல் 2. சு. சண்முக வேலாயுதம், மொழிபெயர்ப்பியல் 3. கா. பட்டாபிராமன் - மொழிபெயர்ப்புக் கலை 4. சேதுமணி மணியன் - மொழிபெயர்ப்பியல் கோட்பாடு 5. நா. முகமது செரிப் - மொழிபெயர்ப்பு வழிகளும் வாய்ப்புகளும்

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the translation tactics of literature
K1, K2	CO 2	understand the notable features of literary geners and flow of writing in source and target language
K2, K4	CO 3	aware of the salient features of translating texts with their cultural features.
K2, K3	CO 4	apply and attempt to solve problems in translation
K4,	CO5	critically analyze and coin new terminology for the translation of advanced science and technology

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

VALUE ADDED COURSE

COURSE CODE	U21TAV511	இதழியல்	L	T	P	C
SEMESTER - V			-	-	-	2

Cognitive Level	**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the art of writing for media**
Learning Objectives	The course aims at ➢ providing a wide spectrum of media formats and content for Tamil media ➢ helping the students to know the growth of communication media in Tamilnadu. ➢ understanding the changes needed in the mechanics of writing for media.
அலகு – 1	இதழியல் - தோற்றம் - வகைகள் - வளர்ச்சி இன்றைய நிலை - இந்திய இதழ்கள் - தமிழ் இதழ்கள் - வளர்ச்சி வரலாறு – தமிழ் இதழாளர்கள் - திரு.வி.க,- அறிஞர் அண்ணா – பெரியார் - சி.பா. ஆதித்தனார் - ஏ.என் சிவராமன் - கி.வா. ஜகந்நாதன் - கல்கி – ஏ.எஸ். அண்ணாமலை – வாசன் - தமிழ்வாணன் தமிழ் இலக்கிய இதழாளர்கள்.
அலகு – 2	செய்தி மூலங்கள் - செய்தி சேகரித்தல் - செய்தி நிறுவனங்கள் - நிருபர்கள் - தகுதிகள் - கடமைகள்
அலகு – 3	செய்தி கட்டமைப்பு – தலைப்பு – முதல் பத்தி – உடல் பகுதி – தலையங்கம் - செய்தி வகைகள் - பக்க அமைப்பு
அலகு – 4	பதிப்பாசிரியர் - ஆசிரியர் குழு - இதழ் நிர்வாகம் - விளம்பரங்கள் - விற்பனை – வாசகர் கடிதம்
அலகு – 5	இதழியல் சட்டங்கள் - இதழியல் சுதந்திரம் - இந்திய விடுதலைக்கு இதழ்களின் பங்கு - இன்றைய தமிழ் இதழ்களின் நோக்கும் போக்கும்.
பாடநூல்	1. மா.பா.குருசாமி - இதழியல் கலை 2. மா.சு.சம்பந்தன் - தமிழ் இதழியல் வரலாறு

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	identify the changes in the usage of Tamil language as per the media for communication
K1, K2	CO 2	develop critical analysis of language structure adopted for media communication by eminent media personalities.
K2, K4	CO 3	recognize the growth of media technology over the decades
K2, K3	CO 4	become proficient in the skill of writing for different media
K4, K6	CO5	know the trend and coherence of language and literature over a period of time through communication media and their impact on society.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks- 39/60
Moderately Correlating (M) - 2 Marks—20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

COURSE CODE	U21TAV512	தமிழ் சதக இலக்கியம்	L	T	P	C
SEMESTER - V			-	-	-	2
Cognitive Level		**K1: Learning** **K2: Understanding** **K3: Applying** **K4 : Analysing** **K5: knowing the background of Sathagam literature**				
Learning Objectives		The course aims at ➢ Providing an understanding of Tamil Sathagam literature. ➢ Helping the students imbibe the abiding human and moral values through the study of great pieces of Sathagam literature. ➢ Understanding the historical background of Sathagam literature and know the life style of people portrayed through Sathagam literature.				

அலகு -1	தொண்டைமண்டல சதகம் - நூலமைப்பு – நுவல்பொருள் சுருக்க வரைவு – வரலாற்றுப் பதிவுகள் - சமூக, பண்பாட்டு, வாழ்வியல் அரசியல் சார் குறிப்புகள் - நூலின் நயங்கள் - வரலாற்றுப் பயன்பாடு
அலகு -2	சோழ மண்டல சதகம் - நூல் வரலாறு – காலம் - நூலாசிரியர் வரலாறு – நூலமைப்பு - நூல் பொருள் சுருக்கம்- நூலமைப்பு -
அலகு -3	பாண்டிய மண்டல சதகம் - நூல் தோன்றிய சூழல் - காலப் பன்னை – வரலாறு – நூலாசிரியர் குறிப்பு – நூலமைப்பும், நுவல் பொருளும் இலக்கிய நயங்கள் - வரலாற்றுப் பதிவுகள்
அலகு -4	தமிழ் நாவலர் சரிதை – நூல் அமைப்பும் வரலாறும்-கருப்பொருள் சுருக்க வரைவு – நூல் ஆசிரியர் வரலாறு – காலப் பின்னணி – வரலாற்று நோக்கிலும். இலக்கிய நோக்கிலும், அணுகி ஆராய்தல்
அலகு -5	தண்டலையர் சதம் - நூலமைப்பும், நுவல் பொருளும் - இலக்கிய நயங்கள் - தனிச்சிறப்புக்கள் – பொதுமைக் கூறுகள் - இலக்கியப் பனுவல்களை வரலாற்று ஆவணங்களாகக் கொள்வதில் நேரும் சிக்கல்கள், தீர்வுகள்
நூல்கள்	1. தொண்டை மண்டல சதகம், மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம். 2. சோழ மண்டல சதகம், மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம். 3. பாண்டிய மண்டல சதகம், மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம். 4. தமிழ் நாவலர் சரிதை, மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம். 5. தண்டலையர் சதகம், மதுரை மின்நூல் தொகுப்புத் திட்ட மின் நூலகம்.

COURSE OUTCOMES

Upon completion of this course the students will be able to

K1, K2	CO1	know the historical information given by the writers of Tamil Sathagam literature.
K1, K2	CO 2	understand the notable information about social history of Tamil Society given through Sathagam Literature.
K2, K4	CO 3	aware of the salient features of Sathagam texts of different regions.
K2, K3	CO 4	attempt to appreciate the nuances of Sathagam literature
K4,	CO5	critically analyze the works of writers of Sathagam Literature.

Mapping of Cos with POS & PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	S	S	S	S	M	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	M	S	S	M	S	S
CO3	S	S	S	S	M	M	S	S	M	S	M	S
CO4	S	M	S	S	S	M	M	S	S	S	M	S
CO5	S	S	S	S	M	M	M	S	M	M	S	S

Strongly Correlating (S) - 3 Marks -39/60
Moderately Correlating (M) - 2 Marks -20/60
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 Mark

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MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

DEPARTMENT OF MANAGEMENT

BACHELOR OF BUSINESS ADMINISTRATION

SYLLABUS TO BE IMPLEMENTED FROM THE ACADEMIC YEAR
2021-2022
(CHOICE BASED CREDIT SYSTEM)

Mother Teresa Women's University, Kodaikanal
Department of Management
Choice Based Credit System (CBCS)
(2021-2022 onwards)
Bachelor of Business Administration

1. About the Programme

The Revised syllabus for BBA is recommended from the academic year2021– 2022 onwards. Regulations scheme of examinations and syllabus for BBA is based on UGC/TANSCHE guidelines under Choice Base Credit System (CBCS).The Bachelor's Degree in BBA is awarded to the student based on demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes, and values) and academic criteria expected of graduates at the end of the programme. Therefore, the learning outcomes of this particular programme are aimed at facilitating the students to acquire these attributes, keeping in view changes in the current socio-economic environment. The Learning Outcomes-based Curriculum Framework (LOCF) of BBA has been designed keeping in view the graduate attributes, qualification descriptors, programme learning outcomes, and course learning outcomes. The syllabus is framed to engage students through an all-encompassing knowledge impartation.

2. Programme Educational Objectives (PEOs)

PEO 1	Graduates will be capable of making a positive contribution to business, trade and industry in the national and global context
PEO 2	Graduates will be able to apply frameworks and tools to arrive at informed Decisions in profession and practice, striking a balance between business and social dimensions.
PEO 3	Graduates will have a solid foundation to pursue professional careers and take up higher learning courses such as MBA, M.Phil, PhD as well as research.
PEO 4	Graduates with a flair for self-employment will be able to initiate and build upon entrepreneurial ventures or demonstrate entrepreneurship for their employer organizations.
PEO 5	Graduates will recognize the need for adapting to change and have the aptitude and ability to engage in independent and life–long learning in the broadest context of socio-economic, technological and global change.

3. Eligibility :

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

3. General Guidelines for UG Programme

i. **Duration:** The programme shall extend through a period of 6 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

	Theory		Practical	
	Min	**Max**	**Min**	**Max**
Internal	**10**	**25**	**10**	**25**
External	**30**	**75**	**30**	**75**

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions - 2 Questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice- Any three Questions out of 5 - one Question from each Unit	**45**
Total Marks			**75**

*** Minimum credits required to pass :156**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks, Viva: 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
40-49	4.0 – 4.9	C	Satisfactory
00-39	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the prescribed form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the prescribed form with the prescribed fee along with the Medical Certificate. Students with attendance less than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and The Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the UG Programmes are also applicable for this Programme.

PROGRAMME OUTCOMES:

PO1	Develop the knowledge, skill and attitude to creatively and systematically apply the principles and practices of management, accountancy, finance, business law, statistics, HR, operations and IT to management problems and work effectively in modern day business and non-business organizations.
PO2	Develop fundamental in-depth knowledge and understanding of the principles, concepts, values, substantive rules and development of the core areas of business such as finance, accounting, marketing, HR, operations along with the tools such as Tally, MS Excel, MS Office, etc.
PO3	Demonstrate the critical thinking mindset and the ability to identify and formulate research problems, research literature, design tools, analyse and interpret data, and synthesize the information to provide valid conclusions and contextual approaches across a variety of subject matter.
PO4	Exhibit self-confidence and awareness of general issues prevailing in the society and communicate effectively with the accounting, commerce, management, business, professional fraternity and with society at large through digital and non-digital mediums and using a variety of modes such as effective reports & documentation, effective presentations, and give and receive clear instructions.
PO5	Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings by demonstrating life skills, coping skills and human values.

PROGRAMME SPECIFIC OUTCOMES:

PSO1	Get familiarized with the core concepts of Business and Management
PSO2	Able to apply leadership principles to manage in a diverse and global business environment
PSO3	Exposure to real business situations through field work, Industrial visits and projects
PSO4	Demonstrate the ability to identify and evaluate ethical business practices
PSO5	Develop Managerial and Job Readiness Skills to take up career in Corporates.

B.B.A CURRICULUM

Paper No.	Course Code	Course Title	Credits	Hours		CIA	ESE	Total
				T	P			
Semester I								
1	U21LTA11	Part I Tamil – I	3	6	-	25	75	100
2	U21LEN11	Part II English – I	3	6	-	25	75	100
3	U21BAT11	**Core-I** Fundamentals of Management	4	5	-	25	75	100
4	U21BAT12	**Core-II** Business Communication	4	5	-	25	75	100
5	U21BAA11	**Allied-I** Managerial Economics	4	6	-	25	75	100
6	U21EVS11	Environment Studies	2	2	-	25	75	100
7	U21PECM11	Professional English I	4	6	-	25	75	100
		Total	**24**	**36**				**700**
Semester II								
8	U21LTA22	Part I – Tamil – II	3	6	-	25	75	100
9	U21LEN22	Part II – English – II	3	6	-	25	75	100
10	U21BAT21	**Core-III** Financial Accounting	4	5	-	25	75	100
11	U21BAT22	**Core-IV** Business Environment	4	5	-	25	75	100
12	U21BAA22	**Allied-II** Computer Application - TALLY (Practical)	4	-	5	25	75	100
13	U21VAE21	Value Education	3	3	-	25	75	100
14	U21PECM22	Professional English II	4	6	-	25	75	100
		Total	**25**	**36**				**700**
Semester III								
15	U21LTA33	Part I Tamil – III	3	6	-	25	75	100
16	U21LEN33	Part II English – III	3	6	-	25	75	100
17	U21BAT31	**Core-V** Oraganisational Behaviour	4	5	-	25	75	100
18	U21BAA33	**Allied-III** Business Statistics	4	5	-	25	75	100

19	U21BAE31 U21BAE32	**Elective I-** Cost Accounting / Talent and Knowledge Management	3	4	-	25	75	100
20	U21CSS31	**Job oriented Course-SBE-I** Computer Skills for Office Management	2	-	2	25	75	100
21		NME - I	2	2	-	25	75	100
		Total	**21**	**30**				**700**
Semester IV								
22	U21LTA44	Part I – Tamil – IV	3	6	-	25	75	100
23	U21LEN44	Part II – English – IV	3	6	-	25	75	100
24	U21BAT41	**Core-VI** Research Methodology	4	4	-	25	75	100
25	U21BAT42	**Core-VII** Personality Development	4	4	-	25	75	100
26	U21BAA44	**Allied- IV**- GST Registration and Filing (Practical)	4	-	4	25	75	100
27	U21BAE41 U21BAE42	**Elective-II** Management Information System / Brand Management	3	3	-	25	75	100
28	U21MSS42	**Job Oriented Course-SBE-II-** Managerial Skills	2	2	-	25	75	100
29		NME-II	2	2	-	25	75	100
		Total	**25**	**31**				**800**
Semester V								
30	U21BAT51	**Core-VIII** Production Management	4	5	-	25	75	100

31	U21BAT52	**Core-IX** Management Accounting	4	5	-	25	75	100
32	U21BAT53	**Core-X** Marketing Management	4	5	-	25	75	100
33	U21BAT54	**Core- XI** Human Resource Management	4	5	-	25	75	100
34	U21BAT55	**Core-XII** Business Law	4	5	-	25	75	100
35	U21BAE51 U21BAE52	**Elective- III** Strategic Management / International Business	3	3	-	25	75	100
36	U21BAS53	**SBE III-** Entrepreneurship Development (Practical)	2	-	2	25	75	100
		Total	**25**	**30**				**700**
Semester VI								
37	U21BAT61	**Core-XIII** Financial Management	4	5	-	25	75	100
38	U21BAT62	**Core-XIV** Total Quality Management	4	5	-	25	75	100
39	U21BAT63	**Core-XV** Market Research	4	5	-	25	75	100
40	U21BAT64	**Core-XVI** E Commerce	4	-	5	25	75	100
41	U21BAT65	**Core-XVII** Skill Enhancement	4	5	-	25	75	100
42	U21BAE61 U21BAE62	**Elective- IV** Service Marketing / Consumer Behaviour	3	3	-	25	75	100
43	U21BAS64	**SBE-IV** Market Survey	2	-	2	25	75	100
44	U21EAS61	Extension Activities	3	-	-	100	-	100
		Total	**28**	**30**				**800**
		Grand Total	**148**	**193**				**4400**

Non Major Elective (NME)

1. NME-I- U21BAN31- (III Semester) - ESSENTIALS OF MANAGEMENT
2. NME-II -U21BAN42- (IV Semester) - PERSONALITY ENHANCEMENT

Additional Credit Courses

1. U21BAO31 - Online Course – III Semester,
2. U21BAI41 - Internship – IV Semester,
3. U21BAV51 - Value added course – V Semester- GENERAL APTITUDE & REASONING

SEMESTER-I

COURSE CODE	U21BAT11	FUNDAMENTALS OF MANAGEMENT	L	T	P	C
CORE -I			5	-	-	4
Cognitive Level		**K1: Recall** **K2: Understand** **K3: Apply** **K4: Analyse**				
Course Objectives		The course aims to 1. introduce students to the basic principles and practices of management. 2. build a base for learning management knowledge and to acquire prerequisite skills. 3. provide a basis of understanding to the students concerning working of a business organization through the process of management. 4. present new perspectives in management 5. examine and explain the management evolution and how it will affect future managers.				

Unit-1: Management:

Management: Definition – Nature – Scope – Importance – Process – Skills required of a manager – Administration Vs Management – Management functions – Theories of Management.

Unit–2: Planning

Planning: Nature and Importance – Principles and Process – Types of Plans –Steps in planning – Management by Objectives (MBO) – Decision making.

Unit-3: Organization:

Organization: Principles and process – Organization structure – Formal &Informal organization – Meaning of Delegation – Authority and Responsibility – Centralization and Decentralization

Unit-4: Direction and Control

Direction and Control: Meaning – Principles – Importance – Techniques – Control: Meaning – Objectives – Types of control – Control process – Control techniques – Coordination: Need – Techniques.

Unit-5: Motivation & Leadership

Motivation & Leadership: Meaning – Types – Theories of Motivation: Maslow, Herzberg, X, Y Theories – Leadership: Meaning – Styles.

Text Book:

1. K.Natarajan&K.P.Ganesan, Principles of Management, Himalaya Publishing House, 2015.

Reference Books:

1. C.B.Gupta, Management Theory &Practice, S. Chand Company, 2017.
2. Koontz and O'Donnell, Principles of Management, Tata McGraw Hill Publication, 2004.
3. L.M. Prasad, Essentials of Management, S. Chand Company, 2015.
4. P.C. Tripathi and P.N.Reddy, Fundamentals of Management, McGraw Hill Education, 2017.
5. R.S.N.Pillai and S.Kala, Principles and Practice f Management, S. Chand Company, 2013.

Note: Question Paper shall cover 100% Theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	examine and explain the management evolution and how it will affect future managers.	K1
CO2	estimate the conceptual framework of planning and decision-making in day to day life.	K2
CO3	explain the various managerial functions to achieve the goals and objectives of the organization.	K1
CO4	analyze the theories of motivation, leadership and communication in a variety of circumstances and management practices in organizations.	K4
CO5	identify and explain the importance of the management process and identify some of the key skills required for the contemporary management practice.	K3

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	S	S	S	M
CO2	M	S	M	S	S	S	M	S	S	S
CO3	S	S	M	M	S	S	M	M	M	S
CO4	S	M	S	S	S	M	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAT12	BUSINESS COMMUNICATION	L	T	P	C
CORE -II			5	-	-	4
Cognitive Level	**K3: Apply** **K4: Analyse** **K6: Create**					
Course Objectives	The course aims to 1. understand the concept, process and importance of communication. 2. gain knowledge of media of communication. 3. develop skills of effective communication – both written and oral. 4. acquaint with the application of communication skills in the business world. 5. learn the appropriate ways to meet industry standards; apply critical evaluation techniques to business documents.					

Unit-1: Introduction to Communication

Introduction to Communication: Definition of Business Communication – Difference between communication & Business Communication, Business Communication - Objectives, Importance – Process of Communication – Principles of Effective Communication – Barriers of Communication – Communication Ethics.

Unit–2: Types of Communication

Types of Communication**:** Formal and Informal Communication, Inter – Personal and Intrapersonal Communication – Verbal Communication and its types – Non –Verbal Communication and its types.

Unit-3: Business Correspondence:

Business Correspondence: Need – Functions – Importance – Layout of business letter.

Unit-4: Letter Writing

Letter Writing:Letters relating to Enquiries and Replies – Order and Execution – Circular – Sales Letter.

Unit-5: Report Writing

Report Writing: Meaning – Types – Mechanics of Report writing – Content of Report.

Text Book:

1. Rajendra Pal, J.S.Korlahalli, Essentials of Business Communication, S. Chand Company, 2013

Reference Books:

1. Paten Shetty, R., Business Communication, S.Chand& Company, 2019.
2. Hory Sankar Mukarjee, Business Communication, Oxford University Press, 2016
3. PayalMehra, Business Communication for Managers, Pearson Education India, 2016.
4. Meenashi Raman, Business Communication, Oxford Publication,2012

Note: Question Paper shall cover 100% Theory

Expected Course Outcomes:

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

Number	**Course outcome**	**Knowledge Level** (According to Bloom's Taxonomy)
CO1	learnand apply effective written communication techniques.	K3
CO2	reviewand refine communications skills.	K4
CO3	developand deliver effective presentations of letters.	K6
CO4	developand draft circulars.	K6
CO5	developskills in report writing.	K6

K3 - Apply; K4 - Analyze; K6 – Create

Mapping of COs with POS & PSOs

CO/ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	S	S	S	S	M	S	S	M
CO2	S	M	S	M	S	S	S	S	S	S
CO3	S	S	S	S	S	M	S	S	M	S
CO4	S	S	S	S	M	S	S	M	S	S
CO5	M	S	M	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21BAA11	MANAGERIAL ECONOMICS	L	T	P	C
ALLIED-I			6	-	-	4
Cognitive Level	**K2: Understand** **K4: Analyse** **K5: Evaluate** **K6: Create**					
Course Objectives	The Course aims to 1. expose basic micro economic concepts. 2. apply economic analysis in the formulation of business policies. 3. use economic reasoning to problems of business. 4. build a wide knowledge about basic Indian economic system. 5. identify the effective applications of factors of production and BEP Analysis					

Unit 1: Managerial Economics

Managerial Economics: Definition, Nature and Scope - Role of Managerial Economics – Concept of Utility – Law of Diminishing Marginal Utility

Unit 2: Theory of Demand:

Theory of Demand: Determinants – Law of demand – Demand functions – Demand curve – Types of demand – Elasticity of demand – Supply: Law of supply – Elasticity of supply.

Unit 3: Production Function

Production Function:Laws of Production function – Law of Variable Proportion – Isoquants – Marginal rate of substitution – Economies of Scale – Law of Returns to Scale – Cobb Douglas Production function.

Unit 4: Cost Concepts

Cost Concepts**:** Cost and output relationship – Total, Average and Marginal cost analysis – Short run and Long run – Break even analysis.

Unit 5: Market Structure

Market Structure: Different types of market – Pricing under Perfect competition – Monopoly: Meaning – Methods of pricing.

Text Book:

1. R.L. Varshhney& K.L. Maheswari, Managerial Economics, S. Chand, 2018

Reference Books:

1. S.Sankaran, Managerial Economics, Margham Publication, 2015
2. K.P.M. Sundaram, Economic Analysis, S.Chand Company, 2015
3. G.S. Gupta , Managerial Economics, McGraw Hill Education, 2012.
4. VanithaAgarwal, Managerial Economics, Pearson Education, 2013

Note: Question Paper shall cover 100% Theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understandthe concepts of utility	K2
CO2	applythe objectives of business firms, demand analysis and elasticity of demand in daily life and their career.	K6
CO3	understandthe production function.	K2
CO4	identify the effective applications of factors of production and BEP Analysis	K4
CO5	evaluatethe performance of different market structures.	K5

K2 – Understand; K4 - Analyze; K5 - Evaluate; K6 – Create

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	M	S	S	S	M	M	S	S
CO4	M	S	M	S	M	M	S	M	S	M
CO5	S	S	S	S	M	S	S	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

SEMESTER- II

COURSE CODE	U21BAT21	FINANCIAL ACCOUNTING	L	T	P	C
CORE –III			5	-	-	4
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K5: Evaluate**					
Course Objectives	The Course aims to 1. acquire knowledge of accounting concepts, principles and practices. 2. apply financial concepts in business administration to manage and be effective in decision making in functional areas like finance and accounting transactions. 3. provide wide knowledge about final accounts. 4. inculcate basic depreciation accounting concepts. 5. illustrate the accounts for non-trading institutions through income and expenditure, receipts and payments accounts.					

Unit 1: Accounting

Accounting: Definition – Nature of Accounting – Accounting Concepts and Postulates –Double Entry Vs Single entry – Books of Accounts: Journal – Ledger – Subsidiary Books: Cashbook – Purchase book – Sales book – Sales return book – Purchase return book.

Unit 2: Rectification of Errors

Rectification of Errors**:** Trial Balance – Errors – Verifications of Errors – Bank reconciliation statement.

Unit 3: Final Accounts

Final Accounts: Preparation of Trading & Profit and Loss Account and Balance Sheet with simple adjustments.

Unit 4:Depreciation:

Depreciation: Meaning – Causes – Methods of Depreciation: Straight Line Method – Written Down Value Method – Annuity Method.

Unit 5:Capital and Revenue Account

Capital and Revenue Account: Accounts of Non-trading organizations – Income and Expenditure Account – Receipts and Payments Account

Text Books

1. Dr. S. N. Maheswari, Financial Accounting, Vikas Publishing House, 2018

Reference Books:

1. S.P.Jain&K.L.Narang, Advanced Accountancy, Kalyani Publishers, 2014
2. M.C.Shukla, T.S.Grewal&S.C.Gupta, Advanced Accountancy, S.Chand& Sons, 2016
3. R.L.Gupta&Radhasamy, Advanced Accountancy, S.Chand& Sons, 2014
4. P.C.Tulsian, Financial Accounting, S.Chand Publications, 2016

Note: Question Paper shall cover 40% Theory and Problems 60%

Expected Course Outcomes:

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

Number	**Course outcome**	**Knowledge Level** (According to Bloom's Taxonomy)
CO1	recall the accounting concepts and understand the rules of the double entry system, journalizing and posting to the ledger in the business transactions.	K1
CO2	interpret the trial balance; identify the errors and reconcile the bank statement by cash book.	K2
CO3	summaries the trading, profit & loss account and balance sheet with the support of financial and accounting transactions.	K5
CO4	illustrate the different methods of depreciation.	K3
CO5	classify the revenue and capital items, understand accounting statements of a non-trading concern	K2

K1 - Remember; K2 - Understand; K3 - Apply; K5 - Evaluate

Mapping of COs with POS & PSOs

CO/ PO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	M	S	M	S	S	M	S	M
CO3	M	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21BAT22	BUSINESS ENVIRONMENT	L	T	P	C
CORE -IV			5	-	-	4
Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyse**					
Course Objectives	The Course aims to 1. familiarize the nature of the business environment and its components in business decision making. 2. increase the awareness of the interconnected nature of today's world, and how economic, social, political and environmental issues can impact international integration and business. 3. impart the environmental scanning skills to identify the business opportunity and challenges. 4. analyze and interpret the current events relating to globalization and international business. 5. analyze the various economic conditions and effects of government policy on business performance.					

Unit 1:Business Environment

Business Environment: Meaning – Concept – Nature – Significance – Various environments affecting Business: Social economic political and legal, culture, competitive, demographic, technological and their impact in business.

Unit 2:Government & Political Environment

Government & Political Environment: Government and business relationship in India – Provision of Indian constitution about business – State regulations on business.

Unit 3:Society and Culture Environment

Society and Culture Environment: Culture – Elements of culture – Impact of a foreign culture – Joint family system. Social responsibilities of Business – Responsibilities of share holders, customers, community, and the government.

Unit 4:Economic Environment

Economic Environment: Economic system, Socialism – Capitalism – Mixed economy –their impact on business– Public sector, Private sector, Joint sector–Objectives, Growth of Public sector in India.

Unit 5:Legal and Technological Environment

Legal and Technological Environment: Industrial Licensing Policy 1991 – FEMA –SEBI – TRIP's – WTO – GATT – Impact of technological changes in business.

Text Books:

1. Aswathappa K, Essentials of Business Environment, Himalaya Publishing House, 2017

Reference Books:

1. Francis Cherunilam, Business Environment, Himalaya Publishing House, 2017
2. Dr .S. Sankaran, MargamBusiness Environment, Himalaya Publishing House, 2013
3. NamithGopal, Business Environment, Tata McGraw Hill Education , 2010
4. Ghosh P.K, Business Environment, S. Chand & Sons, 2010
5. Rosy Joshi, Business Environment, Kalyani Publication, 2019

Note: Question Paper shall cover 100% Theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	develop an understanding of the business environment	K2
CO2	explain the Government and political environment	K2
CO3	understand the relations of society and culture to the business	K3
CO4	comprehend the economical environmental factors that are conducive to the businesses	K4
CO5	have a simple and basic comprehension of the international scenario about the borderless business world due to technological changes	K2

K2 - Understand; K3 - Apply; K4 - Analyze;

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	M	S	S	S
CO2	M	S	S	S	S	M	S	S	S	S
CO3	S	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	S	S	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21BAA22	COMPUTER APPLICATIONS-TALLY (PRACTICALS)	L	T	P	C
ALLIED –II			-	-	5	4
Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyse** **K5: Evaluate**					
Course Objectives	The course aims to 1. help the students to know the fundamental concepts of Tally . 2. help them to understand how to use Tally software in day to day applications. 3. familiarize the students to use this package for business. 4. introduce the students to some basic tools like creation of voucher, purchase order etc. 5. familiarize the students in the preparation of tax related salesvouchers.					

UNIT 1: Introduction to Tally

Introduction to Tally – Selecting a Company- Shutting a Company – Altering a company – Accounting Information – Groups – Managing Groups – Single & Group - Ledgers.

UNIT 2 : Creation of Vouchers

Vouchers - Creating Vouchers - Displaying and Altering Vouchers - Control Vouchers -Purchase Vouchers - Sales Vouchers - Payment – Receipt and Journal Vouchers – Bank Reconciliation Statement.

UNIT 3 : Inventory Management

Inventory Management - Stock Groups - Stock Categories - Stock Items - Types of Inventory Vouchers - Receipt Note Vouchers.

UNIT 4: Purchase and Sales order

Purchase Orders – Creation of a Purchase Order – Altering a Purchase Order – Deleting a Purchase Order-Sales Orders- Deleting a Sales Order- Invoices Reports- Trial Balance - Profit and Loss A/C Balance Sheet.

UNIT 5: Financial Statements

Pay Roll in Tally – Collected at Source – Tax Deducted at Sources – various financial statements – Budget - GST.

Note**: Question Paper shall cover 100% practical work**

Practical work:

1. Program for Creation of company
2. Program for purchase voucher and sales voucher creation
3. Program for payment voucher and Receipt voucher creation
4. Program for Contra voucher creation
5. Program for journal voucher creation
6. Program for preparation of Debit note and credit note
7. Program for working for a calculator
8. Program for Single-ledger and multiple ledger creation
9. Program for single ledger and Multiple ledger
10. Program for preparation of Trial balance
11. Program for preparation of final accounts of a sole-trader
12. Program for preparation of final accounts of a partnership firm
13. Program for preparation of final accounts of a company
14. Program for single stock and multiple stock creation
15. Program for simple and compound unit
16. Program for display on inventory transaction
17. Program for cash flow and fund statement preparation
18. Program for display of ratio Analysis
19. Program for monthly wise chart preparation of sales and purchase
20. Program for Comparative analysis statements

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	use Tally to create personal business documents following current professional and/or industry standards.	K2
CO2	create scientific and technical documents incorporating the billing procedures	K2
CO3	develop entries for creation of vouchers.	K3
CO4	Design bills for implementation of taxation aspects.	K4
CO5	design and construct financial statements after considering taxes and GST.	K5

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

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	S	S	S	M
CO2	S	M	S	S	S	S	M	S	S	S
CO3	S	S	S	M	S	S	S	S	M	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	M	S	S	S	S	M	S	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

SEMESTER- III

COURSE CODE	U21BAT31	ORGANISATIONAL BEHAVIOUR	L	T	P	C
CORE -V			5	-	-	4
Cognitive Level	**K2: Understand** **K4: Analyse** **K5: Evaluate**					
Course Objectives	The Course aims to 1. gain a solid understanding of human behaviour in the workplace from an individual, group, and organizational perspective and frameworks and tools to effectively analyze and approach various organizational situations. 2. familiarize students with contemporary organizational behaviour theories and help them to understand predict and manage people better. 3. acquaint the students with the fundamentals of managing a business. 4. understand individual and group behaviour at work place to improve the effectiveness of an organization.					

Unit 1: Introduction
Meaning- Objectives, Nature and Scope of organizational behavior – Importance of OB - Disciplines contribution to organizational behavior –Theories of organization behavior –Classical – Neo classical and Modern theories.

Unit 2:Foundations of Individual Behavior
Nature of Individual behavior –Personality – Definition -Factors/Determinants of Personality– Types of Personality –Attitude and Values.

Unit 3:Leadership Concept–Qualities **Conflict** of effective Leadership–Leadership Styles– Definition and concepts of Learning.

Unit 4:Motivation
Theories and Process of Motivation – Basic Theories of Motivation. Groups- Types of groups – formation of Group - Group dynamics – Group cohesiveness – Group decision making

Unit 5:Conflict
Nature, Types of Conflict. Organizational Change – Meaning, nature – Causes of change – Resistanceto change –overcoming the resistance.

Text Books:

1. L M. Prasad, Organisational Behaviour - Sultan Chand &Sons, New Delhi, 2014

Reference Books:

1. Stephen P.Robins, Organizational Behavior,- Pearsons Education, 2014
2. Aswathappa, Organizational Behavior- Himalaya Publishing House, 2012
3. Dr.C.D.Balaji, OrganisationalBehaviour, Margham Publication, 2016
4. Uma Samkar, OrganisationalBehaviour, Tata McGraw Hill Publication, 2013
5. J. Jayasankar, OrganisationalBehaviour, Margham Publication, 2015

Note: Question Paper shall cover 100% Theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the implications of organizational behaviour on the process of management	K2
CO2	analyze the individual behaviour and Identify the Determinants of Personality	K4
CO3	know about the qualities of leadership	K2
CO4	understand the theories of motivation	K2
CO5	evaluatethe organizational change.	K5

K2 - Understand; K4 - Analyze; K5 - Evaluate;

Mapping of COs with POs& PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	S	S	S	S	S	S	S	S
CO2	M	S	S	S	S	S	M	S	S	S
CO3	M	S	M	M	M	S	S	S	S	S
CO4	M	M	M	M	M	M	M	M	M	M
CO5	M	M	S	M	S	S	M	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAA33	BUSINESS STATISTICS	L	T	P	C
ALLIED-III			5	-	-	4

Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K4: Analyse** **K5: Evaluate**
Course Objectives	The Course aims to 1. understand the concept of population and sample. 2. usea frequency distribution to make a decision. 3. understand and to calculate various types of averages and variations. 4. use regression analysis to estimate the relationship between two variables.

Unit 1:Business Statistics

Introduction to statistics, Nature, Scope, Importance, Types and limitations of statistics.

Unit 2:Statistical Tabulation

Classification and tabulationofstatisticaldata–Diagrammaticandgraphicalrepresentation of data.Frequency distribution–Simple–Average.

Unit 3:Mean, Median, Mode

Calculation of Mean, Median, Mode – Standard Deviation (Individual only)

Unit4 :Sampling

Types of Samples– use of sampling in Business– Probability– Addition and Multiplication laws.

Unit 5:Correlation

Karl Pearson's Rank and Correlation co-efficient

Note: Question Paper shall cover 40% Theory and 60 % Problems

Text Book:

1. R.S.N.Pillai and Bagavathi, Statistical Methods –S.Chand& Sons, 2017

Reference Books:

1. S.P.Gupta, Statistical Methods,S.Chand& Sons, 2017
2. J.K.Sharma, Business Statistics, Vikas Publishing House, 2014
3. Dr.K.L. Gupta, Business Statistics, SahityaBhawan Publications, 2020

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	know the basic concepts of statistics	K1
CO2	apply the data presentation tools of statistics	K3
CO3	evaluate the measures of statistics	K5
CO4	understand and compute the sampling distributions	K2
CO5	summarize methods of correlation analysis	K4

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

Mapping of COs with POs& PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	M	S	M	S	M	M
CO2	S	S	S	M	M	M	S	S	S	M
CO3	M	M	M	M	M	S	S	M	M	S
CO4	M	S	S	M	M	S	S	M	S	M
CO5	M	M	S	M	M	S	S	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAE31	COST ACCOUNTING	L	T	P	C
ELECTIVE - I			4	-	-	3
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K4: Analyse** **K5: Evaluate**					
Course Objectives	The Course aims to 1. impart the knowledge of basic cost concepts, elements of cost & preparation of cost sheet. 2. provide basic knowledge of important methods & techniques of cost. 3. introduce the basics of cost accounting and enabling the student to correlate the two branches namely financial and cost accounting. 4. build a base for learning management accounting.					

Unit 1:Cost Accounting

Meaning, Nature and Scope of Cost Accounting – Concept and Classification of Cost–Elements and Methods of Cost – Advantages–limitations –Relationship of Cost Accounting and Financial Accounting–Preparation of Cost Sheet.

Unit 2:Materials Control

Meaning – Objectives – Advantages - Methods of Stock Control –EOQ - Levels of Stock–Receipts and Issues of materials–ABC Analysis –Stores Ledger–FIFO,LIFO, Simple Average and Weighted Average Method.

Unit 3:Labor cost

Methods of Remuneration and Incentive Schemes – Methods of wage payment –Time rate and Piece rate system – Labor Turnover Causes, Types and Measurement.

Unit 4:Overhead Cost

Collection, Classification, Allocation, Apportionment and Absorption – Recovery Rates – Over and Under Absorption-Machine Hour Rate

Unit 5:Process Costing

Normal Loss, Abnormal Loss and Abnormal Gains (excluding Equivalent Production and Inter process). Preparation of cost sheets (Simple problem only)

Text Books:

1. R.S.N. Pillai and V. Baghavathi, CostAccounting, S. Chand & Company Ltd., 2010

Reference Books:

1. S.N .Maheshwari, Cost Accounting, Sultan Chand & Sons, 2015
2. S.P. Jain and K.L. Narang, Cost Accounting Principles and Practice, Kalyani Publishers, 2019
3. M.N. Arora, Cost Accounting, Vikas Publication, 2013
4. Dr. Ramachandran and Dr. Srinivasan, Cost Accounting, Sriram Publication, 2019

Note: Question Paper shall cover 40% Theory and 60% Problems

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the concept of cost accounting, Recognize the relationship of cost and management accounting along with the elements of cost concepts.	K2
CO2	describe the cost sheets for store control through economic order quantity, pricing and material issues.	K5
CO3	describe the methods of Remuneration and Incentive Schemes to labours	K5
CO4	understand the Collection, Classification, Allocation, Apportionment and Absorption of overheads.	K2
CO5	apply the process costing and preparation of cost sheet	K3

K2 - Understand; K3 - Apply; K5 - Evaluate;

Mapping of COs with POs& PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	M	M	M	S	S	S
CO2	M	S	S	S	M	S	M	M	M	M
CO3	S	M	M	M	M	S	S	S	M	S
CO4	M	M	M	M	M	M	M	M	M	M
CO5	M	S	S	M	M	M	M	S	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSECODE	U21BAE32	TALENT AND KNOWLEDGE MANAGEMENT	L	T	P	C
ELECTIVE			4	-	-	3
Cognitive Level		K2-Understand; K3-Apply; K4-Analyse K5-Evaluate;				
Course Objectives		The Course aims to 1. offer knowledge on various approaches to talent and knowledge management 2. understand institutional strategies and models for dealing with talent and knowledge management. 3. evaluate mechanism and systems knowledge infrastructure. 4. apply organizational performance knowledge discovery systems				

UNIT –1 : INTRODUCTION TO TALENT MANAGEMENT :

Talent Management – Meaning, Importance, Evolution, Talent Management System, Talent Reservoir – Components . Institutional Strategies for dealing with Talent Management.

UNIT –2 : SUCCESSION AND CAREER PLANNING :

Succession Planning, Talent Acquisition, Talent Identification, Talent Development, Training Coaching, Talent management Strategies. Role of leaders in Talent Management.

UNIT – 3 : KNOWLEDGE MANAGEMENT :

Concepts, Forces driving knowledge management, knowledge systems, knowledge strategies, technologies for knowledge management, factories influencing knowledge management

UNIT –4: NATURE OF KNOWLEDGE :

Data information knowledge Wisdom, use of knowledge, types of knowledge, knowledge management solutions , mechanism and systems knowledge infrastructure.

UNIT – 5 : KNOWLEDGE FRAME MANAGEMENT :

Knowledge management frame Handsnon – earl's sever schools of knowledge management. Alvesson & Karreman's knowledge management approaches, knowledge management approaches. Knowledge management infrastructure organizational. Impact of knowledge management on people process, products on organizational performance knowledge discovery systems.

SUGGESTED BOOKS :

1. Ed by Lance A. Berger and Dorothy R Berger. ‐The Talent Management Handbook‖, Tata McGraw Hill edition, 2011.
2. Sajjad M Jasmuddin, ‐Knowledge Management‖,Cambridge,1st ed, 2009
3. Stuart Barnes, ―Knowledge Management Systems‖, Ed, Cengage Learning, 2012.
4. Irma Becerra-Fernandez, Avelino Gonzalez and Rajiv Sabherwal ―Knowledge Management‖, Pearson Education Inc. 2009
5. Donald Hislop, ―Knowledge management in Organizations‖, , Oxford University Press, Second edition. 2010.

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level(According to Bloom's Taxonomy)
CO1	understand the concept Branding & Brand Awareness, Equity	K2
CO2	help the students acquire knowledge on Brand Advertisement	K5
CO3	know pros and cons of brand extension	K5
CO4	Analyse Brand personality and equity	K4
CO5	Develop the critical and analytical skills of students in brand	K3

K2-Understand; K3 -Apply; K4: Analyse K5 -Evaluate;

Mapping of Cos with Pos & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	M	M	S	S	S
CO2	M	S	S	S	S	S	M	S	S	S
CO3	S	M	M	S	M	S	S	S	M	S
CO4	M	S	S	S	S	M	S	M	S	M
CO5	S	S	S	M	M	S	M	S	S	M

Strongly Correlating (S)	-	3marks
Moderately Correlating (M)	-	2marks
Weakly Correlating(W)	-	1mark
No Correlation (N)	-	0mark

IV SEMESTER

COURSE CODE	U21BAT41	RESEARCH METHODOLOGY	L	T	P	C
CORE -VI			4	-	-	4
Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyse**					
Course Objectives	The course aims to 1. educate the students about the basic researchmethodologies, design and applications. 2. make them identify and prepare a research proposal or problems through review of the literature. 3. familiarize students in the area of sampling, data collection and application of statistical tools in business research. 4. cultivate the skills needed to prepare and present research reports.					

Unit 1:Introduction to Research

Introduction to Research: Definition - Importance - Advantages and Limitations – Types: Basic and Applied, exploratory, descriptive and causal - Phases of business research - The research process – problem identification

Unit 2:Research Design

Research Design: Types of Design - Sampling process and selection - sample types –Sample size and sampling errors

Unit 3:Methods of Data Collection

Methods of Data Collection :methods - tools - Questionnaire – Interview Schedule - Kinds of Data –Primary data, Secondary data - Attitude measurement of scaling technique - Editing, Coding, Tabulation, Analysis Interpretation of data

Unit 4:Statistical Data Analysis

Statistical Data Analysis: Tools and Techniques of data analysis – Hypothesis – its sources –formulation and testing of Hypothesis

Unit 5:Interpretation and Report writing

Interpretation and Report writing: Drafting of reports – Contents of a report - steps in writing reports - layout of report, types, and principles of report writing – Graphical representation ofresults.

Text Books

1. C.R. Kothari, Research Methodology, New Age International Publishers, 2014

Reference Books:

1. R. Cauvery, Research Methodology, S. Chand& Co, 2013
2. Shraddha M. Bhome, Research Methodology, Himalaya Publishing House, 2015
3. Peer Mohamed, Research Methodology -, Pass Publications, 2011.
4. Dr. P. C. Tripathi, Research Methodology in Social Sciences, S. Chand& Co, 2012

Note: Question Paper shall cover 80% Theory and 20 % Problems

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Understand the fundamental concepts of research, types and research process.	K2
CO2	summarize the sampling design and scaling techniques.	K2
CO3	construct a method for data collection and able to edit, code, classify and tabulate the collected data.	K3
CO4	analyze the collected data to prove or disprove the hypothesis.	K4
CO5	interpret the data and prepare a research report.	K3

K2 - Understand; K3 - Apply; K4 - Analyze;

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	M	S	M	S	S	M
CO2	M	M	S	M	M	M	M	S	S	M
CO3	S	M	S	M	M	M	M	S	S	M
CO4	S	M	S	M	M	M	M	S	S	M
CO5	S	S	S	S	M	M	M	S	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAT42	PERSONALITY DEVELOPMENT	L	T	P	C
CORE -VII			4	-	-	4
Cognitive Level	**K2: Understand** **K3: Apply** **K5: Evaluate** **K6: Create**					
Course Objectives	The Course aims to 1. encourage students to develop balanced self-determined behaviour 2. help students in enhancing self, increasing life satisfaction and improving the relationship with others. 3. develop problem-solving skills in a group and use these skills in personal life. 4. encourage students to develop their personality by understanding the influence of environmental, educational and situational factors and how to modify the behaviour					

Unit 1: Introduction Definition of Personality – Determinants of personality – biological, psychological and socio- cultural factors– Misconceptions and clarifications, need for personality development.

Unit2: Self Awareness and Self Motivation

Self- analysis through SWOT and Johari Window, elements of motivation – Seven rules of motivation – Techniques and strategies for self-motivation–goal setting based on principles of SMART –self-esteem.

Unit 3: Interpersonal Skills

Concept of team in work situation–promotion of team spirit–characteristics of team player – awareness of one's own leadership style and performance – nurturing leadership qualities– Emotional intelligence and its components –Empathy and social skills .

Unit 4: Memory and Study Skills

Definition and Importance of memory – causes of forgetting –how to forget? (Thought stopping), how to remember? (Techniques for improving Memory) – Techniques of passing Exams – Management of Examination fear.

Unit 5: Power of Positive Thinking

Nurturing creativity–decision making and problem solving– thinking power–seven steps for dealing with doubt –Traits of positive thinkers and high achievers, goals and techniques for positive thinking– enhancement of concentration through positive thinking–practicing positive lifestyle.

Note: Question Paper shall cover 100 % theory

Text Books:

1. Schafer, W, Stress Management for Wellness , Thomson & Wadswoth, 2011.

Reference Books:

2. Johnson, D.W., Boston, Reaching out - Interpersonal Effectiveness and Self Actualization, Allyn and Bacon, 2010.
3. Robbins, S. P. and Hunsaker, Phillip, L., Training in Interpersonal skills. Tips for managing people at work, PHI Learning, 2014.
4. Barun K .Mithra, Personality Development and Soft Skills, Oxford University Press, 2016

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the determinants of personality	K2
CO2	apply the basic Theories of Motivation	K3
CO3	understand the Career Planning	K2
CO4	evaluate the memory skills	K5
CO5	create a positive thinking	K6

K2 - Understand; K3 - Apply; K5 - Evaluate; K6 – Create

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	S	M	S	S	S
CO2	M	M	M	S	S	S	S	S	S	M
CO3	M	M	S	S	M	S	M	M	M	S
CO4	M	M	S	S	M	M	S	S	S	M
CO5	S	M	S	M	M	S	S	M	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21BAA44	GST REGISTRATION AND FILING (PRACTICAL)	L	T	P	C
ALLIED -IV			-	-	4	4
Cognitive Level	**K2: Understand** **K3: Apply** **K5: Evaluate**					
Course Objectives	The Course aims to 1. provide students with a working knowledge of principles of GST 2. assist the students to understand the provisions of GST 3. make the students understand the relevance of GST in the present Indian Tax Scenario 4. educate the students to aware of the contribution of GST for economic development.					

Unit 1: Indirect Tax

Indirect Tax :Meaning, Features, difference between direct & Indirect Tax Types of indirect tax before GST, Shortcoming of Indirect Tax system during pre GST Era. **GST:** Meaning, advantages, disadvantages, Evolution of GST, Structure of GST: CGST/IGST/SGST/UTGST, Important definition under GST Act. **Machinery under GST:** GST council, GST network, GST Authority.

Unit 2: Concept of Supply

Concept of Supply: Meaning, Features, Types:, Inter -state, intra- state, mixed composite, exempt supply. **Time of supply (TOS)**: Meaning, TOS of Goods & Services, TOS under Reverse Charge Mechanism, Invoicing provisions, provisions related with changes in GST rate. **Place of Supply (POS):** Meaning, POS of goods & service, intra state & Inter State supply. **Value of Supply:** Meaning, provisions related with determination of value of supply of goods & services, determination of GST liability.

Unit 3: Input Tax credit (ITC):

Input Tax credit (ITC):Meaning**,** manner of utilization of ITC, Block credit, supply not eligible for ITC, Matching, reversal & Reclaim of ITC. **Payment under GST:** Manner of Payment of GST liability, concept of Electronic Cash, credit & liability ledger, refund of excess GST. **Return:** Meaning, purpose & Importance, different type of return, due date of filing return. **Assessment under GST:** Meaning, types-self assessment, provisional assessment, summary assessment, best judgment assessment.

Unit 4: Registration

Registration :Meaning, optional registration, compulsory registration, procedure for new registration, amendment & cancellation of registration. **Composition Scheme:** condition and restriction for composition scheme.

Unit 5: Accounts & Records

Accounts &Records :Manner of maintenance of accounts, period of retention of relevant records,
Invoice: format, types- debit & credit note, vouchers.
Audit: meaning, types-mandatory, departmental & special audit. Penalty under GST, E-way bill.

List of Exercises

1. Draw a chart showing tax structure in India.
2. Draw a chart and write a note on Pre – GST indirect tax structure in India.
3. Write any five limitations of Pre – GST Indirect taxes.
4. What was the significance of Introduction of VAT in Indirect Taxes prior to implementation of GST. Write a short note.
5. Need for GST in India.
6. What are the important stages in implementation of GST.
7. What were the taxes subsumed in GST.
8. Visit CBIC Website and make a note of important contents.
9. What is the major difference in incidence of tax during pre and post GST implementation with respect to inter- state transfer. Explain with example.
10. What are the exclusive products not included in the purview of GST. Why?
11. When GST council was notified and what is its composition.
12. What are different types of taxes levied under GST.
13. What are the laws supporting the levy of GST. Explain with examples or rules.
14. What is RNR?
15. What are the categories of Goods and Services for levying GST?
16. Briefly explain the important components of Supply.
17. What activities are included in supply?
18. Brief registration process of GST.
19. Ram Enterprises purchased goods from Shyam Enterprises. The goods were supplied on15/01/2018.Ram Enterprises paid an advance of Rs.1,00,000 for purchases on 10/01/2018. The invoice was raised on 30/01/2018. Explain with respect to supply.
20. Mr. Y was travelling from Hyderabad to Bengaluru on flight. During his journey he purchased some books. Determine the incidence of tax. Identify place of supply.
21. What is Composite supply and Mixed Supply. What is the rate of tax applied?
22. Write short note on the process of GST.
23. What are the types a dealer can opt at registration?
24. What is the threshold limit for composite dealers & Registered dealers.
25. List out five examples of B2C transactions.
26. Draw a specimen of Invoice, Tax Invoice and Bill of Supply.
27. What is Supplementary invoice.
28. What is the eligibility for availing Input Tax Credit?
29. With the help of diagram show Input Credit Mechanism.
30. List out masters to be created to effect GST initially.

31. Draw a table giving details of GST R-1, GST R-2, GSTR-3.

32. Write the steps for filing GSTR-1, GSTR-2, GSTR-3.

33. Who files GSTR-6A?

34. What type of GST Returns, e-commerce operators need to file.

35. What is Reverse Charge Mechanism?

36. What are the activities specified as Negative List according to Schedule-III?

37. Mr. Ankur purchased goods for Rs. 8,00,000 and paid tax @ 5% from a dealer in same locality. He sold Rs. 4,00,000 worth goods to Raj and collected tax from him. Record the following transaction with the help of accounting Software.

38. Mahesh Enterprises of Hyderabad purchased goods from Ashish Enterprises of Chennai, he paid GST @ 28%. Record the transaction in Accounting software.

39. Create 3 stock items named milk, bread and Ice creams. Opening balances of these 3 stock items would be milk –10 litres, Bread– 20 Pkts and Ice creams– 25 numbers. Create 1 sundry debtor and 1 sundry creditor within state. Record a purchase entry of 5 liters of milk at 5% GST rate for Rs. 80 per liter, 10 Pkts of Bread for Rs. 25 per pkt at 5% GST rate and 30 numbers of Ice creams for Rs. 30 per Ice cream at 18% GST rate. A sale entry 10 liter of milk Rs.90 per liter, 15 Pkts of Bread for Rs.40 per pkt and 35 numbers of Ice creams for Rs.50 per Ice cream.

40. What is the value in GST invoices when Rs. 10000 worth of goods are purchased, GST tax rate @ 5%. In second invoice two purchases of Rs 5000 worth goods GST rate @ 5% and another Rs 5000 GST @ 18%. Both the transactions are intra state and show the GST Tax ledger.

41. Mr. A sold goods to Mr. B for Rs .20,000. Mr. A is charging packing charges of Rs. 800. And also paying freight of Rs. 2800 from Mr. A's premises to Mr. B's premises. Mr. A also charged interest of Rs. 750 for delay in payment. Determine the taxable value for levy of GST. Whether packing charges or freight, Interstate required to include in the invoice to determine taxable value? Show Tax Invoice GST @ 12% (intrastate supply).

42. Mr. X sold 1000 units of goods to Mr. Y for Rs. 20,000 and total unit sold during the year to Mr. Y after including these units is 2500 unit. As per terms of the agreement if Mr. Y is purchasing more than 2000 unit of goods in a year then Mr. X is allowing 10% discount in all the supplies. Assuming IGST rate is 18%. How discount will be recorded?

43. Create 5 stock items with GST@ zero tax rate, @ 5%, @ 12%, @ 18%, record interstate purchase and sale transactions. Show the details of input tax credit.

44. What are the conditions for E-Way bill? What are the options available in Tally.

45. Mr. Ajay (Hyderabad) provides consultancy services to Mr. Vijay (unregistered, address on record shows Tamil Nadu) and charged Rs.10000, levied GST @ 18%. Even provided consultancy services to Mr. Anand (unregistered and address is not available) Rs. 15000, GST @ 12%. Show the transactions in Tally.

46. Mrs. Rani, resident of Hyderabad has a Bank account and withdraws money from ATM in Hyderabad. She went on tour and withdrawn Rs50000 from ATM in Kerala. Identify place of service, type of taxes levied in both the cases.

47. M/s. Pooja sold 250 laptops to M/s. Raj for Rs. 50,000 each. Tax Invoice was raised. They were given discount of Rs.5000. M/s. Raj returned 250 laptops. Assuming GST rate is 18%. Show discount and GST ledger.

Text Book

1. M.S. Mathuria, GST Law and Practice Manual, Current Law House, 2020

References:

1. Bansal, K.M; GST and Custom's Law, TAXMANN Publication(P)Ltd, University Edition, 2021
2. Chaudhary, Vashishtha ;Dalmia, Ashu; Girdharwal, ―GST- A Practical Approach‖, Taxman Publication, 2017
3. Datey V.S., ―GST Ready Reckoner‖, Taxman Publication, New Delhi, 2010
4. Jha R. K. & Singh, P. K. –A Bird's Eye view of GST‖, Asia Law House, 2017
5. Majumder, Sumit Dutt –GST in India‖ 2nd edn. Centex Publications Pvt. Ltd, 2016

Note: Question Paper shall cover 100% Practical

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the basic concepts of GST	K2
CO2	apply GST rates in various transactions	K3
CO3	calculate GST calculations in accounting software Tally	K5
CO4	evaluate of Tax in put credit available to goods	K5
CO5	apply the practical knowledge dealings if interstate transactions of GST	K2

K2 - Understand; K3 - Apply; K5 - Evaluate;

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	M	S	M	M	S	S
CO2	M	S	S	S	S	M	S	S	S	M
CO3	M	S	S	S	S	S	S	M	S	M
CO4	M	S	S	S	S	S	S	M	S	M
CO5	M	S	S	S	S	S	S	M	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAE41	MANAGEMENT INFORMATION SYSTEM	L	T	P	C
ELECTIVE-II			3	-	-	3
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K4: Analyse**					
Course Objectives	The Course aims to 1. enable the students to gain an understanding of how Information Systems are developed, implemented and assisted in decision making in an organization. 2. familiarize the students with the four components of an MIS and understand how it adds value to an organization. 3. design a system for an organization and identify privacy, security, and freedomof information issues in a business environment.					

Unit 1:Management Information System

Definition - Meaning and objectives of MIS - Framework for MIS organization - Management triangle - Limitations.

Unit 2:Information Systems

Functional Areas – Marketing, Production, Finance, Personnel Management – Information System Levels – DSS, EIS, ES – Comparison, Managing Global Information System.

Unit 3:Application of Internet

Email – Search Engines – Business decision making using Online.

Unit 4:Computers and its effect on MIS

System Analysis and Design - Components of SAD - System Development Life Cycle (SDLC).

Unit 5:Business and Management Application Packages

Research Analysis Packages – SPSS etc. – Accounting Packages – Tally etc. – Marketing Packages – Production Packages – HR Packages

Note: Question Paper shall cover 100 % theory

Text Book:

1. Gorden B. Davis, Management Information System: Conceptual Foundation, Structure and Development – McGraw Hill.

Reference Books:

1. W.S. Jawadekar, Management Information System -, Tata McGraw Hill Publishing Company, 2013.

2. Kenneth C Laudon Management Information System, Tata McGraw Hill Publication, 2012.
3. Sadagopan. S, Management Information System -, Routledge Publication, 2014

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	apply modern tools, techniques and technology functionally and productively in Professional Activities	K3
CO2	analyze, Design, Construct, Implement and Maintain, Usable, Reliable and Cost-Effective Information Systems (IS) that support Operational, Managerial and Strategic activities of Organizations.	K4
CO3	Study and evaluate existing manual and automated business processes and identify opportunities for re-engineering and/or automation.	K3
CO4	Coordinate confidently and competently with the user community in IS requirements analysis/design activities, provide guidance and technical support to end-user computing activities.	K1
CO5	analyze the impact of computing on individuals, organizations and society with Business and Management Application Packages	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	S	S	S	S	S	S	S	S
CO2	S	M	S	S	S	S	M	S	S	M
CO3	S	M	S	M	S	S	S	S	M	M
CO4	S	M	S	S	S	S	S	S	S	M
CO5	S	M	S	S	M	S	S	M	S	S

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAE42	BRAND MANAGMENT	L	T	P	C
ELECTIVE - II			4	-	-	3
Cognitive Level		K2-Understand; K3-Apply; K5-Evaluate;				
Course Objectives		The Course aims to 1. understand the concept Branding & Brand Awareness, Equity 2. help the students acquire knowledge on Brand Advertisement 3. know pros and cons of brand extension 4. develop the critical and analytical skills of students in analyzing the brand personality & equity				

UNIT -1 : INTRODUCTION TO BRAND MANAGEMENT :

Concept of Branding – Definition – Significance of Brand - Brand Types – Difference between Brand and Product – Braking – Brand Building – Brand Launching.

UNIT -2 : BRAND AWARENESS :

Branding and Advertisement – Creating Brand Awareness – AIDA Model – Branding Strategies – Brand Communication.

UNIT - 3 : BRAND EXTENSION :

Brand Line Extension – Horizontal Extension Pros and Cons of Brand Extension – Related Extension – Unrelated Extension – Brand Generic Branding.

UNIT - 4 :BRAND PERSONALITY :

Branding – Brand Personality – Brand Positioning – Re Positioning – Brand Positioning Strategies – Brand Positioning Variables.

UNIT -5 : BRAND EQUITY :

Concept of Brand Equity – Brand Awareness – Personality – Positioning – Enhancing Brand Equity – Brand Management – Planning – Sources Brand.

SUGGESTED BOOKS :

1. Gulnar sharma, Karan Singh Khundia,Brand Management, Himalaya Publishing House, 2011.
2. Kirti Dutta, Brand Management: Principles and Practices, Oxford University Press, 2012.
3. YLR Moorthi, Brand Management: The Indian Context, Vikas Publishing House, 2007.

4. Tapan K. Panda, Product and Brand Management, Oxford University Press, 2016.
5. Michael Beverland, Brand Management, University of Sussex, 2014.

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level(According to Bloom's Taxonomy)
CO1	understand the concept Branding & Brand Awareness, Equity	K2
CO2	help the students acquire knowledge on Brand Advertisement	K5
CO3	know pros and cons of brand extension	K5
CO4	analyse Brand personality and equity	K2
CO5	Develop the critical and analytical skills of students in brand	K3

K2-Understand;K3 -Apply; K5 -Evaluate;

Mapping of Cos with Pos & PSOs

CO /PO	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	M	S	M	S	S	S	S
CO2	M	S	S	S	M	S	M	M	S	M
CO3	S	M	S	S	S	S	S	S	S	S
CO4	M	S	M	S	M	M	S	M	S	M
CO5	S	S	S	M	S	M	S	S	M	S

Strongly Correlating (S) - 3marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1mark
No Correlation (N) - 0 mark

SEMESTER-V

COURSE CODE	U21BAT51	PRODUCTION MANAGEMENT	L	T	P	C
CORE -VIII			5	-	-	4

Cognitive Level	K1 - Remember K2 - Understand K4 - Analyze K5 - Evaluate
Course Objectives	The Course aims to 1. make the students understand the production function, process and plant design, planning functions, Material Planning and Layout and Scheduling. 2. enable students to choose appropriate statistical techniques for improving processes and write reports to management describing processes and recommending ways to improve them. 3. familiarize students with the design, planning and control of an organization's processes to create and deliver products & services to customers and improving process & supply chain performance

Unit 1:Production System

Production System: Introduction - Production – Productivity – Production Management– Objectives – Functions - Scope and Significance – Functions- Production System

Unit 2:Production planning and Control

Production planning and Control – Techniques - Principles - Maintenance - Types - Materials Handling - Importance - Principles - Criteria for selection of material handling equipment's - Breakdown - Preventive - Routine – Maintenance scheduling

Unit 3:Plant location

Plant location – Introduction need for selecting a suitable location – Plant location problems – Advantages of urban, semi-urban and rural locations – Systems view locations – Factors Influencing plant location – Plant layout: Plant layout problems – Objectives – Principles of plant layout – Factors influencing layout – Types of layout.

Unit 4:Work and method of study

Work and method of study – Importance of work study – Work study procedures – Time Study – Introduction to method study – Objectives of Method study – Steps involved – Work Measurement – Objectives – Techniques – Computation of Standard Time – Allowance – Comparison of various Techniques

Unit 5:Quality control

Quality control – Statistical Quality control – Inspection - Objectives and Significance - Types of Inspection - Centralized and Decentralized - Bench marking: Meaning - objectives – advantages

Text Book

1. K. Aswathappa, Production and Operations Management, Himalaya Publishing House, New Delhi, 2013

Reference Books:

1. Pannerselvam, Production and Operations Management, Prentice Hall India, 2012
2. Jay Heizer, Operations Management, Pearson Education, 2017
3. Goel, Production and Operation Management, Pragati Publication, 2012
4. Banga.T.R, Industrial Engineering and Management Science, Khanna Publishers, New Delhi, 2007.

Note: Question Paper shall cover 100 % theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the production system	K2
CO2	enumerate the production processes and production planning and control	K5
CO3	describe the plant layout system	K2
CO4	outline management issues in work and method study	K1
CO5	discuss the quality control, Total Quality Management, Bench marking	K4

K1 - Remember; K2 - Understand; K4 - Analyze; K5 - Evaluate

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	S	M	M	M	M	M
CO2	M	M	M	M	M	M	M	S	S	M
CO3	M	M	M	S	M	M	S	M	M	M
CO4	S	M	S	M	M	M	M	M	M	M
CO5	M	M	M	M	M	S	S	S	M	M

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (H) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	U21BAT52	MANAGEMENT ACCOUNTING	L	T	P	C
CORE -IX			5	-	-	4
Cognitive Level		K2 - Understand; K3 - Apply; K5 - Evaluate;				
Course Objectives		The Course aims to 1. familiarize the students with the accounting statement analysis. 2. help the students acquire knowledge on ratio analysis by using accounting data and other related information for decisionmaking, planning and control 3. acquaint students with the budgetary preparation and cashflow and fund flow for business planning. 4. develop the critical and analytical skills of students in analyzing the product, project, divisional and organizational performance by using managerial accounting information				

Unit 1:Management Accounting

Management Accounting – Definition – Objectives – Nature and Scope – Merits and Limitations– Functions – Management Accounting Vs Financial Accounting Vs Cost Accounting.

Unit 2:Ratio Analysis

Ratio Analysis – Interpretation, Benefits, Limitations, Classification of ratios – Liquidity, Profitability and Solvency ratios – Construction of Balance sheet (simple problems).

Unit 3:Fund Flow Statement

Fund Flow Statement – Cash Flow Analysis – Uses and Construction – Distinction.

Unit 4:Budget and Budgetary Control

Budget and Budgetary Control – Meaning, Objectives - Characteristics and Limitations –Types of Budgets - Preparation of Sales, Production, Raw material Cost, Cash, Master Budgets and Flexible Budgets.

Unit 5:Marginal Costing

Marginal Costing – Objectives and Limitations – Cost Volume Profit (CVP) Analysis –Break Even Analysis– Merits and Demerits – Margin of Safety.

Text Books

1. S.N. Maheswari, Management Accounting, Sultan Chand &Sons, 2015

Reference:

1. R.S.N.Pillai&Bhagavathi, Management Accounting, S. Chand & Sons, 2010
2. Dr.V.R.Palanivelu, Accounting for management, USP Publishers, 2012
3. N.P.Srinivasan, Management Accounting, S.Chand& Sons, 2011
4. Dr.K.L.Gupta, Management Accounting, SahithyaBhawan Publications, 2019
5. Dr. Ramachandran&Dr.Srinivasan, Management Accounting, Sriram Publications, 2020.

Note: Question Paper shall cover 20 % theory and 80 % problems

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the concept of management accounting	K2
CO2	measure the financial statements by using various financial ratios.	K5
CO3	produce various types of budgets	K3
CO4	simplify the fund flow and cash flow statements by calculating funds and cash from operations	K5
CO5	understand the marginal costing for cost volume profit	K2

K2 - Understand; K3 - Apply; K5 - Evaluate;

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	S	S	S	M	M	S	M
CO2	M	M	M	S	M	S	M	S	M	S
CO3	M	S	S	M	S	M	S	M	M	S
CO4	S	S	M	M	M	M	S	S	M	S
CO5	S	S	S	M	M	S	S	S	M	M

Strongly Correlating (S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (H) - 1 mark

No Correlation (N) - 0mark

COURSE CODE	U21BAT53	MARKETING MANAGEMENT	L	T	P	C
CORE -X			5	-	-	4
Cognitive Level		K1 - Remember; K2 - Understand; K3 - Apply;				
Course Objectives		The course aims to 1. familiarize the student with the concept in marketing and make their design and implement the best combination of marketing actions to carry out a firm's strategy in its target markets. 2. develop the skills in market analysis and design customer-driven strategies concerning the product, pricing, and promotion 3. inculcate the students' skills in applying the analytic perspectives, decision tools, and concepts of marketing. 4. enable to make decisions involving segmentation, targeting and positioning; product offering; pricing; distribution channels and marketing communications.				

Unit 1:Definition

Definition of Marketing: Marketing concepts – Meaning, Objectives – Importance – Distinction between marketing and selling – Types of market – Functions – Marketing management - Marketing Environment: Various factors affecting the marketing function

Unit 2:Market Segmentation

Market Segmentation - bases - Marketing strategy –Consumer Behavior-Factors influencing consumer behavior

Unit 3:The Product

The Product – Nature – Types – consumer goods – Industrial goods – New product development – Product life cycle (PLC) and strategies – Product mix – modification & Elimination – Packaging – Brand Image – Brand Identity – Brand positioning and leveraging the brands – Brand Equity

Unit 4:Pricing

Pricing: Pricing – Meaning – Influencing factors – Objectives – Pricing methods – Kinds of price determination – Procedure for price determination - Competitors action to price changes– multi product pricing

Unit 5:Place and Promotion

Place and Promotion: Definition and Types of Channel–Channel selection and problem–Levels of channels - Personal selling –Process - Advertising – Objectives – Types – Sales promotion– Objectives–Sales promotion methods, publicity and public relations.

Text Book

1. Philip Kotler, Marketing Management-, Prentice Hall of India Pvt. Ltd, 2011

Reference:

1. Rajan Nair, Marketing Management, S. Chand& Sons, 2016
2. M. Ramasamy & Namakumari, Marketing Management, McGraw Hill Education, 2017
3. Dr. Amit Rao and Dr. B. Jegadish Rao, Marketing Management, Sahotya Bhawan Publication, 2019.
4. R. S.N. Pillai and Bhagavathi, Marketing Management, S. Chand& Sons, 2012
5. Kathiresan and Radha, Marketing Management, Prasana Publishers, 2013

Note: Question Paper shall cover 100 % theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	recognize the significance of marketing and its role in economic development	K1
CO2	recognize how market strategy works, market segmentation and product mix have an impact on buying behaviour	K2
CO3	understand Product life cycle (PLC) and strategies	K3
CO4	apply marketing concepts, pricing for the development of marketing function.	K3
CO5	demonstrate the critical thinking skills and analyze the distribution channels	K3

K1 - Remember; K2 - Understand; K3 – Apply

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	M	S	M	M
CO2	S	M	M	S	M	S	S	M	M	M
CO3	S	S	M	S	S	M	S	M	M	M
CO4	S	S	S	M	M	M	S	S	S	S
CO5	M	M	S	S	M	M	S	M	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (H)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAT54	HUMAN RESOURCE MANAGEMENT	L	T	P	C
CORE -XI			5	-	-	4
Cognitive Level		K2 - Understand; K3 - Apply; K4 - Analyze;				
Course Objectives		The Course aims to 1. equip students with knowledge, skill and competencies to manage people in the organization 2. familiarize the students with the HRM practices, HR planning, Training Activities, Compensation and reward planning, Performance Appraisal system in an organization. 3. provide an insight into the importance of motivation, counselling to create a stress-free environment				

Unit 1:Human Resource

Human Resource - Definition – Characteristics and Objectives – Scope - Functions – Role of HR manager – Functions of Personnel Management–Personnel principles and policies – Managerial and Operative Functions.

Unit 2:HR Planning

HR Planning –meaning, nature and importance –Steps in HR Planning process– Job Analysis, Job Description and Job Specification - Recruitment and Selection – Factors affecting Recruitments, Sources of Recruitment – Definition and Importance of Selection, Stages involved in Selection Process .

Unit 3:Placement of Personnel and Induction

Placement of Personnel and Induction, Training and Development – Objectives – Training methods – Promotion - Transfer - Types - Demotions, Separation. Performance Appraisal: Meaning - Importance - Methods –360 degree appraisal.

Unit 4:Wage and Salary Administration

Wage and Salary Administration: Concept and structure Different methods of wage payments – factors principles, Compensation plan, individuals.

Unit 5:Meaning and Sources of Employee Grievance

Meaning and Sources of Employee Grievance – Grievance Handling Systems – Meaning & Process of Collective Bargaining.

Text Books

1. C.B.Gupta, Human Resource Management, Sultan Chand & Sons, 2014.

Reference Books:

1. S.S. Khanka, Human Resource Management, S. Chand Publication, 2015
2. P.S. Subborao, Human Resource Management, Himalaya Publishing House, 2011
3. K.Aswathappa, Human Resource Management, McGraw Hill Publication, 2017.
4. L.M. Prasad, Human Resource Management, Sultan Chand & Sons, 2014.
5. C.B. Gupta, Human Resource Management, Sultan Chand & Sons, 2014.

Note: Question Paper shall cover 100% Theory

Expected Course Outcomes:

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

Number	**Course outcome**	**Knowledge Level (According to Bloom's Taxonomy)**
CO1	analyze the process of Job and its importance as a foundation of human resource management practice.	K3
CO2	anderstand the Human resource planning	K4
CO3	apply the policies and practice of the primary areas of human resource management, including staffing, training and compensation.	K3
CO4	understand the wage and salary administration	K4
CO5	understand the employee grievance handling system	K2

K2 - Understand; K3 - Apply; K4 - Analyze

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	M	S	M	M	M	M
CO2	M	M	S	M	M	M	M	M	M	S
CO3	S	S	M	S	S	S	S	M	M	M
CO4	M	M	S	S	M	S	M	M	S	M
CO5	M	M	M	S	M	S	S	M	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (H)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAT55	BUSINESS LAW	L	T	P	C
CORE -XII			5	-	-	4
Cognitive Level		K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;				
Course Objectives		The course aims to 1. impart in-depth knowledge of the Law of contracts which forms, the foundation of all day to day obligations in the business world. 2. instil in the students an awareness of legal framework in the sale of goods, consumer protection to understand the applications of these laws to practical commercial situations. 3. acquaint the students with the alternative forms of business organization available in the country as per partnership and new companies Act.				

Unit 1:Indian contract act 1872

Indian contract act 1872: Law of Contract – Definition, Classification – Essentials of a Contract– Types of contract - Agreements

Unit 2:Consideration

Consideration – Legal rules as to Consideration – Contract without consideration - Consent- Coercion - undue influence – misrepresentation - fraud - mistake of law and mistake of fact. Legality of Object – Unlawful and illegal agreements – Effects of illegality – Wagering Agreements.

Unit 3:Law of Agency

Law of Agency–Mode of creation – Agency by Ratification – Sub-Agent and Substituted Agent - Termination of Agency, Negotiable Instrument Act 1881; Parties to a Negotiable instrument – material alteration

Unit 4:Sale of Goods Act 1930

Sale of Goods Act 1930: Definition – Formation of contract of sale –Essentials: Duties of Buyers and Sellers; Sale and agreement to sell

Unit 5:Partnership

Partnership – Definition - Essentials - Rights, duties and Liabilities of partners -Types ofPartnership, Companies Act 1956; Definition of a Company, Characteristics, Kinds.

Text Book

1. N.D. Kapoor, Elements of Mercantile Law- S.Chand and company, 2014.

Reference Books:

1. S.P.Sharma, Business Law, International Publishing House Pvt., Ltd., 2012.
2. M.C.Kuchhal and VivekKuchhal, Business Law, S.Chand and company, 2018.
3. P.C.Tulsian& Bharat Tulsian, Business Law, McGraw Hill Education, 2017
4. Pillai&Bhagavathi, Business Law, S. Chand and company, 2011.
5. K.C. Carg and R.C. Chawla, Business Law, Kalyani Publishers, 2013.

Note: Question Paper shall cover 100 % theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	Develop an understanding of business law in the global context	K1
CO2	Know the relevant legal terms of the contract Act	K2
CO3	Construct the relationship of ethics and law in agency	K3
CO4	Apply basic principles of law to the sale of goods	K4
CO5	Understand the rules, and regulations related to partnership and company form of business	K5

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

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	S	S	M	M	S	S
CO2	M	S	S	M	S	M	S	S	M	S
CO3	M	M	S	S	M	S	S	M	M	S
CO4	S	M	M	S	S	M	S	S	M	S
CO5	S	M	S	M	S	S	S	S	M	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (H)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAE51	STRATEGIC MANAGEMENT	L	T	P	C
ELECTIVE -III			3	-	-	3
Cognitive Level		K1 - Remember; K2 - Understand; K3 - Apply; K5 - Evaluate;				
Course Objectives		The course aims to 1. expose students to various perspectives and concepts in the field of Strategic Management 2. enable the students to understand the principles of strategy formulation, implementation and control in organizations. 3. help students develop skills for applying these concepts to the solution of business problems 4. help students master the analytical tools of strategic management				

Unit1:Strategic Management

Strategic Management: Concepts- Difference between strategy and tactics-Three levels of strategy, Strategic Management Process- Benefits, TQM and strategic management process, Social responsibility, Social audit.

Unit 2: Strategic Formulation

Strategic Formulation: Corporate Mission: Need –Formulation, Course Objectives Classification-Guidelines, Goals: Features- Types, Environmental Scanning- Need- Approaches- SWOT analysis-ETOP-Value chain analysis.

Unit 3: Choice of strategy

Choice of strategy: BCG matrix-The GE nine cell planning grid- Corporate level generic strategies: Stability, Expansion, Retrenchment, Combination strategies.

Unit 4: Strategic Implementation

Strategic Implementation: Role of top management-Process- Approaches, Resource allocation-Factors -Approaches, Mckinsey's 7's framework, Strategic Positioning- Four routes to competitive advantage.

Unit 5: Strategic Evaluation

Strategic Evaluation: Importance- Criteria- Quantitative and Qualitative factors, Strategic control: Process-Criteria-Types, Essential features of effective evaluation and control systems.

Text Book:

1. Strategic Management - Vijaya Kumar P, Cengage learning, New Delhi,2010

Reference Books:

1. Strategic Management - John A Pearce II, Amita Mital, TMH, New Delhi, 2012.
2. Cases Studies in Strategic Management - Sanjay Mohapatra, Pearson, New Delhi, 2012
3. Strategic Management – Adrian Haberberg& Alison, Oxford University Press, New Delhi, 2010
4. Strategic Management and Business Policy – Appa Rao, Parvatheshwar Rao, Shiva Rama Krishna, Excel Books, New Delhi, 2012

Note: Question Paper shall cover 100 % theory

Expected Course Outcomes:

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

Number	**Course outcome**	**Knowledge Level (According to Bloom's Taxonomy)**
CO1	synthesize knowledge from other business courses into a comprehensive understanding	K1
CO2	provide a basic understanding of the nature and dynamics of the strategy formulation processes.	K2
CO3	encourage students to think critically and strategically	K3
CO4	develop the ability to identify strategic issues and design appropriate courses of action.	K3
CO5	enable to evaluate the strategies based on the business	K5

K1 - Remember; K2 - Understand; K3 - Apply; K5 - Evaluate

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO 3	P O4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	S	S	S	M	M	S
CO2	M	M	M	S	M	M	S	S	M	M
CO3	M	M	M	S	S	S	M	M	M	S
CO4	S	S	S	M	S	M	S	M	M	M
CO5	S	S	S	M	M	S	M	S	M	S

Strongly Correlating (S) - 3 marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (H) - 1 mark
No Correlation (N) - 0 mark

COURSE CODE	**U21BAE52**	**INTERNATIONAL BUSINESS**	**L**	**T**	**P**	**C**
ELECTIVE - III			**4**	**-**	**-**	**3**
Cognitive Level		K2- Understand; K3-Apply; K4-Analyse K5-Evaluate;				
Course Objectives		The Course aims to 1. teach the students on the International Business 2. create awareness on trade and tariff policies 3. offer knowledge on the economic integration 4. familiarize the students on international trade and business				

UNIT –1 : Introduction To International Business :

Overview of International Business- Definition – Scope and functions – Globalization – Effects and Benefits of Globalization

UNIT –2 : Trade And Tariff Policies

Trade and Tariff Policies – Subsidies, Import Quotas, Export Policies, Policies in the international markets – Anti dumping Policy

UNIT – 3: Regional Economic Integration

Regional Economic Integration - introduction – levels of integration – regional economic integration in Asian region – ASEAN, BRIC, SAARC – Integration for Business

UNIT – 4: Foreign Exchange Determination

Foreign Exchange Determination Systems: Basic concepts – Various types of Exchange rate regimes – factors affecting exchange rates – Indian rupees and other exchange rates

UNIT – 5 : International Institutions

International institutions : UNCTAD – basic principles of UNCTAD – achievements of UNCTAD – International Monetary Fund – Role of IMF , IBRD – features of IBRD – WTO – role of WTO in International business.

SUGGESTED BOOKS :

1. Neeta Vaydande , . –Introduction to International Business ǁ, Sahitya Bhavan, 2019.
2. Sonia Gupta, ―International Businessǁ, McGraw Hill, 2017
3. C B Gupta, –International Businessǁ, S. Chand Publishing, 2014
4. V.K. Bhalla, –International Businessǁ, S. Chand Publishing, 2013
5. Francis Cherunillam, ― International Business – Text and Casesǁ, PHI Publications, 2010

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level(According to Bloom's Taxonomy)
CO1	understand the basic concept International trade	K2
CO2	Study and evaluate the trade and tariff policies	K5
CO3	know the nuances of international trade	K3
CO4	analyze the rolw of international institutions	K4
CO5	develop a strategy for international trade	K5

K2-Understand;K3 -Apply; K4: Analyse K5 -Evaluate;

Mapping of Cos with Pos & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	M	M	S	M	M	S	M	S
CO2	M	S	S	M	S	S	M	S	S	S
CO3	S	M	M	S	M	M	S	S	M	S
CO4	M	M	M	S	S	M	S	M	S	M
CO5	S	S	S	M	M	S	M	S	M	M

Strongly Correlating (S) - 3marks
Moderately Correlating (M) - 2marks
Weakly Correlating (W) - 1mark
No Correlation (N) - 0mark

COURSE CODE	U21BAS53	ENTREPRENEURSHIP DEVELOPMENT (PRACTICALS)	L	T	P	C
SBE–III			-	-	2	2
Cognitive Level		K1 - Remember; K2 - Understand; K4 - Analyze; K5 - Evaluate;				
Course Objectives		The course aims to 1. provide knowledge of entrepreneurship and also provide necessary inputs for the creation of the new ventures. 2. enable them to meet out challenges of starting new ventures and introducing new product and service ideas. 3. familiarize the students with the different stages of project preparation for business. 4. build entrepreneurship development activities undertaken by Indian government. 5. get an idea about factors influencing Women Entrepreneurs.				

Unit 1:Entrepreneurship

Entrepreneurship: Concepts, types and functions of entrepreneurs – Entrepreneurial Development In India – Role of entrepreneurs in economic development.

Unit 2:Business Ideas

Business Ideas: Steps to start a business- Licensing, Registration and local laws- problem and prospectus to start a business. Feasibility analysis of Business Idea.

Unit 3:Developing entrepreneurs

Developing entrepreneurs–Role of DIC, MSME, DST, STARTUPS –activities, services and its functions

Unit 4:Promoting enterprises

Promoting enterprises – SSI – MSME – Role and growth of SSI – Regulations governing SSI – incentives and concessions for SSI units – sickness in SSI – causes and remedies

Unit 5:Women Entrepreneurs

Women Entrepreneurs - Concept of WomenEntrepreneurs – Factors Influencing the Women Entrepreneur – Types of Women Entrepreneur – Problems of Women Entrepreneur – Remedial Measures.

Text Book

1. Gupta,C. B. and Srinivasan N.P, Entrepreneurial Development-., S. Chand and Sons, 2013.

Reference Books:

1. Vasant Desai, Entrepreneurial Development Himalaya Publishing House, 2014
2. Dr. V.R. Palanivelu, Entrepreneurial Development-, Himalaya Publishing House, 2012
3. Saravanavel, P., Entrepreneurship Development- Margham Publication, 2020

Note: Question Paper shall cover 100 % practical

PRACTICALS :

Option I

1. Developing a Business Plan
2. Preparation of Business Proposal
3. Study of various cost involved in Business
4. Preparation of Budget
5. Preparation of Cash flow statement
6. Preparation of Balance sheet
7. Assessing Entrepreneurial Traits of a Successful Women Entrepreneur.

Students can opt any of the below ,not less than 3 activity from each option.

Option: II

1. Hand embroidery – 20 stiches – 10 samples
2. Smocking – 4 types
3. Bead work – 1 sample
4. Sequins work – 1 sample
5. Zardosi work – 1 sample
6. Mirror work - 3 samples

Option: III

1. Stained glass painting – 3 samples
2. Glass painting – 3 samples
3. Oil painting – 3 samples
4. Fabric Painting – 3 samples

5. Tiles painting – 3 samples
6. Pot painting – 3 samples

Option IV

Apparel Dress designing.
Any other skill development followed by small business Plan.

Expected Course Outcomes:

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

Number	**Course outcome**	**Knowledge Level (According to Bloom's Taxonomy)**
CO1	define who is an Entrepreneur and what his or her characteristic features are, what skills made them successful	K1
CO2	foster the students in the areas of entrepreneurial growth and equip them with different entrepreneurial development programmes.	K2
CO3	identify the different institutions that supporting entrepreneurs	K4
CO4	discriminate the benefits Regulations governing SSI	K5
CO5	understand the concepts of Women Entrepreneurs	K2

K1 - Remember; K2 - Understand; K4 - Analyze; K5 - Evaluate

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	S	M	S	M	S	M
CO2	S	S	S	M	M	S	M	S	M	M
CO3	M	M	S	S	M	M	M	M	S	M
CO4	S	S	M	S	M	M	M	S	S	M
CO5	M	S	S	S	M	M	S	S	M	M

Strongly Correlating (S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (H) - 1 mark

No Correlation (N) - 0 mark

SEMESTER-VI

COURSE CODE	U21BAT61	FINANCIALMANAGEMENT	L	T	P	C
CORE XIII			5	-	-	4
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K4: Analyse**					
Course Objectives	The course aims to 1. help the students understand the foundations of finance and financing decisions, Working Capital and Long term sources of finance. 2. acquaint the students with the theory and techniques of financial management, and developing their abilities in respect of investment and capital budgeting, financial planning, capital structure decisions, dividend policy and working capital management. 3. develop the analytical skills for interpretation business information and application of financial theory in financing related decisions and situations.					

Unit 1: Financial Management(Theory Only)

Financial Management - Meaning and Scope - Finance Functions – Profit Maximization and Wealth Maximization – Objectives of Financial Management -Sources of Finance –Short term-Bank sources– Long term

Unit 2: Cost of Capital(Theory & Problem)

Cost of Capital–Concept, Importance – Classification – Calculation of Cost of Debt, Cost of Equity and Cost of Preference Shares - Cost of Retained Earnings –Weighted average cost of capital, Reserves.

Unit 3: Capital Structure(Theory & Problem)

Capital Structure – Meaning and Scope – Factors influencing capital structure - Approaches: Net Income Approach –Net Operating Income Approach – MM Approach –Traditional Approach – Dividend and dividend policy – meaning, classification – sources available for dividend –dividend policy – general determinants of dividend policy

Unit 4: Working Capital Management(Theory)

Working Capital Management: concepts – Importance – Determinants of working capital

Unit 5: Capital Budgeting(Theory &Problem)

Capital Budgeting – Concept and Importance – objectives – various techniques and methods: Pay Back Method – Discounted Cash Flow Method – NPV Method, Excess Present Value Index, IRR, ARR and ROI

Text Book

1. S.N. Maheshwari, Elements of Financial Management-, Sultan Chand & Sons, 2019

Reference Books:

1. I.M.Pandey, Financial Management, Vikash Publishing House Pvt.Ltd, 2016
2. Prasanna Chandra, Fundamentals of Financial Management,TataMcGrawHills, 2017
3. Dr. N.Srinivasan, Financial Management, Sriram Publication, 2019
4. R.K. Sharma,Shashi and K. Gupta, Financial Management-, Kalyani Publication 2016
5. C. Paramasivam and T. Subramanian, Financial Management, New Age International Publications, 2018.

Note: Question Paper shall cover Theory 60% and Problems 40 %

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	use business finance terms and concepts while communicating.	K3
CO2	explain the financial concepts used in making a financial management decision.	K4
CO3	use effective methods to promote respect and relationship for financial deals.	K3
CO4	utilize the information to maximize and manage finance.	K1
CO5	demonstrate a basic understanding of Budgeting.	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	M	M	S	M	S	M	M
CO2	S	M	S	M	S	M	S	M	S	M
CO3	S	S	M	S	M	S	M	S	S	S
CO4	S	M	S	S	M	M	S	M	S	S
CO5	S	S	M	M	S	S	M	S	S	M

Strongly Correlating (S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (H) - 1 mark

No Correlation (N) - 0 mark

COURSE CODE	U21BAT62	TOTAL QUALITY MANAGEMENT	L	T	P	C
CORE - XIV			5	-	-	4

Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K5: Evaluate**
Course Objectives	The course aims to 1. make them understand the philosophy and core values of Total Quality Management (TQM). 2. make them understand the voice of the customer and the impact of quality on economic performance and long-term business success of an organization; 3. educate them about the best practices for the attainment of total quality 4. help the students understand the relationship between business strategy, business performance and quality management.

Unit 1: Introduction

Introduction– Need for quality – Evolution of quality –Definition of quality–Dimensions of manufacturing and service quality – Basic concepts of TQM – Definition of TQM –TQM framework – Contributions of Deming, Juran and Crosby–Barriers to TQM

Unit 2: Leadership

Leadership– Strategic quality planning, Quality Statements - Customer focus, customer orientation, customer satisfaction, Customer complaints, Customer retention – PDSA cycle, 5s, Kaizen.

Unit 3: The seven traditional tools of quality

The seven traditional tools of quality–New management tools – Six Sigma: Concepts,Methodology, Applications to manufacturing, Service sector including IT – BenchmarkingReason to bench mark, Bench marking process.

Unit4: Quality circles

Quality circles – Quality Function Development (QFD) – Taguchi quality loss function –TPM – Concepts, improvement needs – Cost of Quality – Performance measures

Unit 5: Need for IMS

Need for IMS – elements, Documentation, Quality auditing IMS, Concepts, Requirements and benefits – Implementation in manufacturing and service sectors including IT.

Text Book

1. Suganthi L and Anand Samuel, Total Quality Management –, Prentice Hall of India, pvt, ltd., 2006.

Reference Books:

1. Janakiraman Band Gopal R K, Total Quality Management –, Prentice Hall of India, pvt, ltd. 2006
2. Dale H Besterfiled, Total Quality Management –, Pearson Education Asia, 2006.
3. Dr. K.C. Arora, Total Quality Management –, S.K. Katarian& Sons,2013
4. D.R.Kiran, Total Quality Management –, B.S. Publishers, 2016

Note: Question Paper shall cover 100 % theory

Expected Course Outcomes:

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

Number	**Course outcome**	**Knowledge Level (According to Bloom's Taxonomy)**
CO1	understand the basic concepts of TQM	K2
CO2	know the Strategic quality planning	K1
CO3	evaluate the traditional tools and new management tools of quality	K5
CO4	apply the Quality Function Development	K3
CO5	understand the Quality auditing IMS	K2

K1 - Remember; K2 - Understand; K3 - Apply; K5 - Evaluate;

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	M	S	M	S	M	M
CO2	S	M	S	M	S	M	S	M	S	M
CO3	S	S	M	S	M	S	M	S	M	S
CO4	M	S	S	S	M	M	S	M	S	M
CO5	S	S	M	M	S	S	M	S	S	M

Strongly Correlating (S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (H) - 1 mark

No Correlation (N) - 0 mark

COURSE CODE	**U21BAT63**	**MARKET RESEARCH**	**L**	**T**	**P**	**C**
CORE XV			**5**	**-**	**-**	**4**
Cognitive Level	**K1: Recall** **K2: Understand** **K4: Analyse** **K5: Evaluate**					
Course Objectives	The course aims to 1. provide basic knowledge about Market research 2. make the students understand the techniques of market research 3. enable the students to learn about tools available for research 4. inculcate the students the skill of understanding market research and the decision-making process					

Unit 1: Introduction

Marketing research- Definition- Nature and Scope- Problem Definition- Research Design- Exploratory, Descriptive, Experimental design.

Unit 2: : Data Collection

Data collection- Secondary Data- Primary data- Survey methods- Questionnaire Design- Measurement and Scaling- Observation method.

Unit 3: Sampling

Sampling- Types of Sampling- Sample Selection- Data Analysis- Classification, Tabulation and Interpretation of data- Report writing.

Unit 4: Techniques of research

Motivation Research Techniques- Sales analysis research- Methods of Sales Forecasting- Sales Potential.

Unit 5: Product research

Product research – New Product Development- Test Marketing- Advertising research - copy Testing- Pre t testing And Post-Testing - Media research.

Text Book

1. Boyd and west fall, Marketing Research-, Richard D. Irwin Inc.

Reference books:

1. Marketing Research- Luck, Wales and Taylor.
2. Marketing Research (principles, Application and Cases) – Dr.D.D.Sharma.

Course Outcomes

On successful completion of the course, the students will be able to,

K1	**CO1**	understand the introduction to market research
K2	**CO2**	be aware of tools and techniques of market research
K5	**CO3**	know how to conduct a research
K2	**CO4**	understand why companies need market research
K4	**CO5**	gain information about drawing a conclusion on market research

K1 - Remember; K2 - Understand; K4 - Analyze; K5 – Evaluate

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	S	M	M
CO2	S	M	S	M	S	M	S	M	S	M
CO3	S	S	M	S	M	S	S	S	M	S
CO4	S	M	S	S	M	M	S	M	S	S
CO5	S	S	S	M	S	S	M	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAT64	E-COMMERCE (PRACTICALS)	L	T	P	C
CORE XVI			-	-	4	5
Cognitive Level	**K2: Understand** **K4: Analyse** **K5: Evaluate**					
Course Objectives	The course aims to 1. familiarize the students with the technologies in e-commerce, e-business and their impact in business. 2. enable the students to identify and implement the right e-commerce model and understand the ethical and legal issues associated with it. 3. give an insight intothe electronic payment system and its security					

Unit 1: E-commerce

E-commerce: Key elements of e-commerce - E-banking - INFINET - VSAT - ATM'S - ATM Technology - Biometric ATM - ATM card - ATM usage - Internet Banking.

Unit 2: Electronic Payments

Electronic Payments: VISA Card - MASTER Card - Credit Card - Debit Card, e-Cheque Process between Consumer & Merchant.

Unit 3: On-line Business

On-line Business: e-payment - e-Ticketing - e-Dining - e-Ticketing in Railways - e-Brokerage - e-Bill - Online Marketing- Electronic Credit Cards - Smart Cards.

Unit 4: Computer Crimes

Computer Crimes: Money Thefting - Service Theft - Software Theft - Information Altering - Malicious Access - Viruses.

Unit 5: E-Commerce in India

E-Commerce in India: Business models of e-commerce - B2B (Business to Business) - B2C(Business to Consumer) - C2B(Consumer to Business) - C2C(Consumer to Consumer) - G2B(Government to Business)

Note: Question Paper shall cover 100 % practical

E COMMERCE Practical Exercises:

1. Pass port apply online
2. Train ticket booking
3. Flight ticket booking
4. Bus ticket booking
5. Fees payment
6. Money transfer
7. EB bill payment
8. Municipality bill payment
9. Traffic challan – fine payment
10. Voter id apply online
11. Pan card apply online
12. Driving license and LLR apply online
13. Police online complaint
14. Online shopping
15. Scholarship online apply
16. PF online apply (Data correction and claim)
17. Smart card apply and correction
18. Bank account opening online
19. Aadhar card correction

G pay and Phone

Text Book

1. Kenneth C. Laudon and Carlo GuercioTraver, E-Commerce –, Pearson Education, 2019

Reference Books:

1. David Whitely, E-commerce: Strategy, Technology and Applications -, McGraw Hill Education, 2017
2. VijayalakshmiSundaram, E-Commerce, SreeMeenakshi Publications, 2016.
3. M.M. Varma, Multimedia & website Address,Sultanchand& sons2013.
4. Bhaskar, E-Commerce in Banking -, Himalaya publications, 2017.
5. C.NellaiKannan, Internet & E-Commerce, Nels Publications, 2014.

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the introduction to e-commerce	K2
CO2	be aware of commercial e-payments	K2
CO3	know about online businesses	K5
CO4	understand the cybercrimes in business	K2
CO5	gain information about E-business models	K4

K2 - Understand; K4 - Analyze; K5 - Evaluate

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	S	M	M
CO2	S	M	S	M	S	M	S	M	S	M
CO3	S	S	M	S	M	S	S	S	M	S
CO4	S	M	S	S	M	M	S	M	S	S
CO5	S	S	S	M	S	S	M	S	S	M

Strongly Correlating (S)	-	3 marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 mark
No Correlation (N)	-	0 mark

COURSE CODE	U21BAT65	SKILL ENHANCEMENT & EMPLOYABILITY ORIENTATION	L	T	P	C
CORE XVII			4	-	-	5
Cognitive Level	**K2: Understand** **K3: Apply** **K4:Analyse** **K5:Evaluate**					
Course Objectives	The Course aims to 5. developing and sustaining employability skills 6. improve effective communication skills 7. develop effective written communication skills 8. enable students to increase knowledge on self management 9. build a base for learning critical & creative thinking skills.					

UNIT 1: Self Assessment

Self-Regulation and Improving Academic Performance -Personal SWOT analysis, empowering self by developing self-esteem, self-efficacy, self-control and self-monitoring, Basic understanding about EQ, IQ, SQ developing sound study habits, reading newspapers, reviewing a book, research article and it's headings, improving personal memory, understanding the nature of stress and manage stress, basic idea about mind mapping, developing the skills of observation, time managing and its methods

UNIT 2 : **Oral Communication**

Effective Oral Communication Skills - Communication basics and effectiveness in communication, interpersonal and intrapersonal communication, managing conversations, asking questions, working in teams, public speaking –planning , preparing and delivering speeches, effective self-introductions , debate, narrating incidents and events and expressing opinions, dynamics of group communication- taking active part in group discussions, managing meetings-Elements, Members, different types meeting arrangements

UNIT 3: **Written Communication**

Effective Written Communication Skills- Principles of effective writing ,writing an -informal letter, bio-sketch, formal letter writing, a letter to the editor, a report, a memo, routine letters, cover letters, thank you/ follow –up letters, acceptance letter, rejection letters, resignation letters

UNIT 4 : Communication Styles

Self Management and Standards of Conduct - Barriers to effective communication, managing conflicts, developing an assertive communication style, perspectives on relationships, understand the basics of etiquette, general etiquette to be followed by a student, mobile phone etiquette, telephone etiquette, e-mail etiquette, dressing etiquette, interview etiquette, people etiquette, office etiquette, dining etiquette, personal grooming

UNIT 5: **Self Motivation**

Self Motivation and Getting Hired-Develop thinking skills -critical and creative thinking, evaluation, decision making and problem solving, understanding the changing world of work, understand employer expectations, job searching, selection process, CV writing, Body Language, Dress Code, Concept about GD, Interview-Types of interview- preparing for the interview, interview process, Exit Interview

Books Recommended:

1. Harold R. Wallace, Personal development for life and work, Thomson publication pvt ltd, 2012.
2. Gopalaswamy Ramesh, The ACE of Soft Skills: Attitude, Communication and Etiquette for success, Pearson publication, 2010.
3. Meenakshi Raman and Prakash Singh, Business Communication, Oxford 2012.
4. Urmila Rai and SM Rai. Business Communication, Himalaya Publishing House, 2011.

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level(According to Bloom's Taxonomy)
CO1	developing and sustaining employability skills	K2
CO2	improve effective communication skills	K5
CO3	develop effective written communication skills	K5
CO4	enable students to increase knowledge on self management	K2
CO5	build a base for learning critical & creative thinking skills	K3

K2-Understand;K3 -Apply; K5 -Evaluate;

Mapping of Cos with Pos & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	S	S	S
CO2	M	S	S	S	M	S	M	M	M	M
CO3	S	M	S	S	M	S	S	S	S	S
CO4	M	M	S	M	S	M	M	M	S	M
CO5	S	S	S	S	M	M	M	S	S	S

Strongly Correlating(S) - 3marks
Moderately Correlating(M) - 2marks
Weakly Correlating (W) - 1marks

No Correlation (N) - 0 marks

COURSE CODE	U21BAE61	SERVICES MARKETING	L	T	P	C
ELECTIVE IV			3	-	-	3
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K4: Analyse**					
Course Objectives	The course aims to 1. enable the students to know about the various theories of service marketing. 2. familiarize the students to gain insights on the issues in operational and administrative aspects of service marketing. 3. help students to formulate strategies for identifying, organizing and establishing a retail format 4. inculcate the skills of merchandising, segmentation, pricing and promotion strategies in service marketing.					

Unit 1: Evolution of Service Marketing

Evolution of Service Marketing: Stages - Reasons - impact of social environment on the growth of services marketing.

Unit 2: Concept of services

Concept of services: meaning - components of service - characteristics of services - difference between goods and services.

Unit 3: Service marketing mix

Service marketing mix: meaning - definition - characteristics of service marketing mix - 7p's of service marketing mix.

Unit 4: Pricing in services

Pricing in services: Meaning - objectives - characteristics - factors affecting pricing decisions.

Unit 5: Location of services and channels of distribution

Location of services and channels of distribution: factors in choosing a service location - classification of service by location - channels: meaning - methods of distribution services.

Text Book

1. Dr. L. Natarajan, Services Marketing, Margham Publications, 2016.

Reference Books:

1. K. Rama MohanaRao, Services Marketing, Pearson Publications, 2011.
2. Adrian Payne, Malcolm Mcdonald, Maketing Planning for Service, Routledge Publication,2012.
3. K. Rama MohanaRao, Services Marketing, Sultan Chand & Sons, 2014.
4. Adrian Payne, Services Marketing, Tata McGraw Hill Publication, 2013.

Note: Question Paper shall cover 100 % theory

Expected Course Outcomes:

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

Number	**Course outcome**	**Knowledge Level (According to Bloom's Taxonomy)**
CO1	understand the basic concepts of service marketing	K3
CO2	examine the nature of services, and distinguish between products and services	K4
CO3	identify the major elements needed to improve the marketing of services	K3
CO4	understand the pricing in services	K1
CO5	develop an understanding of the roles of relationship marketing and customer service in adding value to the customer's perception of a service	K2

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	S	M	M
CO2	S	M	S	M	S	M	S	M	S	M
CO3	S	S	M	S	M	S	S	S	M	S
CO4	S	M	S	S	M	M	S	M	S	S
CO5	S	S	S	M	S	S	M	S	S	M

Strongly Correlating (S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 mark

No Correlation (N) - 0 mark

COURSE CODE	U21BAE62	CONSUMER BEHAVIOUR	L	T	P	C
ELECTIVE - IV			3	-	-	3
Cognitive Level	**K1: Recall** **K2: Understand** **K3: Apply** **K4: Analyse** **K6: Create**					
Course Objectives	The course aims to 1. provide basic knowledge about consumer behaviour 2. make the students to understood consumer motivation and perception 3. enable the students to learn about consumer learning and attitude 4. inculcate the students the skill of understanding the consumer decision-making process					

Unit 1:Introduction -Consumer Behaviour

Introduction - Consumer Behaviour- definition - scope of consumer behaviour — Discipline of consumer behaviour — Customer Value Satisfaction — Retention — Marketing ethics.

Unit 2:Consumer research

Consumer research- Paradigms — the process of consumer research - consumer motivation — dynamics — types — measurement of motives — consumer perception

Unit 3:Consumer Learning

Consumer Learning-Behavioural learning theories — Measures of consumer learning —Consumer attitude — formation — Strategies for attitude change

Unit 4:Social class Consumer Behaviour

Social class Consumer Behaviour- Life style Profiles of consumer classes — Cross Cultural Customers Behaviour Strategies.

Unit 5:Consumer Decision Making

Consumer Decision Making - Opinion Leadership — Dynamics — Types of consumer decision making — A Model of Consumer Decision Making

Text Book

1. Michael Solomon, Consumer Behaviour –, Pearson Publication, 2016

Reference books:

2. Jim Blythe, Consumer Behaviour, Sage Publication, 2013
3. RikPieters, Consumer Behaviour, South Western College Publishing, 2012
4. Paul Green Berg-Customer Relationship Management -Tata McGraw Hill , 2017
5. Barry Berman and Joel R Evans, Retail Management - A Strategic Approach, Pearson Publication, 2018.

Note: Question Paper shall cover 100 % theory

Expected Course Outcomes:

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

Number	Course outcome	Knowledge Level (According to Bloom's Taxonomy)
CO1	understand the basic concepts of Consumer Behaviour	K1
CO2	identify the motives of consumer behaviour through consumer research	K2
CO3	frame strategies for the consumer by learning the attitudes of consumer	K4
CO4	apply strategic knowledge based on the lifestyle of consumer	K3
CO5	develop consumer decision-making model	K6

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

Mapping of COs with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	M	S	M	S	M	M
CO2	S	M	S	M	S	M	S	M	S	M
CO3	S	S	M	S	M	S	S	S	M	S
CO4	S	M	S	S	M	M	S	M	S	S
CO5	S	S	S	M	S	S	M	S	S	M

Strongly Correlating (S) - 3 marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 mark

No Correlation (N) - 0 mark

COURSE CODE	U21BAS64	MARKET SURVEY	L	T	P	C
SBE -IV			-	-	2	2

Student has to design a questionnaire for any issues on business, households, consumers, marketers in their locality and collect data from 30 to 50 samples. Market survey may be arranged weekly 2 hours during VI semester. The data has to be processed by using percentage analysis and presented in the form of an assignment. It should not exceed 20 pages. The report should be presented to the concern internal faculty. There is no External Viva for this report.

Evolution of the report: 25 marks (CIA)

Presentation of the report: 75 marks (ESE)

Course Code & Title	ESSENTIALS OF MANAGEMENT		
U21BAN31	Semester-III	Credits:2	Hours:2
Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyse K5: Evaluate		
Learning Objectives	The Course aims to On successful completion of this course the student will be able to: 1. To provide a basis of understanding to the students with reference to working of business organization through the process of management. 2. Student will also get the idea about new developments in management. 3. To introduce the basics of management knowledge and enabling the student to correlate it with the practical aspects of its application. 4. To build a base for learning management knowledge and acquiring prerequisite skills.		

UNIT–I

Introduction to Management: Importance– Definition– Nature and Scope of management process– Role and Functions of a Manager– Levels of Management–Development of Scientific Management and other Schools of thought and approaches.

UNIT–II

Types of Planning: Nature– Importance– Forms– Types– Steps in planning– Objectives– Policies Procedures and methods– Nature and Types of Policies.

UNIT-III

Organizing: Types of Organization – Organization structure – Elements of organization.

UNIT– IV

Authority – Delegation – Decentralization –Centralization. Co-ordination–Need, Types of co-ordination– Principles– Techniques of co-ordination

UNIT–V

Controlling – Meaning and Importance – control process – Techniques of control.

Note: Question Paper shall cover 100% Theory

Text & Reference Books:

1. L. M. Prasad, *Principles of management,* S.Chand & Sons 2019
2. Dinkar Pagare, *Principles of Management* S.Chand & Sons 2018
3. P.C.Tripathi and P.N.Reddy, *Principles of Management* , Mc Graw Hill Education, 2017
4. R.S.N.Pillai and S.Kala *Principles of Management* , S.Chand & Sons 2013
5. N. Premavathy, *Business Management* , Sri Vishnu Publication, 2013

Expected Course Outcomes:

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

K1	**CO1**	Examine and explain the management evolution and how it will affect future managers.
K2	**CO2**	Estimate the conceptual framework of planning and decision-making in day to day life.
K1	**CO3**	Explain the various managerial functions to achieve the goals and objectives of the organization.
K4	**CO4**	Analyze the theories of motivation, leadership and communication in a variety of circumstances and management practices in organizations.
K3	**CO5**	Identify and explain the importance of the controlling process and identify some of the key skills required for the contemporary management practice.

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

Mapping of COS with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	M	M	M	S	S	M	S	M	M
CO2	M	M	S	M	S	M	M	S	S	S
sCO3	M	M	M	S	S	M	M	S	M	S
CO4	M	M	S	S	M	M	M	S	S	S
CO5	M	S	S	M	M	M	S	S	S	S

Course Code & Title U21BAN42	NME - PERSONALITY ENHANCEMENT NON- MAJOR ELECTIVE -II		
NME	Semester-IV	Credits:2	Hours:2
Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyse K5: Evaluate		
Learning Objectives	The Course aims to On successful completion of this course the student will be able to: 1. To encourage students to develop balanced self-determined behavior 2. To help students in enhancing self, increasing life satisfaction and improving the relationship with others. 3. To develop new ability to develop new problem solving skills in group and use these skills in personal life. 4. To encourage students to develop their personality by understanding the influence of environmental, educational and situational factors and how to modify the behaviour		

UNIT I

Introduction: Definition of Personality – Determinants of personality – biological, psychological and socio – cultural factors – Misconceptions and clarifications, need for personality development.

UNIT–II

Self Awareness And Self Motivation: Self-analysis through SWOT and Johari Window, elements of motivation – Seven rules of motivation – Techniques and strategies for self-motivation –goal setting based on principles of SMART –self-esteem.

UNIT-III

Interpersonal Skills: Concept of team in work situation – promotion of team spirit – characteristics of team player – awareness of one's own leadership style and performance – nurturing leadership qualities – Emotional intelligence and its components –Empathy and social skills .

UNIT– IV

Memory And Study Skills: Definition and Importance of memory – causes of forgetting – how to forget? (thought stopping), how to remember? (Techniques for improving Memory) – Techniques of passing Exams – Management of Examination fear.

UNIT– V

Power Of Positive Thinking: Nurturing creativity – decision making and problem solving – thinking powe – seven steps for dealing with doubt –Traits of positive thinkers and high achievers, goals and techniques for positive thinking – enhancement of concentration through positive thinking – practicing positive life style.

Note: Question Paper shall cover 100 % theory

Text and Reference Books:

1. Schafer, W., *Stress Management for Wellness,* Thomson & Wadswoth, 2011.
2. Johnson, D.W., Boston, *Reaching out - Interpersonal Effectiveness and Self Actualization*, Allyn an l Bacon, 2010.
3. Robbins, S. P, *Training in Interpersonal skills. Tips for managing people at work*. Hunsaker, Phillip, L., New Delhi: PHI Learning, 2014.
4. Frey. D and Carlock. C., *Enhancing Self Esteem*. Indiana: Accelerated Development INC, 2013.
5. Barun K.Mithra, *Personality Development and Soft Skills*, Oxford University Press, 2016

Course Outcomes

On successful completion of the course, the students will be able to gain knowledge about

K2	CO1	Understand the Determinants of personality
K3	CO2	Apply the basic Theories of Motivation
K2	CO3	Understand the Career Planning
K5	CO4	Evaluate the memory skills
K6	CO5	Create a positive thinking

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

Mapping of Cos with POS & PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	S	M	S	S	S
CO2	M	M	M	S	S	S	S	S	S	M
CO3	M	M	S	S	M	S	M	M	M	S
CO4	M	M	S	S	M	M	S	S	S	M
CO5	S	M	S	M	M	S	S	M	M	S

Communicative English

(For Students of Arts & Science Colleges)

Semester 1

TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION

(TANSCHE)

CONTENTS

Semester 1

PREFACE

This textbook on Communicative English envisioned under the leadership of the Hon. Chief Minister of Tamilnadu, Thiru. Edappadi K.Palaniswami by the Honorable Minister for Higher Education Thiru. K.P. Anbalagan, and Principal Secretary to Government, Department of Higher Education, Selvi. Apoorva, I.A.S., is a pioneering venture and strategic intervention in higher education in Tamil Nadu. It has been prepared with the unstinted support of Thiru. Vivekanandan, I.A.S. Member Secretary, TANSCHE (Tamil Nadu State Council for Higher Education)

Tamil Nadu has the distinction of having the highest GER (Gross Enrolment Ratio) of 50 %, in higher education in the country: this figure attests to the efforts of the government to empower the youth of the state by enhancing access to higher education.

The Communicative English textbook has been prepared with a view to enrich and equip the student entering college: having the wherewithal to cope with the demands of education in an institution of higher learning and making the most of the opportunity of tertiary education, with the learning tools provided in the textbook should prove to be a life transforming experience for the students entering college and set them on the path to realizing their full potential.

The confluence of the stakeholders' (students') motivation and the facilitators' (teachers') dedication is bound to produce amazing results.

Unit I **(20 hours)**

1.Listening and Speaking

a. Introducing self and others

b. Listening for specific information

c. Pronunciation (without phonetic symbols)

i. Essentials of pronunciation

ii. American and British pronunciation

2.Reading and Writing

d. Reading short articles – newspaper reports / fact based articles

i. Skimming and scanning

ii. Diction and tone

iii. Identifying topic sentences

iv. Reading aloud: Reading an article/report

v. Journal (Diary) Writing

3. Study Skills - 1

e. Using dictionaries, encyclopedias and thesaurus

4. Grammar in Context:

Naming and Describing

- Nouns & Pronouns
- Adjectives

1. LISTENING AND SPEAKING

1. INTRODUCING YOURSELF AND OTHERS

INTRODUCING SELF

How do you introduce yourself in college?

The first impression is the best one! You have heard this popular adage, haven't you?

You would want to make a good impression whenever you meet people the first time, wouldn't you? The first thing you would do is introduce yourself. Let's see what we need to say and how we can say it in several different ways depending on where and whom we are meeting. Imagine you are meeting a group of fellow students in college for the first time and the instructor/teacher asks you to introduce yourself.

What to include in your introduction:

Your name	My name is Murgesh Vadivel. My name's Ragini Pillai. I'm Suresh Gopinathan I'm Ismail. I'm Priyanka Sundar…. I'm Rajalakshmi, people call me Raji. Never say, ~~"Myself Rajiv".~~ This is wrong.
The school you studied in	I studied at GRT school. I have completed my schooling at MMT, Vellore. I studied in the prestigious Vivekananda Vidyalaya in Coimbatore. I studied in a famous school in Mysore, the Sri Vidyalaya. I am a proud product of the Chennai School. I studied in the same school in which our former President, APJ Abdul Kalam studied.

The place you live/come from	I'm from Vellore. I live in T Nagar I live in Gopal Nagar while my home town is in Trichy. I come from Madurai. I'm put up in the hostel on campus I come from Delhi. I am staying at my aunt's I come from Meenakshi's abode, Madurai. I come from the mango district, Salem. (Remember not to use ~~My native place is~~)
A little about your hobbies	I'm deeply interested in football, I was part of my school team I love playing the sitar I take a special interest in philately and I have 2000 stamps of 175 countries. Folk music has always fascinated me. I have been learning Karagattam for the past five years. I like watching tennis and cricket: they are my favourite sports.
A few details of your family	We are six at home, including me I have two siblings. I have a sister, who is older to me I have a brother younger than I. I have a brother and two sisters. All my siblings are older than me. I have four siblings, I am the youngest. I am the only child. I live with my grandparents.

How to Introduce Yourself:

Remember to wish people first. Formal ways of greeting are:

- Good day!
- Good Morning!
- Hello!

Informal Greeting: Hi!

Activity

Speak about yourself for about a minute or two. You may want to write it down, just to get the sequence right and it will give you a lot of confidence before you start speaking. Relax and smile when you present yourself!

A few hints about formal and informal situations:

You cannot speak the same things and in the same manner with everybody. Depending on the people and purpose of the meeting, you can broadly classify the instances as formal, casual and informal. When you are with your family and friends an informal approach is acceptable. However, in the communication between a teacher and a student, a service provider and customer, an employer and an employee, the engagement is a formal one. A casual tone is used among peers and also among people who are familiar with each other. So depending on whom you are meeting and why you are meeting them, you need to be selective about what you say about yourself.

Remember a rule of thumb, the more formal the situation, the less personal details you should share as an introduction.

- Do not talk about your family when you are speaking about yourself at a conference, meeting or a job interview.
- Do not talk about your hobbies/ special interest in an interview, unless asked to do so.
- Do not talk about your ambitions when you meet people at a party, meeting or official get-togethers.

There will be several occasions in college when you will have to introduce yourself. The following are a few instances on the campus when you will have to introduce yourself when you meet people for some work. In all likelihood, the Principal or your HOD may not recognise you. It is always better to make a brief introduction before you request them to do something for you.

Example:

1.With the HOD:

Good afternoon Sir/Madam

I'm Priya from II year BSc Physics, I wish to enrol in the Science Quiz being conducted by our department.

2.With the Principal:

Good evening Sir, I'm Rajesh from the department of Chemistry. I am in the first year. I am applying for a scholarship. Sir, could you please attest my application form?

Task 1

Choose any two instances from the list below and make notes (based on the examples given above) of what you would be saying and then present it to the class:

1. With the language teacher in the staffroom
2. With a fellow student in the canteen
3. With students/ volunteers of your club, team, group etc.
4. With the chief librarian
5. At a competition registration desk
6. With a guest at college

Task 2

There are several other instances when you might have to speak about yourself. So gear up, and choose any two of the following as an exercise in introducing yourself. Remember to greet the person you approach and give appropriate details:

1. At the Bank Manager's
2. At the hotel reception
3. At a ticket booking counter
4. With a new neighbour
5. At a conference, where you are presenting a paper

Many a time you may have to send an email or a text message from your mobile phone to a person whom you are meeting/contacting for the first time. Here again, you have to introduce yourself.

Task 3

1. Draft a text message that you will be sending through WhatsApp to a guest whom you wish to invite for an event organised by your club. This is the first message you are going to send him/her.

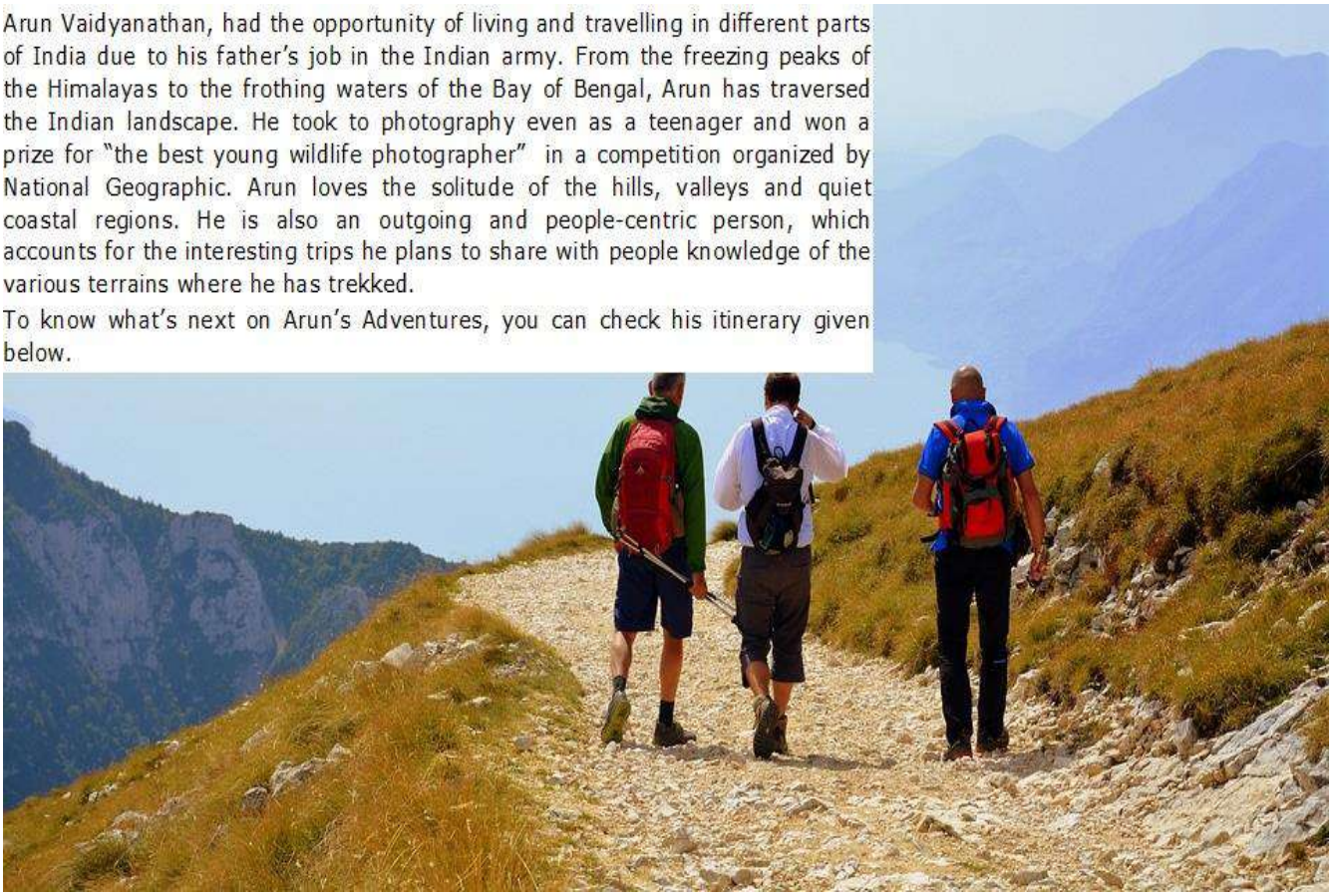
2. Compose a message to your English teacher seeking clarification of a doubt with regard to the lesson taught in class.

Tips on Composing Your Bio-note

There might be occasions when you have to speak about yourself/ provide a small write-up (bio-note) to help a programme compere introduce you to an audience. For this purpose you need to acquaint yourself with writing a bio note.

Example:

Arun is a well-known wildlife photographer and also has a trekking club. To join his trekking programmes you need to book well in advance. Here is Arun's bio-note on his web page:



Task 4

1. Write a bio-note about yourself to publish on your blog in about 120 words.
2. Write a short note about yourself to add to your profile on social media like Facebook and Twitter in about 160 characters.
3. Write a bio note that you would send along with an article/poem/short story that you would like to publish.

How to use an "attention grabber" in introducing yourself:

You can be a little innovative by starting with an attention-grabber. People who use this method do not start with their name. Instead, they begin with

- A story/anecdote
- A joke
- A fact about a place/period in history

Here is an example of providing information about a place and using that to introduce yourself:

> This is a familiar story: There was a time when two eagles soared above a Shiva temple which was atop a hill. They would come every day at lunch time, and the priest at the temple would give them food. It became a ritual. According to legend, these eagles were not ordinary eagles, but two rishis whom a curse had transformed into birds.
>
> You must have guessed which place I am referring to. Yes, it is Thirukalukundram. Kazhugu as you know is the Tamil word for 'eagle'. I come from this place, Thirukalukundram. My name is Loganathan.

Task 5

Use an attention grabber – a story/anecdote/joke to introduce yourself.

B.SPEAKING ABOUT OTHERS:

INTRODUCING OTHERS

While introducing a friend or a classmate include the person's name in full, avoid nicknames or short names that you address them with. State some nice things about the person but never speak about their personal likes and dislikes. Again, depending on the context, include relevant information.

For Example,

While introducing a classmate or friend :-

Good morning, meet my friend/classmate, Krishna.
He is an ace football player and he is a part of the college team.

When you need to introduce a guest at a formal gathering :-

Good Morning. It gives me immense pleasure to introduce Ms Valli Damodaran, the CEO of Star Alliance, a prestigious business amalgamation. She has been with Star Alliance for the past 15 years and has held several responsibilities…

When you need to introduce a resource person

Good Afternoon, I am pleased to introduce Prof. Ganesh, Head, Department of Indian Theatre, University of Texas….

Pre Task

a. Introduce a friend/classmate to others in the class.

b. Imagine a guest/resource person is visiting your class and introduce him/her.

Task 1

a. Write down a formal introductory note on a famous personality, who is visiting your college for an event. This introduction will go on the brochure/ notice board with the schedule of events

b. You are on the editing board of a college e-mag, write a bio note on the contributors of articles, poems and short stories.

LISTENING FOR SPECIFIC INFORMATION

Listening is a significant component of the skill set which comprises the four skills: listening, speaking, reading and writing. It is akin to one of the important tools in a toolkit. Listening involves paying close attention to what is being said. While hearing is an involuntary and casual activity, listening is a voluntary and serious activity and therefore has to be planned deliberately. What observation is to "seeing", "listening" is to hearing. You must have heard the expression, "Observe. Keep your eyes wide open". So also you need to "keep your ears wide open" or have "sharp ears" to pick up what is being said.

Before listening

- Think about the topic of the text you are going to listen to. What do you already know about it? What could possibly be the content of the text? Which words come to mind that you already know? Which words would you want to look up?
- If you have to do a task on the listening text, check whether you have understood the task correctly.
- Think about what type of text you are going to listen to. What do you know about this type of text?

While listening

- It is not necessary to understand every single word. Try to ignore those words that you think are less important.
- If there are words or issues that you don't understand, use your 'general knowledge' as well as the context to find out the meaning.
- If you still don't understand something, use a dictionary to look up the words or ask someone else for help.
- Focus on key words and facts.
- Take notes to support your memory.
- Paying attention to "intonation" (rising and falling tone) and "stress" (words which the speaker lays stress on) can help you understand what you hear.
- Try to think ahead. What might happen next? What might the speakers say? Which words might they use?

After listening

- Think about the text again. Have you understood the main points?
- Remember the speculations you made before you listened. Did you predict right?
- Review your notes.
- Listen again to difficult passages.

Listening challenges

There are many difficulties an individual may face in understanding a talk/ lecture or conversing in a second language. The speaker, the situation and the listener can all be the cause of these difficulties. Contributing factors include the speaker talking quickly, background noise, a lack of visual clues, the listener's limited vocabulary, lack of knowledge of the topic, and an inability to distinguish individual sounds. Students should listen and be able to understand the main idea of what is said, as well as specific details. Here are some of the main skills involved in listening, together with a brief description of what each skill involves.

1. Predicting content

Our knowledge of the world helps us anticipate the kind of information we are likely to hear. When we predict the topic of a talk or a conversation, all the related vocabulary stored in our brains is activated to help us understand what we are listening to. Depending on the context – a news report, a university lecture, an exchange in a supermarket, one can often predict the kind of words and style of language the speaker will use. If you are taking a listening test, skim through the questions first and try to predict what kind of information you need to listen out for. A question beginning 'How many..?' will require you to listen for a specific number or quantity of something.

For example, imagine you have just turned on your TV. You see a man in a suit standing in front of a large map with the symbols of the sun, clouds and thunder. What is he about to say? Most likely, this is going to be a weather forecast. You could expect to hear words like 'sunny', 'windy' and 'overcast'.

TASK 1

Watch or listen to a recorded TV program or clip from YouTube. Pause after every few sentences. Try to predict what is going to happen or what the speaker might say next.

2. Listening for the gist

Information comes in a sequence and in that sequence of information, there are content words such as nouns, adjectives and verbs that can help you form a picture and we often call this listening for the gist. For example, words like 'food', 'friends', 'fun', 'park' and 'sunny day' have their own meanings, but when you hear the words in sequence, they help form the context of a picnic. Mind maps are one of the best ways to jot down information while listening to get the gist of it.

Pre Task

Find a short video with subtitles on a topic that interests you. Use the title to help you predict the content and then listen for content words. Go back, and

listen again with the subtitles. How much did you understand the first time? Return to the video a week later and try again.

3. Listening for details

When listening for details, you are interested in a specific kind of information, perhaps a number, name or object. Anything that does not sound relevant can be ignored. This helps to narrow down your search and get specific details. In a listening test, if you are asked to write down the age of a person, listen for the words related to age like old, young, years, date of birth, etc. or a number that could represent that person's age. If it is a conversation, wait to hear someone begin a question with 'How old…?'

Pre Task

Listen to a weather report to get details about the weather, or you could follow the sports news to find out the latest scores.

4. Inferring meaning

Imagine you are a tourist in a country unaware of the foreign language. In a restaurant, you hand over a credit card to pay the bill, but the server seems to say something apologetic in response. Even though you don't understand his words, you can probably conclude that the restaurant doesn't take credit cards, and you need to pay with cash instead. This is the technique of inferring meaning: using clues and prior knowledge about a situation to work out the meaning of what we hear.

Similarly, we can infer the relationship between people from the words they use, without having to find out directly. For example, read the following conversation:

A: Shyam, did you do your homework?
B: I did, sir, but left my notebook at home.
A: That's a terrible excuse. You'll never pass your exams if you are careless.

We can infer from the use of the words 'homework' and 'exams' that this is a conversation between a student and his teacher. By using contextual clues and our knowledge of the world, we can guess what is being said, who is speaking and what is taking place.

Tasks

1. Choose a short audio track that presents information that may be easily summarized, like a news report. Summarize the main points in one or two sentences. It is not important to deliver details, like numbers, names or statistics but rather express the main point in a concise manner.
2. Listen to a biographical documentary. A number of them are available on YouTube and prepare a short list of questions like *what*, *when*, *where*, *how* type. Listen for these details and report the answers after listening. (On YouTube you will find interesting and brief biographies of eminent people, in a series titled Mini Bio. For example, https://www.youtube.com/watch?v=Y94s85-Crew is about the explorer Ferdinand Magellan.)

NB**:** https://www.esolcourses.com/content/topicsmenu/listening.html is a valuable link where you can access free online listening tests used for IELTS training purposes

PRONUNCIATION (WITHOUT PHONETIC SYMBOLS)

i. Essentials of Pronunciation

Pronunciation in the English language could be a challenge to non-native speakers as it is different from our Indian languages where there is a direct correspondence between the letter and the sound. For example, we don't understand why "tough" has this spelling, when it could be easier for us to pronounce if it were spelt as "tuf".

There are three aspects to the sounds of the English language, they are consonant sounds, vowel sounds and diphthongs (vowel glides).

Why is it important to work on one's pronunciation?

First of all, correct pronunciation makes you sound good. Also, it makes communication more effective.

Minimal Pairs and Diphthongs

As you are aware of consonant and vowel sounds, a brief note on diphthongs and minimal pairs will be helpful with regard to "sounding good"

The following pairs of words are examples of minimal pairs:

Pin, Bin

Mine, Nine

Uncle, Ankle

It is important to be trained in proper articulation of sounds through an exercise in minimal pairs as this will guard us from wrong pronunciation.

There are times when people pronounce typhoid (pronounced as typhoid) as 'typoid'. Sometimes 'pant' is pronounced as 'fant'. These errors in pronunciation can be avoided. Some of the common pitfalls in pronunciation tend to be the interchanging of the 'p' and 'b' sound. How would the words 'Post' and 'Pin' sound if the 'p' sound is interchanged with 'b'. It would sound like 'boast' and 'bin'.

Diphthongs

Diphthongs are also called 'vowel glides' because during their articulation there is a movement from one vowel to another. Notice the vowel glide in the following words:

Here	wait	tourist		boy	rear
Show		my	few	align	
Cow	hair	fate	fake	few	

Listen (on the internet) to the way these words are pronounced. You will find that there is a music to it. Native speakers of English articulate the diphthongs unconsciously and they sound good! On the other hand Indian speakers tend to cut short the vowel glide. Practice vowel glides if you want to sound really good! (Please note that practising vowel glides is not a slavish imitation of native speakers, but a genuine appreciation of the music of the language).

Short Vowels and Long Vowels

Regard and appreciation for the music of the English language can be seen in one's interest in understanding the difference between short vowels and long vowels.

Vowels

ɪ	pit	ɔ:	born
e	pet	u:	boon
æ	pat	aɪ	bite
ɒ	pot	eɪ	bait
ʌ	but	ɔɪ	boy
ʊ	book	əʊ	toe
ə	mother	aʊ	house
i:	bean	ʊə	poor
ɜ:	burn	ɪə	ear
ɑ:	barn	eə	air

(The above chart with symbols is for the teachers' reference only)

Long vowel sounds are denoted by a marker which looks like a colon (:).

The difference in the way the vowels are pronounced in the following pairs of words is the difference between short and long vowels:

Kiss	keys
Ship	sheep
Good `	food
Bull	boon

Imagine replacing the short vowel in 'good' with a long vowel sound: it sounds awful.

If you replace the long vowel sound of 'sheep' with a short vowel sound, it will sound like 'ship'

Commonly mispronounced words

- 'Tier' sounds the same as 'tear' (shedding tears when you cry). It is wrongly pronounced as 'tyre' (i.e. the tyre of a car/bike)
- Pronunciation (It is pr-nun-ciation. People often say pr-noun-ciation, which is not correct)
- Buffet (it is boo-fey. 'Boo' as in 'loose' and 'fey' as in 'fake')

What if you mispronounce?

Here are a few illustrations to show you that you could convey the wrong meaning if you don't pronounce correctly.

1.Dessert and Desert: When you order a sweet dish after a meal, you are ordering dessert(dizz-urt). On the other hand, if you travel to a country in the Middle East, you are going to a desert (dez–urt). Notice the difference in spelling as well.

2. Scrap and Scrape: Be careful about how you pronounce these two words. In 'scrap' the 'rap' rhymes with 'tap' and in 'scrape' the 'rape' rhymes with 'tape. Often people complain that a course which is not good should be "scraped", when they actually mean that it should be "scrapped". "Scrap" and "scrape" are two different words which differ in pronunciation. "Scrape" means 'to drag' or 'pull' a hard or sharp implement across. Example: Remove the green tops from the carrots and scrape them.

3. Suite: A suite is a set of rooms designated for one person's or a family's use or for a particular purpose. For example, "Book a suite at the Taj." This word sounds exactly like "sweet", but those who are not aware of the correct pronunciation, pronounce it as "suit" (as in "suitcase").

i.American and British Pronunciation

Differences in American and British pronunciation could be listed as follows:

DIFFERENCES IN STRESS IN BRITISH AND AMERICAN ENGLISH

- adult
- ballet
- brochure
- garage
- vaccine
- advertisement
- hospitable

SOME WORDS ENDING IN -ILE ARE DIFFERENT IN BRITISH AND AMERICAN ENGLISH

- agile
- fertile
- hostile
- mobile
- versatile

IN SOME WORDS, THE LETTER "A" IS PRONOUNCED DIFFERENTLY IN BRITISH AND AMERICAN ENGLISH

- bath
- laugh
- class
- chance
- ask
- after
- can't
- example

THE SOUND OF "R" IS STRONGER IN AMERICAN ENGLISH

- hard
- were
- ear
- pure
- more
- chair
- bar

THE -IZATION ENDING IS DIFFERENT IN BRITISH AND AMERICAN ENGLISH

- civilization
- organization
- authorization
- globalization

THE LETTER "T" IN THE MIDDLE OF A WORD CAN BE PRONOUNCED LIKE A FAST "D" IN AMERICAN ENGLISH

- better
- water
- hated
- writing
- bottom
- native
- artificial
- notice

The whole idea of working on your pronunciation is to SOUND GOOD

READING AND WRITING

READING AND WRITING:

READING SHORT ARTICLES – NEWSPAPER REPORTS/FACT BASED ARTICLES

The focus of this lesson on reading comprehension is to give you a few tips to ensure that you don't miss the point/s being made in any article that you are reading. With regard to reading a newspaper report/fact based article, you need to hone your skills in relation to

i) Skimming and scanning
ii) Diction and tone
iii) Identifying topic sentences

Read the newspaper article given below. While you read, practice the skills of skimming and scanning. **Skimming** refers to the process of reading only the main ideas within a passage to get an overall impression of the content of a reading selection. With reference to this article you can skim with the following guidelines:

Note the title of the article

Read the introduction or the first paragraph

Read the first sentence of every other paragraph

Read the summary or the last paragraph

Scanning

Is there specific information you are looking for?

Anticipate how the answer will appear and look for clues that might help you locate the answer. For example, if you are looking for a date, you can scan the paragraph for numbers.

The article given has a couple of dates.

Wednesday, October 14, 1964

Prehistoric Tools

By MARY STAMP
Emerald Staff Writer

Prehistoric eskimo tools and semi-subterranean houses have been uncovered in Katmai National Monument in southwest Alaska by Don Dumond, assistant professor of anthropology, and crews of graduate. The excavation took four summers.

Most of the work has been done on the Brooks River which runs a mile and a half between Brooks and Naknek Lakes, and at Kukak Bay on the Pacific Coast on the other side of a mountain range. The diggings have been made under research grants from the National Science Foundation and under research contracts with the National Park Service.

Prehistoric Occupation

In 1960 plans for the diggings were begun by Luther S. Cressman of the anthropology department, now professor emeritus, according to Dumond.

That year Dumond and another anthropologist went to Alaska expecting to spend a year at Brooks River to study the salmon run as compared with past years. Records dated back to 1880.

"To our surprise we found a good deal of evidence of prehistoric occupation," Dumond related. "The stuff (tools) looked like it was 4,000 or 5,000 years old and was similar to the stone implements from further north by the Bering Strait. "It looked like we had a chance of making a sequence of southwest Alaska."

The following year, Dumond took five others to Alaska with him—three were on the Brooks River and three on the Naknek River 30 miles away.

1,000 Year Gap

"That year we got the rudiments of a sequence of tools to represent most of the periods from 2,000 B.C. to 1,800 A.D. when the Russians arrived," Dumond said. "Except there was a gap between 1000 B.C. and the year zero."

After skipping a summer, Dumond took a crew of six with him again in 1963—two surveyed the interior part of the monument and five worked at Brooks River to try to fill up the 1000-year hole. The latter group found 26 more dates with radio carbon.

"We were surprised that we got things from southwest Alaska

Having engaged successfully with this article with the tips you have been taught on skimming and scanning, could you answer the following questions?

1. Where did the anthropologists find the prehistoric Eskimo tools?
2. In the vicinity of which river were these tools located?
3. What is the timeline of this excavation project?

A Note on Diction and tone:

Diction in writing is the word choice used in a piece of writing. It can give a particular **tone** to the writing, depending on the specific words chosen. Aside from individual word choice, the overall tone, or attitude, of a piece of writing should be appropriate to the audience and purpose. The tone may be objective or subjective, logical or emotional, intimate or distant, serious or humorous.

The newspaper article given is related to a research project. The tone is formal and objective.

Identifying Topic Sentences:

Every paragraph should include a topic sentence that identifies the main idea of the paragraph. A topic sentence also states the point the writer wishes to make about that subject. Generally, the topic sentence appears at the beginning of the paragraph. It is often the paragraph's very first sentence.

Could you identity the topic sentences of the newspaper article on Pre Historic Tools?

With your newly acquired skills in reading (skimming and scanning), read the article given below:

Syria Deeply

Dona

December 21, 2012

In January 2009, Al Jazeera launched a pioneering initiative: At the time, restrictions imposed by the Israeli military in Gaza prevented international news outlets from reaching the Strip and reporting from within. Al Jazeera, which had the advantage of being the only news outlet with a correspondent on the ground, came up with a creative solution by making its exclusive footage available to be used, remixed, translated and re-broadcasted by everybody, including competitors.

Three years later, a similar situation is happening with Syria. Shortage of news is dramatic and reports from within the country are rare and often require that journalists' lives are put at risk in order to gather information. This is why it is key to have initiatives such as Syria Deeply, a news aggregator launched two weeks ago by a team of journalists and technologists headed by seasoned reporter Lara Setrakian.

Syria Deeply is a news platform that aims to redesign the user experience of the Syria story, for greater understanding and engagement around a complex global issue.

This is a major step in crisis reporting and will allow a wider audience to become more aware of the dramatic situation in Syria, fostering a better understanding of a complex issue by adding context and historical information to the headlines.

"I believe technology is the key to getting more and better news to a broader audience," says Setrakian. Open licensing can support this process and spread more and better understanding on Syria-related issues.

(https://creativecommons.org/2012/12/21/syria-deeply-cc-licensed-news-aggregator/)

Now, answer the following questions:

1. What is noble about the initiative of Al-Jazeera in a world where "competition" is the name of the news industry?
2. Explain the term "news aggregator".
3. Why is technology "the key to getting more and better news to a broader audience"?

READING ALOUD: READING A PIECE OF WRITING/AN ARTICLE/ REPORT

Reading Aloud: Where it begins

Children love a bedtime story. Most parents narrate stories to theirchildren. It is a wonderful practice. However, from the point of view ofdeveloping language/communication skills, reading aloud to children has great benefits. As Carl Sagan says, *"One of the greatest gifts adults can give – to their offspring and to their society – is to read to children."*

A brief note on reading aloud to children/students:

1. Develops stronger vocabulary

Language is acquired primarily through listening. When you read aloud, the listener has the opportunity to hear new words in new contexts and this helps in building vocabulary and a stronger awareness of how to use the language for self-expression.

2. Builds connections between the spoken and written word

When you read aloud the learner begins to see how printed words are closely connected to spoken words. It is not always the case that the printed word reflects the spoken word. But there are occasions where sound and sense are connected. The listener is also able to come up with a string of words which rhyme with the spoken word: though these rhyming words are not connected to each other in terms of meaning, listing them is also a great way to build vocabulary.

3. Provides enjoyment

Both children and adults enjoy being read to. The auditory impact of words is relished when someone reads aloud and this practice lights the spark of a lifelong love of reading.

4. Increases attention span

It might be beneficial to note that unlike watching television, reading or being read to, promotes a slower unfolding of events and ideas. This enhances the listening skill, i.e. the ability to pay attention and concentrate: repeated exposure to "listening" has an influence on increasing one's overall attention span.

5. Influences ways of thinking

A well written book exposes you to sophisticated language: When you are regularly exposed to sophisticated language or a well-crafted piece of writing, your way of thinking also undergoes a change because words are basically concepts.

IMPROVING FLUENCY BY READING ALOUD

The practice of reading aloud has a bearing on your fluency. You might wonder how this happens.

Silent reading doesn't exercise your vocal organs (lips, tongue, and throat). Reading aloud does that. The practice of reading aloud, is not only for school children. Even adults can benefit from the exercise of reading aloud. Coming to the question of the correspondence between reading aloud and improving your fluency, here are some points:

1. It brings clarity to your voice
2. It improves pronunciation
3. It boosts confidence and reduces hesitation
4. It is the training ground for public speaking.
5. It is a practice ground for the most important aspects of effective speech, i.e. intonation, pause, emphasis and pace.

How often should you read aloud?

You can devote five or ten minutes a day to reading aloud.

How do I go about this daily exercise?

- The first question is, "What should you read?" You can choose a passage from the newspaper or a short story. You could search the internet for "anecdotes" or "motivational quotes" (you can prepare a list of motivational quotes on a given topic, and read them aloud).
  You can read aloud a list of quotes in the manner suggested below:

> I have listed a few quotes on bravery:
>
> Mahatma Gandhi said, "Bravery is not a quality of the body: it is of the soul."
>
> According to Robert Anthony, "The opposite of bravery is not cowardice, but conformity."
>
> Thomas Fuller wrote, "Fear can keep a man out of danger, but only courage can support him in it."

You may add more quotes to the list given.

- Check online for the correct pronunciation of words if you have doubts regarding pronunciation
- Use the voice recorder on your mobile phone to record your voice.
- List the areas where you need to improve with regard to the following:
  - Pronunciation
  - Intonation
  - Pause
  - Emphasis
  - Pace (not too fast and not too slow)

How often should I read out loud?

- You can start with a session of five minutes per day.
- Increase it to two sessions of five minutes per day.

- Settle into a 10 minute per day session on a regular basis.

Exercise:

In the classroom a group of students can volunteer to read aloud this motivational poem:

Don't Quit
by
John Greenleaf Whittier

Voice 1: When things go wrong as they sometimes will,
Voice 2: When the road you're trudging seems all up hill,
Voice 3: When the funds are low and the debts are high
Voice 4: And you want to smile, but you have to sigh,
Voice 5: When care is pressing you down a bit,
ALL: Rest if you must, but don't you quit.
Voice 1: Life is strange with its twists and turns
Voice 2: As every one of us sometimes learns
And many a failure comes about
Voice 3: When he might have won had he stuck it out;
Voice 4: Don't give up though the pace seems slow—
Voice 5: You may succeed with another blow.
ALL: Success is failure turned inside out—
Voice 1: The silver tint of the clouds of doubt,
Voice 2: And you never can tell just how close you are,
Voice 3: It may be near when it seems so far;
Voice 4: So stick to the fight when you're hardest hit—
ALL: It's when things seem worst that you must not quit

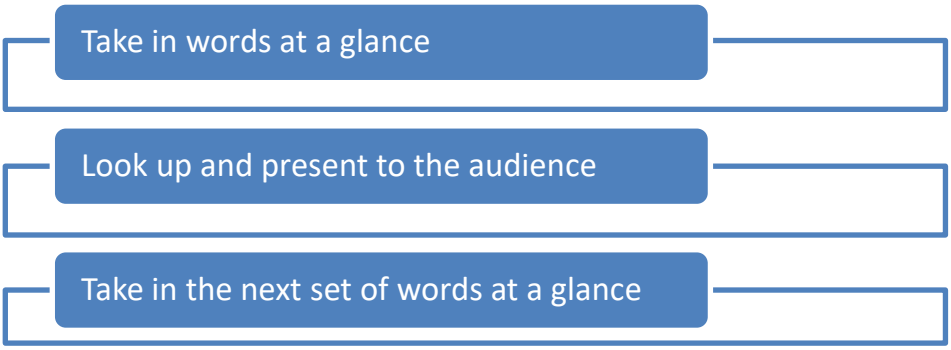
Reading Short Articles, Newspaper Reports and Fact Based Articles.

The best role models you can have when it comes to reading aloud are from newsreaders. Their job requires presence of mind, good pronunciation and command of the language.

Some practical tips for reading from the newsroom:

- Read your script and get familiar with it before you read aloud.

- Do not stare into the page while you read. Take in a couple of words at a glance and look at the audience to which you are presenting the text. Repeat this activity, with every group of words you "take in at a glance." In other words, this is the three-step process which you have to repeat:



Voice Modulation and Intonation are of utmost importance. Without mastery of these two aspects, your listeners will find you boring. **Voice Modulation** is when you control or adjust the volume of your voice to softer and louder tones in order to make an impact and the attention of your listeners to what you are trying to convey. **Intonation** is the rise and fall of your voice,

arising from the words/syllables that are stressed and not stressed in your utterance.

Exercise:

1. Select a brief newspaper report and read it aloud
2. Select a small passage on an achiever in the field of sports/medicine/any other and read it aloud.
3. Prepare a list of quotes on any topic of your choice and read them aloud.

A Little Theatre

Taking part in dramas and plays is a great way of building your ability to read aloud or speak in a public forum. Theatre activities help you to hone your voice modulation, intonation and pronunciation. Read this excerpt (a modern version of a famous passage) from Shakespeare's As You Like It. It is a conversation between Orlando and Rosalind (who are lovers) about Time:

ORLANDO : Why didn't you say "the swift steps" of time instead of the "lazy foot"? Wouldn't that have been just as appropriate?

ROSALIND : No. Not at all, sir. Time travels at different speeds for different people. I can tell you who time strolls for, who it trots for, who it gallops for, and who it stops cold for.

ORLANDO : Okay, who does it trot for?

ROSALIND : Well, it trots for a young woman between the time she gets engaged and the time she marries: the time that's passed may only be a week, but it always feels like seven years.

ORLANDO : Who does time amble for?

ROSALIND : For a priest who doesn't know his Latin or a rich man who is free

from the gout. The one sleeps easily because he isn't up late studying and the other lives merrily because he's free from pain. The first lacks the burden of intense, exhausting study, and the second is spared the burden of heavy, exhausting poverty. Time ambles for both men.

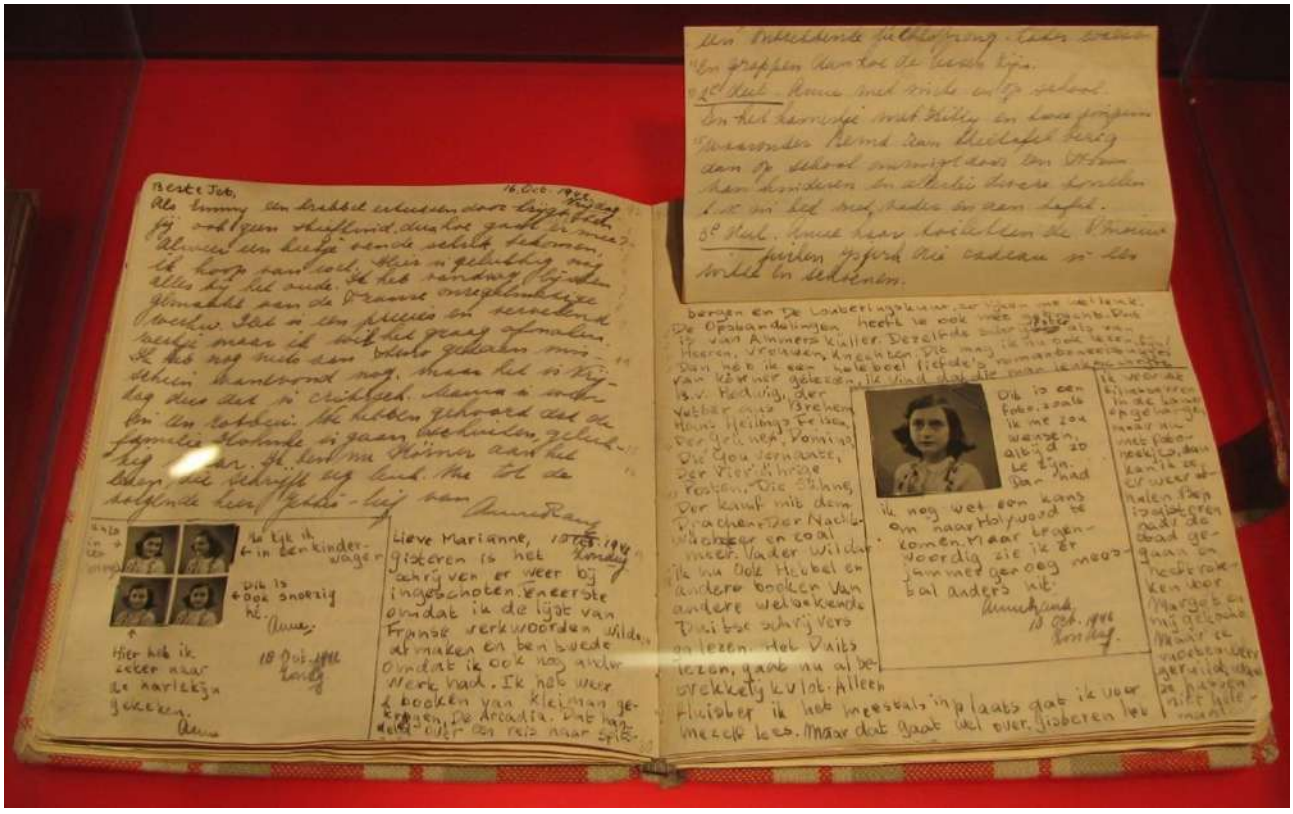
ORLANDO : Who does it gallop for?

ROSALIND : For a thief on his way to the gallows. Such a man walks as slowly as possible and, even so, gets there too soon.

ORLANDO : Who does it stand still for?

ROSALIND : For lawyers on vacation, because they sleep their holidays away, with no sense of how time moves.

JOURNAL (DIARY) WRITING



Picture: Diary entry by Anne Frank (https://commons.wikimedia.org/wiki/File:Anne_Frank_Diary_at_Anne_Frank_Museum_in_Berlin-pages-92-93.jpg)

Journal/diary writing is of great significance in human life. *The Diary of a Young Girl* also known as *The Diary of Anne Frank* proved to be an invaluable document and moving story of the Holocaust, occasioned by Hitler's agenda to exterminate the Jews. Anne Frank was a Jewish teenager, who with her family was in hiding for two years during the Nazi (Hitler's forces) occupation of the Netherlands. They were soon caught by the Nazi's in 1944. Anne died of typhus in a Nazi concentration camp. The only survivor in this family was her father Otto Frank. A person named Miep Giles found Anne's diary and gave it to her father after World War II was over. The diary has been published in more than 60 languages.

With regard to developing our own writing skills, diary writing could play crucial role. Diary entries should not only be about routine activities like:

- I woke up at 5 am today
- I had a bath
- I prayed to God
- I had my breakfast
- I went to college…….

and so on. Apart from these entries, the journal should reflect your thought-life or what you feel about the happenings in your world. Here is an excerpt from the diary of Anne Frank. This was written from her place in hiding:

> November 19th 1942: Mr. Dussel has told us much about the outside world we've missed for so long. He had sad news. Countless friends and acquaintances have been taken off to a dreadful fate. Night after night, green and grey military vehicles cruise the streets. They knock on every door, asking whether any Jews live there. If so, the whole family is immediately taken away. If not, they proceed to the next house. It's impossible to escape their clutches unless you go into hiding. They often go around with lists, knocking only on those doors where they know there's a big haul to be made. They frequently offer a bounty, so much per head. It's like the slave hunts of the olden days……..I feel wicked sleeping in a warm bed, while somewhere out there my dearest friends are dropping from exhaustion or being knocked to the ground. I get frightened myself when I think of close friends who are now at the mercy of the cruelest monsters ever to stalk the earth. And all because they're Jews.
>
> (https://alphahistory.com/holocaust/anne-frank-diary-1942-44/)

There is a difference between reading about the Holocaust through a history textbook and "feeling" the reality through the diary entries of Anne Frank. Please get yourself a copy of this wonderful life-changing book.

How can you begin writing your diary?

As mentioned earlier, merely entering routine activities like the time you woke up/prayed/ate/what you ate doesn't help with regard to developing your power of expression. Your teacher can guide you in the early stages of your venture in writing your diary. Teachers who encourage students to hone their writing skills through the practice of diary writing encourage the students to document/write their experiences by giving them some thought-provoking questions like:

- Did you have any experience that upset you? Did you feel like writing about it?
- Did you witness something on the road/in your neighbourhood that made you think about human life/ society?
- Did something in the natural world (birds, squirrels, trees, sky….) catch your attention? Did you reflect on the beautiful/soul-stirring sight?
- What were the thoughts that crossed your mind when you watched the news on TV? Write your response to any piece of news that made you think deeply.

Alluding once again to the Diary of Anne Frank, we see that she expressed her feelings of sadness about what was happening to the Jewish people in Hitler's regime.

What is a diary in your life's journey?

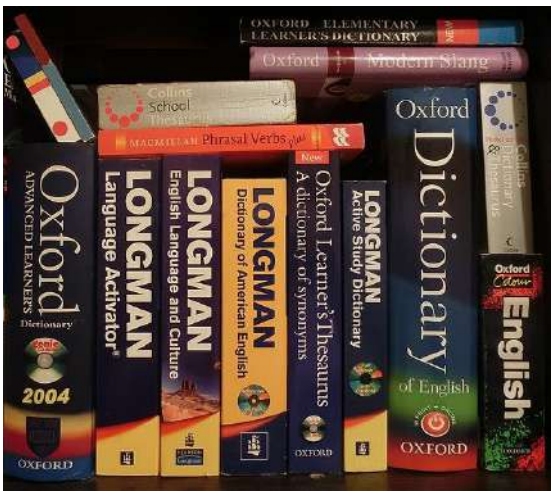
Your diary is an important document, if not for society, for you in your individual journey. You can look back on your entries and see how far you have come. You can revisit happy and sad moments in your life. You can be strengthened by the lessons you learnt from your experiences.

Here are some quotes about the practice of keeping a diary:

- Keep a diary and someday it will keep you – Mac West

- What is a diary as a rule? A document useful to the person who keeps it. Dull to the contemporary who reads it and invaluable to the student, centuries afterwards, who treasures it. - Walter Scott
- I have often been downcast but never in despair; I regard our hiding as a dangerous adventure, romantic and interesting at the same time. In my diary, I treat all the privations as amusing - Anne Frank
- One advantage in keeping a diary is that you become aware with reassuring clarity of the changes which you constantly suffer. - Franz Kafka

STUDY SKILLS – I : USING DICTIONARIES, ENCYCLOPAEDIAS & THESAURUS



Dictionaries

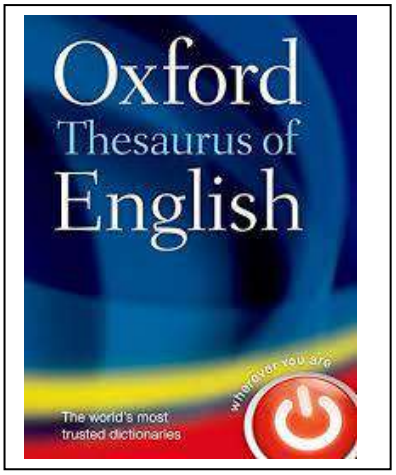
A dictionary is of immense value in building your vocabulary. A learner's dictionary such as the *Oxford Learner's Dictionary* or the *Oxford Advanced Learner's Dictionary* (OALD) is recommended. The OALD provides

- Synonyms
- Collocations (words which go together)
- Phrasal verbs and idioms
- Topic dictionaries
- Wordlists
- Guided activities to improve your writing

1. *The Oxford Learner's Dictionary of Academic English* (OLDAE) is useful for students as the meanings of words vary when used in the technical sense. For example, the OLDAE defines the word 'significance' in the context of statistics as 'the extent to which a result is different from what would be expected from random variation or errors'. This is a technical definition. When required, you can use subject labels pertaining to your discipline to help you skip quickly to the meaning that fits your context. For example, the meaning of 'reaction' under the subject label 'chemistry' is more technical than the general meaning.

If you are looking for a bilingual dictionary, ensure that you go in for a standard one. The Oxford English-English-Tamil Dictionary is used not only by learners but translators as well.

Use the Thesaurus



A thesaurus is a type of dictionary in which words with similar meanings are arranged in groups. A thesaurus provides a list of synonyms. A synonym is a word or phrase that means exactly or nearly the same as another word or phrase. For example, *shut* is a synonym of *close.* A thesaurus is also handy in finding antonyms (the opposite). When you write reports or articles, a thesaurus will come to your aid and help you to avoid repeated use of a word. You will also realize as you get familiar with using the thesaurus that you will get into the habit of using the most appropriate word for what you wish to express.

Encyclopaedia: The best way to begin research

You must have heard that "smart work" is as important as "hard work". Using an encyclopaedia is "smart work". You must have guessed by now why an encyclopaedia is the place to begin your research. In short, it is a time-saver and helps you to a wider range of resources. If you have to map what an encyclopaedia can do for you, your map will look like the central nervous system. The encyclopaedia can connect you so extensively and so intrinsically. These are the reasons why the use of an encyclopaedia is highly recommended when you embark on an assignment or project.

- Encyclopaedias are catalogues of topics**.**
- Most encyclopaedia articles are short (saving you time!).
- Subject experts have condensed it down, usually to one or two pages. (on the other hand the same topic might be covered in 900 pages in a book).
- The information is authentic vis-à-vis, information on many open sources on the internet such as Wikipedia.

- Encyclopaedia articles mention and define search terms you can use in database searches (concepts, names, processes).
- Online encyclopaedias have hyperlinks to related subjects and that is why it is like the central nervous system! The connections are intricate and extensive, encompassing all knowledge.
- Encyclopaedias give you a list of references /further reading.

GRAMMAR IN CONTEXT: NAMING AND DESCRIBING

NOUNS& PRONOUNS

Lesson 1

Nouns, as you know are "naming words". Before we explore how we can enrich our knowledge of nouns and their use, lets engage with a motivational story:

Motivational Text:

The Potatoes, The Eggs and The Coffee Beans

"Once upon a time a daughter complained to her father that her life was miserable and that she didn't know how she was going to make it. She was tired of fighting and struggling all the time. It seemed just as one problem was solved, another one soon followed.

Her father, a chef, took her to the kitchen. He filled three pots with water and placed each on a high fire. Once the three pots began to boil, he placed potatoes in one pot, eggs in the second pot, and ground coffee beans in the third pot.

He then let them sit and boil, without saying a word to his daughter. The daughter, moaned and impatiently waited, wondering what he was doing.

After twenty minutes he turned off the burners. He took the potatoes out of the pot and placed them in a bowl. He pulled the boiled eggs out and placed them in a bowl.

He then ladled the coffee out and placed it in a cup. Turning to her he asked. 'Daughter, what do you see?'

'Potatoes, eggs, and coffee,' she hastily replied.

'Look closer,' he said, 'and touch the potatoes.' She did and noted that they were soft. He then asked her to take an egg and break it. After pulling off the shell, she observed the hard-boiled egg. Finally, he asked her to sip the coffee. Its rich aroma brought a smile to her face.

'Father, what does this mean?' she asked.

He then explained that the potatoes, the eggs and coffee beans had each faced the same adversity– the boiling water.

However, each one reacted differently.

The potato went in strong, hard, and unrelenting, but in boiling water, it became soft and weak.

The egg was fragile, with the thin outer shell protecting its liquid interior until it was put in the boiling water. Then the inside of the egg became hard.

However, the ground coffee beans were unique. After they were exposed to the boiling water, they changed the water and created something new.

'Which are you,' he asked his daughter. 'When adversity knocks on your door, how do you respond? Are you a potato, an egg, or a coffee bean?'

(Source: https://www.moralstories.org/struggles-of-our-life/)

Exercise 1

As the focus of this lesson is 'naming' (i.e. use of nouns) and describing (use of adjectives), can you list the nouns and adjectives in the story you have read?

Exercise 2

Using the nouns you are familiar with from the passage given, complete the following sentences

1. A person for whom cooking is a profession is known as a _____
2. There is a proverbial expression which says, "Don't add fuel to the _____"
3. This endless argument is like asking, "Which came first, the chicken or the_____?"
4. The empowered woman doesn't spend her life in the _____: just cooking and cleaning _____ and pans.
5. You should be emotionally strong in times of _____

Exercise 3

Using the adjectives you are familiar with from the passage given, complete the following sentences

1. Having lost her wallet, she felt _____
2. Handle with care: _____glassware inside.
3. _____garam masala is sprinkled before serving.
4. There are two types of water, _____water and _____water.
5. He complained of_____fever.

NOUNS

Nouns are naming words. They could be names of people, animals, places, things, ideas, feelings and concepts.

TYPES OF NOUNS

Proper Noun and Common Noun

Karthik is an intelligent boy (proper noun)
Karthik is an intelligent boy (common noun)
Chennai is a city (proper noun)
Chennai is a city (common noun)

Concrete Noun and Abstract Noun

The artist has his brush and paint (concrete noun)
There is fish in the tank (concrete noun)
When adversity knocks on your door, how do you respond? (abstract noun)
The egg had lost its fragility (abstract noun)

Collective Noun

The police controlled the mob
I live with my family
The crowd gathered

Countable Noun and Uncountable Noun

I have many books (countable noun: plural allowed)

You have a lot of knowledge (uncountable noun: no plural)
Apples are good for health (countable noun: plural allowed)
Milk is also good for health (uncountable noun: no plural)

Exercise 4

List some of the nouns that you already know

Proper Nouns	Common Nouns	Concrete Nouns	Abstract Nouns	Collective Nouns	Countable Nouns	Uncountable Nouns

Enrich Your Vocabulary:

In the motivational story, The Potatoes, The Eggs and The Coffee and The Beans, there are two key words (nouns) – 'chef' (a professional) and 'adversity' (a circumstance), which is also an abstract noun.

Here are some words from the world of a chef

- Related to food preparation and varieties: cuisine, menu, gourmet, ingredients, dishes (food items)
- Action words – heat, bake, grill, sauté, roast, knead (dough), stir, fry, chop, mince, boil, grind, powder, garnish
- Words related to taste: spicy, bland, tangy, sour, tasty, insipid, crunchy, soft, palatable

'Adversity' is a circumstance. Find the synonyms for 'adversity' and 'prosperity'

Make a list of ten abstract nouns (For example: love, childhood, bravery)

Express Yourself

1. Describe some of the cuisines (in India or other parts of the world)
   (Suggestion: The teacher can divide the class into zones and each can choose a cuisine of a region. For example, North Indian cuisine, South Indian cuisine, Greek cuisine, Thai cuisine, Italian cuisine etc. The students can explore different types of cuisine and make a group presentation before the class)

Work in pairs

1. Describe to your partner, your favourite dish, how it is prepared and how it tastes.
2. Talk to your partner about any one of the abstract nouns you have listed.

LESSON 2

Motivational text:

"To become really good at anything, you have to practice and repeat, practice and repeat, until the technique becomes intuitive." Paolo Coelho

ASPECTS OF NOUNS

In this section we will be considering the following aspects of nouns namely, 'number', 'gender' and 'case'.

Number

S.No	How to form the Plural	Singular	Plural
1.	By adding 's' after the noun	Book, pen, lamp	Books, pens, lamps
2.	By adding 'es' after sibilant sounds of 'ch','s', 'sh' and 'x'	church, bus, brush, box,	Churches, buses, brushes, boxes,
3.	By substituting 'y' when it is 'preceded by consonant with 'ies'	City, county, country	Cities, counties, countries
4.	By adding 's' to a word which ends with 'y' and is preceded by a vowel sound	Boy, toy, joy	Boys, toys, joys
5.	By substituting 'fe/fe' with 'ves' when the 'f/fe' ending is preceded by a vowel	Wife, thief	Wives, thieves
6.	By adding's' for a word ending with 'f' and where 'f' is preceded by a vowel	Roof	Roofs
7.	By adding 's' or 'es' to a word ending with'o'	Disco, tomato	Discos, tomatoes
8.	Irregular plural forms	Man, child, mouse, tooth, goose, foot, ox	Men, children, mice, teeth, feet, oxen
9.	Precede these words (scissors, trousers,	A pair of scissors A pair of trousers	

	shorts) which always have a plural form with "a pair of"	A pair of shorts	
10.	Certain collective nouns are always used as plurals	People, cattle	
11.	Some nouns have the same form in both singular and plural	Sheep	
12.	The case of compound nouns like daughter-in-law, son-in-law	Daughter-in-law Son-in-law	Daughters-in-law Sons-in-law

No Singular Form & No Plural Form

No Singular Form	**No Plural Form**
Cattle	News
Trousers	Information
Scissors	Measles
Pliers	Furniture
Police	Baggage
Glasses/Spectacles	Advice
Pants	Knowledge
Shorts	Rubbish

Task 1

Fill in the blanks from the list of words given above (No Singular Form & and No Plural From)

1. My mother is a good seamstress. She needs a new pair of _____
2. You can cut the wire. I have a pair of _____in my tool kit
3. I'll be going to the beach in a pair of _____
4. I am not able to read without my _____
5. The television is awash with _____about the President's visit
6. Of the new _____ we got for our home, I like the sofa.
7. Some people do not listen to the _____given by their well-wishers.
8. The _____is on the notice board.
9. The flight arrived on time. But our _____came late.
10. The _____are the law enforcing agency.

Task 2

Fill in the blanks with the Singular/Plural

Singular	Plural
	Feet
Knife	

Baby	
Watch	
	Teeth
	Media
Shelf	
Dictionary	
	Taxes
Industry	

Gender

In human beings

Masculine form of noun	Feminine form of noun
Father	Mother
Husband	Wife
Son	Daughter
Nephew	Niece
Uncle	Aunt

Among animals

S.No.	Animal	Male	Female	Young
1.	Ass	Jackass	Jenny Ass	Foal of an ass
2.	Chicken	Rooster/Cock	Hen	Chick
3.	Deer	Buck	Doe	Fawn
4.	Dog	Dog	Bitch	Pup
5.	Sheep	Ram	Ewe	Lamb
6.	Goose			
7.	Whale			
8.	Swan			
9.	Horse			
10.	Rabbit			

Complete the list given above (Fill in the blanks from S.No.6 to10)

Case

Subjective Case/ Nominative Case	**Objective Case/ Accusative Case**	**Possessive Case (By adding apostrophe)**
Senthil likes Vijayan (**Who** likes Vijayan?)	Senthil likes **Vijayan** (**Whom** does Senthil like?)	This is **Senthil's** pen (**Whose** pen?)
The **lion** attacked the deer (**What** attacked the	The lion attacked the **deer** (**What** did the lion attack?)	This is the **lion's** den (**Whose** den?)

deer?)		

- When a noun is used as 'subject', it is in the 'subjective/nominative case' and answers to the questions 'who' and 'what'
- When a noun is used as 'object', it is in the 'objective/accusative case' and answers to the questions 'whom' and 'what'
- Guidelines for forming the possessive case are as follows:
  - By adding apostrophe + s to singular nouns, e.g. Senthil's pen, lion's paws, boss's room
  - By adding apostrophe + s to plural nouns, e.g. men's college, women's college
  - By adding only apostrophe after the 's' in plural nouns, e.g. boys' school

Enrich Your Vocabulary:

The motivational text at the beginning of Lesson 2 states, "To become really good at anything, you have to practice and repeat, practice and repeat, until the technique becomes intuitive." (Paolo Coelho).

1. What is meant by "intuition"?
2. Explore how you can use these words: vision, foresight, astute, perceptive, acumen

Express Yourself:

1. Gender is one of the aspects of nouns. Even the animal world (in most cases) has different names for male and female of the same species (E.g. lion, lioness). The human world is also divided into 'man' and 'woman'. Does the human world have a gender divide which cannot be bridged? Share your views.

LESSON 3

Motivational text:

"A boss says, "Do that". A leader says, "Let's do this." - Jeremy Kingsley

PRONOUNS

Pronouns are used instead of nouns. For example, "Mohan is a cricketer. He plays for the state.". Here "he" is a pronoun because it refers to Mohan.

I. Personal Pronoun

The pronouns, I, We, You, He, She, It, are called personal pronouns because they refer to the particular person(s) discussed in that sentence. Different forms (Cases) of the personal pronoun are used according to the position of its usage, like that is j

Subject form	Object Form	Possessive Adjective form (Possessive Case)	Possessive Pronoun form (Genitive Case)
First person			
I am a student	The teachers like **me**	This is **my** class This is **our** class	**Mine** is interesting **Ours** is interesting
We are students	The teachers like **us**		
Second Person			
You are a student	The teachers like **you**	This is **your** class	**Yours** is interesting
Third Person			
He is a student	The teachers like **him**	It is **his** class	**His** is large
She is a student	The teachers like **her**	It is **her** class	**Hers** is large
It is a cat	Children like **it**	This is **its** tail	**Its** is white
They are students	The teachers like **them**	**It** is their class	**Theirs** is large
Nouns are always Third person			
Balu is a student	The teachers like **Balu**	It is **Balu's** bag	**Balu's** is red
Question Words (Interrogative Pronouns)			
Who **What**	**Whom** **Where**	**Whose** **Which**	--- ---

From the above chart you can infer that pronouns take different forms in different positions. Consider the sentence, "He is a good student, and the teachers like him." Both 'he' and 'him' refer to the same person, but different forms and cases are used because 'He' is a subject and 'him' is an object. Not only personal pronouns, but other types of pronouns (given below), have cases depending on the structural position of their usage in a sentence.

II. Reflexive Pronouns: They are the pronouns used as objects in sentences wherein the action of the subject reflects upon the subject itself as illustrated below:

I hurt **myself**
You hurt **yourself**
He hurt **himself**
We hurt **ourselves**
You hurt **yourselves**
They hurt **themselves**

She hurt **herself**
It hurt **itself**

III. Emphatic Pronoun/Intensive Pronoun: They are the pronouns used to refer to the **subject** itself for emphasis as illustrated below:

I **myself** prepared the food. We **ourselves** prepared the food.	I prepared the food **myself.** We prepared the food **ourselves.**
You **yourself** prepared the food.	You prepared the food **yourself**
You **yourselves** prepared the food.	You prepared the food **yourselves.**
He **himself** prepared the food.	He prepared the food **himself.**
She **herself** prepared the food.	She prepared the food **herself.**
They **themselves** prepared the food.	They prepared the food **themselves.**

IV. Reciprocal Pronouns

When there is an exchange of some kind between two people, the reciprocal pronouns 'each other' and 'one another' are used. There is very little difference between 'each other' and 'one another' and we can normally use them in the same places.
Love one another/ Love each other
We phone each other/one another regularly
We've known each other/one another for twelve years.

V. Demonstrative Pronouns: Demonstrative pronouns are 'pointers': they point out/point to something as seen in the examples given below:
This is interesting These are interesting

That is wonderful Those are wonderful

VI. Indefinite Pronouns: Indefinite pronouns can refer to everybody/everything of a group of nouns in a general way as illustrated below:

Everybody likes a good meal You cannot trust **anybody**

(Everybody is used in a positive sentence and 'anybody' here is used to convey a negative message)

Somebody will be interested in it. **Nobody** can do this

Everything will be done He cannot do **anything**

(Everything conveys a positive meaning here and anything in this sentence conveys a negative meaning)

Something is going to happen **Nothing** can stop him

One should have hope **None** can be so good

All are singing **Some** are good

You can meet any of them **Each** may donate as they please

Few will object to this **Many** will appreciate this.

Other indefinite pronouns include the following:

enough, fewer, less, little, much, several, more, most, both, either and neither

Some of these pronouns like 'few and many' are used for countable nouns and other others like 'little and much' for uncountable nouns.

VII. Distributive Pronouns

Distributive pronouns refer to all persons/things in a group of nouns but one at a time as illustrated below:

I will give you a chocolate, **each** **Each** of them will get a chocolate

We can buy apples at Rs.20/- **each** We can buy **each** apple for Rs.20/-

Either of them can participate. I like **neither** of them.

VIII. Interrogative Pronouns: When the possible question of words of pronouns, namely 'who, whom, whose, what and which,' are used in questions, they are called interrogative pronouns.

IX. Relative Pronoun: Relative pronouns are similar to interrogative pronouns, but used in clauses.

Exercise 1

Imagine that Ravi is your friend and that you are relating something about him to an acquaintance. Choose the correct personal pronoun from the one given in brackets to complete what you have to say about Ravi:

Ravi and I have been buddies for ages. Now _____(I/my/me) am a Professor at Chemistry at Guru Nanak College and _____(he/his/him) is a Professor of Chemistry at Vivekananda College. _____(We/ us) met two decades ago. Our families also became friends. _____(he/his/him) father and my father were colleagues at the Southern Railway office. _____(We/us) lived in the Railway Quarters and so did _____(they/their/them). When _____(they/their/them) bought _____(they/their/them) own house, they moved out of the quarters. A few years later _____(we/us) bought our own house and went to live there. _____(Our/we/us) friendship didn't fade. Both of _____(we/us) joined the same college and the same course as well! I used to share my class notes with _____(him/he) when he couldn't make it to college. He also shared _____(he/his/him) with me, whenever required. We studied together, but did_____(our/we/us) projects independently. He got the first prize for _____(he/his/him) and I got the second prize for _____(me/mine). When Ravi congratulated me, he said, "I like _____(you/your) project. _____(it/its) awesome." I replied, "I think _____(you/yours) is the best. You deserve the first prize."

Exercise 2

Fill in the blanks with a suitable reflexive pronoun or emphatic pronoun:

1. I _____learned painting
2. I taught _____painting.
3. They put _____into unnecessary trouble by fighting with their neighbours
4. She blamed _____for her poor performance
5. The dog hurt _____

Exercise 3

Fill in the blanks with suitable reciprocal pronouns:

1. At the end of the tennis match the players congratulated _____
2. Friends should support _____
3. Love _____
4. Siblings should care for _____
5. In a crisis we should be there for _____

Exercise 4

Fill in the blanks with suitable demonstrative pronouns, indefinite pronouns or distributive pronouns. Choose the appropriate form from the list given below.

all, anybody, each, either, everybody, everything, few, many, neither, nobody, none, nothing, one, somebody, such, that, this, these, those.

1. You should not give it to _____
2. _____is welcome.
3. _____are welcome.
4. _____ father nor mother responded to the call from the Principal.
5. _____parent can sign to acknowledge receipt of the report card.
6. Donate your books to the Book Bank or Library. They might be useful to _____.
7. Give _____child a notebook and a pencil.
8. Buddha gave up _____for his spiritual quest.
9. _____is my wife and _____are my children.
10. The mangoes on _____tree are not as good as _____from the other tree.

Enrich Your Vocabulary

1. The motivational text, "The boss says, "Do that". A leader says, "Let's do this." is an insight into what makes a person a good leader.

You can add to this word list of the qualities of a good leader:

i. Respectful
ii. Responsible
iii. Systematic
iv. Organized
v. Transparent

2. Refer to Martin Luther King Jr's "I Have a Dream" speech (https://www.americanrhetoric.com/speeches/mlkihaveadream.htm) and observe his use of 'I' and 'We'. Make two lists of sentences - one list of sentences where he uses 'I' and the other list showing his use of 'We'

Express Yourself

1. Read this story and comment on the moral of the story:

It's Not My Job

This is a story about four people named Everybody, Somebody, Anybody and Nobody. There was an important job to be done and Everybody was sure that Somebody would do it. Anybody could have done it, but nobody did it. Somebody got angry about that, because it was Everybody's job. Everybody thought that Anybody could do it, but nobody realized that Everybody wouldn't do it. In the end Everybody blamed Somebody when Nobody did what Anybody could have done!

(https://www.englishclub.com/grammar/pronouns-notmyjob.htm)

2. An egotist often uses the pronoun 'I'. Often an egotist is jokingly referred to as an "'I' specialist." S/He boasts about himself/herself and 'I' occurs frequently in their speech. Write five sentences which form the speech of an egotist.

ADJECTIVES

Adjectives, as you might already know, are words that are used to describe or modify nouns or pronouns. Adjectives give more information about a noun or pronoun.

Listen to this song from the famous film *The Sound of Music*. Sing along and enjoy it.

https://www.youtube.com/watch?v=urCTUyKzTzc

Raindrops on roses
And whiskers on kittens
Bright copper kettles and warm woolen mittens
Brown paper packages tied up with strings
These are a few of my favorite things
Cream-colored ponies and crisp apple strudels
Doorbells and sleigh bells
And schnitzel with noodles
Wild geese that fly with the moon on their wings
These are a few of my favorite things
Girls in white dresses with blue satin sashes
Snowflakes that stay on my nose and eyelashes
Silver-white winters that melt into springs
These are a few of my favorite things
When the dog bites
When the bee stings
When I'm feeling sad
I simply remember my favorite things
And then I don't feel so bad
Raindrops on roses and whiskers on kittens
Bright copper kettles and warm woolen mittens
Brown paper packages tied up with strings
These are a few of my favorite things
Cream-colored ponies and crisp apple strudels
Doorbells and sleigh bells and schnitzel with noodles
Wild geese that fly with the moon on their wings
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Girls in white dresses with blue satin sashes
Snowflakes that stay on my nose and eyelashes
Silver-white winters that melt into springs
These are a few of my favorite things
When the dog bites
When the bee stings

When I'm feeling sad
I simply remember my favorite things
And then I don't feel so bad

(Songwriters: Oscar Hammerstein / Richard Rodgers)

Can you recognize the "favourite things" depicted in the picture? (Hint: The images are in the same order as they are in the song)

Exercise 1

List the 'describing words' in the song Favourite Things

1. List the phrases where there is only one adjective before the noun. (Examples: favourite things, white dresses…….)

2. In some phrases, two adjectives precede a noun as in "bright copper kettles". You should be able to spot four such phrases.
3. There are two hyphenated adjectives. One is "cream-coloured". Spot the other one.
4. Raindrops is a noun and a compound word. Can you spot the other two compound nouns in the song?
5. In these expressions "feeling sad" and "feel bad" the words "sad" and "bad" are adverbs/adjectives (Tick the right answer)

Exercise 2

1. "These are a few of my favourite things" is a refrain in the song. What is the difference between "These **few** are my favourite things" and "These are **a few** of my favourite things"?

2. The song says, "When I'm feeling sad, I simply remember my favourite things and then I don't feel so bad."

   Substitute the word sad with other adjectives from the list given below and form more sentences of your own in the following structure:
   When I'm feeling _____, I _____.
   (for example: When I'm feeling <u>lonely</u>, I <u>listen to music</u>.)

   lonely happy unhappy angry excited anxious bored

3. Fill in the blanks with words which describe the "favourite things" or "favourite" people young children, teenagers and adults turn to when they feel sad. The first one is done as an example.

Young Children	Teenagers	Adults
<u>Cuddly</u> toys	_____food	_____books
_____games	_____music	_____TV programmes
_____dress (girl child)	_____friends	_____food
_____friend	_____mother/father	_____friends
_____sweets	_____brother/sister	_____dress
_____parent	_____games	_____companion

If you would like to strengthen your knowledge of adjectives and the place of an adjective/s in a sentence, you have to explore the following:

1. Where adjectives go in a sentence
2. Adjectives with '-ing' and '-ed'
3. Adjective order
4. Adjectives of quantity (many, much, few, little)

5. Comparative and superlative adjectives
6. Intensifiers

1. **Where adjectives go in a sentence**

Most adjectives can be used **in front of a noun**:
Deepak and his wife have a **beautiful house**.
They saw a very **exciting film** last night.
Or **after a link verb** like be, look or feel:
Their house **is beautiful**.
That film **looks interesting**.

Exercise 3

In some of the sentences given below the adjective is in the wrong place. Correct those sentences

- I saw a really good movie last night.
- My brother has got two young children.
- I didn't know your mother Chinese was.
- Are you OK? You look terrible!
- I've just bought a new printer.
- This food doesn't very good smell. How old is it?
- They're building a factory big next to our home.
- Russia can be a country very cold in the winter.
- Sorry, can you stop the car? I feel sick.
- I'd like to see that new Hindi film. It interesting sounds.

Adjectives with '-ing' and '-ed'

A lot of adjectives are made from verbs by adding *–ing*or-*ed*:

***-ing* adjectives**

The commonest *–ing* adjectives are:
amusing, annoying, boring, exciting, disappointing, interesting
shocking, surprising, frightening, tiring, worrying,
Examples:
I saw a very **interesting** programme on TV today.
That film was absolutely **boring**.

***-ed* adjectives**

The commonest *–ed* adjectives are:
annoyed, excited, bored, frightened, closed, tired, delighted, worried, disappointed
Examples:
We had nothing to do. We were really **bored**.
I didn't really enjoy the film. Most of the time I was **bored***.*

Exercise 4

Choose from the '-ing' and '-ed' adjectives' given in the box

delighted, annoying, boring, frightening, amusing, exciting, frightened, excited, bored, annoyed,

When we travelled this summer, in the same compartment, there was a family travelling with their little girl. We enjoyed her company. She was _____ing. We were _____ted to listen to her. On the other hand, there were a few people who spoilt our journey. They were _____ing because they talked loudly after 9 pm (which is bedtime). We were _____ed with them and so were the others who travelled in that compartment. The train passed through the Western Ghats. It was _____ning when we travelled through tunnels. It was also _____ing. That is what adventure is. We are _____ned when it is scary and _____ted when it is over. There's one thing, we can say forsure. The journey was not_____ing. We were not _____red even for a moment.

Adjective order:

i). Two adjectives:

We often have two **adjectives** in front of a **noun**:

a beautiful young woman
a fierce black panther
that ***intelligent young*** *man*

Exercise 5

Match the adjectives and the noun:

Adjectives	Noun
lazy little poor old crazy young big old creamy white tasty red sweet juicy old stale	Bread mango strawberry soup mansion artist beggar boy

ii) Two adjectives which are hyphenated:

part-time, long-term, second-hand, half-hearted, far-fetched, time-consuming, well-known, hand-made, good-looking, world-famous, hard-working, broad-minded, bad-tempered, broken-hearted, self-confident, low-paid.

Exercise 6

Find as many associations as you can for each of the hyphenated words given: (the first one has been done for you)

Adjective	Associated Noun
broken-hearted	lover, friend, mother, brother, father, sister, wife,
self-confident	
hard-working	
bad-tempered	
low-paid	
world-famous	
time-consuming	
well-known	
broad-minded	
long-term	

Some adjectives give a general opinion.

To describe almost any noun, we can use the following adjectives:

good, nice, awful, bad, beautiful, important, lovely, brilliant, wonderful, strange, excellent, nasty

He's a **good/wonderful/brilliant/bad/dreadful** *person*

That's a **good/wonderful/brilliant/bad/dreadful** *book.*

Some adjectives give a specific opinion.

We only use these adjectives to describe particular kinds of noun, for example:

Food	Furniture	Buildings	People	Animals
delicious tasty tasteless sumptuous bland, spicy cold, warm	comfortable uncomfortable regal expensive cheap old, new impressive	tall lofty spacious impressive imposing stately old new	clever, intelligent, friendly, hostile benevolent, cantankerous venomous vindictive, helpful, unhelpful, kind, unkind, dependable responsible, generous, aggressive,assertive arrogant, audacious annoying, irritating smart	fierce clever intelligent friendly hostile ferocious huge,large, small, big,

We usually put a general opinion in front of a specific opinion:

a **nice tasty** *soup*
a **nasty uncomfortable** *armchair*
a **lovely intelligent** *animal*

We usually put an opinion adjective in front of a descriptive adjective:

A **nice red** *dress*
a **silly old** *man*
those **horrible yellow** *curtains*

Adjectives after link verbs

We use some adjectives **only after a link verb**:
For example: The bus **was late**
The following adjectives are used after a link verb:
afraid, ill, alive, alone, asleep, content, glad, ready, sorry, sure, unable, well
For instance,

1. The child **was afraid**
2. He **is content** with what he earns.

Some of the commonest –*ed* adjectives are normally used only **after a link verb**:
annoyed, bored, finished, pleased, thrilled :
Our teacher **was ill***.*
My uncle **was** *very* **glad** *when he heard the news.*
The policeman seemed **to be** *very* **annoyed***.*

Sometimes we have **three** adjectives in front of a noun, but this is **unusual**:
a **nice handsome young** *man*
a **big black American** *car*
that **horrible big fierce** *dog*
It is **very unusual** to have **more than three** adjectives.

Adjectives usually come in this order:

1	2	3	4	5	6	7	8	The rest of the sentence
General opinion	Specific opinion	Size	Shape	Age	Colour	Nationality	Material	
That nice	Handsome			young man				joined the army
The		Tall			black	Arabian horse		turned out to be the winner

Comparative adjectives

We use **comparative adjectives** to show change or make comparisons:

*This bike is certainly **better**, but it's far **more expensive**.*
*I'm feeling **healthier** now.*
*We need a **bigger** house.*

We use *than* when we want to **compare one thing with another**:

*Sneha is two years older **than I***
("Sneha is two years older than me" is also correct)
*Delhi is much bigger **than** Bangalore.*
*He is a better player **than** Ganguly.*
*Australia is a bigger country **than** New Zealand.*

When we want to **describe how something or someone changes** we can use two comparatives with *and*:

*The balloon got **bigger and bigger**.*
*Everything is getting **more and more expensive**.*
*Grandfather is looking **older and older**.*

We often use *the* with comparative adjectives to **show that one thing depends on another**:

***The sooner** you do your work, **the better** for us.*
(= When you do your work soon, it is better.)
***The higher** they climbed,* **the colder** *it got.*
(= When they climbed higher, it got colder.)

Superlative adjectives

We use *the* with **superlative adjectives**:

*It was **the sunniest day** in December.*
*Everest is **the highest mountain peak** in the world.*
*That's **the best film** I have seen this year.*
*I have three sisters: Rekha is **the oldest** and Anjali is **the youngest**.*

How to form comparative and superlative adjectives

We usually add *–er* and*–est* to **one-syllable words** to make comparatives and superlatives:

Cold	Colder	Coldest

Old	Older	Oldest

If an adjective **ends in –*e***, we add–*r*or–*st*:

nice	*Nicer*	*Nicest*
large	*Larger*	*Largest*

If an adjective **ends in a vowel and a consonant**, we double the consonant:

big	*bigger*	*Biggest*
fat	*fatter*	*Fattest*

If an adjective **ends in a consonant and –*y*,** we change –*y* to –*i* and add –*er* or–*est*:

happy	*happier*	*Happiest*
silly	*sillier*	*Silliest*

We use *more* and *most* to make comparatives and superlatives for most two syllable adjectives and for all adjectives with three or more syllables:

Careful	*more careful*	*most careful*
Interesting	*more interesting*	*most interesting*

However, with **these common two-syllable adjectives**, you can **either** add *–er/–r* and *–est/– st*or use *more* and *most*:

common	*narrow*
cruel	*pleasant*
gentle	*polite*
handsome	*simple*
likely	*stupid*

*He is certainly **handsomer** than his brother.*
*His brother is handsome, but he is **more handsome**.*
*She is one of **the politest** people I have ever met.*
*She is **the most polite** person I have ever met.*
The adjectives ***good***, ***bad*** and ***far*** have irregular comparatives and superlatives:

good	*Better*	*Best*
bad	*Worse*	*Worst*
far	*farther/further*	*farthest/furthest*

- **Intensifiers**

We use words like *very*, *really* and *extremely* to make **adjectives** stronger:

*It's a **very** interesting story.*
*Everyone was **very** excited.*
*It's a **really** interesting story.*
*Everyone was **extremely** excited.*
We call these words **intensifiers**. Other intensifiers are:

amazingly	*particularly*
exceptionally	*remarkably*
incredibly	*unusually*

*We also use enough to say more about an adjective, but enough comes **after** its **adjective**:*
*If you are seventeen, you are **old enough** to drive a car.*
*I can't wear those shoes. They're not **big enough**.*

Intensifiers with strong adjectives
Strong adjectives are words like:

We do not normally use *very* with these adjectives. We do not say something is ~~*very enormous*~~ or someone is ~~*very brilliant*~~.

very big	*Enormous, huge*
very small	*Tiny*
very clever	*Brilliant*
very bad	*Awful, terrible, disgusting, dreadful*
very sure	*Certain*
very good	*Excellent, perfect, ideal, wonderful, splendid*
very tasty	*Delicious*

With strong adjectives, we normally use intensifiers like:

absolutely	*really*
completely	*quite*
exceptionally	*totally*
particularly	*utterly*

*The film was **absolutely awful**.*
*He was an **exceptionally brilliant** child.*
*The food smelled **really disgusting**.*

- **Intensifiers with comparatives and superlatives**

We use these words and phrases as intensifiers with **comparative adjectives**:

much	*a great deal*
far	*a good deal*
a lot	*a good bit*
quite a lot	*a fair bit*

He is **much older** *than me. (*"He is **much older** than I" is also correct)
New York is **a lot bigger** *than Boston.*

We use *much* and *far* as intensifiers with **comparative adjectives in front of a noun**:

France is ***a much bigger country*** *than Britain.*
He is ***a far better player*** *than Ronaldo.*

We use these words as intensifiers with **superlative adjectives**: *easily*, *by far*, *much*:

The blue whale is ***easily the biggest*** *animal in the world.*
This car was ***by far the most expensive****.*

Unit II

1. Listening and Speaking

a. Listening with a purpose
b. Effective Listening
c. Tonal Variation
d. Listening for information
e. Asking for Information
f. Giving Information

2. Reading and Writing

1. a. Strategies of Reading:
   Skimming and Scanning
   b. Types of Reading:
   Extensive and Intensive Reading
   c. Reading a prose passage
   d. Reading a poem
   e. Reading a short story
2. Paragraphs: Structure and types
   a. What is a Paragraph?
   b. Paragraph structure
   c. Topic Sentence
   d. Unity
   e. Coherence
   f. Connection between Ideas: Using Transitional words and expressions
   g. Types of Paragraphs

3. Study Skills II:

Using the Internet as a Resource

a. Online search:

b. Know the keyword:

c. Refine your search:

d. Guidelines for using the Resources:

e. e-learning resources of Government of India

f. Terms to know

4. Grammar in Context

Involving Action-I

a. Verbs

b. Concord

1.Listening and Speaking

Warm up:

- What is your response when your friend cracks a joke?
- When your lecturer is teaching a lesson, how do you listen?
- As a listener did you listen in the same way to the joke and the lecture? Obviously not.
- Is there something about the way we tune in as listeners in different contexts?

a. Listening with a purpose:

Your way of listening varies according to the purpose for which you listen. Look at the purpose for listening and the ways of listening:

Purpose of Listening	**Way of Listening**
Listening for enjoyment	You maintain eye contact, show you understand and react to what is being said
Listening to learn something new	Focus on ideas that are new and think about what you already know
To understand the speaker's point of view, and share your ideas	Listen carefully, observant to find an opportunity to share your ideas
To solve a problem	Listen closely and identify goals and problems; build on those ideas
To follow directions	Listen for words such as first, second, finally; take notes

b. Effective Listening: Make a conscious effort to tune in to the speaker

- focus on the content
- look for familiar words
- Identify the "chunks" of words that give the core meaning of the utterance.

There are four strands of Oracy: Physical (voice and body language), Linguistic (vocabulary, right language use), Cognitive (content, reasoning and structure) and Social and Emotional (audience awareness, confidence in speaking, listening and responding, working with others).

Take a look at the voice element of the Physical. It refers to

- Tonal variation
- Fluency & pace of speaking
- Clarity of pronunciation
- Voice projection

The speaker's intonation and pausing assist you while you listen. Pay attention to the tonal variations.

c. Tonal Variation:

Speech without tonal variation is incomplete and monotonous. So improve your ability to recognise tonal variation.

It is associated with the pitch variation of the voice. A 'tone' is a certain pattern in the pitch of a person's voice which is meaningful in any discourse. It reflects the moods and attitudes of the speaker -- confident, hesitating, agreeing, disagreeing, referring, proclaiming etc., and this helps the listener in deducing the speaker's intended meaning.

Falling tone:

Convey information in a matter-of-fact way:

I live in Tamil Nadu

He is twenty years old.

Wh-questions asked in a casual or neutral way:

Where do you live?

When did you come?

Commands:

Close your books and listen.

Take it away.

Exclamatory:

How nice of you!

What a pity!

Tag questions - When the speaker expects the listener to agree with him:

It's good, isn't it?

They are pretty, aren't they?

Rising tone:

In general questions:

Have you read the novel?

Would you please pass the salt?

Wh-questions when asked with involvement and interest:

When did you arrive?

What did you say?

Yes/No and questions seeking information with polite deference:

Did you like the gift?

Why didn't you join us at lunch?

Falling-Rising Tone:

Doubt or uncertainty (i.e. when you are uncertain what the answer might be)

Have we nearly finished?

Did he know she was there?

Implied meaning in a statement

Well I remember her face (but not her name)

Activity 1:

Listen to the following utterances and identify the tone associated with each of these.

1. What a wonderful surprise!
2. Do you have white sheets?
3. They are heavy, aren't they?
4. Shut the door.
5. Where do you work?
6. Did they ever tell him the truth? (uncertain)
7. Turn left at the junction.
8. Keep quiet.
9. Leave this column blank.

10. What did the manager say? (with polite deference)

Activity 2

Practice the above utterances and check if you are using the right tone.

d. Listening for information

Listen to the following conversation:

Sneha: Hi, I just came to give you the cake I made...

Rajan: Wow, looks yummy...thank you...

Sneha: What's the hurry? Are you going somewhere?

Rajan: Yeah, I'm planning to go to the College Readers' Club.

Sneha: Oh, I didn't know about it.... Where is it?

Rajan: It's on the Trunk Road, near the Hill StationMall... There's so much reading and fun there.

Sneha: Is the club open on all days?

Rajan: No, only on weekends, from 3 p.m. to 7 p.m.

Sneha: What sort of reading taste does it cater to?

Rajan: A wide range - fiction, non-fiction, travelogues, fantasy.... you can even find newly published books.

Sneha: Can we borrow books?

Rajan No lending: You are permitted to read in the library……. There's more to it than the library: they have film screening, group discussions and Quiz programmes which provide us an enjoyable learning experience... Even if you miss going there for a week, no worries, you will find the events updated on the Club webpage.

Sneha: I wish I were a member there...

Rajan: Anyway, it's not too late. All that you need is your college ID card for getting a membership.

Sneha: Is there any membership fee?

Rajan: No, only the College ID card ... It's mandatory.

Sneha: Fine then. Let me quickly go home and get my ID... I'll be back in five minutes....Wait for me... I'll join you.

Rajan: Sure.

Exercises:

A). Complete the following sentences:

1. Rajan was getting ready to go to _____.
2. Sneha hasn't joined the Club yet, because she _____.
3. _____ is mandatory to get membership in the Club.
4. The Club gives an _____ learning experience.
5. The Club functions on weekends from _____.

B). State whether true/false:

Sneha brought a cake for Rajan.

Sneha's house is very far from that of Rajan's.

When Sneha came, Rajan was taking a nap.

Sneha decides to join the Club immediately.

The Club asks for a membership fee of Rs. 200.

C). Answer the following questions:

1. Where is the College Readers' Club located?
2. Does the library lend books?
3. What are the events that are held in the Club?
4. What sort of books can one find in the library?
5. If a member has not visited the Club for a month, how will he/she know about the events?

e. Asking for Information

Phrases used:

In ordinary conversation

1. Do you know..... ?
2. Do you happen to know.....?
3. Can/Could you tell me ....?

4. I'd like to know....
5. Do you have any idea.....?

Formal Occasions

1. I wonder if you could tell me ....
2. I should be interested to know....
3. I hope you don't mind my asking, but.....

Very Informal (among close friends):

1. Any clue....?
2. Any idea.....?

Activity 1:

Frame five questions using the above phrases.

f. Giving Information:

You can start with one of the following phrases

- Formal:
  I'd be happy to answer that.
  It'd be a pleasure to help you.
- Informal:
  Sure.
  No Problem
  Let me see.

If you have no information to help with, you can indicate your inability by using one of the phrases given below:

- Formal:
  I'm afraid I don't have the answer to that.
  I'd like to help you. Unfortunately, I don't know about it".
- Informal
  Sorry, I can't help you out.
  Sorry, but I don't know that.

Activity 2

There is an Exhibition of homemade products being held in the city.

Vandhana **asks** the salesman who comes to distribute sample products **for information** about the products.

Fill in the gaps and complete the conversation:

Vandhana: _____ Sir, how long will the exhibition go on?

Salesman: It's open till October 30th. _____ Sundays too Ma'am.

Vandhana: Oh Good. What _____?

Salesman: We've got a range of homemade items, utility products, homemade masalas, indigenous health drinks and other such items.

Vandhana: _____

Salesman: We sell organic products too.

Vandhana: Nice to know. _____ herbal plants?

Salesman: Yes, a few plant varieties, we do have. But the point is, they get sold out very fast... so if you need to buy herbal plants, please don't delay.

Vandhana: Sure sir. _____to know if Kokum is available?

Salesman: Yes, _____ and we have ordered for more, as the stock is getting over.

Vandhana: _____ Kokum rinds per Kg?

Salesman: Just a minute, please. (He looks at the catalogue) It's Rs.300/- per Kg.

Vandhana: Thank you. _____some tangy Jamun, Hmm.... blackberry squash. Is it available?

Salesman: Yes, it's the _____. (He hands over a packet to

Vandhana)... Kindly accept this sample of homemade snacks. All that we have is of great quality. Do not miss the opportunity Ma'am. We appreciate your patronage.

Vandhana: Thank you .... I'll definitely make it this Sunday.

Activity 3:

Role play: Ask for information about

1. The procedure to apply for a College ID card.
2. A programme in which you wish to participate.
3. A new product that you wish to buy.

Take turns and continue the activity with you being the respondent.

2.READING AND WRITING

Skill: Reading

Warm-up:

- What kind of books do you enjoy reading?
- Are there any books that you found boring?
- How do you go about reading your textbooks? Do you find them easy to read and comprehend?

1. a. STRATEGIES OF READING: SKIMMING AND SCANNING

Skimming and Scanning are useful skills of reading that will help the reader in reading effectively and comprehending the needed information precisely.

In an academic setting, when a book is prescribed, readers tend to skim through description as well as unimportant information, and focus on the passage which is most relevant to the assignment or a term paper on hand. The required information will then be read intensively.

Hence the function of skimming is to get an overall grasp of the text and to gather the required information

Skimming Methods

When you are reading using skimming skills, you will predominantly use the following

☐ Titles, subtitles or the headlines

☐ Contents

☐ Introduction

☐ Synopsis

☐ Chapter beginnings

☐ Paragraph

☐ Bold/Italicised words

☐ Review questions

☐ Conclusion

This strategy of skimming will be useful when you have to write a term paper for which you have to consult a large number of books. Using the above said methods of skimming you will be able to select the books that you might use. Also skim for titles and subtitles to narrow down to your academic requirement. When you are skimming through various books and websites for your assignment, remember to make a note of the sources either in a notebook or in a document on your computer.

Activity 1

Group activity: The teacher pairs the students in the class. In each pair, one is A and the other B. A reads through the text for 7-10 minutes silently and writes a title for each paragraph. **The maximum time given to A is 15 minutes**. The passage worked upon by A (with titles for paragraphs), should be read by B. **Time allotted to B is only 3-5 minutes**. The following passage can be used for this activity.

Questions and instructions to the students in 'A' category:

1. What is the main topic of the passage?
2. Give a suitable title to the passage given.
3. Give a subheading for each paragraph?
4. What difficulties did you face while reading?

SAY NO TO DRUGS

(https://pixabay.com/vectors/no-drugs-sign-healthy-forbidden-156771/)

Drug usage often escalates into abuse. How this happens is not surprising. At a very basic level this happens when the person concerned feels a desperate need to deal with stress or to get a momentary high or to just ‘fit in‘ with his/her peers (which is often the case of youngsters). It soon reaches a stage where it becomes a crutch on which the person is dependent: it reaches a stage where the person begins to believe that his/her survival depends on drugs.

Popular media is one of the major influences on youngsters who have resorted to doing drugs: it is glorified in some television serials and films. Quite often great artists and intellectuals are depicted as people who were misfits in the world system and indulged in drugs to rise above their frustrations with conservative society. For youngsters it becomes a thrilling and seductive affair: they are easily misguided easily because of their relative lack of experience in life. At times, the knowledge of risk factors related to drug abuse can also lure people into using these harmful substances. In certain instances people gain this knowledge from their own families or immediate surroundings and are obviously driven – due to some reason or the other – to give it a try and before they know it, it becomes an addiction.

Brain damage is one of the fallouts of drug abuse and this consequentially affects every other aspect of life of the person who is addicted. The communication system of the human brain is primarily affected: the ways in which nerve cells send, process and receive information is disturbed. One of the ways in which drugs achieve this is by copying the natural chemical messengers of the human brain and over stimulating the brain‘s reward circuit. Drugs such as heroin and marijuana are structured in the same way as chemical messengers known as neurotransmitters.These neurotransmitters are produced naturally by the human brain. As a result of this similarity, the drugs can fool the receptors of the human brain and activate the nerve cells in such a way that they send some abnormal messages.

Drug abuse is associated with euphoric behaviour, which is why users keep on repeating the same action of drug abuse. When this pattern continues the brain tries to adapt to the usage by reducing its own dopamine production as well as dopamine receptors. The user tries to adapt to this

through drug abuse so that his/her dopamine production level can be brought back to a level that seems normal to him/her.

The old adage "Prevention is better than cure" applies to drug abuse as well. Medical practitioners are quite positive about the effectiveness of prevention programmes. According to medical experts and practitioners, it is one affliction which can be easily prevented. Prevention programmes involving families, schools and the immediate communities are important in this regard. Media also has to behave like a responsible power – the media ought to understand its' role in this context and play a positive role by resisting the urge to earn millions by romanticising and glorifying drug abuse. It needs to highlight the alarming and abysmal consequences of drug abuse. It is important that the youth are made to feel that drug usage itself is harmful in every conceivable way and only then will they stop using them and prevent others in their peer group from doing the same.

While "prevention" work is necessary, it is also necessary to reach out to people who have already gone down the road of drug abuse and are highly into it. The treatment for a drug abuser normally depends on the kind of drug that the person has been using. It is said that the best treatments normally emphasise on phenomena related to the individual‛s life. This includes areas such as medical, psychological and work-related needs as well as issues in relationships with other people in the person‛s life.

Questions to individual students in 'B' category:

1. Did the title and sub headings help you read faster?

2. Did they help you in understanding the content better?

3. What are the main issues in the above passage?

4. Were you able to grasp the meaning of the passage in five minutes?

NB: The passage given is only a sample. For effective use of the exercise, the teacher may select and distribute copies of a passage that the students have not seen.

SCANNING

This is a reading skill used for finding out a specific piece of information in a text which has a lot of information. It is a reading strategy where a reader discards a lot of unwanted information, but searches for very specific

information. In skimming an entire text is read fast to get the general information of the text: in scanning the text is used to extract specific information.

Steps to effective Scanning

The reader has to first ascertain how information in a particular text has been classified. This is an effective step in scanning for information from a source.

In some texts information is presented chronologically, as in history books: some texts arrange the information topically, that is the 'Contents' are based on the topics: reference books and edited books are classified topically.

TYPES OF READING: EXTENSIVE AND INTENSIVE READING

Extensive Reading

By definition, extensive reading is "reading for pleasure". Those who love to spend hours with a book are said to engage in extensive reading. In this practice of reading, the reader does not stop to look at the meaning of every unknown word as it hinders the flow of reading. However, the practise of extensive reading is known to improve fluency.

While extensive reading can help in learning English as a second language, learners tend not to go in for extensive reading primarily due to the length of books. For a beginner who sets out to read, it is best to start with short stories that are easily understandable. For example O. Henry's short stories have a very interesting twist in the end. Rabindranath Tagore is also one of the finest short story writers. His stories are filled with humanism and pathos. Choose a good short story to start with and this will slowly help you read novels.

Intensive Reading

Intensive reading happens when a reader reads a text, carefully and intently with absorbed concentration with a view to extract specific information. Intensive reading helps different readers in various contexts. For a person who is learning English as Second Language this becomes an effective tool to learn grammar from a short text or a poem. For those who aspire to clear competitive exams, the practice of intensive reading goes a

long way: these exams test ones' ability to grasp ideas and as well as the ability for logical thinking and reasoning.

A researcher does intensive reading when he/she has to do a review of literature for their research work. A humanities researcher reads through research articles and tries to find a research gap and also find a theoretical framework for her research. A science researcher looks at the findings of earlier researches, studies the scientific methods and then decides on his/her field of research inquiry.

Exercise 1:

Read the following passage and answer the questions.

One of the most popular literary figures in American literature is a woman who spent almost half of her long life in China, a country on a continent thousands of miles from the United States. In her lifetime she earned this country's most highly acclaimed literary award, the Pulitzer Prize, and also the most prestigious form of literary recognition in the world, the Nobel Prize for Literature. Pearl S. Buck was almost a household name throughout much of her lifetime because of her prolific literary output, which consisted of some eighty - five published works, including several dozen novels, six collections of short stories, fourteen books for children, and more than a dozen works of nonfiction. When she was eighty years old, some twenty - five volumes were awaiting publication. Many of those books were set in China, the land in which she spent a great part of her life. Her books and her life served as a bridge between the cultures of the East and the West. As the product of those two cultures she became (as she described herself), "mentally bifocal." Her unique background made her an unusually interesting and versatile human being. As we examine the life of Pearl Buck, we cannot help but be aware that we are in fact meeting three separate people: a wife and mother, an internationally famous writer and a humanitarian and philanthropist. One cannot really get to know Pearl Buck without learning about each of the three. Though honoured in her lifetime with the William Dean Howell Medal of the American Academy of Arts and Letters, in addition to the Nobel and Pulitzer prizes, Pearl Buck as a total human being (not only a famous author) is a captivating subject of study.

1. What is the author's main purpose in the passage?

(A) To offer a criticism of the works of Pearl Buck.

(B) To illustrate Pearl Buck's views on Chinese literature

(C) To indicate the background and diverse interests of Pearl Buck
(D) To discuss Pearl Buck's influence on the cultures of the East and the West

2. According to the passage, Pearl Buck is known as a writer of all of the following EXCEPT
(A) novels (B) children's books (C) poetry (D) short stories

3. Which of the following is NOT mentioned by the author as an award received by Pearl Buck?
(A) The Nobel Prize (B) The Newberry Medal
(C) The William Dean Howell Medal (D) The Pulitzer Prize

4. According to the passage, Pearl Buck was an unusual figure in American literature in that she
(A) wrote extensively about a very different culture
(B) published half of her books abroad
(C) won more awards than any other woman of her time
(D) achieved her first success very late in life

5. According to the passage, Pearl Buck described herself as "mentally bifocal" to suggest that she was
(A) capable of resolving the differences between two distinct linguistic systems
(B) keenly aware of how the past could influence the future
(C) capable of producing literary works of interest to both adults and children
(D) equally familiar with two different cultural environments

6. The author's attitude toward Pearl Buck could best be described as
(A) indifferent (B) admiring (C) sympathetic (D) tolerant
(Passage taken from TOEFL Practice Test 47- January 1993)

Exercise 2:

Let us now try and do an intensive reading of Emily Dickinson’s poem which is both simple and complex at the same time. Answer the questions given below.

“HOPE” IS THE THING WITH FEATHERS

“Hope” is the thing with feathers -

That perches in the soul -

And sings the tune without the words -

And never stops - at all -

And sweetest - in the Gale - is heard -

And sore must be the storm -

That could abash the little Bird

That kept so many warm -

I’ve heard it in the chillest land -

And on the strangest Sea -

Yet - never - in Extremity,

It asked a crumb - of me.

(https://www.poetryfoundation.org/poems/42889/hope-is-the-thing-with-feathers-314, accessed 30.05.20)

Grammar

1. In what tense is the poem written?
2. Pick out the helping verbs?
3. List out the main verbs.
4. Pick out the adjectives.
5. What is the conjunction used very often?

Vocabulary

Find out the meaning of the following words and write what part of speech they belong to.

1. perches
2. gale
3. sore
4. storm
5. abash

Comprehension Questions

a) Look up the meaning of the word, "metaphor" and explain how metaphor is used in the poem?

b) What does the poem say about the way the bird sings?

c) Identify a pair of synonyms in the poem.

d) How are the words, "chillest", "strangest" and "Extremity" connected in the poem?

e) Does hope ask for anything in return?

READING A SHORT STORY

THANK YOU, MA'M
by
LANGSTON HUGHES

Pre-reading Activity:

- Think of the last kind act that you did – a random act of kindness. It may be a simple thing, like that of opening the door for someone who

had luggage in both hands

- How did you feel and what was the reaction of the other person?
- Think of any act of kindness which you've seen
- Volunteer to share these incidents with the class

Know the author:

Langston Hughes is an African American writer, whose poems, plays and novels made him popular in the 1920's. He is often called the "Poet Laureate of Harlem". Harlem is a section of New York City in northern Manhattan. Hughes wrote on the experiences of African Americans.

"When people care for you and cry for you, they can straighten out your soul" Langston Hughes

THANK YOU, M'AM

by

Langston Hughes

She was a large woman with a large purse that had everything in it but hammer and nails. It had a long strap, and she carried it slung across her shoulder. It was about eleven o'clock at night, and she was walking alone, when a boy ran up behind her and tried to snatch her purse. The strap broke with the single tug the boy gave it from behind. But the boy's weight and the weight of the purse combined caused him to lose his balance so, instead of taking off full blast as he had hoped, the boy fell on his back on the sidewalk, and his legs flew up. The large woman simply turned around and kicked him right square in his blue-jeaned sitter. Then she

reached down, picked the boy up by his shirt front, and shook him until his teeth rattled.

After that the woman said, "Pick up my pocketbook, boy, and give it here." She still held him. But she bent down enough to permit him to stoop and pick up her purse. Then she said, "Now ain't you ashamed of yourself?"

Firmly gripped by his shirt front, the boy said, "Yes'm."

The woman said, "What did you want to do it for?"

The boy said, "I didn't aim to."

She said, "You a lie!"

By that time two or three people passed, stopped, turned to look, and some stood watching.

"If I turn you loose, will you run?" asked the woman.

"Yes'm," said the boy.

"Then I won't turn you loose," said the woman. She did not release him.

"I'm very sorry, lady, I'm sorry," whispered the boy.

"Um-hum! And your face is dirty. I got a great mind to wash your face for you. Ain't you got nobody home to tell you to wash your face?"

"No'm," said the boy.

"Then it will get washed this evening," said the large woman starting up the street, dragging the frightened boy behind her.

He looked as if he were fourteen or fifteen, frail and willow-wild, in tennis shoes and blue jeans.

The woman said, "You ought to be my son. I would teach you right from wrong. Least I can do right now is to wash your face. Are you hungry?"

"No'm," said the being dragged boy. "I just want you to turn me loose."

"Was I bothering *you* when I turned that corner?" asked the woman.

"No'm."

"But you put yourself in contact with *me*," said the woman. "If you think that that contact is not going to last awhile, you got another thought coming. When I get through with you, sir, you are going to remember Mrs. Luella Bates Washington Jones."

Sweat popped out on the boy's face and he began to struggle. Mrs. Jones stopped, jerked him around in front of her, put a half-nelson about his neck, and continued to drag him up the street. When she got to her door, she dragged the boy inside, down a hall, and into a large kitchenette-furnished room at the rear of the house. She switched on the light and left the door open. The boy could hear other roomers laughing and talking in the large house. Some of their doors were open, too, so he knew he and the woman were not alone. The woman still had him by the neck in the middle of her room.

She said, "What is your name?"

"Roger," answered the boy.

"Then, Roger, you go to that sink and wash your face," said the woman, whereupon she turned him loose—at last. Roger looked at the door—looked at the woman—looked at the door—*and went to the sink*.

Let the water run until it gets warm," she said. "Here's a clean towel."

"You gonna take me to jail?" asked the boy, bending over the sink.

"Not with that face, I would not take you nowhere," said the woman. "Here I am trying to get home to cook me a bite to eat and you snatch my pocketbook! Maybe, you ain't been to your supper either, late as it be. Have you?"

"There's nobody home at my house," said the boy.

"Then we'll eat," said the woman, "I believe you're hungry—or been hungry—to try to snatch my pocketbook."

"I wanted a pair of blue suede shoes," said the boy.

"Well, you didn't have to snatch *my* pocketbook to get some suede shoes," said Mrs. Luella Bates Washington Jones. "You could of asked me."

"M'am?"

The water dripping from his face, the boy looked at her. There was a long pause. A very long pause. After he had dried his face and not knowing what else to do dried it again, the boy turned around, wondering what next. The door was open. He could make a dash for it down the hall. He could run, run, run, run, *run!*

The woman was sitting on the day-bed. After a while she said, "I were young once and I wanted things I could not get."

There was another long pause. The boy's mouth opened. Then he frowned, but not knowing he frowned.

The woman said, "Um-hum! You thought I was going to say *but*, didn't you? You thought I was going to say, *but I didn't snatch people's pocketbooks*. Well, I wasn't going to say that." Pause. Silence. "I have done things, too, which I would not tell you, son—neither tell God, if he didn't already know. So you set down while I fix us something to eat. You might run that comb through your hair so you will look presentable."

In another corner of the room behind a screen was a gas plate and an icebox. Mrs. Jones got up and went behind the screen. The woman did not watch the boy to see if he was going to run now, nor did she watch her purse which she left behind her on the day-bed. But the boy took care to sit on the far side of the room where he thought she could easily see him out of the corner of her eye, if she wanted to. He did not trust the woman *not* to trust him. And he did not want to be mistrusted now.

"Do you need somebody to go to the store," asked the boy, "maybe to get some milk or something?"

"Don't believe I do," said the woman, "unless you just want sweet milk yourself. I was going to make cocoa out of this canned milk I got here."

"That will be fine," said the boy.

She heated some lima beans and ham she had in the icebox, made the cocoa, and set the table. The woman did not ask the boy anything about where he lived, or his folks, or anything else that would embarrass him. Instead, as they ate, she told him about her job in a hotel beauty-shop that stayed open late, what the work was like, and how all kinds of women came in and out, blondes, red-heads, and Spanish. Then she cut him a half of her ten-cent cake.

"Eat some more, son," she said.

When they were finished eating she got up and said, "Now, here, take this ten dollars and buy yourself some blue suede shoes. And next time, do not make the mistake of latching onto *my* pocketbook *nor nobody else's*—because shoes come by devilish like that will burn your feet. I got to get my rest now. But I wish you would behave yourself, son, from here on in."

She led him down the hall to the front door and opened it. "Good-night! Behave yourself, boy!" she said, looking out into the street.

The boy wanted to say something else other than "Thank you, m'am" to Mrs. Luella Bates Washington Jones, but he couldn't do so as he turned at the barren stoop and looked back at the large woman in the door. He barely managed to say "Thank you" before she shut the door. And he never saw her again.

(https://archive.org/stream/ThankYouMam/ThankYouMam_djvu.txt accessed on 01.07.20)

GLOSSARY:

Pocketbook: purse or handbag

Slung: Hung or thrown loosely

Frail: lacking in strength; weak

Ain't: a short form of am not, is not, are not, has not, or have not. The characters speak in a dialect, a different form of English

Willow-wild: slender, graceful, and flexible like a willow tree

Half nelson: a wrestling hold using one arm

Kitchenette: furnished room -- a room with a small kitchen

Blue suede shoes: men's shoes made of soft leather; stylish shoes

Presentable: fit to be acceptable; suitable to be seen by others

Mistrusted: doubted

Barren: empty; bare; having no life; dull or uninteresting.

RESPONDING TO THE TEXT:

Exercise 1

Here is a list of words that refer to the actions/reactions of Mrs. Jones and Roger. Tabulate these in the corresponding columns. The first one is done for you.

Dragged	shook	bending over the sink
snatched	struggled	jerked
whispered	frightened	went behind the screen
sweat popped out	left the door open	looked at the door

Mrs. Jones	Roger
Dragged	

Exercise 2

Choose the correct answer:

1. Roger tries to snatch Mrs. Jones's pocketbook because
   a. he is hungry
   b. he wants to buy blue suede shoes
   c. he wants to buy a shirt

2. Mrs. Jones works
   a. in a hotel beauty shop
   b. at a restaurant
   c. in a library

3. Why doesn't Mrs. Jones call the police?
   a. Roger returned the pocketbook
   b. she wants to help Roger change his ways
   c. Roger is afraid of the police

4. Roger offers to go to the store for Mrs. Jones because
   a. Mrs. Jones wants cake
   b. he wants to get her dinner
   c. he wants to show her that he can be a good person and be trusted

5. Mrs. Jones doesn't ask Roger about himself because
   a. she doesn't care for him
   b. she is tired after work and wants to rest
   c. she doesn't want to embarrass him.

Exercise 3:
RECALL:

1. What was Mrs. Jones's initial reaction when the boy tried to snatch her pocketbook?

2. What does she say she would teach Roger?

3. What do Mrs. Jones and Roger talk about during their meal?

MAKING INFERENCES:
1.When Mrs. Jones makes dinner, Roger sits far away from her purse. Why?
2. What does Roger say when he leaves the apartment? Why can't he say more?
3. Identify the details to support Roger's poverty and his rough home life.
INTERPRETING:
1. Why does Mrs. Jones say that she has "done things too"?
2. What is meant by the expression "Shoes got by devilish ways will burn your feet"?
3. What more does Roger want to say, other than just "Thank you"?

EVALUATIVE:
1. How does Mrs. Jones's kindness to Roger change him? Provide evidence from the text.

CRITICAL THINKING:

Point of view refers to the perspective or vantage point from which a story is told. When a story is told in the first person, the narrator is a character in the story. In a third-person narration, the narrator stands outside the story. The story 'Thank You, M'am' uses third person point of view.

1. How do you think Roger would tell the story of his meeting with Mrs. Jones?

APPLYING:

1. Read through the quote given near the author's picture. How do you relate the quotation and the story?

PARAGRAPHS: STRUCTURE AND TYPES

Every form of writing, except poetry and drama, is presented in paragraphs.

What is a Paragraph?

A paragraph has a group of sentences and all these sentences are usually related to a common idea. As a sentence is insufficient to explain an idea, there is a necessity to compose a paragraph. Usually, a paragraph is composed keeping in mind **one main idea**. To compose paragraphs easily, students can adopt the **"One para, One idea"** formula.

Structure:

A paragraph can be structured in many ways depending on various purposes. But, normally, any paragraph should have **three important components**. Firstly, at the beginning of any paragraph, the main idea of the paragraph should be stated or introduced. Secondly, the main idea should be explained. Thirdly, supporting details should be included to strengthen the explanation or the main idea.

Read the following paragraph to see whether all three components are present:

Busyness is a great enemy of relationships. We become preoccupied with making a living, doing our work, paying bills and accomplishing goals as if these tasks are the point of life. They are not. The point of life is learning to love—God and people. Life minus love equals zero.

Look at the beginning of the paragraph, that is, the first sentence of the paragraph.

"Busyness is a great enemy of relationships."

This sentence is the most important one in the paragraph because it introduces or states the main idea or theme or the subject of the paragraph. All the other sentences revolve around the main idea: busyness is a great spoiler in relationships.

Here, the first sentence of the paragraph is said to be the **topic sentence** as this sentence states or introduces the topic or subject or main idea of the paragraph. Usually, the topic sentence comes at the beginning of a paragraph. That is, the first sentence of the paragraph happens to be the topic sentence most of the time. A good topic sentence should be concise and emphatic.

Secondly, many activities that keep us busy all the time lead to the sacrifice of relationships and these are explained in the paragraph.

Thirdly, as a result of busyness, how loving others and God is affected is stated and it serves as the supporting point of the main idea.

Unity

A paragraph should have **unity.** The sentences in a paragraph are connected, both in meaning and structure. In a good paragraph all the supporting sentences work together to develop the main idea. Unity of a paragraph can be achieved by meaningful **sequencing of sentences.** Each sentence should lead logically to the next and they should be in the best order.

Coherence:

Coherence means the correct fitting of ideas in a paragraph. That is, coherence belongs to the relationship of its ideas. To have genuine coherence of ideas, these three factors are very important: relevance, right

order and inclusiveness. Relevance means every idea or point must be related to the topic. No irrelevant idea is included.

The presentation of points in the correct order is the second important factor. The ideas or points may be relevant in a paragraph. But, if they are not arranged in the right order, then the paragraph cannot be coherent. The relevant sentences in a paragraph should be well organised and arranged in such a way that the ideas should be placed in the paragraph in the order of relative importance. That is, place the idea in the best possible place in the paragraph.

Inclusiveness means all the vital points or ideas must be included, and on any account, they should not be omitted.

Flow is a matter of style and it can be seen on the surface. That is, it is visible in the explicit words and phrases and the grammatical patterns that link one sentence to another.

The following paragraph is a good example of good flow:

There are three kinds of book owners. The first has all the standard sets and best-sellers-unread, untouched. (This deluded individual owns wood pulp and ink, not books.) The second has a great many books—a few of them read through, most of them dipped into, but all of them as clean and shiny as the day they were bought. (This person would probably like to make books his/her own but is restrained by a false respect for their physical appearance. The third has a few books or many—every one of them dog eared and dilapidated, shaken and loosened by continual use, marked and scribbled in from front to back. (This man owns books.)

Connections between ideas: Using transitional words and phrases

Transitional words and phrases function as connectors between ideas and serve as a means to achieve coherence. They are the words and phrases that make a transition from one idea to another. The following table includes some frequently used transitional words and phrases.

Place	**Time**	**Importance**	**Cause God**	**Contrasting ideas**	**Comparing ideas.**
above down inside next across here over to around before under around in	before after at last at once first thereafter eventually finally next meanwhile then	First Last Mainly More important Then To begin with ……..	as a result because consequently so that since therefore	although in spite of on the other hand but instead still however yet	Also Another Similarity Too

Types of Paragraphs:

Paragraphs are composed in different ways, depending on the purposes for which they are composed. The following are some of the important types of paragraphs. In each model, the central idea is the Olympics, but it is treated in different ways, depending on the purpose – description, sequence, comparison and contrast, cause and effect, persuasion, argumentation. We will set out to acquaint ourselves to address each of these purposes.

Description:

Description forms a very important part of writing. We may have to describe a sunset, an instrument or a machine, an accident, a character, and so on. The following paragraph describes the Olympic symbol:

> The Olympic symbol consists of five interlocking rings. The rings represent the five continents – Africa, Asia, Europe, North America and South America – from which athletes come to compete in the games. The rings are coloured black, blue, green, red, and yellow. At least one of these colours is found in the flag of every country sending athletes to compete in the Olympic games.

This paragraph begins with a topic sentence. As the paragraph is about the Olympic symbol, the first sentence introduces the Olympic symbol and then states that the symbol consists of five interlocking rings. And then the next sentence goes on to say that these five rings represent five continents from which athletes come to compete. The next sentence says about the colours of the rings. Finally, the connection between the colour of the ring and the flag of the country is pointed out in the paragraph. This is a well-knit paragraph. It is written in a lucid style.

Sequence:

Sometimes, we will have to present certain things sequentially, that is, in a logical order or sequence. For instance, writing a biography, describing an accident and writing about manufacturing a product which involves a process. All these writings follow a logical or chronological order or a sequence of presentations. Read the following paragraph:

> The Olympic Games began as athletic festivals to honour the Greek gods. The most important festival was held in the valley of Olympia to honour Zeus, the king of the gods. It was this festival that became the Olympic Games in 776 B.C. These games were ended in A.D. 394 by the Roman Emperor who ruled Greece. No Olympic games were held for more than 1,500 years. Then the modern Olympics began in 1896. Almost 300 male athletes competed in the first modern Olympics. In the games held in 1900, female athletes were allowed to compete. The games have continued every four years since 1896 except during World War II.

You can find from your reading that all the events starting from the origin of the Olympic Games to the present development have been presented sequentially. The order of events has been maintained strictly. The appearance of the years in ascending order - 776 B.C., A.D. 394, 1896, 1900- indicates that the paragraph sticks to the chronological order.

Comparison and Contrast:

Comparison plays a vital role in one's life. Drawing a comparison between two things that are alike is unavoidable. In any comparison, we talk about things that are similar whereas in contrast, we speak of the dissimilarities between the things or objects of comparison. For example, we can compare and contrast the ocean and a lake.

Here is a paragraph in which a comparison is made between the ancient and the modern Olympic games:

The modern Olympics is very unlike the ancient Olympic games. Individual events are different. While there were no swimming races in the ancient games, there were chariot races. There were no female contestants and all athletes competed in the nude. However, the ancient and modern Olympics are also alike in many ways. Some events, such as the javelin and discus throws, are the same. Some people say that cheating, professionalism, and nationalism in modern games are a disgrace to the Olympic tradition. But according to the ancient Greek writers, there were many cases of cheating, nationalism, and professionalism in their Olympics too.

After going through the paragraph, you may have noticed the writer's analysis of the similarities and differences between the ancient and modern Olympic games. A careful reading of the paragraph points to the fact that the writer devotes the first half of the paragraph to discuss the dissimilarities between the modern and ancient Olympic games and the second half focuses on the similarities between them.

This very paragraph can be composed differently. That is, devoting the first half to speak of the similarities between the ancient and modern Olympic games and the second half to the dissimilarities between them.

Cause and Effect:

"What we sow, we reap." is a familiar proverb. According to the proverb, sowing is the cause and reaping is the effect or result. Cause and effect are inseparable. If a student spends many hours daily to study his/her lessons, he/she will score good marks. Hard work is the cause and scoring good marks is the result.

The paragraph given below is a good example to illustrate cause and effect:

There are several reasons why so many people attend the Olympic Games or watch them on television. One reason is tradition. The name Olympics and the torch remind people of the ancient games. People can escape the ordinariness of daily life by attending or watching the Olympics. They like to identify with someone else's sacrifice and accomplishment. National pride is another reason, and an athlete's or a team's hard-earned victory becomes a nation's victory. There are national medal counts and people keep track of how many medals their country's athletes have won.

This paragraph lists various reasons or causes for people attending or watching Olympic games on television and the benefits that they get.

Persuasion:

There are many occasions where we have to persuade others for a good cause or their good. Read the following paragraph and analyse how the writer has composed the paragraph effectively:

Our school has arranged a big Food Festival on Monday. Every year the proceeds of the festival are given to charities such as home for the aged, orphanages, home for the physically and/or mentally challenged and cancer hospitals. A student of the 7th standard approaches his/her neighbour to get some food tokens so that their financial assistance will be of great help to the needy and underprivileged. He/she succeeds in his/her attempt to sell some food tokens.

The persuasive power of the writer can be seen in this paragraph.

Argumentation:

In any argumentative paragraph, the writer presents his/her viewpoints providing evidence in support of his/her stand. Various reasons, facts, statistical data, research results and personal experience may be brought in as evidence.

A powerful paragraph of argumentation is presented below:

There is a notion that people who have money, beauty, coveted position and popularity are the happiest and the most fortunate. But the following declarations disprove the commonly-held notion. A Texas millionaire confided: "I thought money could buy happiness—I have been miserably disillusioned." A famous film star broke down: "I have money, beauty, glamour and popularity. I should be the happiest woman in the world, but I am miserable. Why?" A top British social leader said, "I have lost all desire to live, yet I have everything to live for. What is the matter?" The reason is there are better and nobler things than these that give us purpose in life and lasting happiness.

Exercise 1

Answer the following questions:

1. What is a topic sentence?
2. Write a note on the structure of a paragraph.
3. Mention at least two types of paragraphs.
4. Give at least one example to explain cause and effect.
5. What are the transitional words/phrases that indicate comparison of ideas?

Exercise 2

Write a paragraph on the following topics:

1. My dream home
2. Ban of plastics
3. A stitch in time saves nine.

Study Skills II: Using the Internet as a Resource
Warm up:

Time Flies! It really does! You are a college student now! Till just a month ago, you were in a School for Boys/Girls. Today you are in a college for Men/Women. You've taken a leap from one world to another. In your new world, college, you will listen to lectures, present assignments and seminars. Your teachers in college will have higher expectations of you. Especially with regard to your assignments and seminars you will be expected to do independent work. Moreover, you ought not to keep your mind like a blank slate before a lecture. A good student always prepares ahead for the lecture.

Pxfuel.com

The Internet is a definite resource you can turn to. The Internet is a global computer network which not only offers excellent communication facilities but also serves as a source of a vast range of information. When online one can interact and share information. There are a plenty of websites which one can view and access. Search Engines make it easier for the user to find the relevant websites. The popular Search Engines are Google, Bing, Yahoo, DuckDuckGo, Baidu and Internet Explorer.

Let us learn how to access the information from the websites.

Online search:

- Choose the word or words that best describe the topic you're looking for.
- Go online and type the chosen keyword or keywords into the search field and press the Enter key.
- Search results will appear. A list of possible leads from websites with web addresses appears.
- Click on the required entries and the link will take you automatically to those web pages.

Know the keyword:

- Be clear about what you are looking for and decide on the key search word
- If you choose a general keyword, the search result will be a huge list
- Choose specific word/words

Activity 1:

Search for the keyword(s) given below:

a. Mask
b. Computer
c. Tamil Nadu

Refine your search:

Narrow your search by including more keywords. This will fetch you more relevant results.

For example, if you enter the word 'cooker' you will find many number of sites with information on 'cooker'. With more keywords in the search string such as 'solar cooker' , 'box type solar cooker' and 'box type solar cooker Tamil Nadu', you find that fewer pages are listed and relevant results are displayed.

Check if the keyword you've chosen occurs in any field other than the one that you are working on. If that is the case, use at least one keyword that applies specifically to your topic.

For example, if you are looking for the word 'crane' – the machine, how will you go about it? The word 'crane'-- belonging to two different fields --- that of Zoology and Construction, refers to a particular bird and a particular machine. Your search string should include at least one keyword from the field of construction. It can be 'Truck crane'. This will show the information only with regard to crane used in building construction.

Activity 2:

a. Search for the keyword(s) given below and note down the number of entries displayed

cooker

solar cooker

box type solar cooker

box type solar cooker Tamil Nadu

b. Search for the keyword(s) given below and check if you get the relevant information

crane

Truck crane

c. If you are looking for 'crane' from the field of Zoology, how will you refine your search?

Extend your search.

By using the word 'OR ' inserted between the two keyterms you can extend your search.

Example, if your search is 'Computer OR TV', the search result will

show you pages that include only the keyword Computer, pages that include the word TV and also the pages that include both of your keywords Computer and TV.

Limit your search

By typing the word 'AND' between two keywords you can limit your search and get relevant pages. For example, with the same keywords used above, search for Computer AND TV. You will get the pages that include both Computer and TV and not the pages that contain only of one these keywords.

Be precise in your search

use double inverted commas " " to be more specific. For example, "types of solar cooker" will only list pages where these words appeared together.

Activity 3:

a. Search for the keywords given for the tasks above

b. Search using the following keywords

Mango OR pickle

Mango AND pickle

"Mango pickle"

Guidelines for using the Resources:

You have learnt how to access information from the internet, but that is not the end of it. You should also know how to use the information. Reference and reading will help you to understand your topic better. Surf the net for information but acknowledge your source. If you use someone else's material without crediting the source, it amounts to plagiarism. Plagiarism is totally unacceptable. By definition, "Plagiarism is presenting someone else's work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgement. All published and unpublished material,

whether in manuscript, printed or electronic form, is covered under this definition. Plagiarism may be intentional or reckless, or unintentional. Under the regulations for examinations, intentional or reckless plagiarism is a disciplinary offence.
(https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism?wssl=)

Now that you are sensitised to the issue of plagiarism, here is a checklist of what you should do when you use information:

- Acknowledge every source of information either as a quote or in reported speech citing the source of information.
- When you take information from the internet, it should be a reliable source (a published article). For. e.g. Wikipedia is not a source which can be quoted.
- Provide the Bibliography.
- Expressing your thoughts and point of view is important. Originality is the key to a successful presentation.
- Reference work is essential. When you refer to books on the subject, you will see that some of your thoughts have already been expressed.
- Every piece of writing should have three parts – Introduction, Body and Conclusion
- Focus on the information you are looking for. You don't have to read a reference book from cover to cover. If the 'Contents' page does not have what you are looking for, check the Index and you will find the page number of the subject/topic of interest to you.

e-learning resources of Government of India

Audio-Video e-content

1. SWAYAM offers courses from Class 9 to Post Graduation with rich e-learning content in the form of e-Tutorial, Audio, Video and Virtual labs.

https://swayam.gov.in/

2. NPTEL (National Programme on Technology Enhanced Learning)

Largest online repository for web and video courses in engineering, basic sciences andselected humanities and social sciences subjects

http://nptel.ac.in/

3. CURRICULUM CLASSES offers digital content in 87 UG subjects as per model syllabi of UGC ; Visual, web and text based learning material ; Self-paced learning opportunity

http://cec.nic.in/cec/curricul um_class (You tube Channel https://www.youtube.com/user/cecedusat)

4. DIKSHA (Digital Infrastructure for Knowledge sharing) provides video courses and practise tests for students and teachers of Class I to Class XII. School curriculum based courses prepared by NCERT, CBSE, State boards etc.

https://diksha.gov.in/

5. **e-skill india** provides online courses across all sectors ranging from Beauty, Agriculture to IT-ITES and BFSI.

https://www.eskillindia.org/

Digital content: access journals and e-books

6**. National Digital Library of India**offers learning content for users from Primary to Post Graduate Levels across all disciplines Content available in multiple formats (Audio, Video, Web, Dataset, Report, Book, Thesis, Album etc.

https://ndl.iitkgp.ac.in/

7. **e-Pathshala** offers e-textbooks and supplementary books of NCERT for all subjects for Classes I to XII in English, Hindi & Urdu Offers e-Resources like audios, videos, interactive images, maps, question banks etc. in English and Hindi

http://epathshala.nic.in

8. **e-PG Pathshala**is a gateway to all Post graduate courses. Offers curriculum based, and interactive e-content in 70 subjects across all disciplines of social sciences, arts, fine arts, and humanities, natural & mathematical sciences

https://epgp.inflibnet.ac.in/#

9. **Sakshat** is a one stop education Portal that offers: Learning content across disciplines in the form of audiovisual tools, web, e-books, ejournals etc. Educational material to learners from Kindergarten to PhD.

http://media.sakshat.ac.in/n meict/econtent.html#

10 **e-kalpa** offers distance e-learning programs on Design. It also offers Digital Design Resource Database including the craft sector.

(Information accessed from www.dsource.in&www.ncs.gov.in - National Career Service Portal on 15.07.20)

TERMS TO KNOW

Blog: A web-based log or a website that is maintained by an individual or a small group who update the site with their own observations and opinions. Blogs contain posts that are informal in nature.

Copyright: It refers to the exclusive and assignable legal right given to the originator over the created work, for a fixed number of years.

Podcast: Audio files or audio visual files which are published on the Internet in a fileformat. It can be downloaded and listened offline.

URL: (Uniform Resource Locator) It refers to the unique location/address associated with every web page or a website that is displayed on the Internet. Example:https://www.ielts.org/about-the-test.

QR code: Quick Response code, represented as a pattern of small black and white squares, contains information encoded in it. When one scans it with one's cell phone, the information it contains can be deciphered. If

Static URL Code is encoded, one will be taken tothe web site immediately.

Website – It refers to a collection of related web pages identified under a single domain name.

WWW – The World Wide Web – usually called the Web – refers to a collection of websites that one can access through the Internet.

Activity 4:

Read the following and fill the check list box with a **√ if yes**, and with a **× if No**.

□ Plagiarism is a disciplinary offence.

□ Acknowledging the source used is not necessary.

□ Checking the Index of a book will not help in selecting a book of reference.

□ Copyright protections apply even to the images posted online.

□ Swayam is one of the e-learning resources of Government of India

□ e-Pathshala offers e-resources likes audios and videos.

□ Podcast means recommended books

□ QR code is star-shaped

□ Blogs are formal in nature

□ Bibliography means booklovers.

GRAMMAR IN CONTEXT

Involving Action - 1

Verbs

Verbs, as you know are action words. But before we get to talk about it, let us go to places where the action is. First of all, are you hungry? Then let us head for the bakery and see how they make yummy pastry.

Making Puff Pastry:

Puff pastry is **made** from hundreds of paper-thin layers of butter **trapped** between hundreds of paper-thin layers of dough. In the oven, the liquid in both the butter and the dough rapidly **evaporates**, **puffing** the individual layers skyward. The butter **melts** into the dough, **turning** it golden and crispy.

Getting to this end result takes a little work. First, you **make** a "lean" dough

of just flour and water — it's considered lean because it contains no fat. Then you **wrap** this dough around a block of cold butter. **Roll** it out, **fold** it up like a letter, roll it out, fold it up, and **repeat**. At the end of this whole process, you will have **created** all the paper-thin layers that make puff pastry puff.

Task :-

Fill in the blanks with suitable verbs underlined in the above passage:-

1. Chapati is _____ of wheat flour.

2. A cat survived after being _____ underwater in an air pocket for nearly four hours.

3. Water _____ as gas on heating.

4. The chimney was _____ out clouds of smoke.

5. Great heat _____ iron.

6. Vasanth's hair is _____ gray.

7. You can't _____ an omelette without breaking eggs.

8. _____ all your glasses in newspaper.

9. She was chomping on a bread _____.

10. _____ the paper along the dotted line.

11. I'm sorry-could you _____ that?

12. The boom has created job opportunities.

Do you love riding your bike? Hope you enjoy reading this excerpt from a biker's diary.

I hardly need to state that biking is a passion: The first tiny touch of counter steer to **initiate** the turn, **feeling** rather than **seeing** the road as it curves in from the left and then **dipping** a shoulder into my own turn as it starts, **shadowing** the road's moves, **squeezing** in power, feeling it tighten, feeling the grip from the tyre as surely as running the palm of a gloved hand along the tarmac.

I think all biker's will agree. This is not about going from point A to B. I'm not going anywhere, in the sense that the point of this journey is the journey. It's Sunday morning and the weather is pleasant. This is going out for a ride just for the sake of the ride.

Task :-

You can select from the verbs given in the box to narrate the experience of riding/driving (either your experience or someone else's), a bike, car, or cycle.

viewing, slowing down, manoeuvring, shifting gear, seeing, racing, speeding, accelerating, applying the brake, cruising, stopping, pedalling, watching, crossing, turning

Action Words or Verbs

A verb is a word that describes action or a state of being. The second part of this definition is important, as many believe that verbs are always action words that can be visualized. This is true of action verbs: run, walk, play, jump, sing, scream, etc.

However, there are also linking verbs, and these types of verbs do not express action; instead, they express identity, classification, or existence. (The following are the most common linking verbs: is, am, was, were, are, and verb phrases ending in be, been, being.)

Verbs often change their form as different endings are added to them. These endings are changed to show a verb's relationship to time. This is referred to as verb tense.

Revising writing to include verbs that are lively and express action is a fantastic way for students to improve their prose. Consider what the actions are in a sentence and choose the most expressive, powerful verbs to convey those actions. For example:

The band appeared on the scene.

The band erupted onto the scene.

Regular and Irregular Verbs

A regular verb is one that follows the pattern of taking –ed for the simple past and past participle (or –d if the verb ends in –e; smoke smoked).

Irregular Verbs

A verb in which the past tense is not formed by adding the usual *-ed* ending. Examples of irregular verbs are *feel* (*felt*); and *go*(*went*).

Infinitive	Present	Past	Perfect
Be	Is	Was	Been
Become	Becomes	Became	Become

Begin	Begins	Began	Begun
Break	Breaks	Broke	Broken
Bring	Brings	Brought	Brought
Buy	Buys	Bought	Bought
Catch	Catches	Caught	Caught
Choose	Chooses	Chose	Chosen
Come	Comes	Came	Came
Cost	Costs	Cost	Cost
Cut	Cuts	Cut	Cut
Dig	Digs	Dug	Dug
Do	Does	Did	Done
Draw	Draws	Drew	Drawn
Drink	Drinks	Drank	Drunk
Drive	Drives	Drove	Driven
Eat	Eats	Ate	Eaten
Fall	Falls	Fell	Fallen
Find	Finds	Found	Found
Fly	Flies	Flew	Flown
Forget	Forgets	Forgot	Forgotten
Get	Gets	Got	Got
Give	Gives	Gave	Given
Go	Goes	Went	Gone
Have	Has	Had	Had
Know	Knows	Knew	Known
Let	Lets	Let	Let

Lie	Lies	Lay	Lain
Make	Makes	Made	Made
Pay	Pays	Paid	Paid
Put	Puts	Put	Put
Read	Reads	Read	Read
Run	Runs	Ran	Run
Say	Says	Said	Said
Sell	Sells	Sold	Sold
Sit	Sits	Sat	Sat
Speak	Speaks	Spoke	Spoken
Spend	Spends	Spent	Spent
Stand	Stands	Stood	Stood
Teach	Teaches	Taught	Taught
Tell	Tells	Told	Told
Take	Takes	Took	Taken
Write	Writes	Wrote	Written

Task 1

Fill in the blanks with the correct past tense form of the verb

(irregular verbs)

1. I _____ (lose) my wallet in the train compartment.

2. David _____ (not injure) his ankle.

3. While playing cricket, Raghu hit a ‘sixer’ and it _____ (break) a window.

4. Sheila’s new handbag _____ (not cost) a lot of money.

5. He _____ (get) this book from the district library.

6. The complex had a basement parking where we _____ (park) our car.

7. Ann _____ (cut) her wrist.

8. The vase _____ (fall) off the table.

9. The porcelain cup _____ (not break).

10. We _____ (sell) our brand new car.

11. We _____ (buy) a second-hand car.

12. The telephone _____ (not ring).

13. The children _____ (go) to school.

14. The fielder _____ (catch) the ball.

15. The woman _____ (not kneel) down.

16. Our dog _____ (run) onto the road.

17. Jyoti _____ (not write) a letter.

18. I _____ (buy) a new mobile phone last week.

19. We _____ (drive) to a theme park yesterday.

20. Yesterday Dad _____ (not take) me to the mall.

21. Erum _____ (give) Aarthi a chocolate.

22. Jagan and Jaya_____ (not go) to the temple.

23. Her ring _____ (cost) ten thousand rupees.

24. The diabetic man_____ (not add) sugar to his coffee.

25. She _____ (not throw) the ball over the net.

Task 4

Verbs in Proverbs

Read the following proverb. Write down all the verbs in it. Then explain in your own words what the proverb means. For example, "You cannot prevent the birds of sorrow from flying over your head, but you can prevent them from building nests in your hair."

Verbs

1. Cannot prevent
2. Flying
3. Can prevent
4. Building

Explanation of proverb

People cannot stop bad/sad things from happening to them, but they have control over how long they allow the bad/sad things to make them feel sad.

1. "People who live in glass houses should not throw stones."
2. "Hope for the best, but prepare for the worst."
3. "Don't bite the hand that feeds you."
4. "A penny saved is a penny earned."
5. "You can lead a horse to water, but you can't make him drink."

Verbs and their synonyms

In Unit 1 you were encouraged to use the dictionary and the thesaurus. A thesaurus helps you with synonyms. As most of us are connected to the internet, it is easy to find synonyms with the help of an online thesaurus. You must note that synonyms are don't mean exactly the same thing. Some words are suited to some contexts. For instance, "look" and "peer" are synonyms. But both don't mean exactly the same. So, if you are looking for a word which syncs exactly with what you have in mind, you should consult a thesaurus.

1. Blink: to look at with disbelief, dismay, or surprise or in a cursory manner

2. Browse: to look at casually

3. Consider: to look at reflectively or steadily

4. Contemplate: to look at extensively and/or intensely

5. Dip (into): to examine or read superficially

6. Eye: to look at closely or steadily

7. Fixate (on): to look at intensely

8. Gape: to look at with surprise or wonder, or mindlessly, and with one's mouth open

9. Gawk: see gape

10. Gawp: see gape (generally limited to British English)

11. Gaze: to look steadily, as with admiration, eagerness, or wonder

12. Glare: to look angrily

13. Glimpse: to look briefly

14. Gloat: to look at with triumphant and/or malicious satisfaction

15. Glower: to look at with annoyance or anger

16. Goggle: to look at with wide eyes, as if in surprise or wonder

17. Leer: to look furtively to one side, or to look at lecherously or maliciously18. Observe: to look carefully to obtain information or come to a conclusion, or to notice or to inspect

19. Ogle: to look at with desire or greed

20. Outface: to look steadily at another to defy or dominate, or to do so figuratively

21. Outstare: see outface

22. Peek: to look briefly or furtively, or through a small or narrow opening

23. Peep: to look cautiously or secretively; see also peek (also, slang for "see" or "watch")

24. Peer: to look at with curiosity or intensity, or to look at something difficult to see

25. Peruse: to look at cursorily, or to do so carefully

26. Pore (over): to look at intently

27. Regard: to look at attentively or to evaluate

28. Rubberneck: to look at in curiosity

29. Scan: to look at quickly, or to look through text or a set of images or objects to find a specific one

30. Skim: see scan

31. Stare: to look at intently

32. Stare (down): to look at someone else to try to dominate

33. Study: to look at attentively or with attention to detail

34. Watch: to look carefully or in expectation

35. Wink: to look at while blinking one eye to signal or tease another person

Source: https://sites.google.com/site/dailystoryspider/some-informative-articles/writing-help/35-synonyms-for-look

Task 5

List 3 to 5 synonyms of your choice for the following verbs:

1. Buy
2. Prepare
3. Smile
4. Create
5. Grow

CONCORD

The synonyms for concord include

accord amity calmness chime comity concert consensus friendship goodwill peace placidity rapport serenity tranquility tune unanimity

Explore the use of these words.

You will find that they are associated with

- Music (harmonious, pleasant music) as in "chime"
- Peaceful relationships as in "friendship", "goodwill",
- Good vibes in teamwork as in "rapport", "unanimity", "consensus", "amity"
- The feeling of peace as in "tranquillity", "serenity", "placidity", "calmness"

- Working together is invoked in "concert" (as in "concerted effort" to make something successful
- Speaking with one voice as in "unison" ("singing in unison", "cheering in unison", "shouting in unison")

This picture denotes peace and harmony

The antonyms of concord are

agitation disagreement discord disharmony

disturbance hatred hostility disunity

The Cambridge English dictionary defines 'concord' as "agreement and peace between countries and people". It also states that in language it is "the

situation in which the words in a sentence matcheach other according to the rules of grammar, for example, when the verb is plural because the subject of the sentence is plural." Concord in Grammar means the agreement between the subject and the verb or the agreement between a verb/predicate and other elements of clause structure.

When there is 'disharmony' in sentence construction, it is jarring and most unmusical. Spoken or written English should be characterised by 'Concord'.

Examples of lack of 'Concord' (presence of discord)

- The boys **comes** to the market everyday
- I **knows** her very well
- The government **have** implemented.

There are three types of concord:

1. Grammatical concord
2. Proximity concord
3. Notional concord

Grammatical concord refers to the agreement in number between a verb and its subject. A singular subject takes a singuar verb and a plural subject also takes a plural verb e.g.
a. Rekha loves Rumi
b. They love her

Proximity concord as the term suggests, means "nearness or closeness". Hence, proximity concord is a situation where two nouns (one singular and the other plural) are likened by "OR" or "NOR". In this case the verb agrees with the noun that is nearer to it. E.g.
a. The individual player or the 'members' of the team 'are' to be blamed.
b. The members of the team or the individual 'is' to be blamed.

Notional concord, as the name implies, is about the notion of the user base on his previous knowledge about the meaning or conventional use of the word or expression. It usually applies when the speaker uses a plural verb

with a collective noun or singular verb with a subject that has plural features. **Notional concord is based on meaning rather than form.**E.g.

a. Australia are playing with India next week.
b. My family are not supportive of this venture.
c. Pearl's admiration and love for her lover is boundless.

The examples above are based on the notion of the speaker i.e. what he means and not how the sentence is formed. For instance, in example 'b' above, the speaker may mean that the collection of his family members are present which the speaker considers each of them separately to form a plural subject.

Let us study these three types of Concord in depth:

Grammatical Concord

The basic rule of subject-verb concord is that a singular subject takes a singular verb and a plural subject takes a plural verb. And it is needful to establish this fact that singular verbs are inflected with suffix '-s' while plural verbs maintain the base form. Simply put, a singular verb ends with an 's' and a plural verb has no 's'.

Verb

Singular	**Plural**
Reads	Read
Looks	Look
Climbs	Climb

Rules of grammatical concord:

1. Singular subjects take singular verbs.

- A critical **situation calls** for a brave approach.
- The **period** between baggage checking and boarding **is** sometimes stressful.
- **Anxiety breeds** disaster.

2. Plural subjects take plural verbs**.**

- The **students wake** up late on holidays.
- Serious **issues call** for serious approaches.
- The budding **cricketers** on the pitch **play**
- **What you see and how you react determine** the result.

- **My father and his friend believe** in smart investment.

Note: The focus is on the subject of the verb, not what comes in between the subject and the verb.

3. When a subject is joined to another noun by subordinator, focus on the first noun and disregard the subjoined noun or noun phrase.

    - **The Director** alongside other members **visits** the Centre for Children regularly.
    - **The College Union President,** as well as, other students never **follows** the rules.
    - From the examples above, we have two nouns in each subject slot as highlighted below:

    - The **Director** alongside other **members** …
    - The **College Union President**, as well as, other **students**…

The subjoined nouns are *members*, and *students*. Going by the rules, the focus of the expression is on *Director*, and *College Union President* Hence, they determine the nature of the verbs. Moreover, the sentence can be restructured thus for further clarity:

- Alongside other members, the Director visits the Centre for Children regularly.
- Along with other students, the College Union President, never follows the rules.

So, the main subject determines the status of the verb.

Other examples:

- The **man** with his children **attends** to customers.
- The **soldiers** as well as the vigilante team **watch** over the small community.

4. When more than one is used as a subject of a verb in simple present tense, the verb should be singular because the headword is one.

    - More than one woman was in the queue.
    - More than one fruit was shared among the children.

5. When two nouns refer to one person at the subject position, the verb should be singular, of course, because it is one person.

See these:

- **My husband and partner** never **goes**late for meetings.

  Here the speaker's husband is also her partner. So, one pre-modifier us is there for both nouns as it is one person. Compare, "My husband and my partner never go late to meeting". Here, the speaker is referring to two different people.

- **The President and Commander-in-chief of the armed forces defends**the country.
- **The class captain and best student** of our set **is** just too proud.

Note: Always check for the pre-modifier when you have two nouns in the subject slot. When the nouns refer to one person, we use one pre-modifier.

6. When an indefinite pronoun pre-modifies a subject or acts as the main subject, the verb should be singular.

   - **Everyone loves** to be acknowledged.
   - **Every** boy and girl **loves** his or her parent.
   - **Nobody cares** for everybody's job.
   -

7. Some nouns end with 's' but they are singular. You need to be careful because they are meant to go with singular verbs.

   - **Measles is** dreadful.
   - **Mathematics was** a problem in my school days.
   - **Statistics was** the only course available.

8. When a relative/adjectival clause qualifies a noun, the verb in the relative/adjectival clause works with the noun it qualifies.

For instance, 'One of the **boys** *that **sit** in the front row* has been suspended'. 'sit' in the relative clause agrees with '*boys'* as the relative clause, 'that sit in the front row' qualifies the noun, 'boys'. Then, the main verb in the sentence 'has' agrees with 'one'.

The meaning here is: Of the many boys who sit in the front row, only one has been suspended.

Other examples:

- Algebra is one of the **topics** that **confuse**
- Dr.Arun is one of the **lecturers** who **teach** well

9. When a generic reference is used with the definite article 'the' as a subject of the verb, the verb should be plural.

Generic reference is used when you make a reference to all the members of a class of people or things.

Examples:

- The **rich** also **cry**.
- The **less privileged look** after one another.
- **The young dream**
- **The wise** don't talk too much.

10. When a result of a survey is issued or reported, caution should be exercised to avoid error of overgeneralization.

For instance,

- One in ten **prefer** coffee to tea'; Not, 'One in ten prefers coffee to tea'.
- One in every five boys **go** to the local cinema.

11. When an uncountable noun is introduced with a quantifier or percentage, it attracts a singular verb. In the same vein, when a countable noun is introduced in percentage, it goes with a plural verb.

- A quarter of the land **is** occupied by squatters.
- Two cups of wheat flour **is** enough for the chapathi.
- Only ten percent of people in the world actually **believe** in superstitions.
- A two-third of the IPKF forces were involved.

12. When a modal auxiliary verb precedes a main verb, the verb maintains the base form.

- The child might **come**
- She came in so that we could **discuss** the issue.
- The matter should **go** to court.

13.Mandative Subjunctive: Mandative Subjunctive is used to express a demand, requirement, request, recommendation or suggestion. When it is

used with either the singular or the plural subject, the verb takes the base form:

- I recommend he attend the seminar alone.
- I pray she come early tomorrow.
- The board suggests the chairman resign immediately.

Proximity Concord

Proximity concords are a type of subject-verb agreement in which we have two or more subjects in a sentence joined together by **'either…..or, neither……nor, not only……..but also'**. The rule of proximity concord states that the verb in the sentence should always agree with the subject closer to the verb hence the name proximity concord. Remember what I told you about proximity? It means nearness in distance.

Let us look at the examples of proximity concord below:

- Either Jyoti or her children are in the house.

From the sentence above you can see that we have two subjects '**Jyoti**' and '**children**'. The first subject '**John**' is singular whereas the second '**children**' is plural. We have a plural verb '**are**'. The reason we used a plural verb '**are**' is because of the fact that we are dealing with a proximity concord here, and the rule of proximity concord states that verb in the sentence should always agree with the subject closest to it. Of the two subjects we have in the sentence '**John**' and '**children**' you can clearly see that '**children**' is closer to the verb '**are**' than '**John**' is. So we make sure that the plural subject '**children**' agrees with the plural verb '**are**'.

Some other examples of proximity concord:

- Either the **boys** or the **girl** *goes* to school.
- Neither **Jagan** nor the **laborers** *are* at work.
- Not only the **students** but also the **teacher** *is* unhappy about the results.

- Neither the **principal,** nor the **teacher**, nor **anyone else** *likes* the result.

From the examples above, the subjects of the various sentences have been made bold. The verbs have also been indicated in italics. Each verb agrees with the subject that is closer to it. If the subject is plural then the verb automatically is plural; if the subject is singular then the verb is also singular.

Notional concord

Here under notional concord we consider the relationship between collective nouns (e.g. committee, team etc.) and their verbs. With collective nouns, the context determines whether the verb is singular or plural. If the noun is taken as a unit, then the singular verb will be used but if the members in the group are seen as separate. Then, the plural will be used.

Examples:

- The committee meets once in a year.
- The committee contribute to relief work.
- The jury vote according to their consciences.
- The jury was dissolved after the case.

Exercises

A) In each of the following sentences supply a verb in agreement with its subject:

1. The cost of vegetables_____risen.
2. That night every one of the drama troupe _____overjoyed.
3. One of those people _____stolen the jewellery.
4. No news _____good news.
5. An entrepreneur and a humanitarian_____passed away.
6. Three-fourths of the city _____flooded.
7. Three Men in a Boat _____written by Jerome K. Jerome.

8. The Financial Advisor and accountant _____been summoned for enquiry.
9. The ebb and flow of tides____influenced by the moon.
10. Each of the talented dancers _____awarded a cash prize.

B) Fill in the blanks with the correct form of the verb given in brackets:

Vivek has gone to the bank. He _____(want) to take out some money. First he _____(have) to fill in a form for a new cheque book as all the cheques leaves in the old book _____(has) been used. He needs to _____(make) out a cheque for the amount he _____(have) to pay as rent. The manager as well as the counter clerks _____(try) to persuade him to use an ATM card.

C) Choose the correct form of the verb that agrees with the subject.

1. Jyotsna and her brothers (is, are) at school.
2. Either my brother or my father (is, are) coming to the meeting.
3. The rats and the cats (is, are) ancient enemies.
4. Either my shoes or your gloves (is, are) always on the floor.
5. Ganesh and Thanesh (doesn't, don't) want to see that movie.
6. Bertilla (doesn't, don't) know the answer.
7. One of my sisters (is, are) going on a trip to Benares.
8. The man with five dogs (live, lives) on my street.
9. The movie, (take, takes) about three hours to watch.
10. The players, as well as the coach, (want, wants) a break.
11. Either answer (is, are) acceptable.
12. Every one of those books (is, are) expensive.

13. Nobody (know, knows) the trouble I've been through to get here.

14. (Is, Are) the news on at nine or ten?

15. Statistics (is, are) John's favorite subject, while Mathematics (is, are) Aruna’sfavorite subject.

16. Hundred rupees (is, are) the price of a movie ticket these days.

17. (Is, Are) the stationery in this cupboard?

18. Your pants (is, are) at the laundry.

19. There (was, were) fifteen lemons in that basket. Now there (is, are) only one left!

20. The committee (decides, decide) these matters.

Unit III **(16 hours)**

1. Listening and Speaking

    a. Giving and following instructions

    b. Asking for and giving directions

    c. Continuing discussions with connecting ideas

2. Reading and writing

    a.Reading feature articles (from newspapers and magazines)

    b. Reading to identify point of view and perspective (opinion pieces, editorials)

    c.Descriptive writing – writing a short descriptive essay of two to three paragraphs.

3. Grammar in Context:

    Involving Action – II

    - Verbals - Gerund, Participle, Infinitive
    - Modals

1.LISTENING AND SPEAKING

a.Giving and following instructions

Giving instructions:

When you instruct someone to do something step by step, you would use the following structures:

First, you…
Then, you…
Next, you…
Lastly, you…

Starting out:

When your emphasis is on how to begin a process/procedure, you can use the following structures:

The first thing you do is…
Before you begin, (you should…)
The best place to begin is…
I would start by…

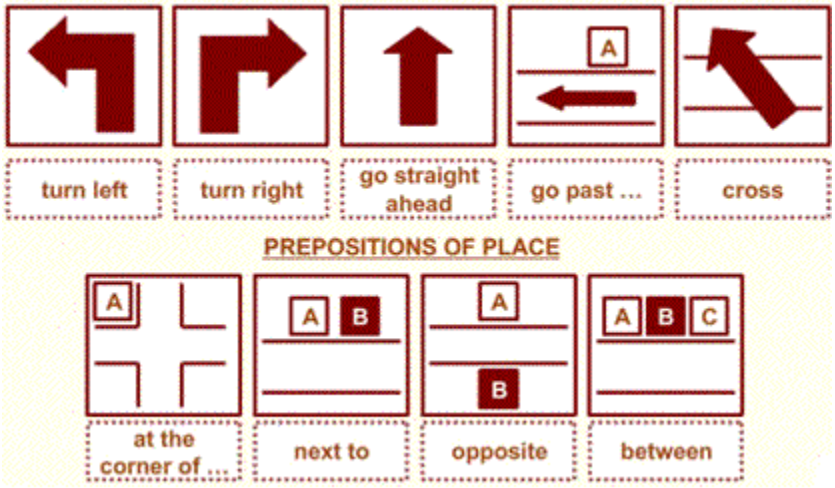
Continuing:

After that,
The next step is to…
The next thing you do is…
Once you've done that, then…
When you finish that, then…

Finishing:

The last step is…
The last thing you do is…
In the end,…
When you've finished,…
When you've completed all the steps,…

b. Asking for and giving directions



(https://www.tes.com/lessons/KkiShW1MYrJddw/asking-and-giving-directions-places)

Using Imperatives in giving directions:

Some of the imperatives used in a sentence while giving directions are:

Go to	Turn right	Go straight on
Walk along	Go down	
Go up	Walk up	Go along
Go through	Go round	Go over

Here is a sample of English sentences used when giving directions to a place:

Salma: Please tell me how to get to your house?

Radhika: Are you coming by bus or by train?

Salma: I am coming by train. Could you tell me the easiest way of getting to your house?

Radhika:Board the Thiruvallur (Fast) at Central Station. It will reach Perambur Station in 10 minutes. Get off at Perambur Station. Outside the station you will find a 'Share-Auto' stand. These autos ply in two directions:

one towards Vyasarpadi and the other towards Madhavaram. Board the one going to Madhavaram and ask for Lakshmi Talkies. The auto driver will charge you twenty rupees for this stretch (Perambur Station to Lakshmi Talkies)

Salma: From Lakshmi Talkies, how do I get to your place?

Radhika: When you alight from the 'share-auto', you will see "Lakshmi Talkies", an old movie theatre.

Salma :Okay

Radhika: Adjoining Lakshmi Talkies is ThirumuruganKoil Street. Enter this street and turn into the fifth street on your right. It is called Nathan Street.

Salma: Is that where your house is?

Radhika: Not exactly.

Salma: Could you send me the location on Google maps, please? I don't know the area.

Radhika: Sure. But don't panic. It is easy to locate. After you enter Nathan street, you will find Cheerios Bakery on the right. My house is right above Cheerios Bakery.

Salma: Sounds delicious. Thank you. By the way, the landmarks are interesting (Lakshmi Talkies and Cheerios Bakery). I'm sure I can find the place!

Exercise 1
Fill in the blanks given in the sentences below choosing a suitable imperative from the selection given below:

Go to	Turn right	Go straight on	Walk along	Go down
Go upWalk up	Go along	Go through	Go round	Go over
Go across	Stop at			

1. Can you tell me how to reach the nearest hospital?

----------the street corner and on your left is the hospital

2. I need to buy a pen. Where is the stationery shop in this area?

   There is a stationery shop if you ---------- Gandhi road, next to the fruits shop.

3. Is there a temple nearby?

   No. But there is one when you ---------- the hill 15kms from here.

4. Does this train go to Yercaud?

   No. All trains ---------- Salem.

5. Have you travelled by train from Mumbai to Pune?

   Yes. All trains -------- the tunnel on that route.

6. Is there a library in this block?

   Yes, if you --------- to the first floor, it's on your right.

7. My friend has hurt herself. Is there a nurse's room in this school?

   _____ to the Reception. The attender will take you.

8. Aruna's parents want to meet the warden. Can you tell me where to find her?

   ---------- the corridor till you reach the Hostel Mess. She is there.

9. Excuse me, Can you tell me the way to the nearest bank?

   ---------- the street, the bank is between the Photo studio and the Opticals.

10. How far is the train station from here?

    -------- to the Cake shop, its two blocks from there.

Exercise 2

Fill in the blanks choosing an appropriate word from the list given:

can't miss	straight	turn
take	on	

1. If you go up to the fifth floor, you'll find his office _____ your right as you come out of the elevator.
2. Go to the end of the road and _____ left by the traffic lights.
3. _____ a right just after the supermarket.
4. You _____ his house, it's painted bright pink!
5. Go _____ up to the end of the road.

Exercise 3

Match the words and phrases given in the columns below, form meaningful sentences. The first one is done for you:

The boys are dancing to the music.

The boys	are dancing	out of	the space
They	is flying	along	the street
The players	is walking	across	the fence
The girls	is passing	over	the stadium
The bird	are coming	round	the bridge
The boat	are going	past	the volcano
He	is coming	under	the bus stop
They	is jumping	through	the music
The dog	are riding	from	the forest
Lava	are running	to	the sky

c. Continuing discussions with connecting ideas

Connectives are used in and between sentences. They allow us to be more precise about the relationships between statements in a sentence or between sentences. Particular phrases and words serve different functions in connecting ideas and arguments. Different clauses or words can signal or

'signpost' additional or similar information, opposition or contrast, concession, cause or effect, emphasis, clarification, or a relationship in time or sequence. Some useful examples of each are categorised by function in the following section. Note that most of these terms can also be used to start new paragraphs. However, some of them need to be incorporated into fuller sentences to be effective as paragraph openers.

For example, if you use "notwithstanding" as a paragraph opener you may have to add other words to provide more information as in "Notwithstanding a lack of natural resources, the region has …" Addition – to add an idea additionally, and, also, apart from this, as well (as), in addition, moreover, further, furthermore, too Condition – to provide a condition if, in that case, provided that, unless

For comparison – to show how things are similar: correspondingly, equally, for the same reason, in a similar manner, in comparison, in the same way, on the one hand, similarly, too…

For contrast – to show how things are different alternatively: although, but, conversely, despite, even so, even though, however, in contrast, in spite of, instead, on the contrary, contrary to, nevertheless, nonetheless, notwithstanding, on the other hand, rather, still, though, yet, whereas, while…

For emphasis – to put forward an idea more forcefully again: in fact, interestingly, indeed, it should be noted (that), more important(ly), most importantly, to repeat, (un)fortunately, unquestionably…

For illustration – to provide examples: a further instance of this is..., an example of this is…, for example, for instance, such as, thus, as follows…

Connecting sentences

A common way to link sentences is with the basic words - and, but, so and because.

Academic language offers alternative words and phrases to ensure your sentences flow well.

And – in addition, additionally, moreover, apart from this, as well (as), further, furthermore

But – alternatively, conversely, despite, although, even though, however, on the other hand, in contrast, on the contrary, nevertheless, nonetheless

So – accordingly, as a result/consequence, consequently, for this reason, hence, therefore, thus

Because – due to, a/the consequence of, the result of, for, since, the effect of

Most of these words join two independent clauses, and they follow similar punctuation and grammar rules.

Connecting ideas

A strong essay links ideas in a way that a reader can follow the progression of an argument without losing focus or becoming confused. Sometimes information needs to be repeated to highlight the angle being developed. At other times, concepts must be explained or clarified by providing examples.

To repeat/simplify – in other words, simply put, to put it differently / another way

To show similarities – similarly, in a similar manner, correspondingly, in the same way, equally, for the same reason

To give examples – for example, for instance, a further instance of this is…, an example of this is…, such as

To contrast – although, even though, however

To show emphasis – interestingly, indeed, it should be noted (that), (un)fortunately, more important(ly), most importantly, unquestionably

Cause and Effect: Hence, therefore, thus, so, because, due to, consequently and as a result.

- Lalita never studied for her exams **therefore** she couldn't pass.
- Everyone loves spring **because** colourful flowers bloom.
- Ram usually eats at home, **because** he likes home cooked meals.

Addition: Along with, moreover, also, too, as well as that, besides.

- It is too early now. Besides, it is raining heavily.
- Ramya is intelligent; **moreover**, she is very hardworking.

Contrast: Unlike, nevertheless, nonetheless, in contrast (to), whereas, alternatively, even so.

- My sister is completely **unlike** me.
- **Whereas** the animals suffered due to the flood, the humans were rescued.

Summary: To summarize, in short, briefly, in conclusion, to sum up, altogether, in summary and to conclude.

- **In conclusion** the meeting was a failure.
- The officer addressed the safety issue **briefly** in the meeting.

Comparison: Similarly, just like, equally, likewise, just as, same as, compare to, in the same way.

- Football is a physical activity in the same way as chess being a mental activity.
- Compared to the health benefits of Yoga, walking as an exercise has limited benefits.

He is very clever, **further**, his father is very rich.

I think apples are good. **Likewise**, i think oranges are good.

Lots of animals, like **for example** lions eat meat.

You can be **both** mother **and** business woman.

What do you like **besides** the apple?

I think you should **eventually** change your style.

Exercise 1

Using the examples given above, frame sentences with list provided to form sentences using the connective words

Fill in the blanks using the wordlist given below:

therefore	instead	in spite of	despite	likewise
	otherwise	though	furthermore	
nonetheless		whereas		unless

- Please call your grandmother on her birthday, _____she'll get upset.
- Her son looks a lot like his father, _____her daughter looks like her.
- We enjoyed ourselves, _____the bad weather.
- I'm no athlete: _____I'm terrible at sports
- _____ streaking and tinting one's hair seem trendy nowadays, they have actually been around since ancient times, and are practiced in many cultures.
- I'll phone you if I receive any more information and you can do _____.

READING AND WRITING

READING AND WRITING

a. READING FEATURE ARTICLES (FROM NEWSPAPERS AND MAGAZINES)

Here is a feature article. Observe how it is written.

Harmony in Diversity: A Tribute to Gadag

(Picture: https://indiarailinfo.com/arrivals/gadag-junction-gdg/507)

Gadag, a small town in the Gadag district of Karnataka shines a beacon of light in today's world where divisiveness makes headlines. The people of Gadagare an epitome of religious harmony. The VeeranarayanaJumma Masjid Trust of Gadag, (the name says it all) is a shining example of communal harmony which has lasted for 70 years.

The trust handles celebrations for all the Hindu and Muslim festivals, and also other activities run by both communities in the city. It manages the Veeranarayana temple as well as the Jumma Masjid. Members of the trust management belong to both the communities, with Hindus and Muslims taking turns to manage it each year. The members take decisions about how to jointly celebrate the festivals of both the religions in a grand manner, with everyone joining in the festivities for Eid, Deepavali, Ganesh Chaturthi, Dasara and other occasions.

The influence of the VeeranarayanaJumma Masjid Trust is salutary, spreading to neighbouring places: people from surrounding towns and districts come here to see the Ganesha festival, wherein many Muslims carry the deity's idol, chanting, "Ganeshabappamoraya". Every year on ShivajiJayanti, Muslim youths serve lemon juice to hundreds of Hindus who take out a procession on the main streets of Gadag. Dasara is also celebrated in a unique way here. It begins with the trust president worshipping the Banni tree, after which hundreds of people belonging to both the religions exchange 'banni' and take out a rally. The functions also involve distribution of food to everyone. Donations pour in for these interfaith celebrations.

One of the trustees stated, "It's a unique organisation, and I am happy to be a part of it. Over the past seven decades, there have been no issues or quarrels among us, as our ancestors have showed the perfect path to follow". The Jumma Masjid is built between Veeranarayana temple and Trikuteshwara temple. The latter is located 1 km away from the Veernarayana temple, and the mosque is situated very close to the Trikuteshwara temple.

"While the Veeranarayana temple follows the Vaishnava tradition, the Trikuteshwara temple follows the Shaiva tradition, and the Jumma Masjid is sacred for Muslims. They have a common trust for administration and organisational purposes, which is a rare thing to find in the whole world," Though the trust was registered in 1949, people here have been working for preserving the heritage and communal harmony for centuries.

"We are proud to say that we are united in Gadag. We have a mosque situated between two historic temples. We all get together during Hindu and Muslim festivals. During Ramzan and Eid, we call our Hindu brothers, and give them Sheer Khurma, which is called Surkumbha here. It

resembles 'shavigepayasam' but we add more dried fruits," he explains, talking about how they learnt the mutual way of celebration from their ancestors. "It is a normal thing for us. But people residing in other towns are surprised to know about this," says Abdul, a social worker in this town.

Another social worker, Bharath, agrees, saying, "People from neighbouring districts have a shocked look after seeing the communal harmony here. During Shivaji Jayanthi, 20-30 Muslim youths distribute panaka (sweet lemon juice) to their Hindu brothers. During Ramzan, many Hindus observe a fast, and they eat together during Iftar. The younger generation is also following this tradition. Hindus of the area also organize Ayyappa pooja with the help of their Muslim brethren, who sponsor 25 Ayyappas for their tour to Sabarimala,"

Winning accolades three years ago, a tableau depicting the message of communal harmony of Gadagwas selected among 40 participants to bag the first prize in the Mysuru Dasara festival competition. The tableau depicted the models of the Veeranarayana temple, Trikuteshwar temple and the Jumma Masjid, along with figures of a Hindu and Muslim hugging each other. At the front was displayed the message, 'Stop hating and start loving'. Artist Ravi Shishuvinahalli, who led the tableau-making team in 2017, says, "We decided on the theme of communal harmony as Gadag has a history about it."

Answer the following questions:

1. How is the Veeranarayana Jumma Masjid Trust different from other religious trusts?
2. What is the writer's perspective on religious harmony?

Some tips on writing feature articles:

Here are some basic tips for people who are new to feature writing:

• Cover the essential elements of who, what, when, where, how and why

• Put the most important things at the beginning, preferably in the first paragraph

• Plan out what you are going to say beforehand

• Look at your chosen theme carefully. Consider the questions suggested and attempt to answer some of them

• But remember: you need an "angle" - a way to focus your feature. You can't answer all of those questions. This is journalism, and journalism needs to be new and original. That's why an "angle" is important: even if your topic has been covered in the past, there will always be something new to say.

• You need quotes. But if these quotes have been gathered by someone other than you, and in particular if they have already been published, you MUST say where they came from. If you don't, this is plagiarism and you will be disqualified.

(Source: https://www.theguardian.com/global-development-professionals-network/2013/mar/27/tips-for-writing-a-features-article)
NB: The Guardian is a good online resource to improve your knowledge on various subjects.

Task:

Write a feature on “unorganised labour” (sellers in markets, vendors, small entrepreneurs) in the Indian context

OR

Write a feature on the culture of physical fitness which is gaining ground (gyms, yoga centres, early morning/evening scene on the road with joggers, parks and beaches that are venues for fitness activities).

b. READING TO IDENTIFY POINT OF VIEW AND PERSPECTIVE (OPINION PIECES, EDITORIALS ETC.)

Here is a piece of editorial writing. Make a note of the topic and the style in which it is presented.

Refugees, Legality and Humanity

The circumstances surrounding the death of a Sudanese man, whose body was found on a beach near Calais, is a reminder of what is at stake for migrants trying to cross the Channel and enter Britain. The refugee, Abdufatah Hamdallah, was trying to reach England in a dinghy, using shovels for oars. His makeshift boat capsized and he was found dead on the beach at Calais. French authorities announced his death with "great sadness". As fate would have it, his request for asylum was rejected by France and was the reason for the risky journey he undertook across the Channel.

Sadly, immigration policies seem to lump traffickers, smugglers and asylum seekers together.

Another instance of asylum seekers perishing is that of at least 45 people who died in a shipwreck off the coast of Libya. Among them were five children. The same plight was faced by another boat of refugees near the Canary Islands. These stories are a grim reminder of the hazards faced by those who flee their homes and countries in search of a better life for themselves and their children.

The plight of the Rohingya refugees is closer home. While religious intolerance and internecine warfare make "home" a place of terror, people who have the pluck and daring to flee and make their journey across hazardous terrain in search of another homeland, often pave their path with tears and blood.

It is obvious that the claim to humanitarian help is shelved by conjuring ghosts of traffickers and smugglers. Heaven knows that the immigration

authorities and the government can distinguish between these categories. But, isn't it easy to take cover under legality? Whither humanity!

Answer the following questions:

1. Why do people seek "asylum" in foreign lands?
2. Do immigration authorities make an ***error of judgement*** in relation to asylum seekers or do they "take cover under legality"?

Understanding what an editorial is all about:

Having engaged with that heart-wrenching editorial on the plight of refugees, let us turn our thoughts towards the essentials of writing an editorial.

What is an editorial?

An editorial expresses your opinion about any current topic or issue, aiming to persuade readers to see the world from your perspective. The nice thing about editorials is that—unlike other types of formal writing—you are entitled to presenting your point of view. That doesn't mean that you don't need evidence. To form a compelling argument, you have to include proof to back up your bold claims

How do you put together an editorial?

Here is a step-by-step guideline on how to put together an editorial.

The essential Parts of an Editorial

Editorial topic
Title
Intended audience
Purpose of your editorial
Topic sentence
Supporting details (facts, opinions, analogies/examples, statistic data, etc.)
Opposing viewpoints
Weaknesses of opposing viewpoint
Conclusion

As a reader, how do you approach an editorial?

To form opinion on an editorial, the following aspects need to be considered

Topic
Introduction

Stance
Proof
Opposing argument
Solution

Task:
Write a brief editorial on how COVID 19 has impacted the employment scenario

OR

Write a brief editorial on merits and demerits of the online classroom.

d. Descriptive writing – writing a short descriptive essay of two to three paragraphs.

Look at the following snippets of "descriptive writing"

- My dog's fur felt like silk against my skin and her black colouring shone, absorbing the sunlight and reflecting it back like a pure, dark mirror.
- The sunset filled the sky with a deep red flame, setting the clouds ablaze.
- The waves rolled along the shore in a graceful, gentle rhythm, as if dancing with the land.

Did you notice that these descriptions are "evocative"? They evoke images/scenes/create pictures in your mind. You are able to feel the dog's fur and visualize the sunset and the waves.

Descriptive writing is a literary device in which the author uses details to paint a picture with words. This process provides readers with descriptions of people, places, objects, and events through the use of suitable details. The author also uses descriptive writing to create sensory details as a means of enhancing the reading experience. If done effectively, the reader

will be able draw a connection through the use of sensory details that include seeing, hearing, smelling, touching, and tasting. These techniques will assist you in becoming not only a better writer, but will also make your writing more engaging for readers.

Descriptive Writing Techniques

The primary objective of descriptive writing is to provide a clear picture of the place, people or thing in the reader's mind. The writer provides enough details to evoke the senses. A reader can feel the environment of the text through senses like seeing, hearing, smell, taste, and touch. Descriptive writing may be found in travel writing, biographies, poetry, diary writing, nature writing, memoirs and novels.

Some types of descriptive writing present information in chronological order. If you are describing a person, start with his appearance, nature, and background. If you are describing a place, tell your readers about the atmosphere, environment, which part of day or night and such small but interesting pieces of information: these small things are very useful to make a text excellent and keep readers engaged.

When we talk about ideal descriptive writing, it should have nouns, adjectives and strong action verbs. These three things bring life to the text and only then a writer can create images in the mind of readers. Most of the forms of descriptive writing are colourful and hold a vivid description of sensory details. These details play a key role in forming the image in the reader's mind. For the reader it could prove to be an escape from the drudgery of daily life: this escape is through art – a piece of descriptive writing.

Use of figures of speech:

Last but not least is the use of simile, metaphor, and analogy. These

things are like the final touch-up to the writing. Without them, a piece of descriptive writing will remain incomplete.

Using the most appropriate words:

Finding a word which matches what you actually have in mind is not easy. That is why you need to use a thesaurus (explained in Unit 1 of this book)

The first words that occur are not always the best. For example the use of "nice" and "really" in these sentences:

"We had a really nice dinner,"

Sounds better when you say,

"We enjoyed a tasty meal"

"The children had a great time at the circus"

Sounds better when you say,

“The children shared a thrilling night at the circus".

Variety makes writing interesting: adjectives are only one way of improving descriptions. Careful choice of verbs can help too.

What do you want to describe?

As you get started on your descriptive essay, it's important for you to identify exactly what you want to describe. Often, a descriptive essay will focus on portraying one of the following:

- a person
- a place
- a memory
- an experience
- an object

Ultimately, whatever you can *perceive* or *experience* can be the focus of your descriptive writing.

Why are you writing your descriptive essay?

Example: Imagine that you want to write a descriptive essay about your

grandfather. You've chosen to write about your grandfather's physical appearance and the way that he interacts with people. However, rather than providing a general description of these aspects, you want to convey your admiration of his strength and kindness. This is your reason for writing the descriptive essay. To achieve this, you might focus one of your paragraphs on describing the roughness of his hands, roughness resulting from the labor of his work throughout his life, but you might also describe how he would hold your hands so gently with his rough hands when having a conversation with you or when taking a walk.

Planning your descriptive essay:

- What or who do you want to describe?
- What is your reason for writing your description?
- What are the particular qualities that you want to focus on?

Drafting your descriptive essay:

- What sights, sounds, smells, tastes, and textures are important for developing your description?
- Which details can you include to ensure that your readers gain a vivid picture given from your perspective?

Revising your descriptive essay:

- Have you provided enough details and descriptions to enable your readers to gain a complete and vivid perception?
- Have you left out any minor but important details?
- Have you used words that convey your emotion or perspective?
- Are there any unnecessary details in your description?
- Does each paragraph of your essay focus on one aspect of your description?
- Are your paragraphs ordered in the most effective way?

Consider these two descriptions of a room:

- "The room was square with a window along one side. It had four chairs and a TV and video. There was a drinks cabinet and computer in the corner. The carpet was red and the ceiling cream."
- "The room was brightly lit by a large window and housed several modern pieces of electrical equipment but the effect was softened by a drinks cabinet and a warm red carpet."

A Sample of Descriptive Writing

There is a forest at the outskirts of the village. We have received two hundred acres of land in the forest as a grant from the government of Orissa to run the Post-Basic School, out of which thirty acres have been levelled with the help of bulldozers. Now, the brick-laying activity is going on. The students are assisting the labourers in these activities. The school for the time being, is being run in a three-roomed house and a tent. During the morning hours, we lay bricks and collect firewood from the forest for the oven. In the afternoon, we study our lessons under the shade of a Mahula tree beside the house.

It is very cold here, even more than at Angul. The students do not have enough warm clothes. While returning from the forest we collect roots and stumps of dead trees. We light a bonfire in the courtyard with those stumps. Towards the last part of the night, when it is too cold to have any more sleep, the children warm themselves around this bonfire.

The natural beauty of the place fills our tough living conditions with the requisite sweetness. The hills surround us like a blue wall. We get a lot of food for thought while roaming under the open sky and clean air. At present, the forest wears a dishevelled look with lopped up trees, bushes and weeds. Someday a school building will be built here, housing a library and the laboratories for science and agricultural sciences.

(Excerpt from *Letters From a Forest School*,by Hittarranjan Das,

pages 1-2)

Observations about the descriptive passage:

- The sequence of events is described: land granted by the government and brick-laying activity which has commenced
- The make-shift school is described
- The daily routine of the people involved in this project is described
- The climatic conditions are described
- The raw and untamed natural beauty of the place is described
- A picture of how this place will change with the coming of buildings is described.

Task

Write a descriptive piece on a favourite dish (food item)

OR

Write a descriptive piece on the produce (fruits, vegetables, eggs, etc) sold at your local market

Involving Action – II

VERBALS – GERUNDS, PARTICIPLES, INFINITIVES

Before we get into the subject of Verbals, let us meet the Happies/ the Happy Family

Eating is a favourite pastime of the Happies. They love to camp outdoors and have a barbeque. Planning an excursion comes easily to Mr. and Mrs. Happy. Mr. Happy is the family chef. Working on the menu for their outdoor family time is his job. He loves to cook for his family. While Mr. Happy is a foodie, Mrs. Happy is a fitness freak. Trekking is her passion. She selects the place for their excursion. Packing up the gear for trekking is her part of the planning and getting the food supplies ready is Mr.Happy's job. Mrs. Happy is a good singer. While rocking baby Bonny to sleep, she sings for him. She is also a great storyteller. While sitting around the campfire, she tells everyone beautiful stories about great adventures. The children, Joy, Twinkle, Rocky, Luna, Bobby and baby Bonny have a rollicking time with the outings planned by their parents.

Observe the following expressions

Eating…..is a pastime

Planning an excursion

Working on the menu

These are gerund phrases

Notice these expressions

While rocking

While sitting

These expression are called participles

And finally, look at the structure of these expressions:

To camp

To cook

These expressions are called "infinitives"

You will now learn what goes into the making of a gerund, a participle and an infinitive.

Verbals:-

There are certain applications of nouns which may sound like verbs, but actually function as nouns. These are called "verbals" or verbal nouns. They are gerunds, infinitives, and participles. Let's discuss them here.

Gerunds

A gerund is a verbal that ends with "-ing" and functions as a noun. The "-

ing" is attached is a verb, but the application is such that the total word becomes a noun.

Compare the following sentences

1. Rajini is gardening
2. Rajini's hobby is gardening.

In the first sentence, the word "gardening" is clearly the main verb in the sentence and is talking about the action of gardening. But in the second sentence, the word "gardening" is treated as the name of Rajini's hobby.

So if we were to construct questions in such a manner that the sentences mentioned above become answers to them, the questions will be –

1. What is Rajini doing?
2. What is Rajini's hobby?

As you can see, the first question asks for the action (What is Rajini *doing?*), but the second question asks for the name of Raj's hobby (What is *Rajini's hobby?*). In the second sentence, the action becomes the noun.

- Reading is a good pastime. (Gerund — traveling)
- They complimented me on my cooking. (Gerund — cooking)
- His favourite hobby is painting. (Gerund — painting)
- He has been booked for drunk driving. (Gerund — drunk driving)

A gerund phrase is a group of words that function as a gerund. In the following sentences, the underlined phrases are gerund phrases–

- Climbing Mount Everest is easier than what we are climbing right now.
- Talking to my dog is more soothing to me than having a bowl of ice-cream.

Important

A gerund cannot be used in a sentence that doesn't have a main verb and the gerunds never use punctuations.

Infinitives

An infinitive is a verbal noun that functions either as a noun, adjective, or adverb and is formed by adding “to” + a verb in its simple form.

Compare the following sentences

- Binoy hates to wait.
- Binoylikes to paint.

In these two sentences, you can see that the main verbs are “hates, likes” but the parts “to wait, to paint” are infinitives.

The gerund form of both the sentences −

- Binoy hates waiting.
- Binoy likes painting.

Important

- In other words, taking away the “-ing” part of a gerund and adding a “to” before it makes it an infinitive.
- If the infinitive or infinitive phrase is used in the beginning of a sentence, it uses a comma.

For Example

- To arrive on time, Shyam took the metro.
- To master your aim, you must practice daily.

Participles

A participle is a verbal that is used as an adjective and uses either “-ing”, “-ed”, “-en”, “-d”, “-t”, “-n”, or “-ne" as per the root word.

A participial phrase is a group of words consisting of a participle and nouns or pronouns that together function as participles −

- Removing her shoes, Annie jumped into the river.
- Ayesha noticed her dog running along the road.

Important

If a sentence begins with a participial phrase, a comma should be placed after the phrase. Also, a participial phrase must be placed as close to the noun it describes, to prevent confusion.

- While talking to Sanjay, I smiled at Radha.
- I smiled atRadha, while talking to Sanjay.

In these sentences, it's not clear who is talking to Sanjay if we miss the commas, hence when it comes to participial phrases, we need to use it as close to the noun that is doing the action.

Exercise 1:-

Use the appropriate Gerund or Infinitive:

1. Would you mind _____ me the sauce. (pass)
2. The doctor promised _____ the report as soon as possible. (read)
3. I had a hard time _____ the situation to my boss. (explain)
4. Jansi had some problems _____ without glasses. (read)
5. My schoolmates were happy _____ me at the reunion. (see)
6. My grandchildren are likely _____ up at any time. (show)
7. The woman denied _____ the crime. (commit)
8. Their memories of _____ in the hills will stay with them forever. (travel)
9. Gladys has always been afraid of _____. (fly)
10. _____ is good for your health. (swim)

Exercise 2:-

Complete the sentences with the correct form of GERUNDS and INFINITIVES.

1. She suggested _____ (go) to the museum.
2. They plan _____ (start) college in the December.
3. I don't want _____ (leave) yet.
4. Jay decided _____ (study) medicine.
5. Some girls dislike _____ (sew).
6. I promise _____ (meet) you tomorrow.
7. We discussed _____ (go) to the beach, but in the end we stayed at home.
8. She agreed _____ (bake) the cake.
9. I don't recommend _____ (take) a flight: it's too expensive!
10. We hope _____ (visit) our children next month.

Exercise 3:-

Combine the following pairs of sentences by using participles.

1. His handwriting was illegible. His children couldn't figure out what he had written.

2. We make some friendships in our travels. They are over with the journey.

3. The sun had risen high. The birds stopped their morning chorus.

4. I walked along the road. I saw a mongoose.

5. Shekar lost all his money in gambling. He became a pauper.

6. I took the cue from the prompter. I was able to carry on with my part in the play.

7. The thieves stole the jewellery. They escaped.

8. We met a girl. She was travelling in our compartment.

9. The wedding hall was decorated with flowers. It looked beautiful.

10. The motorist was over-speeding. The cops caught him.
11. The cat found the door open. It crept inside.
12. The police saw the fugitive. He was standing on the banks of the river.
13. He cried at the top of his voice. He rushed down the stairs.
14. We had worked for several hours. We came out of the office.
15. The troops routed the enemy. They marched home triumphantly.

MODALS

Modals (also called **modal verbs, modal auxiliary verb**s, **modal auxiliaries**) are special verbs which behave irregularly: they are different from normal verbs like "work, play, visit..." They give additional information about the ***function*** of the main verb that follows it. They have a great variety of ***communicative functions***.

Here are some characteristics of modal verbs:

- They never change their form. You can't add "s", "ed", "ing"...
- They are always followed by an infinitive without "to" (that is, the bare infinitive.)
- They are used to indicate modality - allow speakers to express certainty, possibility, willingness, obligation, necessity, ability

Here is a list of modal verbs:

can, could, may, might, will, would, shall, should, must

The verbs or expressions ***dare***, ***ought to***, ***had better***, and ***need not*** behave like modal auxiliaries to a large extent and may be added to the above list

Use of modal verbs:
Modal verbs are used to express functions such as:

a. Permission
b. Ability
c. Obligation
d. Prohibition
e. Lack of necessity
f. Advice
g. possibility
h. probability

(Except for "Prohibition", modals play a significant role in refining conversation and making our expressions polite)

We use **can** to ask for permission to do something:

Can I ask a question, please?

Can we go *home* now?

could is more formal and polite than *can*:

Could I ask a question please?

Could we go home now?

may is another more formal and polite way of asking for permission:

May I ask a question please?

May we go home now?

We use **can** to give permission:

You can go home now if you like.

You can borrow my pen if you like.

may is a more formal and polite way of giving permission:

You may go home now, if you like.

We use **can** to say that someone has permission to do something:

We can go out whenever we want.

Students can travel free.

may is a more formal and polite way of saying that someone has

permission:

Students may travel free.

POLITE WAYS OF SPEAKING

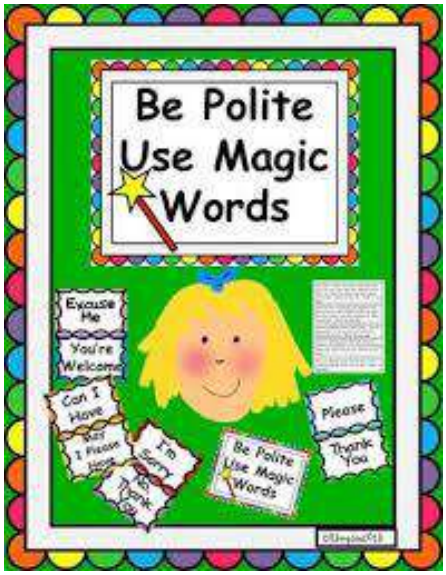
Compare

Polite	More direct
It's **kind of** cold in here, isn't it? **Could we** close the window?	It's cold in here. Let's close the window.
Could you just turn the radio down **a little, please**?	Turn down the radio.
Your playing **could possibly be** improved.	You must improve your playing.
You may need to spend more time working a little bit on the rhythm.	You need to spend more time working on the rhythm

Task 1

Make the following sentences more polite by using- *Please/ can you/ could you/ would you/ would you mind/*

- Fill in this form.
- Bring us some water.
- Send them an email.
- Shut the window.
- Switch off your cell phones.



Examples of modal verbs
Here is a list of modals with examples:

Modal Verb	Expressing	Example
Must	Strong obligation	You must stop when the traffic lights turn red.
	Logical conclusion / certainty	He must be very tired. He's been working all day long.
must not	Prohibition	You must not smoke in the hospital.
Can	Ability	I can swim.
	Permission	Can I use your phone please?
	Possibility	Smoking can cause cancer.
Could	Ability in the past	When I was younger I could run fast.
	Polite permission	Excuse me, could I just say something?
	Possibility	It could rain tomorrow!

May	Permission	May I use your phone please?
	Possibility, probability	It may rain tomorrow!
Might	Polite permission	Might I suggest an idea?
	Possibility, probability	I might go on a holiday to Australia next year.
need not	Lack of necessity/absence of obligation	I need not buy tomatoes. There are plenty of tomatoes in the fridge.
	Advice	You should / ought to revise your lessons
	logical conclusion	He should / ought to be very tired. He's been working all day long.
had better	Advice	You 'd better revise your lessons

Exercise 1:

Fill in the correct modal verb:

a. Jaguars _____run really fast. (can/might/may)
b. I _____go for the wedding reception, but I'm not sure. (might/can/must)
c. I think you _____go out and meet new people. (should/mustn't/must)
d. You _____come with us if you don't want to. (mustn't/don't have to/mightn't)
e. This is a secret between you and me, so we _____tell anyone. (mightn't/don't have to/ mustn't)
f. It's dangerous to go into deep water if you _____swim. (cannot/may not/ shouldn't)
g. I feel miserable, so I _____stay at home (can/may/have to)
h. I _____go out later with my parents but I don't really know. (might/should/can't)
i. All passengers _____(needn't/ can/ mustn't) remain in their seats and _____(mustn't/ might not/ don't have to) use their mobile phones.

j.To get a driving license you_____ be over 18. (may/can/have to)

Exercise 2:

Choose the most appropriate answer for expressing the idea specified in parentheses.

1. ____ I speak to Mr.Shyam, please? (Formal polite request)

Can May Would Would you mind if

2. ____you open the window, please? It's hot in here. (Polite request)

Could Couldn't Won't Wouldn't

3. Would you mind if I____your dictionary for an hour or so? (Polite request)

borrowed will borrow would borrow

4 . Would you mind if I____come to your party? (Asking for permission)

didn't won't wouldn't

5. Could I use your cell phone, please? – Sorry, you ____. (Permission not given)

can't couldn't mustn't won't

Exercise 2

Fill in the appropriate modal

1. If you are the owner of this purse, you _____ be able to tell us how much money is there in it. (**should/ shall/ need)**
2. I _____ do something to help my family. (**ought** / **must / need)**
3. _____ you come with me? (**shall / may/ will**)
4. The traveller felt that he _____ be going on, but pity held him back. (**need/ / will/ought to**)
5. _____I open the window? (**Should/ will/ ought to)**
6. If they started last evening, they _____ be here soon. (**should/ can/ must)**
7. In the not-so-distant future, sparrows _____become extinct.(**should/ could/ need)**
8. You _____ work overtime to make up for it.(**must/ ought/ would)**

SUMMING UP

MODAL VERBS

Type	Modal Verbs	Examples
ABILITY	Can, Could	• David can speak three languages. • He could speak fluent French when he was 5.
PERMISSION	Can, Could, May	• Can I sit in that chair please? • Could I open the window? • May I borrow your dictionary?
ADVICE	Should	• You should visit your dentist at least twice a year. • You should try to lose weight.
OBLIGATION	Must, Have to	• I must memorize all of these rules about tenses. • You have to take off your shoes before you get into the mosque.
POSSIBILITY	Might, May, Could, Can	• It looks nice, but it might be very expensive. • Richard may be coming to see us tomorrow.

Unit IV **(16 hours)**

1. Listening and Speaking

   a. Giving and responding to opinions

2. Reading and writing

   a. Note taking

   b. Narrative writing – writing narrative essays of two to three paragraphs

3. Grammar in Context:

   Tense

   - Present
   - Past
   - Future

1. LISTENING AND SPEAKING

j. GIVING AND RESPONDING TO OPINIONS

Pre Task

Read the following exchange aloud, playing the roles of the characters.

I. An exchange between friends:

THOMAS: I think Adyar Ananda Bhavan has the best masala dosa in all the city. Wouldn't you say so?

AYESHA: I disagree. I think Saravana Bhavan serves the best masala dosas. The idlis in Adyar Ananda Bhavan are heavenly though.

RITHIKA: I feel both of you are wrong. There is a small restaurant called Dosa Corner at the corner of my street. I really believe the dosas there are really tasty. And their masala dosas are yum.

THOMAS: Ah yes, Rithika, I agree with you. I have eaten at Dosa Corner once and I really liked their dosas. Ayesha, I think you once told me you have eaten there. Don't you remember?

AYESHA: Yes, of course. I completely agree with both of you. The dosas were very tasty. I have also eaten idlis in Babu Mess that's right next to it; the idlis were extremely soft and tasty.

II. An exchange in the marketing department of a company

SARIKA: The reports on this ad campaign have been very positive. I believe it would be a good idea to continue with it for some more time. What do you all feel?

DAVID: I agree with Sarika. Since the reports have been positive, I don't think we should remove the campaign and spend more money in making a new one.

KAMINI: In my opinion, I feel we should remove the campaign soon. While the reports have been positive, there is also a feeling that the ideas in it are old-fashioned.

DAVID: From my perspective, the positive aspects are greater than the negative ones. Our company cannot afford to spend money on a new campaign. What are your thoughts on that, Sarika?

SARIKA: I couldn't agree more with you, David. The company just cannot afford to spend money on a new campaign. Perhaps once our revenue has picked up, we can think of a new campaign.

Use the dictionary to find the meanings of the following words. Some of the words/ phrases may have more than one meaning.

(1) Ad campaign (2) afford (3) perspective (4) revenue

Identify phrases from the above dialogue that are used

(a) **while asking for an opinion** (wouldn't you say so?/ What do you all feel?/ What are your thoughts on that?)

(b) **before / while giving an opinion** (I think/ I feel/ I really believe/ In my opinion/ From my perspective)

(c) **while agreeing or disagreeing with another's opinion** (agreeing: I agree with you/ I completely agree with you/ I couldn't agree with you more) (disagreeing: I disagree/ I feel both of you

(d) are wrong)

TASK 1

Read the exchanges once again. Do you notice that the kinds of phrases used in the two conversations are different from each other? The first conversation is between friends and is informal in nature. The second conversation takes place in an official set up and is formal in nature. Because of this difference, the kinds of phrases used are also different. Below you will find common formal and informal phrases used for the three aspects related to asking, giving and responding to opinions. In the blanks provided, add some more phrases you can think of.

(a) Phrases used while asking for opinion

Formal	**Informal**
What are your thoughts on….	What do you say?
Would you say that…..	What do you feel?
Would you agree,…..	Sarika? (using the name of the person from whom you are asking for the opinion)
Do you think it's a good idea to…	Do you think it's a good idea to…
Where do you stand on the	Do you agree?

issue of	
Can you share your opinion on…	

(b) Phrases used while giving an opinion

Formal	**Informal**
In my opinion…	I feel that..
I firmly believe that…	I really think that…
It is my (humble) opinion that…	I believe…
From my perspective/ point of view…	I would say that…
In my view…	
It seems to me that…	

(c) Phrases used while agreeing / disagreeing

Formal	**Informal**
Agreeing	
Yes, I agree with you…	I agree with you…
I think you're right	You're right
I couldn't agree more	I couldn't agree more
	Me too
	Definitely
	Of course
Disagreeing	
I'm afraid I don't agree with you	Oh, no. I feel
I have to disagree with you	No, you're wrong. I think
I'm sure you're right, but I feel…	Yeah, but…
I beg to differ	
Don't you think it might be better …..	

You would have already noticed that some phrases can be used in both formal and informal contexts. For example: "Do you agree?" or "I think …"

TASK 2

Complete the following using phrases for asking for, giving opinions and agreeing and/ or disagreeing with opinions.

1. Arpita: You have been away from your family for a long time. _____ you should move back home with your family.

   Bhaskar: _____. I really miss my wife and daughter.

2. Press reporter: _____ about the government's decision to hike fuel prices?
   Opposition Leader: _____ that the move is wrong. _____ that the fuel prices should be cut.

3. Sahana: _____ Switzerland is the best place to visit for our summer vacation._____?
   Tarun:_____. Why should we go all the way to Switzerland? We have lovely hill stations in India.
   Dinesh: _____. We can go to Missouri or Dehradun instead.

4. Activist 1: _____ it is important to treat all creation with respect and _____ believe it is wrong to test cosmetics on animals.
   Entrepreneur: _____. Animals are different from us. And how else can we find out if the cosmetics are safe for us?
   Activist 2: _____ with that point of view. Science has grown so much. _____

believe we can find a more humane way of finding out how safe cosmetics are.

Use the dictionary to find the meanings of the following words. Again, some words may have more than one meaning. Identify which meaning is used in the dialogue above.

(1) hike (2) move (3) entrepreneur (4) humane

Asking for, giving opinions and agreeing and/ or disagreeing with opinions- II

You would have noticed that when you are giving your opinion or agreeing with or disagreeing with others' opinions, you can do so with varying degrees of firmness. For example, we can either say "I agree with you" or "I *really* agree with you" or "I *fully* agree with you". You can see that the last two expressions are stronger than the first in expressing agreement. Other ways of adding strengths to views are:

- I **strongly** believe…
- I **truly** feel… or
- In my **honest** opinion…
- I firmly **believe**…
- I **simply cannot** agree with you.
- Do you **really** think…

Can you think of more ways of adding strength to your views?

Activity

Work in groups of four and have a debate on the following topics. Make sure that you use the phrases we have studied for asking for, giving, agreeing and disagreeing with opinions. Also make sure that there are at least two people agreeing to the topic and two people disagreeing. Remember that you don't need to come to a conclusion. Finish the discussion in about ten minutes.

1. Is animal testing on cosmetics necessary?
2. Are Indian systems of medicine better than allopathy?
3. Should children be taught only in the mother tongue?
4. Should village cuisine be promoted in cities?
5. Should food delivery services be encouraged?

READING AND WRITING

a. NOTE TAKING - I

Most of us take notes when we read our text books or any reference book. If the book is our own, we may make notes on the margins; if the book is borrowed from the library, we will make notes in our notebooks.

Think about how you take notes—what do you include when you make notes? How do you write? What do you do with the notes you have made?

Pre Task

From the following list, place a tick against sentences that are true about note taking.

1. We use full sentences.
2. We use abbreviations.
3. We put down in short sentences everything that is there in the passage.
4. We put down only the important points.
5. We make use of our notes to plan an essay.
6. We throw away our notes as soon as we make them.

As you would have noticed, sentences 2, 4 and 5 are true about note-taking.

TASK 1

Read the following passage:

William Shakespeare, the famous British dramatist and poet lived from 1564 to 1616. He was born in a village called Stratford-upon-Avon and moved to London where he wrote plays for a theatre group called Lord Chamberlaine's Men. His plays were performed in a theatre called The Globe and were very successful. Later in his life, Shakespeare returned to Stratford-upon-Avon where he died quite a rich man.

Shakespeare wrote 39 plays, five narrative poems and 154 sonnets. He wrote three kinds of plays—comedies, tragedies and histories. Among his famous comedies are *The Comedy of Errors*, *As You Like It*, *Twelfth Night* and *A Midsummer Night's Dream*. *Hamlet, Othello, Romeo and Juliet* and *King Lear* are some of his tragedies while *Richard II, Henry IV, Henry V* and *Richard III* are history plays. Apart from these, he also wrote plays based on Roman history like *Anthony and Cleopatra* and *Julius Caeser*. His plays have been translated into many languages and are still performed the world over.

After reading the passage,

1. Underline the words/ phrases you think are important.
2. What kind of a passage do you think it is?
    a. It describes a process
    b. It gives facts
    c. It gives opinions

Once you know what the important points in the passage are, it is time to arrange them in a way that will make it easy to read and reuse. Since the passage given above has a lot of facts, there are at least two formats on which you can put down the notes you have taken on the passage.

The outlining method

In this method, points are grouped according to relationship and importance. To do this,

- First list the main points
    - Then indent the related points under it
      (to indent means to add extra space between the margin and the place where the line starts. The bullet point above is indented)

Below you will find notes based on the passage. Some parts have been done for you. Fill in the blanks using the model.

William Shakespeare

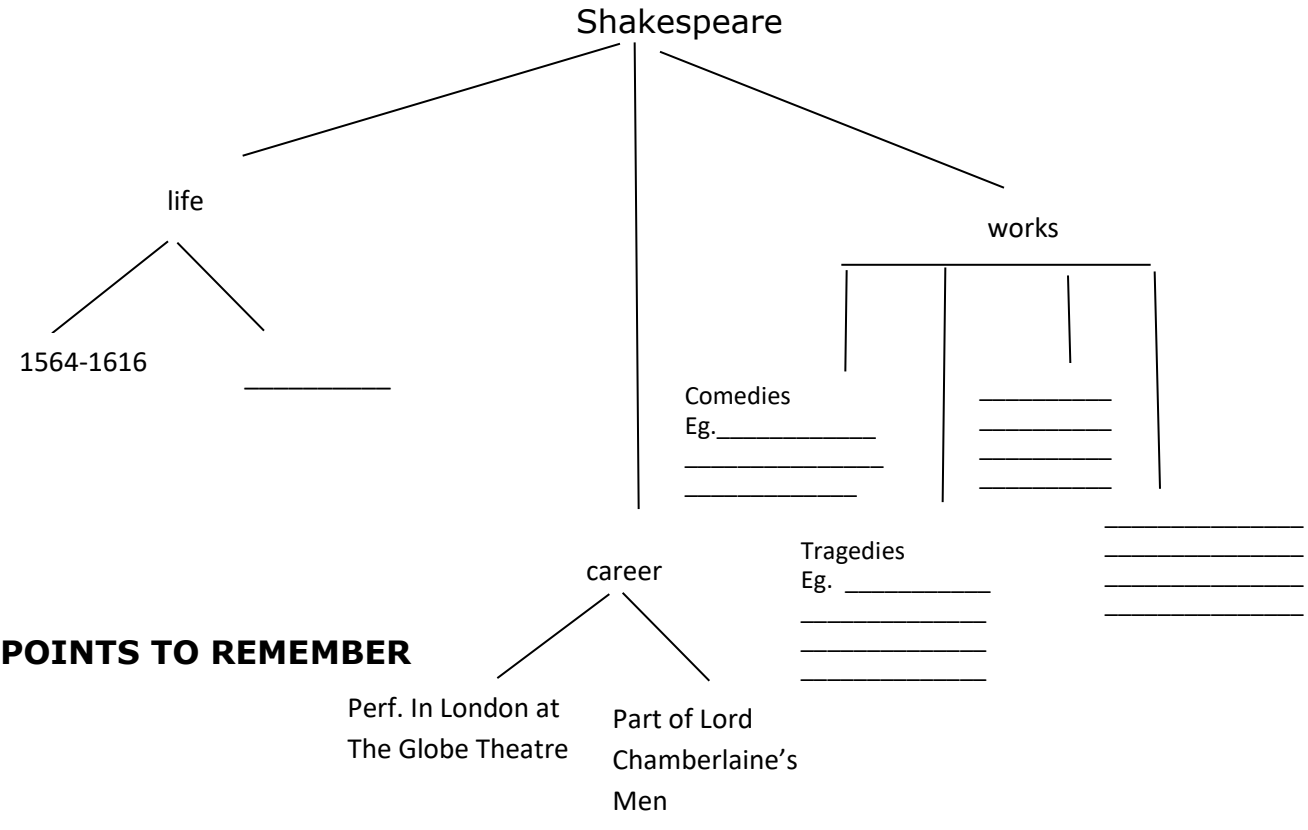
- Life
    - 1564-1616
    - Born and died: Stratford-upon-Avon
- Career—plays
    - Perf. in London
        - At _____
    - written for _____ Men
- Works
    - 39 plays
        - Comedies
            - Example: *As You Like It, A Midsummer Night's Dream*
        - Tragedies
            - Example: *Hamlet, King Lear*
        - Histories
            - Example: _____
        - Roman plays
            - Example: _____
    - Five narrative poems
    - _____

It is important to make it clear what the main point is and what the points being grouped under it are. For this, use specific kinds of symbols—you can use I, II, III etc. for the main points and for further groupings, you can use 1, 2, 3…/ i, ii, iii…. / a, b, c etc. This means the third heading of the note above will look like this:

III. Works
    1. 39 plays
        a. Comedies
            i. Eg: *As You Like It, A Midsummer Night's Dream*
        b. Tragedies
            i. Eg: *Hamlet, King Lear*
        c. Histories
            i. Eg: _____
        d. Roman plays
            i. Eg: _____
    2. Five narrative poems
    3. 154 sonnets

I. Mapping Method

In this method, arrows are used to connect ideas to a central point. Using this method, notes to passage on Shakespeare would look something like what is given below. Fill in the blanks provided to complete the notes.



POINTS TO REMEMBER

- Notice that the passage is not divided into sections such as 'life', 'career' and 'works'. This is something we can do to better organise our notes.
- Also notice that no full sentences are used in the notes.
- Not all examples given in the passage are reproduced in the notes.
- Notice also that 'eg.' is used instead of example and perf. is used instead of performed. These are abbreviations or short forms. We can use a number of short forms while making notes, but it is always a good idea to use universally used abbreviations. Below is a list of such abbreviations that you can use. Add any more that you can think of. Remember that when you are using an abbreviation, you need to put a fullstop at the end of the abbreviation—eg.,perf., etc.

    a. & for and
    b. >, < for greater than or less than
    c. = for equal to
    d. etc. for etcetera
    e. Govt. for government
    f. Lib. For library
    g. Lab for laboratory
    h. Ad for advertisement
    i. _____
    j. _____
    k. _____
    l. _____
    m. _____

IMPORTANT TIPS

- Read the passage fully first before beginning to make notes on it.
- While reading the passage, it helps to underline important points.
- It may also help if you divide the passage into categories—like we did in the passage on Shakespeare
- Do not copy sentences from the passage. Always rewrite them in your own words.
- Make sure your notes are focused and organised—you will be using your notes to write essays or study for exams.

TASK 2

Now read the following passages and make notes from it. You can use either of the formats discussed above.

The World Health Organization began a DDT spraying program which virtually eliminated malaria. But other things began to happen. Besides

killing mosquitoes, the DDT killed other insects that lived in the houses, such as flies and cockroaches. These insects were the favourite food of geckos (small lizards). And so when the geckos ate the dead insects, they died from DDT poisoning. Similarly, the house cats ate the dead geckos and cockroaches, and they too died from the DDT poisoning. As a result, the rat population rose sharply, and the human population of Borneo began to die from a type of plague carried by fleas on the rats. In order to deal with the emergency, thousands of cats were parachuted into the island, in what was called 'Operation Cat Drop'.

(adapted from:
https://www.who.int/mediacentre/news/releases/2006/pr50/en/)

Note Taking - II

The passage from which you made notes in the previous task was fact based. We will now look at how we can make notes from other kinds of passages.

TASK 1

Read the following passage describing how chocolate is made:

How is chocolate made?

Have you ever wondered where chocolate comes from? Well, chocolate is made from beans which grow in pods on the Theobroma cacao tree. These trees grow in several different countries and the flavour of the beans varies depending on where they come from. The beans also vary in flavour, depending on the age of the tree.

(Picture:https://commons.wikimedia.org/wiki/File:%C3%81rbol_Cacao.JPG)

After the beans have been collected and dried, they are transported to chocolate factories. There, the beans are weighed and separated by type so

that the manufacturer knows exactly what kind of cacao is going into the chocolate. This ensures the flavour of the chocolate is consistent over time. Some manufacturers use up to twelve types of cacao, depending on the flavour of chocolate they want to create.

(Picture: https://www.needpix.com/photo/1211899/cocoa-cacao-chocolate-food-sweet-brown-ingredient-plant-tropical)

Once weighed, the cacao beans are roasted in large ovens for up to two hours. The heat not only dries and darkens the beans, but also brings out their flavour. Next, the cacao beans are cracked, and then winnowed – that is, the broken shells are blown away, which leaves the crushed pieces of cacao beans, called 'nibs'. These are edible but do not taste very pleasant. The cacao nibs are then crushed and ground into a thick paste called chocolate liquor. This is bitter and not very smooth or creamy. To improve the flavour, the manufacturer mixes in things like sugar, vanilla and milk.

You could eat this mixture, and it would taste pretty good, but it wouldn't quite have the right texture. So the manufacturer runs the mixture through steel rollers and then it is 'conched'. This is a process which involves putting the mixture in a machine that mixes and mashes the chocolate. Conching can last a few hours for cheaper chocolate, and up to six days for more expensive types.

Finally, we have chocolate!

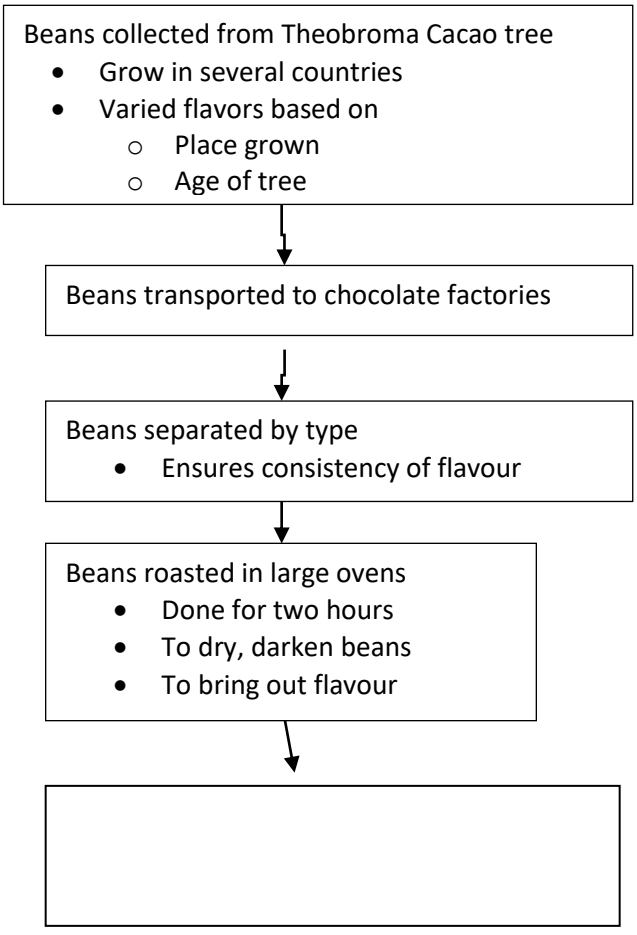
(passage sourced from Cambridge International Examination Question Paper 2015. © UCLES 2015)

Use the dictionary to find out the meanings of the following words. Some of the words have more than one meaning. Identify the meaning that is relevant in the passage. Once you have found out the meanings of the words, make sentences of your own with these words.

(a) Ensure (b) flavour (c) edible (d) quite (e) pretty

When you need to make notes from a passage such as this, a flowchart model is helpful. This is because a flowchart allows you to place the various components of a process in the correct place. Within each of the boxes in the flowchart, you can also add bullets or numbered points to add related information. Part of the notes made on this passage using the flowchart model could be like what is given below. Complete the flowchart.

HOW CHOCOLATES ARE MADE



TASK 2

Read the following passage on tea:

(Picture:https://pixabay.com/photos/search/green%20tea%20plantation/)

Tea is the common name for a family of mostly woody flowering plants, and for one of its important genera. The tea plant itself is a native of Southeast Asia. The tea brewed from the dried leaves of this plant has been drunk in China since perhaps the 28th century BC and certainly since the 10th century BC, from which time written records of its use survive. It was first brought to Europe by the Dutch in the early 17th century AD. After the introduction of tea there in 1657, England became the only European country of tea drinkers rather than coffee drinkers. Tea was introduced into North America by early settlers but was heavily taxed by the British, eventually resulting in the well-known Boston Tea Party of 1773, and it has never competed successfully with coffee as the staple beverage. Tea is drunk by about half of the world's population; China, India, Indonesia, Sri Lanka, and Japan are the main producers.

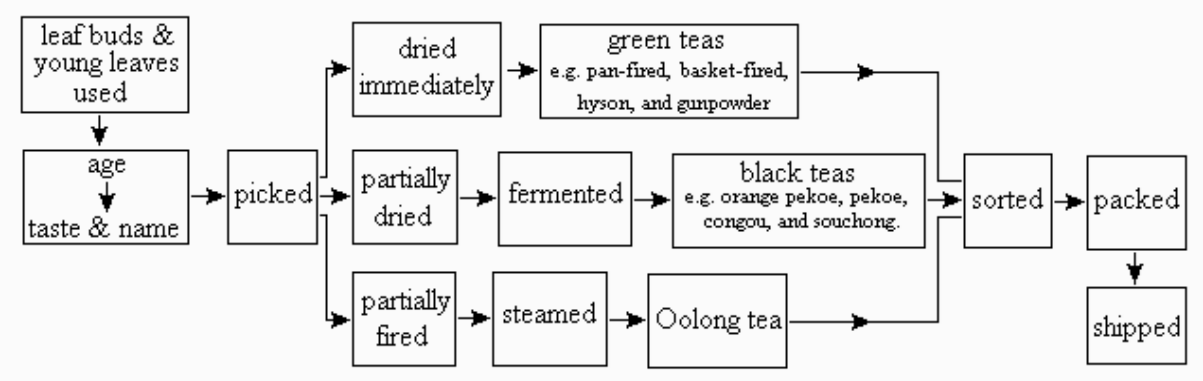
Leaf buds and young leaves are used in making tea, the age of the leaves determining the taste and name of the particular commercial variety. Thus, orange pekoe is made from the youngest leaves, and souchong from the fourth leaves. After picking, the leaves either are dried immediately and completely to produce green teas - such as pan-fired, basket-fired, hyson, and gunpowder - or are partially dried and then allowed to ferment to produce various kinds of black teas, such as orange pekoe, pekoe, congou, and souchong. Oolong tea is partially fired and then steamed, thus being intermediate between green and black teas. After being sorted, all grades of tea are packed in foil-lined chests to prevent the absorption of unpleasant odors or the loss of aroma during shipment. In China, tea is sometimes allowed to absorb the scent from various flowers; jasmine is a particular favourite.

(Source: http://www.uefap.net/reading/reading-note-taking/639-reading-note-taking-taking-notes-example3)

As you can see, this passage includes a process as well as a lot of facts. When making notes from such a passage, it helps if we can combine the outlining/ mapping method with the flowchart. Notes made from the above passage may look like this:

TEA

- native to SE Asia
- drunk in China since C10th BC, C28 BC ?,
- brought to Europe by Dutch C17
- intro to USA - Boston Tea party 1773
- main producers China, India, Indonesia, Sri Lanka, Japan
- Making tea:



(Source: http://www.uefap.net/reading/reading-note-taking/639-reading-note-taking-taking-notes-example3)

TASK 3

Read the following passage and make notes from it. You can use any of the formats we have discussed so far. You can also use a combination of the formats.

OILS

There are three main groups of oils: animal, vegetable and mineral. Great quantities of animal oil come from whales, those enormous creatures of the sea which are the largest remaining animals in the world. To protect the whale from the cold of the Arctic seas, nature has provided it with a thick covering of fat called blubber. When the whale is killed, the blubber is stripped off and boiled down, either on board ship or on shore. It produces a great quantity of oil which can be made into food for human consumption. A few other creatures yield oil, but none so much as the whale. The livers of the cod and the halibut, two kinds of fish, yield nourishing oil. Both cod liver oil and halibut liver oil are given to sick children and other invalids who need certain vitamins. These oils may be bought at any chemist's.

Vegetable oil has been known from antiquity. No household can get on without it, for it is used in cooking. Perfumes may be made from the oils of certain flowers. Soaps are made from vegetable and animal oils.

To the ordinary man, one kind of oil may be as important as another. But when the politician or the engineer refers to oil, he almost always means mineral oil, the oil that drives tanks, aeroplanes and warships, motor-cars and diesel locomotives; the oil that is used to lubricate all kinds of machinery. This is the oil that has changed the life of the common man. When it is refined into petrol it is used to drive the internal combustion engine. To it we owe the existence of the motorcar, which has replaced the private carriage drawn by the horse. To it we owe the possibility of flying. It has changed the methods of warfare on land and sea. This kind of oil comes out of the earth. Because it burns well, it is used as fuel and in some ways it is superior to coal in this respect. Many big ships now burn oil instead of coal. Because it burns brightly, it is used for illumination; countless homes are still illuminated with oil-burning lamps. Because it is very slippery, it is used for lubrication. Two metal surfaces rubbing together cause friction and heat; but if they are separated by a thin film of oil, the friction and heat are reduced. No machine would work for long if it were not properly lubricated. The oil used for this purpose must be of the correct thickness; if it is too thin it will not give sufficient lubrication, and if it is too thick it will not reach all parts that must be lubricated.

(http://www.uefap.net/reading/reading-note-taking/636-reading-note-taking-taking-notes-example1)

Note Taking - III

A third kind of passage you are likely to come across are passages that compare two or more items. It is useful to use tables when making notes from such passages.

TASK 1

Read the following essay and use the table provided to fill in notes from it:

PAPER BOOKS AND E-BOOKS

There is a growing concern that mass media and digital technologies have decreased the time spent on reading. Still, people all over the world still like books. Reading is a great pleasure because you have a chance to immerse into the exciting world and learn something new. Thousands of new books are published every year, and given the number of already existing books, every person has unlimited opportunities in selecting some interesting pieces of literary work. During the past several years, e-books have gained immense popularity around the world. Due to their accessibility and convenience, they easily won over the market and now successfully compete with traditional paper books. This essay will explore differences and similarities between e-books and paper books.

Despite all their visible differences, digital versions and paper books are similar in many ways. First, they both have the same text structure including the cover, title page, copyright page, table of content, chapters, etc. Second, they have the same function – provide readers with new information. Irrespective of the form, all readers use paper books and e-readers for the same purposes, that is, to study, relax, work, and learn.

At the same time, there are many differences between them too. E-books are sleek and thin, which makes them easier to carry. They have a huge capacity, meaning that users can download thousands of books in one gadget and spare themselves of the necessity of carrying large volumes. Some opponents of e-books claim that contrary to regular books, electronic devices are not so pleasant to smell and touch. They are made of plastic and metal that have no smell, whereas traditional books smell of paper, ink, dust, someone’s perfumes, and many other things related to their history. Some people love old library books for this unique, authentic smell that cannot be compared to the coldness and impersonality of digital devices.

Another important difference relates to books’ durability. Traditional paper books can stand the test of time. They easily withstand heat, falls, moisture, tearing, and so on, which allows to keep them for hundreds and even thousands of years. E-readers do not have this amazing quality. They are easier to carry and hold, yet they may break at any time; files kept in gadgets can be damaged by computer viruses. Besides, as technologies

develop, some e-book models come out of use, which means that a person will have to buy new models to be able to download and use digital books.

The cost is another point of comparison. While e-books themselves can be expensive, users can save much money by buying electronic versions of printed books. They often cost half the price of traditional books and can be downloaded immediately. Paper books, especially rare ones, can be very expensive and hard to find. Moreover, buying many paper books to use for a limited period of time (e.g., for studying) is impractical. At the same time, the value of some paper books may increase with time, which allows collecting and reselling them later for much profit.

To conclude, the selection of a form depends on the purpose, readers' taste, financial resources, etc. E-books and traditional books have their similarities and differences, and it seems there is no better choice. Ultimately, it is information that matters, so everything works as long as you can get it.

(adapted from https://scoobydomyessay.com/blog/paper-books-and-e-books-compare-and-contrast/)

Use the dictionary to find out the meanings of the following words:

(a) Concern (b) accessibility (c) irrespective of (d) durability (e) impractical

PAPER BOOKS AND E-BOOKS

I. Similarities:
   a. _____
   b. _____
   c. _____
   d. _____

II. Differences:

Paper Books	E books
Looks	
Durability	
Cost	

Note Taking – IV (Longer passages)

TASK 1

Now that you have learnt different methods of making notes, it is now time to move on to making notes from longer passages. Read the following passages and make notes from them using any or a combination of the formats discussed.

I.

THE ACACIA TREE

(Picture: https://www.google.com/search?q=the+acacia+tree&tbm)

Few exotic trees are as widely cultivated and versatile as the Acacia tree. While its unique shape and blossoms are eye-catching, the Acacia's appearance reveals just a hint of its functions. The Acacia's distinctive leaves make the tree highly distinguishable. While there are more than 800 species of the Acacia trees around the world, most feature small, finely divided green leaflets that give the stalk a fernlike appearance. Meanwhile, in other species, which grow in the desert and see very little rain, leaves are absent altogether. Instead, the stalks perform the functions of leaves and can appear as sharp spines or large thorns. Most Acacia trees have short lifespans of 15 to 30 years. Consequently, they tend to grow quickly and can reach heights in excess of 40 feet. In addition to the stunning yellow and white blooms, the Acacia produces a dry seedpod as its fruit. Each pod is about three inches long and contains five to six brownish black seeds. The

combination of its feathery leaves, globular flowers and dry seedpods creates a dramatic appearance during the tree's peak growing years.

The Acacia is one of the largest species of trees in the world with more than 800 different types growing in warm, tropical and desert-like regions of both hemispheres. The flat-topped Acacia is typically found on the savannahs of South Africa. The top of these trees resemble a ledge. The Swollen-thorn Acacias thrive in Central America; its seed pods form a notable symbiotic association with ants. Native to Hawaii, the Koa Acacia tree is known for its dark hardwood and is prized for its variety of grains which ranges from plain, to curly, to deep fiddleback. There are two types of flowering Acacias. The baileyana species of Acacias are known for their yellow flower clusters. The farnesiana species is known its spiny shrub-like appearance which contains many fragrant blossoms that attract numerous insect pollinators.

In the Indian subcontinent one of the species of acacia called Acacia Catechu is known as `Khair`. It is a medium sized deciduous tree with crooked and forked truck. Its growth can be traced in both natural and plantation forms in most parts of the nation up to an elevation of 1300 meters above sea level. In India the Acacia Catechu is categorized mainly into three divisions: Catechu, Catechuoides and Sundra. In India the Acacia Catechu is widely found in Uttar Pradesh, Jammu, Punjab, Himachal Pradesh, Madhya Pradesh, Bihar, Orissa and Andhra Pradesh. The other species known as Acacia Catechuoides is found in the terrain region of Sikkim, West Bengal and Assam whereas the third variety also known as the `red catechu` or `lalkhair` is prevalent in Gujarat, the Deccan, Rajasthan and southern parts of Maharashtra.

The Acacia tree has an storied past, from its introduction in Europe by a herbalist to Henri IV in 1601 to its addition to various botanical gardens throughout North America in the late 1960s. The tree's eye-popping white and yellow blossoms were made popular by the early American Indians, who used them as gifts to woo unsuspecting females. The Acacia tree thorns house stinging ants who live off the tree's nectar. While giraffes and cattle love to chew on its leaves, butterflies are attracted to Acacia trees. The thorns of the Central American Bullhorn Acacias are commonly strung into necklaces and belts.

(Source: http://www.portghalib.com/news/2017/3/acacia-tree/18/)

Task 2

The climate of a coniferous forest depends upon where it is located. In general, the farther north the latitude, the cooler the climate. The presence of mountain ranges and oceans also affects the climate of an area. In Japan, for example, Siberian air masses bring severe winters to some forests, while other forests are influenced by warm ocean currents, and have a more tropical climate.

The most severe climate is found in the boreal forest, or taiga, where temperatures are below freezing for more than half of the year. Winter temperatures range from -65° to 30°F (-54° to -1°C), and summer temperatures from 20° to 70°F (-7° to 21°C).However, because the taiga is a land of extremes, temperatures can drop as low as -76°F (-60°C) in winter or climb as high as 104°F (40°C) in summer.

Most of the precipitation (rain, snow, or sleet) in the boreal forest comes from summer rain, which averages 12 to 33 inches (30 to 85 centimeters) per year.

Mountain forests face cold, dry climates and high winds. The higher the elevation, the harsher the conditions. Scientists estimate that for every 300 feet (91 meters) in elevation, the temperature drops more than 1°F. On Alaskan mountains, temperatures in January average about 8°F (-13°C) and in July only 47°F (8°C).

In general, northern hemisphere forests found on the northern side of mountains are shaded from the sun and the air is cooler. The forests receive more rainfall and have denser stands (groups) of trees and other plants. Forests on the southern side of mountains are drier, warmer and have less vegetation.

The redwood and Pacific Northwestern forests have a climate that is moderated by the Pacific Ocean and the coastal mountain ranges. In the Olympic Rain Forest in Washington, for example, the temperature is always above freezing in winter and is seldom higher than 85°F (29°C) in summer. Up to 145 inches (368 centimeters) of rain fall annually.

In the Mediterranean and parts of California, winters are warm and wet, while summers are hot and dry. Droughts (extremely dry periods) may be common. In the Mediterranean region, for example, winter temperatures usually do not fall below freezing.

The climate in the Southern Hemisphere forests varies, depending upon where the forests are located. In the tropics (the regions around the equator), where the forests are at higher elevations, clouds of mist may blanket them creating cool and damp conditions. In more temperate regions, such as in the mountains of Chile, conditions are drier and colder.

(adapted from *UXL Encyclopaedia of Biomes: Volume I*, by Marlene Weigel)

Task 3

THE NEW MUSIC

The new music was built out of materials already in existence: blues, rock'n'roll, folk music. But although the forms remained, something wholly new and original was made out of these older elements - more original, perhaps, than even the new musicians themselves yet realize. The transformation took place in 1966-7. Up to that time, the blues had been an essentially black medium. Rock'n'roll, a blues derivative, was rhythmic, raunchy, teen-age dance music. Folk music, old and modern, was popular among college students. The three forms remained musically and culturally distinct, and even as late as 1965, none of them were expressing any radically new states of consciousness. Blues expressed black soul; rock, as made famous by Elvis Presley, was the beat of youthful sensuality; and folk music, with such singers as Joan Baez, expressed anti-war sentiments as well as the universal themes of love and disillusionment.

In 1966-7 there was a spontaneous transformation. In the United States, it originated with youthful rock groups playing in San Francisco. In England, it was led by the Beatles, who were already established as an extremely fine and highly individual rock group. What happened, as well as it can be put into words, was this. First, the separate musical traditions were brought together. Bob Dylan and the Jefferson Airplane played folk rock, folk ideas with a rock beat. White rock groups began experimenting with the blues. Of course, white musicians had always played the blues, but essentially as imitators of the Negro style; now it began to be the white bands' own music. And all of the groups moved towards a broader eclecticism and synthesis. They freely took over elements from Indian ragas, from jazz, from American country music, and as time went on from even more diverse sources (one group seems recently to have been trying out Gregorian chants). What developed was a protean music, capable fan almost limitless range of expression.

The second thing that happened was that all the musical groups began using the full range of electric instruments and the technology of electronic amplifiers. The twangy electric guitar was an old country-western standby, but the new electronic effects were altogether different - so different that a new listener in 1967 might well feel that there had never been any sounds like that in the world before. The high, piercing, unearthly sounds of the guitar seemed to come from other realms. Electronics did, in fact, make possible sounds that no instrument up to that time could produce. And in studio recordings, multiple tracking, feedback and other devices made possible effects that not even an electronic band could produce live. Electronic amplification also made possible a fantastic increase in volume, the music becoming as loud and penetrating as the human ear could stand, and thereby achieving a 'total' effect, so that instead fan audience of passive

listeners, there were now audiences of total participants, feeling the music in all of their senses and all of their bones.

Third, the music becomes a multi-media experience; a part of a total environment. In the Bay Area ballrooms, the Fillmore, the Avalon, or Pauley Ballroom at the University of California, the walls were covered with fantastic changing patterns of light, the beginning of the new art of the light show. And the audience did not sit, it danced. With records at home, listeners imitated these lighting effects as best they could, and heightened the whole experience by using drugs. Often music was played out of doors, where nature - the sea or tall redwoods - provided the environment.

(source: http://www.uefap.net/exercises/writing/report/music.htm

b. Narrative writing – writing narrative essays of two to three paragraphs

WRITING NARRATIVE ESSAYS – I

NUMBER OF SESSIONS: 3

Session 1

Do you remember the last time someone told you a story? Or when you told someone a story? Did you enjoy the experience? What kinds of stories did you hear? What kinds of stories did you tell others?

Telling stories about ourselves and others, whether they are real stories or imagined ones, is something almost all of us like. There is something in people of all ages that enjoys a good narration.

'Narrative Essays' refers to essays that tell a story. By 'story' we do not always mean an imaginary one. We can narrate something that happened to us as a story. For example, if I had an interesting experience on my way to college today, I will narrate it to my friends or I can write it down as an interesting narrative essay.

Read the following narrative essay and consider the questions that follow.

My knees were shaking, my heart was beating fast, and I had butterflies in my stomach. I had never given a presentation in front of a whole class. Why had the teacher made it the final term project? How well I remember that day three weeks ago when she had told us about it!

"For your final term project, you will all do some research on some aspect related to plants and make a presentation on it. The presentations should be unique and original. "

We had all groaned and tried to talk our teacher out of this. But she had just stood there smiling. “If you don’t try it,” she had insisted, “you will never know if you can do it or not.”

I had tried my best since that day to overcome my fear. I have always been afraid of speaking in front of people. If there were too many guests at home, I would make some excuse or the other to avoid speaking to them. How on earth was I going to make a presentation in front of the whole class?

I had tried to make myself feel better by finding a topic as interesting as possible about plants. I finally chose plant communication. The topic was new to me—I had never thought plants could communicate in any way. So I thought it would be interesting enough to hold the class’s attention even if I got cold feet and couldn’t talk well.

But now that I had to talk in front of the class, I began to sweat. I was sure I would forget what I had to say. I was even ready to tell my teacher that I had fever and avoid giving the presentation. Listening to the others make their presentations before me only made me feel worse. Their topics seemed so much better.

At that moment I glanced at the water plant I had brought with me in a bottle to show during my presentation. The leaves were bright green and the flowers a beautiful shade of purple. Something about the plant suddenly gave me courage.

So when the teacher called out my name, I went up feeling much more confident than I had in the past three weeks. “This plant,” I began, “just told me not to be scared. It did not use English to speak to me, but it used a language I understand.” Every head in the class looked up, interested. I had got their attention.

That first presentation I made in front of my class not only helped me overcome my stage fright and gave me more confidence; it also made me realise that we can find inspiration in places we might never have thought of.

1. Why do you think the essay was written?
2. Who is the narrator?
3. What do you think is the function of the first paragraph of the essay?

4. Who are the characters you meet in the essay? What do you know about them?
5. Where does the incident take place?
6. What do you think is the function of the last paragraph of the essay?

As you would have noticed, the essay has a purpose. It was written not only to narrate an event but also because the incident was important in some way. The last paragraph of the essay tells us that the narrator learnt an important lesson from the incident.

It is not always necessary that we should learn some lesson from an incident we write about; we can write about an incident that has affected us deeply, perhaps because it was very funny or scary or surprising. In any case, the central incident in a narrative essay has to have some significance for the narrator.

TASK 1

Think of an incident that happened to you that

(a) surprised you the most
(b) scared you the most
(c) left you very happy
(d) left you very confused
(e) taught you a valuable lesson

The essay given above is narrated by the person to whom the incident happened. This is called first person narration.

Narrative essays are almost always written from the first person point of view. If you use the third person point of view—he/ she/ they etc.—the essay reads like a short story and therefore becomes more a piece of creative writing than a narrative essay. Narrative essays are essays in which you narrate an incident that happened to you and that is important for you.

You would also have noticed that the first paragraph of the essay creates the atmosphere. Look at the phrases used—shaking knees, heart beating fast and the idiom ‘butterflies in my stomach’ (this idiom means being scared; you will learn about idioms in another lesson).

TASK 2

Write down words to describe the following atmospheres. The first one is done for you.

1. **Scary**
   spooky
   dark
   gloomy
   eerie
2. **Happy**
   _____
   _____
   _____
   _____
3. **Confused**
   _____
   _____
   _____
   _____
4. **Surprise**
   _____
   _____
   _____

This is just one way of starting an essay. There are other ways in which you can start essays.

(a) You can begin by telling the readers the lesson you learnt from the incident. In the essay you just read, this comes in the last paragraph, but you can also begin with it. The essay could also have begun like this:

> It was when I gave my very first class presentation that I learnt that inspiration can come from any place. The presentation also gave me the self-confidence I needed so badly.

(b) You could also begin an essay by asking a question: Would you ever have thought that a plant could instil self-confidence in anyone?

Even though the incident given above is narrated in the first person, there is at least one other person involved: the teacher. What do we know about the teacher?

We know that the teacher is a woman and that she can be very persuasive. However, she does not appear to be unkind--she does not scold the children for asking her to change her mind. She only encourages them smilingly. We hear her speak, but we are not told anything about how she looks or how her voice sounded. Adding these details can bring the teacher to life and make the essay more interesting. For example, instead of

> 'We had all groaned and tried to talk our teacher out of this. But she had just stood there smiling. "If you don't try it," she had insisted, "you will never know if you can do it or not."

we can write:

> 'We had all groaned and tried to talk our teacher out of this. But she had just stood there smilinggently, her short hair falling over her forehead. "If you don't try it," she insisted in a sweet voice, "you will never know if you can do it or not."

Both dialogue and description are important in a narrative essay. They add details and make it easier for the reader to imagine the events being described.

TASK 3

In the essay given above, you can add a bit of description to the plant. Go ahead and try it. What plant was it? What kind of container was it kept in?

_____
_____
_____
_____

It is obvious that the incident narrated is taking place in a classroom. But the essay itself does not give us any idea of how the classroom looks or feels. The classroom is the setting for the narrative essay. Adding details to the setting, like adding details to the characters, makes the essay more interesting.

TASK 4

Include some details about the classroom in the essay above.

_____
_____

_____
_____

Session 2

Writing Narrative Essays – II

Since a narrative essay revolves around an incident, it is very important to use the correct verbs and adverbs in them. As you already know, verbs are action words and adverbs qualify verbs. Adding adverbs to verbs is like adding adjectives to nouns—they give more information and bring the incident to life. For example, in the essay given in Session 1 instead of saying: "So when the teacher called out my name, I went up feeling much more confident than I had in the past three weeks", we can say: "When I heard my name being called, I walked to the front of the class with firm steps"; 'with firm steps' indicates confidence.

TASK 1

Add relevant adjectives to the following verbs. The first one is done for you.

1. **Walk**
   slowly
   fast (remember: not fastly)
   jauntily
   hesitatingly
   with a spring to my step (an idiom meaning happily)
   happily
2. **Sit**
   _____
   _____
   _____
   _____
   _____
3. **Think**
   _____
   _____
   _____
   _____

_____

4. **Sleep**

   _____
   _____
   _____
   _____
   _____

5. **Wait**

   _____
   _____
   _____
   _____
   _____

A very important aspect we need to remember when writing a narrative essay is the tense we are using. Most often, narrative essays are written in the past tense. This is natural, because we usually write about an incident only after it has happened. But we can use different forms of past tense. You have already studied the simple, continuous and perfect forms of all tenses.

Writing Narrative Essays - III

TASK 1

Go back to the sample essay given in Session 1 and identify what forms of the past tenses are used and when they are used. For example, the first sentence is written in simple past tense. But when the narrator remembers the time when the teacher had given the task, past perfect tense is used. When you write your narrative essay, you can use this as a guide to choose what form of past tense to use.

TASK 2

Go back to Task 1 in Session 1 and pick any two of the incidents you had identified. You will now write a narrative essay based on these.

Write down a list of people involved in each of these incidents. Remember you need to write a short essay. So make sure you don't have more than three or four people, including yourself, in your essay. Once you have identified the people, write down brief descriptions for each one of them.

INCIDENT 1

Person 1	Description
Person 2	
Person 3	
Person 4	

INCIDENT 2

Person 1	Description
Person 2	

Person 3	
Person 4	

TASK 3

Write the opening paragraph of two narrative essays based on the two incidents you have picked. Each opening paragraph needs to be of a different kind (we have discussed the kinds of opening paragraphs in Session 1) and must have only two to three sentences.

Session 3

Go back to the sample narrative essay given in Session 1 and notice how the writer has developed the essay. You will observe that the essay begins in the classroom, with a description of the narrator's emotions in the first paragraph. After this, the writer gives some background about the incident as well as her/ his sense of fear; so the essay goes backward in time. Once that is done, the essay returns to the classroom where it began.

There are at least two ways in which you can develop a narrative essay. You can

(a) Narrate the events in the order in which they happened: In this case, the essay given in session 1 will begin with the teacher announcing the project

(b) Narrate an event as a flashback. The essay could have been written when the narrator became a teacher and remembered the first time s/he gave a class presentation

It is important that for any kind of organisation, you use the correct form of the verbs.

TASK 1

Develop the two first paragraphs you wrote in Session 2 into narrative essays. Each essay should not exceed 500 words.

3. GRAMMAR IN CONTEXT:

Tense

- **Present**
- **Past**
- **Future**

SIMPLE TENSES

Most often when your assignment/test paper is corrected, you will notice that your teacher circles/underlines mistakes in relation to tense. Mastery of tense will help you to express, explain or narrate without making mistakes.

Study this passage to understand **the use of the simple present in describing facts:**

> Of all the birds, the eagle is the only one which loves the storm. The eagles get excited when clouds gather. The eagle uses the wings of the storm to rise and is pushed up higher. How does it do this? The eagle instinctively finds the wing of the storm: once that happens, the eagle stops flapping and uses the pressure of the raging storm to soar and glide. It can actually rest its wings now. During such storms, all other birds hide in the leaves and branches of the trees. We can use the storms of our lives (obstacles, trouble, etc) to rise to greater heights. Achievers relish challenges and use them profitably.

Note the relationship between the subject and the verb

Example: The Eagle.....loves, clouds.....gather, the eagle finds)

(You can complete the above list)

Exercise 1

The Simple Present is used to state facts such as

- The sun rises in the east
- The earth revolves around the sun

Make a few sentences stating well known facts

Exercise 2

Describe the process by which a caterpillar becomes a butterfly (Use Simple Present Tense)

OR

Describe the process by which a tadpole becomes a frog (Use Simple Present Tense)

The Simple Present is also used to describe habitual actions/ fixed procedures

Exercise 3

Can you describe your daily routine?

Exercise 4

Give a recipe/ describe the preparation of a dish.

For example:

It is easy to prepare a cup of tea. To prepare one cup of tea, take one cup of water and bring it to a boil. Add ½ a teaspoon of tea leaf. Let it boil for a few seconds and turn off the flame. Strain the tea. Add hot milk and sugar according to your requirement.

In a similar fashion you can explain how to conduct an experiment.

SIMPLE PAST

Here is yet another inspiring story! You will notice that the **simple past and the past continuous tense** are used in this passage.

Hang in There

Nicolo **Paganini was** a well-known and gifted nineteenth century violinist. He was also well known as a great showman with a quick sense of humour. **His most memorable concert was** in Italy with a full orchestra. He was performing before a packed house and his technique was incredible, his tone was fantastic, and his audience dearly loved him. Toward the end of his concert, Paganini was astounding his audience with an unbelievable composition when suddenly **one string on his violin snapped and hung** limply from his instrument. **Paganini frowned** briefly, shook his head, and **continued to play**, improvising beautifully.

Then to everyone's surprise, a second string broke and shortly thereafter, a third. Almost like a slapstick comedy, **Paganini stood there** with three strings dangling from his Stradivarius. But instead of leaving the stage, **Paganini stood his ground and calmly completed** the difficult number on the one remaining string. Paganini's performance is an illustration of not giving up and "hanging in there".

(Source of Paganini story: https://www.pantagraph.com/lifestyles/faith-and-values/)

The Simple Past is used to express any action completed in a specific time in the past.

Exercise 1

Do you have an unforgettable experience like Paganini's? Narrate your experience.

FUTURE TENSE

Read this excerpt from the famous speech of Dr. Martin Luther King Jr.

I have a dream that **one day this nation will rise up** and live out the true meaning of its creed: "We hold these truths to be self-evident, that all men are created equal."

I have a dream that one day on the red hills of Georgia, the sons of former slaves and **the sons of former slave owners will be able to sit down together** at the table of brotherhood.

I have a dream that one day even the state of Mississippi, a state sweltering with the heat of injustice, sweltering with the heat of oppression, **will be transformed into an oasis of freedom and justice**.

I have a dream that my four little children will one day live in a nation **where they will not be judged by the color of their skin** but by the content of their character.

I have a *dream* today!

The Future Tense is used for actions that will take place in the future. Make a note of what Dr. Martin Luther King Jr says about the future. He uses "will" in talking about the future

The use of "will" and "shall"

"Shall" is used to express certainty/determination

E.g. 1. If you do not save me, I shall drown

2. I shall be twenty next year ("I will be twenty next year" is also correct)

In relation to the Future Tense "shall" is used only with the first person, i.e. I/We shall.

Activity 1

Sing this familiar song

We shall overcome (2)

We shall overcome some day

Oh deep in my heart I do believe
We shall overcome some day.

Activity 2
Do you have a dream? Speak about your dream.

PRESENT PERFECT TENSE
A) Make suitable sentences using the PRESENT PERFECT TENSE, the first one has been done for you.

1. Bhavya's hair was dirty. Now it's clean. (wash)

Answer: Bhavya has washed her hair.

2. Murugan was 80 kg. Now he's 70. (lose weight)
   Answer: ……..

3. Chetan was injured yesterday. Now he can't walk; his leg is in plaster. (break)
   Answer: ……

4. Mary Anne is looking for her little puppy. (lose)
   Answer: ……

5. Megala is on holiday in Goa. (go)
   Answer: ……..

6. Mr.Hirachand was in Shimla last week. He's back in Chennai now. (be)
   Answer: …… …….

7. Look! Our appa's bag is carrying a bag full of mangoes. (buy)
   Answer:…….

8. I can't eat anything now. (eat too much)
   Answer: …….

9. Amma is very tired. (clean / house)

Answer: ……

10. Sheldon and Shreya need a holiday. (work / hard / this year)
Answer: ……

B) Use the Present Perfect tense:

In the example given below a new sentence (in the present perfect tense) is created with the inclusion of "because". Follow this pattern to complete the given exercise.

Example:
She can't go to the party. (catch a cold)
She can't go to the party because she has caught a cold.

1. He can't move around. (hurt / leg)
……
2. My son can't get into the house. (lose / key)
……
3. I know this story very well. (read the book)
……
4. I can't post the letter. (not put / stamp / on it)
……
5. He can't drive immediately. (eat too much)
……
6. They can't go to their village. (not save / money)
……
7. I know her. (meet him before)
……
8. We don't know how she is. (not hear from him)
……
9. He won't accept a cigarette. (give up smoking)
……
10. She can't attend the interview. (lost original documents)
……

A) Use the Present Perfect Tense:

In the example given below a new sentence (in the present perfect tense) is created as a response to an imperative (Bring the newspaper in, please)by using the phrase "have already." Complete the exercise by providing responses to the injunctions/requests.

Example: Bring the newspaper in, please
Response: I have already brought it in.

1. You must find the files soon
   Response:……..
2. Turn the TV down, please.
   Response: ……
3. Get the guest room ready.
   Response: ……..
4. Could you pick up some groceries on the way back?
   Response:…….
5. Why don't you see an ophthalmologist?
   Response ……...
6. You are suffering with a back ache. I think you should stop driving.
   Response: ……...
7. Why don't you clean the backyard?
   Response: ……..
8. Clean your shoes, will you?
   Response: ……..
9. We have guests today. Shall we make biriyani?
   Response:……
10. We should invite Ancy to the party.
    Response: ……..

D) Follow the example and do the same using YET:
Example: She has been in the shop. (buy anything) - She has been in the shop but she hasn't bought anything YET.

1. I've written to them three times. (not reply)
……...
2. I've asked you again and again. (not do it)
……...
3. I lent him one thousand rupees

last month. (not give it back)
……...
4. He lost his wallet three days ago. (not find it)
……...
5. He borrowed my book last month. (not give it back)
……...
6. She went to Los Angeles six months ago. (not return it)
……...
7. She gave me twenty rupees a week ago. (not return it)
……...
8. I finished reading my library books a long time ago. (not change them) ……...
9. She went to the bus-stop half an hour ago. (the bus / not come)
……...
10. He's still studying that lesson. (not learn it)
……

E) Fill in the blanks with ALREADY or YET:

1. He hasn't called us …….
2. They have …… sent the letter.
3. Samson has …… bought the tickets for the cricket match.
4. We have …….. been to Trichy three times.
5. You haven't visited Tokyo …… .
6. Has Rahim bought a new car …….. ?
7. The train has …… left.
8. Has she done it …….. ? No, not …….. .
9. A: Haven't they arrived …….. ? B: Oh, yes. They have …… arrived.
10. Hurry up! The programme has …… started.
11. Be careful! They have …… painted the door.
12. Haven't you seen the movie ……. ?

F) Follow the example and do the same using JUST:
Example: he / go out - What has he JUST done? - He has JUST gone out.

1. She / returned from the USA

……

2. they / watch the news

……

3. I / finish preparing dinner

……

4. he / put on the coat

……

5. he / catch a fish

……

6. he / call a cab

……

7. you / write a letter

……

G) Put the verbs in the correct tense. Use the SIMPLE PAST or the PRESENT PERFECT:

1. …….. Ria……. (finish) her work yet?
2. They ……. (just / go) out.
3. …… you ……. (send) the letters yet?
4. They ……. (not / see) the film yet.
5. The plane …… (just / arrive).
6. ……. you ……. (ever / be) in a recording studio?
7. I ……. (lose) my purse. I can't find it anywhere.
8. My handbag isn't here. Somebody ……. (take) it.

H) Rewrite the following sentences twice, using SINCE and FOR:

Example: I haven't seen you. (Christmas / 3 days)

a) I haven't seen you SINCE Deepavalli.

b) I haven't seen you FOR 3 days.

1. We've been here. (an hour / 4 o'clock)

a) ……

b) ……

2. She hasn’t spoken to me. (2 weeks / last / last week)

a) ……

b) ……

3. They’ve lived in this street. (1970 / a long time)

a) ……

b) ……

4. I haven’t had time to do it. (last Monday / a few days)

a) ……

b) ……

5. We haven’t bought a new one. (ages / many years)

a) ……

b) ……

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Unit V (18 hours)

1.Listening and Speaking

a. Group discussion

2.Reading and writing

b. Reading diagrammatic information – interpretations maps, graphs and pie charts

c. Writing short essays using the language of comparison and contrast

3.Grammar in Context: Voice (Show the relationship between Tense and Voice)

GROUP DISCUSSION

Where it begins:

Group Discussion need not be daunting. Just go back to the times when you sat around the table in a restaurant and discussed matters of interest with your friends. Even at home, sitting with family and sharing a meal could also be a time for interesting discussions.

(Picture: https://www.needpix.com/photo/598828/classroom-cooperative-learning-discussion-group-work-school-students-teaching)

Formal Discussions:

As you get ready for professional life, you should be able to participate in a discussion. Discussion is the lifeline of creative and progressive organisations. Being creative and innovative is important. But equally important is your ability to communicate your ideas in a group without feeling inhibited or without being too aggressive and offending others in the group. Participation in group discussion is indeed a skill. While arguments due to disagreements might be accepted and forgiven by friends and family, it is totally unacceptable in formal discussion.

What is Group Discussion?

Group Discussion (GD) is a methodology or in a simple language it may be called an interview process or a group activity. It is used as one of the best tools to select prospective candidates for a job or seat in an institute of higher learning.

How is a GD conducted?

In this methodology, a group of candidates is given a topic or a situation, given a few minutes to think about the same, and then asked to discuss the topic among themselves for 15-20 minutes. It is a very useful tool to screen a candidate's potential and skills.

How does GD work in terms of assessment?

Group discussion is handy because the evaluation is on a comparative basis. In a one-to-one interview or pen-to-paper test, this kind of comparative evaluation is not so easy. GD as a methodology is effective in gauging whether the candidate has the required personality traits andskills. GD evaluation is done by the subject experts based on the discussions. At the end of the discussion, a report is prepared based on the observations of the experts.

Some of the personality traits the GD is trying to gauge may include:

*Communication skills

*Interpersonal Skills

*Leadership Skills

*Motivation

*Team-Building Skills

*Analytical/Logical Skills

*Reasoning ability

*Thinking out of the box

*Initiative

*Assertiveness

*Flexibility

*Creativity

*Ability to think on one's feet

Why do organizations prefer GD as a method of testing and evaluation?

After putting a candidate through a session where the candidate's technical knowledge and conceptual skill is tested, institutesput the candidate through the next level of testing, which is the GD. The objective is to get to know the candidate as a person and gauge how well s/he will fit in their institute, because, whatever a person's technical skill might be, s/he has to be a team player: GD evaluates how you can function as a part of a team. As a manager or as a member of an organization you will always be working in teams. Therefore how you interact in a team becomes an important criterion for your selection. Managers have to work in a team and get best results out of teamwork. That is the reason why management institutes include GD as a component of the selection procedure.

To summarise, companies conduct group discussion after the written test to assess your

*Interactive Skills (how good you are at communication with other people)

*Behaviour (how open-minded are you in accepting views contrary to your own)

*Participation (i.e. if you are an active speaker and fully involved in the discussion)

*Contribution (i.e. whether you put the group objective above your own)

*Verbal Communication (fluency and command of the language)

*Non-verbal behaviour (your body language)

*Confirmation to norms (whether you will abide by the rules of the organisation)

*Decision-making ability

* Cooperation

Activity:

The class teacher may divide the students into groups and choose some of the following topics for discussion:

1. Safety of industrial and construction workers
2. Making healthcare available to all
3. Using renewable energy to reduce pollution
4. Promoting the fitness culture
5. Consumer awareness
6. Wasteful expenditure at weddings
7. Nature cures versus allopathy
8. Child labour

a. READING DIAGRAMMATIC INFORMATION: INTERPRETING CHARTS, GRAPHS AND MAPS

AIM: By the end of the lesson, the learners will be able to interpret charts, graphs and maps. They will also be able to use appropriate vocabulary to describe them.

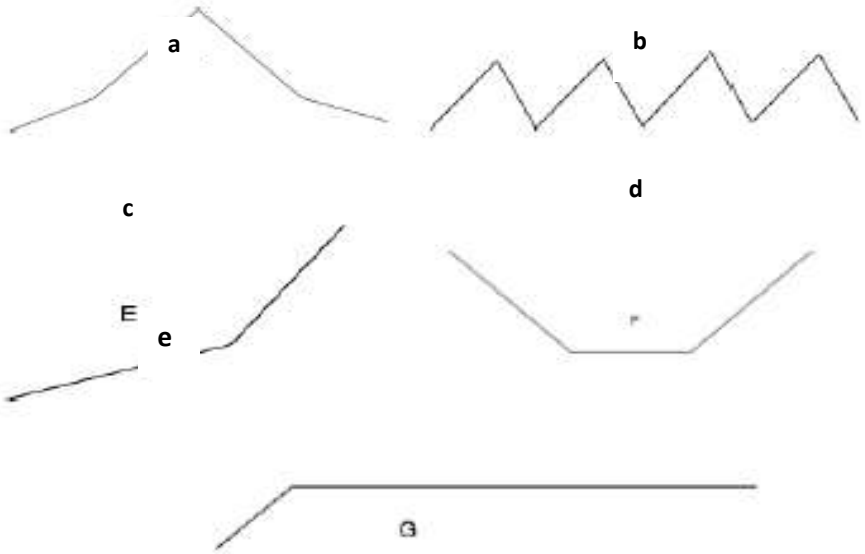
Pre Task

Let us now discuss in the class about, the kinds of data that can be represented by graphs and charts and further, the different kinds of charts and graphs (bar graphs, pie-charts etc.) Let us brainstorm to arrive at the words commonly used while talking about such data. It is possible that these words in the textbox are on your classroom board as well.

cricket scores	trends in sales	existing green cover
decreasing	change in green cover	Increasing
marginal rise	steep drop	remain steady
Changes in trend	go up a little	fluctuate

Task 1

Given below are five graphs depicting the run rate of the Indian cricket team in each match in a tournament. Match the graphs with the sentences that best describe them.

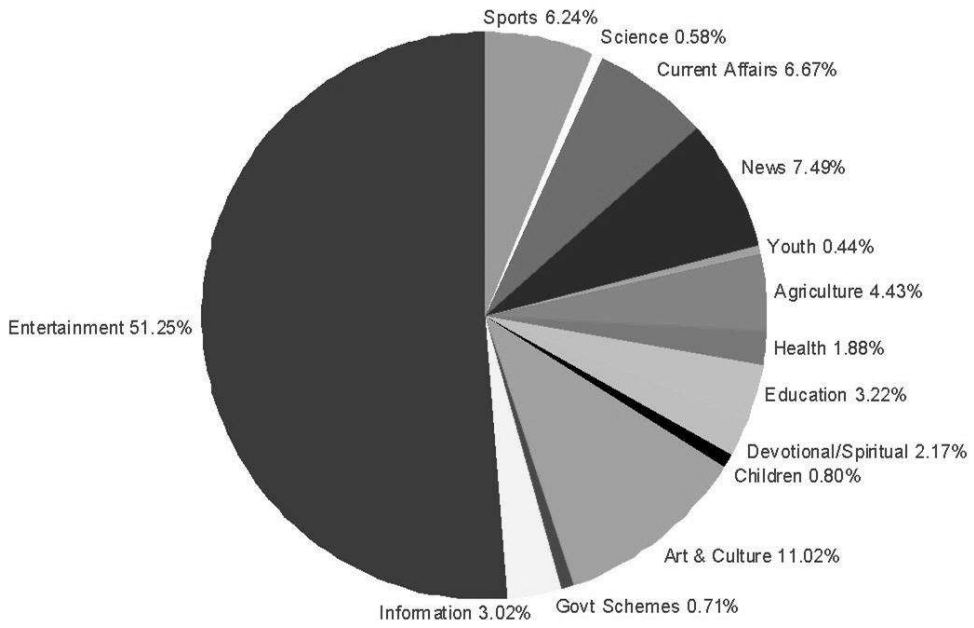


1. The run rate fluctuated through the match.
2. The run rate was very low in the beginning but it rose sharply and then remained steady.
3. They began very badly, then improved marginally and suddenly showed tremendous improvement.
4. The run rate was a bit poor in the first few overs, then it showed a sharp rise before falling.
5. They began with a high run rate but soon the run rate showed a sharp fall and remained bad for a few overs. After this, it rose sharply.

Once you have worked out the depiction of the 'run-rate', please turn your attention to Task 2

Task 2

Given below is a pie-chart depicting the percentage of people watching the various categories of TV channels in Chennai. Read the pie-chart and answer the questions.

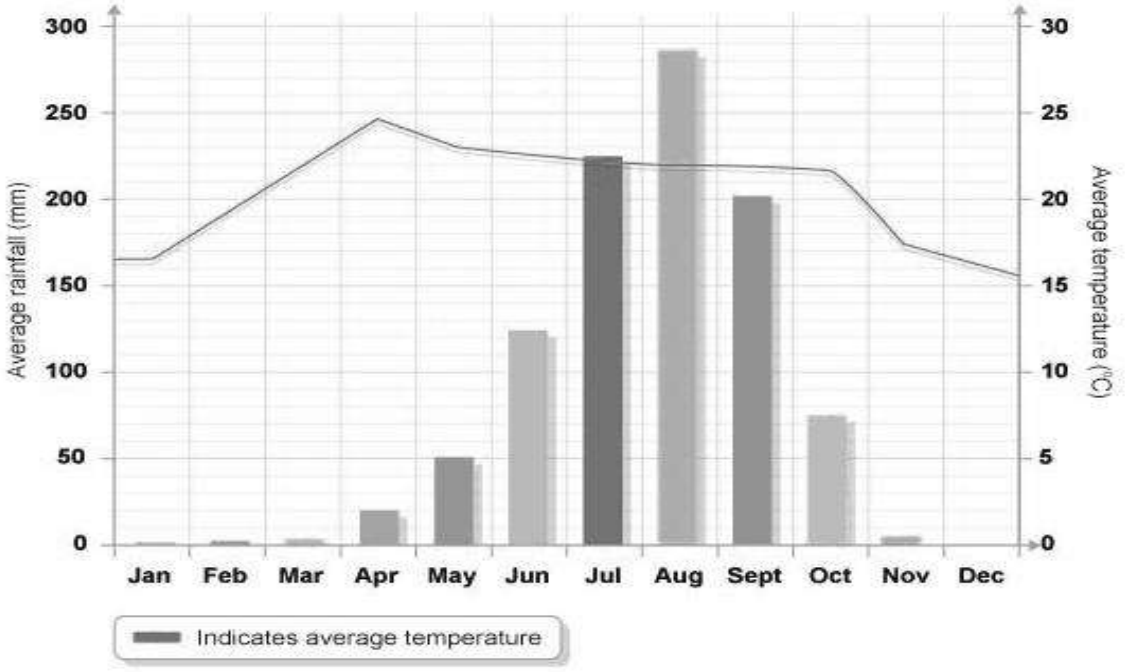


1. Which category of channels has the least viewership?
2. Discovery Culture is a new channel that deals with the art, culture and heritage of different places in the world. What percentage of viewership does the category it belongs to have?

3. Sirippoli, the Tamil comedy channel, belongs to a category that has _____ percentage of viewership.
4. Ramya's grandmother finds it difficult these days to make a trip to Velankanni. So she prefers to watch the Mass being telecast live on TV. Which category of channels will she watch? What is the viewership percentage of that category?

Task 3

Read the graph depicting average rainfall and temperature of a city through a year and answer the questions that follow.



1. Which month has recorded the highest temperature?
2. Which month has the highest amount of rainfall?
3. The peak monsoon season for this city is from _____ to _____.
4. The driest months of the year are:
5. What is the range of the average temperature?

6. Is the temperature the same all year round? If it is different, how many seasons does the location experience?
7. Which monthsare the warmest and which are the coldest?
8. Which months do you think the city will be most uncomfortable to live in and why?
9. With the rainfall and temperature information, briefly describe the climate of the city between May and August.

Pre Task

Let us discuss the different uses to which maps can be put. Now write these down on the blackboard/ notebook. Some of the phrases we use in relation to making a journey are: 'finding our way,' gauging distances' and 'identifying directions' 'finding alternate routes', 'finding specific places' (such as hotels, petrol bunks etc.). You can also list the words and phrases you have heard while using Google maps. These words should be listed out, either on the blackboard or your notebook (or both)

When you use Google maps you will come across Words / phrases such as:

Go straight for 2 km, turn right on Cathedral Road, turn left at Saidapet Signal etc.

Task: 2

Jot down all that you think "Google maps" would tell you if you sought its help to journey to another city (Bangalore/Kanchipuram)

Pre Task

- *Let us discuss the various components of a map and put these down on the blackboard. Legend, scale and directions are a few components. We can also engage our minds to seek out vocabulary related to positions – words such as adjacent to, parallel to, opposite to should emerge from this. It is important to use these phrases correctly. Let us now steer the discussion tothe four directions (East, West, North and South) and the four intermediate directions (North East, South West, South East and North West).*
- *You can also take out your college handbooks and open the page which has the College map. You can workin pairs, and complete the following activities.*

Task 1

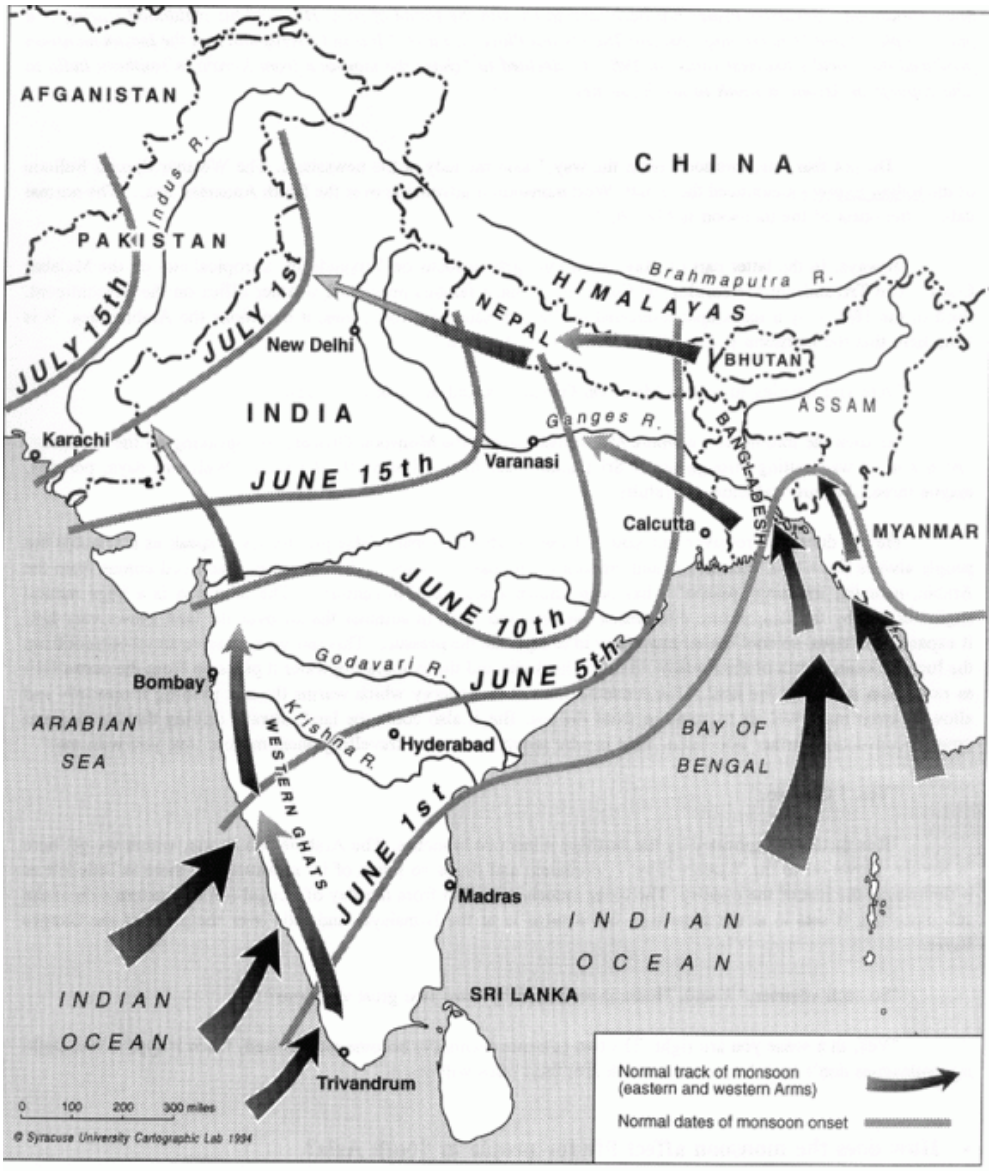
Answer the following questions.

I.

a. Are there roads adjacent to the College? If so, name them.
b. What is the name of the building to the East of the Main Block?
c. Which is the building in the College farthest from the gate?
d. Which part of the College is closest to the main road?
e. How would you describe the location of the college hostel?

Task 2

Read the following map of India showing the movements of different winds over the country and answer the questions.



1. When does the monsoon usually start in Pakistan?
2. Hyderabad can expect rains to start from _____.
3. The city at the southernmost point, as seen in the map, is _____.
4. Arrange the following places in the chronological order of the onset of monsoon

   Varanasi Karachi Hyderabad Trivandrum
5. Name the river that flows between Madras and Hyderabad.
6. The monsoon that brings rains to Calcutta moves in which of the following directions?

   a. Northern b. Eastern c. Western d. Southern

b. WRITING SHORT ESSAYS USING THE LANGUAGE OF COMPARISON AND CONTRAST

Have you heard the expression, there are two sides to every coin?

The expression is metaphorical and conveys that with regard to any issue/product there are merits and demerits, positive and negative aspects.

One of the benefits of college education is analytical and critical thinking. College education is not only about making you employable, but also about the making of an intellectual. Thinking patterns are nurtured and honed in the college environment through thought-provoking assignments, debates, oratorical competitions and essay writing contests.

The art of "using the language of comparison and contrast" comes in handy for effective presentation of intellectually stimulating ideas. It is an excellent academic/intellectual exercise. Moreover, it is a cogent way of expressing.

To compare is to examine how things are similar, while to contrast is to see how they differ. A compare and contrast essay takes into consideration the similarities between two or more objects and the differences as well. In the academic context, with regard to college assignments and exam questions, you are often called upon to "compare and contrast". This type of essay writing assignment is the teachers' way of testing your understanding of theories, methods, historical periods, characters in a novel etc.

Structure

There are two main ways to structure a compare and contrast essay, namely using a *block* or a *point-by-point* structure. For the *block* structure, all the information about one of the objects being compared/contrasted is given first, and all the information about the other object is listed afterwards. This type of structure is similar to the block structure used for cause and effect and problem-solution essays.

For the point-*by-point* structure, each similarity (or difference) for one object is followed immediately by the similarity (or difference) in the other. Both types of structure have their merits. The former is easier to write, while the latter is generally clearer as it ensures that the similarities/differences are more explicit. The two types of structure, *block* and *point-by-point*, are shown in the diagram below.

Block

Introduction
Object 1 - Point 1
Object 1 - Point 2
Object 1 - Point 3
Transition sentence/paragraph
Object 2 - Point 1
Object 2 - Point 2
Object 2 - Point 3
Conclusion

Point-by-point

Introduction	
Point	1
Object 1 – Object 2	
Point	2
Object 1 – 2	
Point	3
Object 1 – Object 2	
Conclusion	

Compare and Contrast Structure Words

Compare and contrast structure words are transition signals which show the similarities or differences. Below are some common examples.

Compare

- Similarly
- Likewise
- also
- both... and...
- not only... but also...
- neither... nor...
- just like (+ noun)
- similar to (+ noun)
- to be similar (to)
- to be the same as
- to be alike
- to compare (to/with)

Examples

- Computers can be used to communicate easily, for example via email. **Similarly/Likewise**, the mobile phone is a convenient tool for communication.
- **Both** computers **and** mobile phones can be used to communicate easily with other people.
- **Just like** the computer, the mobile phone can be used to communicate easily with other people.
- The computer **is similar to** the mobile phone in the way it can be used for easy communication.

Contrast

- However
- In contrast
- In comparison
- By comparison
- On the other hand
- while
- whereas
- but
- to differ from
- to be different (from)
- to be dissimilar to
- to be unlike

Examples

- Computers, although increasingly small, are not always easy to carry from one place to another. **However**, the mobile phone can be carried with ease.

- Computers are generally not very portable, **whereas** the mobile phone is.
- Computers **differ from** mobile phones in their lack of portability.
- Computers **are unlike** mobile phones in their lack of portability.

Criteria for comparison/contrast

When making comparisons or contrasts, it is important to be clear what *criteria* you are using.

Study the following example, which contrasts two people.

Arun and Varun **differ** in four ways. The first difference is height. Arun is tall, **while** Varun is short. A second difference is strength. Arun is strong. **In contrast**, Varunis weak. A third difference is appearance. Arun, who is average looking, **differs from** Varun, who is handsome. The final difference is intelligence. Arun is of average intelligence: Varun, **on the other hand**, is very intelligent.

Can you see that the writer has established 4 criteria to show how Arun and Varun differ from each other?

Example essay

Below is a compare and contrast essay. This essay uses the *point-by-point structure*.

Question:

Compare and contrast methods of communication used today with those of yesteryears.

Answer:

A few decades ago letters and telephone were the means by which people communicated over long distances. Nowadays we have a whole range of

communication tools, ranging from email to instant messaging and video calls. While similarities exist between the present and previous means of communication, they differ with regard to their speed and the range of tools available. One similarity between current and previous methods of communication relates to the form of communication. In the past, written forms such as letters were frequently used, in addition to oral forms such as telephone calls. Similarly, people nowadays use both these forms. Quite similar to the communication in the past, written forms of communication are prevalent even today, i.e. the email and text messages are 'electronic'. In addition, oral forms are still used: these include speaking over telephone, mobile phone and voice messages which are instant messaging services.

However, there are clearly many differences in the way we communicate over long distances, the most notable of which is speed. This is most evident in relation to written forms of communication. In the past, letters would take days to arrive at their destination. In contrast, an email arrives almost instantaneously and can be read seconds after it was sent. While letters and telephone (booking trunk calls and later STD) were the only tools available fifty years ago, there are today vast arrays of communication methods available. These include not only the telephone, letter, email and text messages already mentioned, but also video conferences via software such as Skype or mobile phone apps such as WeChat, and social media such as

Facebook and Twitter. In conclusion, methods of communication have greatly advanced over the past fifty years. While there are some similarities, such as the forms of communication, there are significant differences, chiefly in relation to the speed of communication and the range of communication tools available. There is no doubt that technology will continue to progress in future, and the advanced tools which we use today may one day also become outdated.

Exercises:

1. Compare and contrast the economies of India and China
2. Evaluate education of women before and after Indian Independence
3. Compare and contrast online teaching and real-time classroom teaching.

GRAMMAR IN CONTEXT

THE RELATIONSHIP BETWEEN TENSE AND VOICE

Since you have already learnt(in your lesson on Verbs), about how the verb undergoes a change with tense, we can now observe another dimension, namely the relationship between 'voice' and 'tense' Let us revise what we have learned about the relationship between 'verb' and 'tense' from the example given below:

Present Tense

Verb	Person	Simple Present	Present Continuous	Present Perfect	Present Perfect Continuous
Read	I/We	I read	I am reading	I have read	I have been reading
		We read	We are reading	We have read	We have been reading
	You	You read	You are reading	You have read	You have been reading
	He/She/It	He/She/It reads	He/She/It is reading	He/She/It has read	He/She/It has been reading
	They	They read	They are reading	They have read	They have been reading

Past Tense

Verb	Person	Simple Present	Present Continuous	Present Perfect	Present Perfect Continuous

Read	I/We	I read	I was reading	I had read	I had been reading
		We read	We were reading	We had read	We had been reading
	You	You read	You are reading	You have read	You have been reading
	He/She/It	He/She/It read	He/She/It was reading	He/She/It had read	He/She/It had been reading
	They	They read	They were reading	They had read	They had been reading

The above examples are in the ACTIVE VOICE. The object in these expressions is implied. The whole sentence could be:

I read a book

OR

I read a magazine

OR

I read the newspaper

(Interestingly 'read' appears to be the same in print, whether in present or past tense. The pronunciation of 'read' is, as you might already know, different in the present and past tense.)

TENSE AND VOICE: SOME OBSERVATIONS

1. The position of the subject and object is interchanged when a sentence is changed from active voice to passive voice

I read a book (Active voice)

A book **is read by** me (Passive voice)

He ate mangoes (Active voice and past tense)

Mangoes **were eaten by** him (Passive voice and past tense)

I cook a meal (Active voice and Present tense)

A meal **is cooked by** me (Passive voice and Present tense)

I cookeda meal (Active voice and Past tense)

A meal **was cooked by** me (Passive voice and Past tense)

Did you notice how the 'verb' undergoes a change with change in voice?

2. The 'verb' phrase undergoes a change when the sentence is changed from active voice to passive voice

   E.g. I cook a meal (Active & present tense) &

   A meal is cooked by meal (Passive& present tense)

EXERCISE I

Complete the following text using ACTIVE or PASSIVE forms of the verbs in the parentheses. Be careful about using the correct tense.

This is a journal entry of a Bulgarian girl. She is explaining her concerns about chicken flu. A couple of weeks ago, in Romania, chicken flu _____ (discover). I_____ (think) that it _____(come) from Turkey,

which_____(locate) only a couple of hundred miles south of Romania. Now, people_____ (give) injections, and a lot of chickens _____(kill) for the purpose of keeping the virus from spreading. No reports of human victims _____(report) until now. A case like that definitely presents a big problem for everybody. In a society such an event may even cause mass panic. The reason I'm concerned is because my homeland of Bulgaria is a country that_____(separate) Romania and Turkey. It is really easy for the disease to find its way out of those two countries. Then the danger may become real because viruses like that can spread like wild fire and therefore get out of control long before anybody even takes notice. We all _____(know) the movie "Outbreak". The situation with the chicken flu virus cannot get that bad obviously, but it can definitely cause some damage. Therefore, precautionary matters _____(should / take) immediately in all the neighbouring countries of Romania and Turkey, plus the nations that _____(import) chickens from Turkey.

The following charts will help you understand all the nuances of changing from 'active' to 'passive' voice:

Verb	**Person**	**Voice**	**Simple Present**	**Present Continuo**	**Present Perfect**	**Perfect Continuou**

				us		**s**
Play	First person: I/We	Active Voice	I play the keyboard	I am playing the keyboard	I have played the keyboard	I have been playing the keyboard
		Passive Voice	The keyboard is played by me	The keyboard is being played by me	The keyboard has been played by me	
		Active Voice	We play the keyboard	We are playing the keyboard	We have played the keyboard	We have been playing the keyboard
		Passive Voice	The keyboard is played by us	The keyboard is being played by us	The keyboard has been played by us	
	You	Active Voice	You play the keyboard	You are playing the keyboard	You have played the keyboard	You have been playing the keyboard
		Passive Voice	The keyboard is played by you	The keyboard is being played by you	The keyboard has been played by you	
	He/She/ It	Active Voice	He plays the keyboard	He/She/It is playing the keyboard	He/She/It has played the keyboard	He/She/It has been playing the keyboard
		Passive Voice	The keyboard is	The keyboard	The keyboard	

			played by him/her/it	is being played by him/her/it	has been played by him/her/it .	

PRESENT TENSE

EXERCISE I

Read this dramatic poem and notice the many sentences/phrases which are in active voice. They have been underlined for you. Try to change the underlined expressions from active to passive voice. (Read "ye" as "you": "Ye" means "you" in old English)

He Fell Among Thieves

(By Sir Henry Newbolt)

'Ye have robb'd,' said he, 'ye have slaughter'd and made an end,

Take your ill-got plunder, and bury the dead:

What will ye more of your guest and sometime friend?'

'Blood for our blood,' they said.

He laugh'd: 'If one may settle the score for five,

I am ready; but let the reckoning stand til day:

I have loved the sunlight as dearly as any alive.'

'You shall die at dawn,' said they.

He flung his empty revolver down the slope,

He climb'd alone to the Eastward edge of the trees;

All night long in a dream untroubled of hope

He brooded, clasping his knees.

He did not hear the monotonous roar that fills

The ravine where the Yassinriver sullenly flows;

He did not see the starlight on the Laspur hills,

Or the far Afghan snows.

He saw the April noon on his books aglow,

The wistaria trailing in at the window wide;

He heard his father's voice from the terrace below

Calling him down to ride.

He saw the gray little church across the park,

The mounds that hid the loved and honour'd dead;

The Norman arch, the chancel softly dark,

The brasses black and red.

He saw the School Close, sunny and green,

The runner beside him, the stand by the parapet wall,

The distant tape, and the crowd roaring between,

His own name over all.

He saw the dark wainscot and timber'd roof,

The long tables, and the faces merry and keen;

The College Eight and their trainer dining aloof,

The Dons on the daïs serene.

He watch'd the liner's stem ploughing the foam,

He felt her trembling speed and the thrash of her screw;

He heard the passengers' voices talking of home,

He saw the flag she flew.

And now it was dawn. He rose strong on his feet,

And strode to his ruin'd camp below the wood;

He drank the breath of the morning cool and sweet:

His murderers round him stood.

Light on the Laspur hills was broadening fast,

The blood-red snow-peaks chill'd to dazzling white;

He turn'd, and **saw the golden circle at last**,

Cut by the Eastern height.

'O glorious Life, Who dwellest in earth and sun,

I have lived, I praise and adore Thee.' A sword swept.

Over the pass the voices one by one

Faded, and the hill slept.

EXERCISE II

Rewrite the following sentences active voice:

1. The bill has been paid by Rohit.
2. A special dosa has been eaten by me.
3. Five miles have been cycled by us.
4. The present has been opened by me.
5. The book has not been read by them.
6. The parcel has not been sent by you.
7. This issue has not been agreed to by us.
8. The thieves have not been caught by them.
9. Have we been noticed by them?
10. The job has not been appreciated by the boss.

PAST TENSE

Verb	**Person**	**Voice**	**Simple past**	**Past continuous**	**Past perfect**	**Perfect continuous**

Repair	First person I	Active	I repaired the car	I was repairing the car	I had repaired the car	I had been repairing the car
		Passive	The car was repaired by me	The car was being repaired by me	The car had been repaired by me	
	WE	Active	We repaired the car	We were repairing the car	We had repaired the car	We had been repairing the car
		Passive	The car was repaired by us	The car was being repaired by us	The car had been repaired by us	
	Second person You	Active	You repaired the car	You were repairing the car	You had repaired the car	You had been repairing the car
		Passive	The car was repaired by you	The car was being repaired by you	The car had been repaired by you	
	Third person He/she/it	Active	He/she/repaired the car	He/she/ was repairing the car	He/she had repaired the car	He/ she had been repairing the car
		Passive	The car was repaired by him/her/it	The car was being repaired by him/her	The car had been repaired by him/her	

EXERCISE I

Fill in each blank with either the passive voice or the active form of the simple past tense of the verb in the brackets.

1. The radio _____by Guglielmo Marconi in 1896. (invented / was invented)

2. In the 19th century, bicycles along with horses_____ (were ridden/ rode)

3. I _____my room after the birthday. (didn't tidy/ wasn't tidied)

4. A famous painting of Ravi Varma _____in the auction yesterday. (sold/was sold)

5. The electricians _____ the new smoke alarm system last week. (were tested/ tested)

6. All the students in our class _____ the Tamil exam. (passed/ were passed)

7. Google_____ by Sundar Pitchai. (is headed/ are headed)

8. I _____my bag all by myself. (packed/ was packed)

9. Donald Trump_____ as President of the United States in the November 8, 2016 election. (elected/was elected)

10. Joyce _____a second chance by the school administration. (gave/ was given).

EXERCISE II

Change the following sentences into the passive voice and underline the modified verb

1. Megha was writing a poem.

2. She made a third attempt.

3. The boy asked a difficult question.

4. She wrote an award-winning novel.

5. The terrorists blew up the bridge.

6. The police caught the thief.

7. The woman was washing clothes.

8. The masons were building the house.

9. Mother was making a cake.

10. The girl was painting a picture.

FUTURE TENSE

Verb	**Person**	**Voice**	**Simple future**	**Future continuous**	**Future perfect**	**Perfect continuous**
Write	First person I	Active	I will/shall write a poem	I will/shall be writing a poem	I will/shall have written a poem	I will/shall have been writing a poem
		Passive	A poem will/shall be written by me		A poem will/shall have been written by me	I would/should have been writing a poem
	We	Active	We will/shall write a poem	We will/shall be writing a poem	We will/shall have written a poem	We will/shall have been writing a poem
		Passive	A poem will/shall be written by us		A poem will/shall have been written by us	a poem would/should have been written by us

	Second person You	Active	You will/shall write a poem	You will/shall be writing a poem	You will/shall have written a poem	You will/ shall have been writing a poem
		Passive	A poem will be written by you		A poem will/shall have written by you	A poem would/should have been written by you
	Third person He/she/it	Active	He/she/ - will/shall write a poem	He/she will be writing a poem	He/she will have written a poem	He/she would /should have written a poem
		Passive	A poem will/shall be written by him/her		A poem will/shall have written by him/her	A poem would/should have been written by him/her

EXERCISE I

Change the passive tenses into active

1. He **will be helped** by me.

2. The invitation **will be accepted** by them.

3. Mark **will be invited** by Jane to the party.

4. The puzzle **will be solved** by her.

5. The fee **will be paid** by him.

6. Two tickets **will be booked** by me.

7. Her piano **will be brought** by her.

8. A new car **will be bought** by me.

9. They **will be visited** by her.

10. He **will be killed** by them.

EXERCISE II

Read the short story and answer the following questions using the future perfect tense

Shawn is in the army. Tomorrow, he will leave home to join his troops overseas for 18 months. He will have trained for 8 months by the time he leaves. He will have worked very hard by the time he comes. By the time he returns, he is going to have been gone for eighteen months. His wife will have worried about him all that time. They will have written many letters by the time he comes home. She will be happy when he safely returns.

1. For how many months will Shawn have trained by the time he leaves to go overseas?
2. By the time he returns, for how long would he have been gone?
3. What would they have written by the time S
4. hawn comes home?

COMMUNICATIVE ENGLISH

SEMESTER - II

Tamil Nadu State Council For Higher Education (TANSCHE)

CONTENTS

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PREFACE

This textbook on Communicative English envisioned under the leadership of the Hon. Chief Minister of Tamilnadu, Thiru. Edappadi K.Palaniswami by the Honorable Minister for Higher Education Thiru. K.P. Anbalagan, and Principal Secretary to Government, Department of Higher Education, Selvi. Apoorva, I.A.S., is a pioneering venture and strategic intervention in higher education in Tamil Nadu. It has been prepared with the unstinted support of Thiru. Vivekanandan, I.A.S. Member Secretary, TANSCHE (Tamil Nadu State Council for Higher Education)

Tamil Nadu has the distinction of having the highest GER (Gross Enrolment Ratio) of 50 %, in higher education in the country: this figure attests to the efforts of the government to empower the youth of the state by enhancing access to higher education.

The Communicative English for Semester II has built on the competencies developed in Semester 1 and carries forward the objective to enrich and equip the student in the first year of the course: having the wherewithal to cope with the demands of education in an institution of higher learning and making the most of the opportunity of tertiary education, with the learning tools provided in the textbook should prove to be a life transforming experience for the students entering college and set them on the path to realizing their full potential.

The confluence of the stakeholders' (students') motivation and the facilitators' (teachers') dedication is bound to produce amazing results.

Unit I (18 hours)

1. Listening and Speaking
   a. Listening and responding (to complaints – formal situation)
   b. Listening to problems and offering solutions (informal)
2. Reading and writing
   a. Reading aloud (brief motivational anecdotes)
   b. Writing a paragraph on a proverbial expression/motivational idea.
3. Word Power/Vocabulary
   a. Synonyms & Antonyms
4. Grammar in Context

- Adverbs
- Prepositions

LISTENING AND SPEAKING

In the Listening and Speaking section of this unit the focus is on listening to "complaints" (in a formal context) and listening to "problems and offering solutions" (informal). "Complaints" call for "action" to be taken after the facts have been ascertained. With regard to listening to "problems", the listener has to practice *active listening* and "offer solutions" or "suggest ways" by which the problem can be solved. The onus to solve the problem is not on the listener. Decision-making rests with the one who shares the problem and seeks solutions.

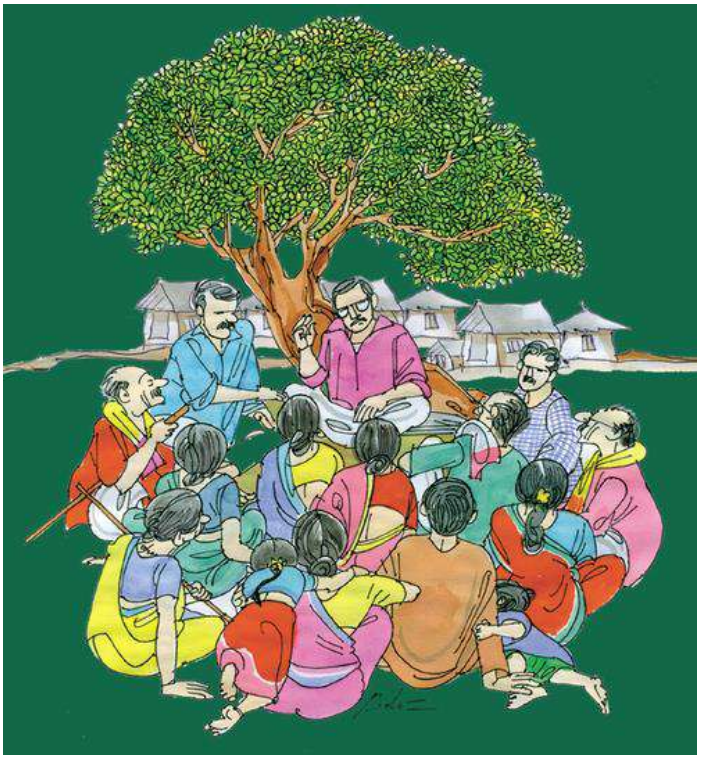
Listening and responding to complaints (formal situation)

Complaints could be made in a forum or individually

Making Complaints in a Forum

The healthy practice of listening and responding to complaints is deeply ingrained in the administrative system of our country. The village

panchayat is a forum where complaints are received and issues resolved.



Such meetings take place even in a modern office environment. Here again the aim of the meeting is to discuss issues raised and sort out problems.

Complaints could also be made by individuals over the phone. The complaints made over the phone usually pertain to products and services. In case you have a problem with an item you have purchased online, you could call the customer care centre of that company and make your complaint. With services provided by the government such as electricity

and water, there is a number designated for receiving complaints from the public. There are two samples of conversations pertaining to lodging complaints.

1. In A Forum

   The Councillor of Washermanpet visits his ward. The meeting has been arranged by the residents of Alwarnagar of Washermanpet. Examine the conversation given below to learn phrases and expressions used in making complaints.

   Alwarnagar Secretary: Vanakkam, residents of Alwarnagar. It is our privilege to have with us the Councillor of our ward. He has responded to our letter in which we have expressed all the needs of our nagar. He has visited our nagar today to listen to us and address all the outstanding issues.

   Councillor: Thank you Thiru. Srinath, Secretary of the Alwarnagar Welfare Association. I have made time to get a first hand account of the issues you are facing and will do my best to solve them.

   Arunkumar (Resident): Vanakkam sir. I am Arunkumar, residing at 12th Cross Street. I would like to bring to your attention the drains that are blocked: that is why rainwater stagnates in the street. If

you had done some work on preparedness for the monsoon, by clearing these drains, we wouldn't have faced this problem.

Councillor: Sir. *You have rightly pointed* out one of the causes for flooding of the streets. *I would also like to inform* you that prior to the arrival of the monsoon, clearance of storm drains was undertaken. You, who have lived in this area for more than twenty years know that many of the old independent houses are replaced by residential apartments. This a major reason for the flooding of this locality. We should work towards increasing the capacity of these drains.

Ramesh (Resident): Sir, first of all let me congratulate you on becoming the Councillor. Sir. I have a complaint to make regarding our ration shop. The queue at the ration shop is endless. It is very pathetic to see people standing in long queues. Could you use your good offices to get one more ration shop for our nagar and more staff in each ration shop so that the disbursement is quick?

Councillor: Mr. Ramesh, I agree with you. I shall make arrangements for an additional ration shop in this locality and post

additional staff. Quick disbursement will solve the problem of long queues

Sudha (Resident): Sir, I would like to bring to your notice that our nagar has not received the flood relief package. Other localities have received the money as well as the materials for flood relief.

Councillor: Madam, this relief is given only to areas designated as BPL (Below the Poverty Line). I'm afraid, this locality doesn't fit into that category.

President: Madam, I also made enquiries and I fully agree with the statement made by our Councillor. I also wish to add that we received the relief given in Phase 1. I understand that in Phase 2 the government has restricted the supply of money and materials only to BPL areas.

Friends, our Councillor has made time to be with us this morning. As he has another meeting in 15 minutes from now, he will take leave of us. Please feel free to bring the civic needs of our Alwarnagar to me and my fellow office-bearers. Thank you.

(Councillor waves goodbye and leaves)

Making a Complaint over the phone:

Cool Net Service: Hello, this Cool Net Customer Service. How can I help you?
Customer: I want to register a complaint regarding my internet service.
Cool Net Service: What has been the problem sir(madam)?
Customer: My connection snapped suddenly. I happened about 30 minutes ago.
Cool Net Service: Could you give me your customer number?
Customer: D: Yes, my customer number is 7654-321.
Cool Net Service: Let me check to see if we have already received a report. Well……It hasn't been reported sir (madam). Give me a moment. Could you be on the line? I will check it out. The windy weather could have caused some disruption.
Customer: Yes, I will wait
Cool Net Service: I got in touch with the operator in your area. He says that a lot of trees have fallen due to the storm. The technical team will be at the site in a few minutes. They'll fix things up soon. You should be able to get your connection in an hour's time.
Customer: Thank you.

Here is a list of expressions used in making a complaint:

I'm sorry to say this but…
I have a complaint to make…
There seems to be a problem with…
I'm afraid there is a slight problem with…
Sorry to bother you but…
I'm not satisfied with…
Wouldn't be a good idea to…
There appears to be something wrong with…
I was expecting… but…
Sorry to bother you but…
I want to complain about…

I'm afraid I've got a complaint about…

I have to make a complaint about…

I don't understand why…

Excuse me but there is a problem…

Would you mind…?

Some expressions used in accepting a complaint:

I'm so sorry, but this will never happen again.

I'm sorry, we promise never to make the same mistake again.

I can't tell you how sorry I am.

I wish it had never happened.

Rejecting a complaint:

Sorry, there is nothing we can do about it.

Sorry but it's not our fault.

I'm afraid there isn't much we can do about it.

Activities:

1. Work in pairs for the following conversations:
   a) Between a resident of an area and the EB office regarding power failure
   b) Between a customer and an online service provider regarding a product (clock/mobile phone/any other), which has not arrived
   c) Between a diner at a restaurant and the hotel manager about the food that is not of a good quality.
   d) Between a customer and a furniture shop owner about a defect in a new piece of furniture discovered by the customer when the piece arrived.
   e) Between a parent and a teacher. The parent complains that the teacher is too harsh with the child for not learning mathematics.

The teacher complains that the child is not cooperating with the teacher.

NB: The above exercises may also be taken as exercises in dialogue writing.

Listening to Problems and Offering Solutions (Informal)

Being a good listener can take you far in your career and relationships.

In the context of college life, you might be required to listen to the problems of a classmate or friend. Later, when you move into professional life, you might have to listen to clients. If you choose social work or counselling as a profession, your ability to "listen to problems and offer solutions" will determine your success with people who seek your help.

Understanding what a person is trying to convey requires the skill of active listening. Active listening is the process of listening attentively while someone else speaks, paraphrasing and reflecting back what is said. Active listening involves more than just hearing someone speak. When you practice active listening, you are fully concentrating on what is being said. You listen with all of your senses and give your full attention to the person speaking. Some of the features of active listening are:

- Being neutral and non-judgmental
- Listening with patience

- Giving verbal and nonverbal feedback, i.e. signs of listening (e.g., smiling, eye contact)
- Asking questions (but not too often and only at the right moment)
- Reflecting back what is said
- Asking for clarification
- Summarizing

In this way, active listening is the opposite of passive hearing.

With regard to language proficiency, our focus is on the diction used in offering solutions. The responses of the person listening to another's problems could be categorised as

A) Expressions showing understanding and sympathy
B) Expressions used when one gently disagrees
C) Expressions to show that you have grasped the problem being shared
D) Expressions used in offering solutions
E) Expressions used as positive reinforcement.

Expressions showing understanding and sympathy could include:

- I understand what you are going through
- I sympathise with you
- This is what anyone in your place would feel
- This is indeed a difficult situation.

Expressions used when one gently disagrees

- You have a point. But could you look at it from a different angle?
- I'm afraid that might not be a helpful approach
- I'm afraid that you won't get far with that approach
- Do you think that would solve your problem?

Expressions to show that you have grasped the problem being shared

- I get what you are saying
- Allow me to sum up what you have said

Expressions used in offering solutions

- I would suggest that you…….
- Why don't you……..
- Since you have worked out the options, you must now choose one of them
- You need to take a decision/step
- You must refrain from taking this step/doing this
- That decision would be most ill-advised. I hope you will reconsider.
- Considering the merits and demerits, the options before us are…….

Comprehension:

1. What is "active listening"?

Exercise:

A person who is deep in debt shares his problem with a friend. The following paragraph is an excerpt from the advice given by his friend.

Refer to the expressions listed in the lesson and fill in the blanks with suitable expressions:

You have incurred this heavy debt. I understand …….through. You say that you have taken the loan for your brother's wedding and that all your family members should share this burden. You have a …….. But could you look at it from a different……? You have just said that none of your family members are concerned about the loan which you have taken in your name. To take another loan on higher interest to settle your debts would be most …….. You must …….taking this step. However,

you need to take a …….to settle your loans. You said that you have some jewellery and some land as well. Since you have worked out the……., you must now choose one of them.

READING AND WRITING

Reading

You must have known the basic techniques of effective reading based on the exercises and tasks given last term. So, let us do a bit of loud reading in order to enunciate language effectively and to comprehend the meaning.

Read the passage below as a group activity. Five people can read this as there are five characters and each can read a part. The entire class can read the passage five groups, each group taking one part.

The Seasons of Life

There was a man who had four sons. He wanted his sons to learn not to judge things too quickly. So he sent them each on a quest, in turn, to go and look at a pear tree that was a great distance away.

The first son went in the winter, the second in the spring, the third in the summer, and the youngest son in the fall.

When they had all gone and come back, he called them together to describe what they had seen.

The first son said that the tree was ugly, bent, and twisted.

The second son said no – it was covered with green buds and full of promise.

The third son disagreed, he said it was laden with blossoms that smelled so sweet and looked so beautiful, it was the most graceful thing he had ever seen.

The last son disagreed with all of them; he said it was ripe and drooping with fruit, full of life and fulfilment.

The man then explained to his sons that they were all right, because they had each seen but one season in the tree's life.
He told them that you cannot judge a tree, or a person, by only one season, and that the essence of who they are – and the pleasure, joy, and love that come from that life – can only be measured at the end, when all the seasons are up.
If you give up when it's winter, you will miss the promise of your spring, the beauty of your summer, and the fulfilment of your fall.
Don't judge a life by one difficult season. Don't let the pain of one season destroy the joy of all the rest.

(https://livelifehappy.com/live-life-happy-stories/, accessed on 13.12.20)

Tasks from the passage read.

1. Highlight the words for which you do not know the meaning.
2. Before referring to the dictionary, read the passage again and see whether you can guess the meaning of the unknown word and then check with the dictionary.
3. Read the passage more than once.

Exercises:

1. Find out the pronunciation of "pear." (Use an online aid)
2. Find out the difference between dropping and drooping.
3. Write a condensed version of the story and read it aloud.
4. Which season of life would you prefer and why?

WRITING

Writing a Paragraph on Proverbial Expressions

PARAGRAPH WRITING

Parts of a Paragraph

- Topic Sentence
- Supporting Sentences
- Concluding Sentence

The topic Sentence is the first sentence of the paragraph. It states the main idea reflecting the topic of the paragraph. The topic sentence should also convey what the rest of the paragraph will be about.

The Supporting Sentences that follow the topic sentence provide details, explanations or examples to support the topic sentence. These sentences expand on the main idea and are connected in a logical manner. Transition words and phrases are used to emphasise on the inter related progress of ideas.

The Concluding Sentence sums up the main idea and the supporting ideas presented. It is almost similar to the topic sentence but expressed in different words stating the conclusion.

Writing paragraphs on proverbial expressions:

Proverbs

What ornaments are to attire, proverbial expressions are to speech. They are great accessories. They lend style and charm to one's way of speaking.

What are Proverbs?

Proverbs are the traditional sayings of a country; short sentences that offer wisdom and are considered as advice to lead a good life. Sometimes proverbs are used in everyday communication to convey a

meaning or a message to the listeners. Proverbs are like moral teachings in short sentences to convey the importance of values essential for achieving success and happiness in life. There are proverbs that are specific to a place which reflect the lifestyle or customs of that place. Thus, proverbs based on different cultures and regions inform about diversity in humanity as well as uphold universal values of truth, self-discipline, honesty, personal integrity, kindness, the importance of hard work etc.

Proverbs are also used for effective communication as sayings in a single sentence instead of using long speeches for moralising purpose. The advantage of using a proverb also lies in giving a message in a nutshell.

Example:

Write a paragraph on the proverb given, in about eight to 10 lines:

The proverb, "As you sow, so will you reap" can be explained thus:

The metaphor of sowing the seed in agriculture is used here, to indicate the personal involvement and hard work of farming as labour as essential to get a good harvest to reap. This proverb has two interpretations. Firstly, it conveys the message that if you work hard, you will get good results. Whether it is wealth or intellectual enrichment, it is important to put in enough efforts to ensure good result. The benefit of a good harvest for monetary benefits is emphasised here. Similarly, in any life situation that requires personal dedication and hard work, the reward is assured depending on the intensity of one's efforts. The other meaning is that, whatever we do to others will come back to us as well. If we wish good for others and have good will for others, we will also get good will from others. If a person helps another person who requires help, according to the proverb, he or she will also be helped at the right moment when the help is required. The virtue of being kind and compassionate towards other human beings is emphasised through this proverb. When a person commits evil against another person, someday that evil will be returned to him or her.

A list of the common proverbs used in everyday communication is given below.

Proverbial Expression	**Meaning**
The early bird catches the worm	Do things promptly. If you are late, you will be a loser.
Make hay while the sun shines	Make best use of the opportunity
Rome wasn't built in a day	Work consistently (regularly)
All that glitters is not gold	Don't be fooled by appearances
A stitch in time saves nine	Attend to problems immediately(If the tear is not mended immediately it will expand and become bigger)
A rolling stone gathers no moss.	Positive meaning: Keep moving. Don't stop Negative meaning: If you keep moving, you will gather nothing.
Empty vessels make more noise	Those who are not capable make the most noise.
Look before you leap	Check before you take a step
Time and tide wait for no man	Time keeps moving. It doesn't stop for anyone.
Two wrongs don't make right	Justifying the wrong deed by doing something to approve of it, doesn't make it right.
A friend in need is a friend in deed	A friend who helps you in your hour of need is a true friend
Haste makes waste	If you do things in a hurry, you could create more loss.
Look before you leap	Make a clear assessment before you

	get involved or take steps.
You can lead the horse to the water, but you cannot make it drink (This expression is often used by parents and teachers!)	You can advise a person about what is good for him/her, but you cannot make the person do it.
The pen is mightier than the sword	The written word is very powerful.
When in Rome, be a Roman	When you live in a certain place, adopt the culture of that place.
Tough times don't last: tough people do	Bad times are not forever. But strong people survive bad times
No man is an island.	We cannot isolate ourselves. Life is such that we should be connected with others (family, neighbours, colleagues and so on)

The following is a brief write-up on the proverbial expression, "Better safe than sorry"

Better Safe Than Sorry

We live in times when we often hear the expression, "better safe than sorry". The expression is also used in relation to safety measures like installing a fire extinguisher in buildings. In the event of a mishap, like an accident or contracting a disease because one was not careful, we end up regretting the consequences of not taking precautions. The same principle applies to wearing a helmet while driving. In relation to Corona virus, we are cautioned time and again to wear masks, use sanitizers and practice physical distancing. (The phrase "social distancing" is not quite accurate as we are socially connected through the online mode and the distance between us is "physical" and not "social").

Task 1

Complete the following paragraphs written on the proverbs selected, in your own words, adding about five lines:

1.Make hay while the sun shines.

The given proverb means that one should make use of the opportunity available in order to make one's life better. The importance of using the sunshine to finish the process of making the hay is emphasised to indicate how one should never miss appropriate chance given to one to accomplish one's dream. Therefore…

2. Where there is a will, there's a way.

The given proverb talks about the importance of perseverance. As an important virtue, individuals are always encouraged to believe in their willpower. In other words, self-confidence and determination always make an individual overcome the difficulties and struggles in life. Therefore…

Task 2

Write a paragraph on any two of the proverbs given in the list above in not more than eight lines.

Use the plan suggested below:

1. Explain or express your understanding of the given proverb
2. Comment on how the proverb conveys a moral value or a basic philosophy to follow in one's life.

3. Summarise your ideas and insights in realising the positive effects of the proverb for the good of the society.
4. Conclude by making a personal statement about your belief in the effectiveness of the proverb.

WORD POWER: SYNONYMS AND ANTONYMS

Read the following exchanges out loud. Pay special attention to the words italicised. What do you think connects them?

1. RAVI: I think the rava dosas in Saravana Bhavan are very *tasty*. What do you feel, Ahmed?

   AHMED: I agree. Those rava dosas are *yummy*. In fact, 5

   all their dosa varieties are *delicious*.

   PETER: Mmmmm… yes, but have you tried the new Dosa Joint at the corner of the street? Those dosas are simply *mouth-watering*.

2. RAMYA: How did you find the question paper today? I thought it was very *difficult*.
   SARA: Yes, I too found it *tough*.
   TARA: You're both right. I found it *challenging* as well.

The words *yummy, tasty, delicious* and *mouth-watering* are synonyms. The same observation applies to the words *difficult, tough* and *challenging.*

The word "synonym" is borrowed from the Latin word (*synōnymum*) which in turn was borrowed from the Greek word *synōnymon*: "syn" meaning, "together/similar/alike" and *-ōnym* meaning, "name"

We use synonyms for a number of reasons. Very often, we use synonyms when we want to stress a point. In both the exchanges above, every new word re-emphasises the first point. In the first exchange, "yummy" and "mouth-watering" add to what Ravi is saying about the dosas in Saravana Bhavan; in the second, "tough" and "challenging" do the same to what Ramya says about the question paper.

Another reason for using synonyms is to avoid repeating the same words. Especially, when we write, it is a good practice not to use the same word or phrase too often. Using synonyms will make sure that our writing is elegant. For example, consider the following paragraph:

The audience found the film very interesting. Many of them said that the story was very interesting and that the suspense also made the movie interesting.

This can be rewritten in the following way:

The audience found the film very interesting. Many of them said that the story was very absorbing and that the suspense kept them glued to their seats.

As you can see, synonyms can either be a single word (one synonym of interesting is absorbing) or a phrase (another synonym of interesting is keeping people glued to their seats).

If we are looking for synonyms for a word, the best available source for reference is a thesaurus – a physical one or an online one. A thesaurus is a book that gives the synonyms of word along with some other information. Almost all major dictionary publishers also publish thesauruses – Oxford, Merriam Webster, Roget etc. all have very good thesauruses we can use. Nowadays, many of these have their own websites we can use. For example, https://www.merriam-webster.com/thesaurus is the link for the Merriam Webster thesaurus. The Advanced Oxford Dictionary is also available as an app that you can download on your devices. Keeping a thesaurus ready for use is always helpful when we write.

Most thesauruses have a number of synonyms for a single word. Which of these synonyms should we use? That will depend entirely upon the context in which you are using the word. For example, in the second exchange between Ramya, Sara and Tara, different synonyms of the word "tough" are used. As the context of this word is a question paper of an examination, relevant words such as "difficult "and "challenging" can be used. However, "strenuous" and "arduous" are also synonyms of "difficult" or "tough". But it will not make sense that the question paper was arduous or strenuous; these are words that can be used in the context of a work that is undertaken. We can say that a journey was arduous or that carrying the heavy box upstairs was strenuous. So, before choosing the appropriate synonym, make sure that you use it in the right context.

Activity 1

For each of the following phrases, choose the word from the list that comes closest in meaning to the word in italics. The first one is done as an example for you. Use a thesaurus wherever needed.

1. *Arduous* journey
   (a) *difficult* (b) easy (c) interesting (d) using a vehicle
2. *Ability* to perform
   (a) ease (b) capability (c) difficulty (d) machine
3. An *articulate* person
   (a) beautiful (b) artistic (c) eloquent (d) irritating
4. *Doggedly*
   (a) dog-like (b) animalistic (c) with a bark (d) determinedly
5. *Vibrant* session
   (a) full of energy (b) enjoyable (c) interesting (d) boring
6. *Precious* metal
   (a) necessary (b) regular (c) valuable (d) dangerous
7. To *assist* someone
   (a) help (b) threaten (c) meet (d) stand with
8. To share a *unique* bond
   (a) typical (b) simple (c) hard (d) special
9. A *vicious* animal
   (a) large (b) deliberately harmful (c) friendly (d) small in size
10. To *startle*
    (a) starry (b) surprise (c) terrify (d) upset

Activity 2

In each of the following sentences, a word or phrase is italicised. From the list of words/phrases given in brackets, choose the correct one that can replace the italicised word/phrase. The first one is done as an example. Again, use a thesaurus if needed.

1. The *firmament* was beautiful; looking up, we were amazed at the beauty all around us.
   (a) <u>sky</u> (b) ceiling (c) roof (d) tall tree

2. The new game looks interesting. I'm going *to give it a try*.
   (a) ignore it (b) attempt it (c) talk about it (d) play
3. Their mansion is *enormous*.
   (a) very large (b) very small (c) well-built (d) ugly
4. The GDP of the country *shrunk* after the lockdown.
   (a) increased (b) decreased (c) became famous (d) produce
5. The scientist *established* that his idea had been correct all along.
   (a) decided (b) worried (c) proved (d) wrote
6. I met her when I was taking a *stroll* in the park.
   (a) move (b) jog (c) walk (d) run
7. The man in the orange robe warned me that the journey to the top of the mountain could be *perilous*.
   (a) easy (b) difficult (c) interesting (d) dangerous
8. I was *contemplating* calling my friend when she arrived.
   (a) thinking about (b) trying to (c) beginning to (d) ignoring
9. My sister was being very *candid* about herself when she admitted that she used to be addicted to gaming.
   (a) angry (b) sad (c) truthful (d) slow to speak
10. The minister *declined* the industrialist's invitation to attend the ceremony.
    (a) agreed to (b) got angry with (c) refused (d) disagreed with

Activity 3

Some words in the following passage are italicised. Replace each of the italicised words with a suitable synonym from the list given at the end. The passage is an excerpt from "The Case for Samosa as a National Snack" by Nasir Salam

> There was a *debate* recently on what should be India's national dish or item of food. Someone came up with the *tasteless* (pun intended) idea of khichdi. Really? This *flavourless*, colourless *mishmash* of rice and lentils as our national food? All it does is to remind you of those days when you were sick in bed and *advised* by doctors and members of your family to consume it because it is "light" and "easily digested".
>
> On the one hand you are bed-ridden with no contact with the outside world and not much *to look forward to* for the day, and then comes khichdi. A watery mixture of overcooked cereals, that still tastes bland even after

adding huge amounts of desi ghee and heaps of mango achaar. I refuse to vote for khichdi!

….

… as a north Indian I am deeply *biased* and my vote is for the samosa, a triangular piece of pure happiness! This deep-fried packet of potatoes and peas wrapped in kneaded dough is an *absolute* delight. As soon as you take a bite it melts in your mouth, with a combination of *crispy* dough and mushy mixture of potatoes and peas *exploding* in your mouth like fireworks.

Samosa is the comfort food one can rely on anytime. Whether it is a summer afternoon, rainy August or wintry December, samosa never disappoints. You can be an *overworked* employee, a tired mother, a stressed-out student—samosa always provides comfort. One bite and all your worries melt away. *Consume* it with tea or coffee, with chutney or ketchup, with friends or colleagues, and it always works. The love for this deep-fried delight has been *exported* to other countries as well by the Indian diaspora.

(Source: https://www.thehindu.com/opinion/open-page/the-case-for-the-samosa-as-national-snack/article22384690.ece Published in *The Hindu Open Page* on 7 January 2018 and accessed on 30 Nov 2020)

Argument	Transported	
Hotchpotch		
Crunchy	Anticipate	Flat
Bursting	Chips	Taxed
Prejudiced	Utter	Bland
Asked	Instructed	

Antonyms

While you were looking up the thesaurus to find synonyms for words, you would have noticed another set of words below the synonyms marked

'ant.' or 'antonyms'. If you had looked that the words you would have guessed that an antonym is a word that is opposite in meaning to any given word.

Just like synonyms, we need to choose antonyms also carefully, keeping in mind the context of the sentence. Let us re-read the same two exchanges as we did for our last session; this time, instead of agreeing with each other, the speakers will have different and opposite opinions.

1. RAVI: I think the rava dosas in Saravana Bhavan are very tasty. What do you feel, Ahmed?

   AHMED: Oh no. Those rava dosas are tasteless. In fact all their dosa varieties are vapid.

   PETER: You're being very harsh, Ahmed. but have you tried the new Dosa Joint at the corner of the street? Those dosas are simply mouth-watering.

2. RAMYA: How did you find the question paper today? I thought it was very difficult.
   SARA: Really? I'm surprised. I thought it was quite easy.
   TARA: I wouldn't say it was exactly easy, Tara. I found it a bit tough too.

In these exchanges, you will notice that when one person disagrees, s/he uses the antonym of the word used by the previous speaker. For example, tasteless and vapid are antonyms of tasty and mouth-watering. Similarly, easy is an antonym of difficult and tough.

The word antonym comes from two Greek words – 'anti' meaning "against" and "onuma" meaning, "name"

Activity 1

Use the thesaurus to find the antonyms of the following words.

1. Lengthen
2. Depart
3. Become visible
4. Enormous
5. Persuade
6. Make clear
7. Darken
8. Angelic

9. Cruel
10. Hardworking

Activity 2

In each of the following sentences, a word or phrase has been underlined. From the choices given, select the closest antonym for it.

1. The detectives found the evidence very illuminating.
   (a) delightful (b) unclear (c) too many (d) sad
2. My physics teacher used an interesting experiment to teach us that magnetic like poles repel.
   (a) rebel (b) go away (c) attract (d) mix
3. The plane could not take off at the scheduled time.
   (a) taken in (b) give off (c) give on (d) land
4. The edges of the furniture were smooth.
   (a) rough (b) silky (c) spiky (d) sharp
5. The explorer undertook a very arduous journey.
   (a) difficult (b) dangerous (c) easy (d) long
6. The doctor was very concerned about that patient.
   (a) worried (b) careful (c) indifferent (d) careless
7. The high pressure in the bogs preserved the specimen.
   (a) destroyed (b) saved (c) coloured (d) whitened
8. The class made sure that they included the special student in all their activities.
   (a) added (b) liked (c) excluded (d) played with
9. My uncle used to own a very vicious dog.
   (a) gentle (b) cruel (c) friendly (d) good
10. The young girl obeyed everything her grandmother told her.
    (a) agreed with (b) ignored (c) liked (d) enjoyed

Activity 3

In the following passage, some words are *italicised* and some are underlined. From the list given at the end, replace the italicised words with suitable synonyms and the underlined words with suitable antonyms.

> The fact that everybody enjoys a good mystery *explains* why magicians are such popular entertainers. We all know that a magician does not really *depend on* 'magic' to perform his tricks, but on his *ability* to act at great speed. However, this does not prevent us from enjoying

watching a magician produce rabbits from a hat or swallow countless eggs.

Probably, the greatest magician of all time was Harry Houdini who died in 1926. His real name was Ehrich Weiss, but he *adopted* the name Houdini after reading a book which greatly *influenced* him. This had been written by a famous magician called Robert-Houdin. Houdini *mastered* the art of escaping. He could free himself from the most difficult locks in seconds. No one knows how he did this. But there is no doubt that he had made a close *study* of every type of lock invented. He would carry a small needle-like tool tied to his leg. He used this tool as a *substitute* for a key.

Houdini once asked the Chicago police to lock him in prison. They tied him in chains and locked him up, but he freed himself in a short time. The police *accused* him of having used a tool and locked him up again. This time, there were chains around his neck, waist, wrist, and legs—but again, he escaped in a few minutes. Houdini had probably hidden his 'needle' in a wax-like substance and *dropped* it on the floor in the passage. As he went past, he stepped on it so that it *stuck* to the sole of his foot. His most famous escape, however, was altogether surprising. He was tied and enclosed in a wooden box. The lid of the box was nailed. The box was dropped into the sea in the New York harbour. In one minute, Houdini had untied himself and was able to come up to the *surface* of the sea. When the box was brought up and opened, the chains were found inside.

depth	absolve placed inside	simple
totally an effect	examination replacement	had
charged	became proficient in picked up	clarifies
slowly relv	competence certainlv	

GRAMMAR IN CONTEXT

Adverbs and Prepositions

Adverbs

Read the passage given below and make a note of the words highlighted:

Sports Day at GAC

Our college is often referred to as GAC. There is no need for expansion of this abbreviation. Everyone in the city and around know that it is Government Arts College. Sports Day in our college is a spectacular event. After every Sports Day, the local newspapers are awash with colourful photographs of the event and a report highlighting the sports talent in our college.. Usually, a distinguished personality, most often a high-ranking IPS officer is the Guest of Honour.

Though it is Sports Day, there is also a cultural extravaganza showcasing traditional folk arts like karagam, poikal kuthurai. They also have demonstration of yoga. Silambam, a traditional sports is also presented. Apart from these, the students make exciting presentations and formations through aerobics. The karagam performers move rhythmically to the music.

While watching the aerobics performance, my heat skipped a beat, when the students daringly performed the act of jumping through the ring of fire. They bravely performed the act of fire-breathing.

In Silambam, the sticks are wielded **dextrously**. The ability to move **swiftly** is most basic to all sports performances. The aerobics demonstration was performed **energetically**: the transitions from one exercise to another were done **quickly**.

One of the sportsmen in our college is a national champion in rifle-shooting. He gave a scintillating performance by **rapidly** firing at 100 air balloons and he was right on target for all 100. Our college also has a champion in tight-rope walking.

Without faltering the tight-rope walker **slowly** and **steadily** performed the act. The gymnasts also held the audience spell-bound as they **gracefully** displayed their skills.

Did you notice that the words highlighted are related to actions? These words are adverbs.

An adverb by definition is a word that describes or gives more information about a verb, adjective, adverb, or phrase.

Let's enrich our knowledge of adverbs by learning

- Adverbs of Manner
- Comparative and superlative adverbs

Adverbs of manner are usually formed from adjectives by adding *–ly*:

In the passage Sports Day at GAC, the adverbs highlighted are adverbs of manner.

Here are some more examples of adverbs of manner:

1. They are badly affected by the virus

2. We can <u>easily</u> move the cupboard to the other end of the room
3. The doctor <u>gently</u> told them that their father's condition was worsening.
4. <u>Carefully</u> go through the accounts.
5. He spoke <u>angrily</u>

A few adverbs of manner have the same form as the adjective:

Example:

They all worked hard.
She usually arrives late/early.
I hate driving fast.

Exercises:

Choose the appropriate adverb from the options given:

1. The aeroplane landed_____on the runway (shyly/safely/delightfully)
2. The judge told him to answer the questions _____(truthfully/sleepily/casually)
3. The cab driver drove_____. I was scared. (gently/recklessly/funnily)
4. If you want to be fit, eat_____(greedily/healthily/frugally)
5. Misers save money by living _____(frugally/lavishly/cheerfully)
6. Spendthrifts live _____(frugally/slowly/lavishly)
7. Models and film actors dress _____(simply/stylishly/shabbily)
8. The beggar was _____dressed (stylishly/interestingly/shabbily)
9. It was a grand wedding. The venue was decorated _____. (exquisitely/cheaply/badly)
10. The doctor who is an expert, examined the patient_____(thoroughly/painfully/badly)

<u>Comparative and superlative adverbs:</u>

Before you engage with comparative and superlative adverbs you can get acquainted with (or refresh your knowledge of) "Degrees of Comparison" which are shown in the table below:

Positive	Comparative	Superlative
He is a good athlete	He is a better athlete	He is the best athlete
It is a cold day	It is a colder day	It is the coldest day

An expression like "more slowly" (formed from the adverb, "slowly") is a comparative adverb. Comparative adverbs are used to show change or make comparisons

Examples:

- I drink water more often in summer.
- I am working harder after my failure in the last exam.
- She spoke more quickly as her temper was going up.

Superlative Adverbs:

An expression like "most carefully" (formed from the adverb "carefully") is a superlative adverb. It is used to show who (or what) has performed an action in a specific manner to the greatest or least degree.

Examples:

He spoke most convincingly

He was least interested.

Exercises:

1. They arrived _____
    - more early than we
    - earlier than us
    - earlier than we

2. Could you please drive _____
    - more slowly
    - slowlier
    - most slowly
3. I forget things _____nowadays
    - More often
    - Oftenly
    - Often more
4. The students are working_____as the exam is approaching
    - Hardly

- Harder
- Lazily

5. We sanitize our hands _____in these days of the pandemic
    - much less
    - much more often
    - much
6. Since you are my best friend, I will do this_____for you,
    - more happily
    - most happily
    - quite happily
7. The prisoner went into his cell_____
    - more willingly
    - most unwillingly
    - more joyfully
8. I will bring the cakes for the party as I live _____to the bakery
    - Closest
    - Closer
    - Close
9. One who _____wins the race
    - works
    - works hardest
    - works enough
10. The eagle _____during a storm
    - soars highest
    - soars nearer
    - flies lower

<u>The use of than with comparative adverbs:</u>

We often use than when it comes to comparative adverbs

Elderly people remember their youth <u>more than</u> the recent past.

Make a note of the <u>intensifiers</u> and <u>mitigators</u> that are used with comparatives. The expressions listed below are intensifiers.

Some intensifiers are:

Much, far, a lot, a great deal, quite a lot.

Example:

I forget things much more often nowadays.

The following expressions are mitigators (to "mitigate" means to make something less severe or difficult. In other words, to lower or reduce)

a bit, slightly, rather, a little, a little bit, just a little bit.

Example:

She began to walk a bit more quickly.

Words and phrases as intensifiers with superlatives:

The following words serve to intensify a superlative adverb. Note that we often put "the" in front of the adverb.

Example:

In our class, Hema works by far the hardest.
Of the three brothers, Balu easily runs the fastest.

Exercises:

Fill in the blanks with the appropriate word:

1. She is _____the sweetest of the four girls (by chance/by far/by and by)
2. Of the three businessmen, Suraj is _____ the wealthiest (easier, easiest, easily)
3. After her parents arranged individual tuition she learnt_____quickly (a bit more, little, nicely)
4. You can cook _____quickly if you have a three-burner stove. (far, far more, far and more)
5. You can make it _____more interesting with visuals. (a great deal/ deal/ great)

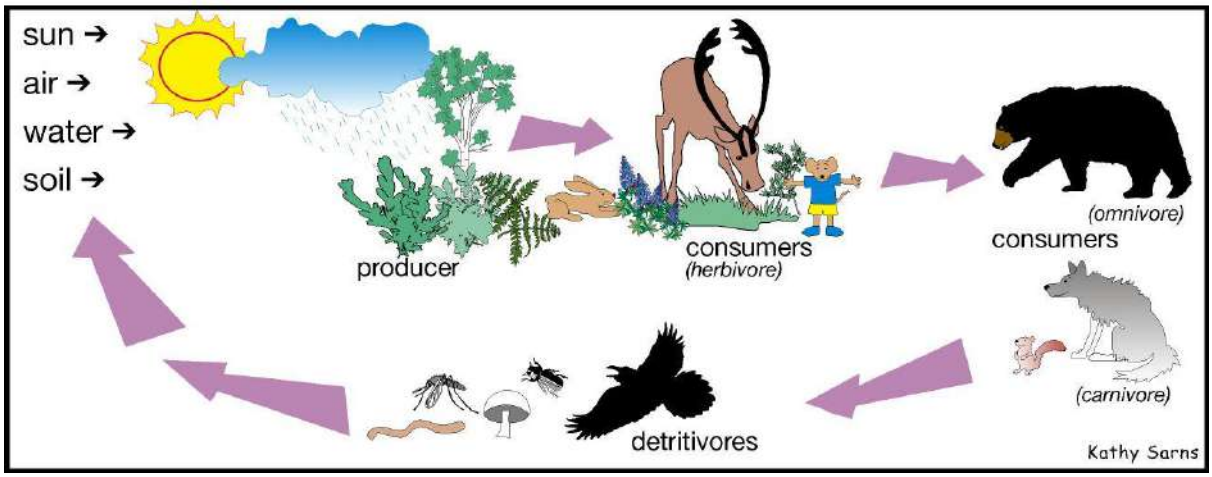
PREPOSITIONS

Everything about Life is Relational

From the moment of birth **to** final breath, relationships comprise our lives. A child is born **into** the world. He/she is born **to** parents. If the child has siblings he/she grows **along** with them. When a person leaves the world he goes **to** the grave.

Apart from relationships, we also know that everything in the world exists in relation to something else: For instance the fruit is **on** the tree. The tree is rooted **in** the ground. The branches of a tree are **above** the ground and they seem to branch **into** the sky.

You might have learnt about the food chain in your biology class



The sun shines **on** the earth. The moisture rises **up** from the earth **into** the atmosphere, where clouds are formed and the rain which from the clouds falls **on** the earth, nourishing the grass and herbs. Herbivores feed **on** grass and plants, while carnivores **in** the forest feed **on** these herbivores and other creatures.

The words highlighted in this passage are prepositions.

A preposition is a word that indicates the relationship between a noun and the other words of a sentence. They explain relationships of sequence, space, and logic between the object of the sentence and the rest of the sentence. They help us understand order, time connections, and positions.

Let's look at the use of prepositions today!

Let's begin with the Preposition of time

When did it happen?

Think about an important event in your life and begin writing about it. You can begin your paragraph by supplying the details in the template below and continue to complete it and share it with your class.

I was at/on/in _____ (place) when it happened. It was at _____ (time) on _____ (day). It was in _____ (month), in _____ (year). I remember that I felt _____ (how did you feel?).

Preposition of time	Explanations	Example

_____
_____
_____
_____

On	Days	Many shops don't open on Sundays.
In	months / seasons / year morning / evening / afternoon period of time	I visited Italy in July, in spring, in 1994 In the evenings, I like to relax. This is the first cigarette I've had in three years.
At	Night weekend (British English) used to show an exact or a particular time:	It gets cold at night. What did you do at the weekend? There's a meeting at 2.30 this afternoon / at lunch time.
Since	from a particular time in the past until a later time, or until now	England have not won the World Cup in football since 1966
For	used to show an amount of time.	I'm just going to bed for an hour or so.
Ago	back in the past; back in time from the present:	The dinosaurs died out 65 million years ago.
Before	at or during a time earlier than	She's always up before dawn.
To	used when saying the time, to mean before the stated hour	It's twenty to six.
Past	telling the time	Five past ten
To	until a particular time, marking end of a period of time	It's only two weeks to Christmas.

From	used to show the time when something starts	The museum is open from 9.30 to 6.00 Tuesday to Sunday.
till / until	up to (the time that)	We waited till / until half past six for you.
By	not later than; at or before	She had promised to be back by five o'clock.

Fill this College Times questionnaire:

Answer the questions. Write a time, day, month or year. The first one is done for you.

- When do you leave for college? _I leave for college at 8.00 am_____
- When do you get back home? _____
- What time do you eat lunch?_____
- What days don't you go to college? _____
- When do you have your holidays? _____
- When did you last take a day off? _____
- When do you have to take your exams? _____
- When did you first come to this college? _____
- When is the busiest time of the year for you? _____
- When is the slowest time of year for you? _____

Here are some commonly used prepositions and their uses.

I*n*

a. We often use *in* with *the morning, the afternoon and the evening.*

I usually wake up early in the morning.

There is no flight to Mumbai in the afternoon.

Jyothi goes to work in the evening.

b. We use *in* with the names of months, seasons, years and centuries.

Shivani is leaving for France in January.

She knows that France will be cold in winter.

She first went to France in winter in January.

She is studying Indo-French relations in the twentieth century.

c. We also use *in* when we refer to a specific week.

We may not be in London in the last week of November.

d. We usually use *in* with spaces that have three dimensions – length, breadth and depth.

A: Have you seen my phone?

B: I think you have left it in the car.

A: Where is Arin?

B: He is in the school.

On

a.We use *on* with the names of days and specific dates and before phrases such as Wednesday morning, Saturday evening and … the morning of.

I think they are leaving on Monday morning.

We are meeting them on the fourth of September.

People woke up on the morning of January to see all around.

At

a. The preposition *at* has many uses. One of its common uses is to indicate time.

Let's leave at ten.
The train is expected at 10.00 pm.
We will speak at lunchtime.

b. We use *at* when we use "the end".

The story has a sudden twist at the end.

c. We use *at* to say where something or somebody is or where something happens.

Mom is not at home.

She is already at work.

We had to change at Pune.

d.We also use *at* to say where a person works or studies.

Imaya has been at Wipro for 3 years.

He is at Johns Hopkins University, the USA.

e. We use *at* with words that describe specific events or places where the events happen.

Everyone was quiet at breakfast.

We had lunch at the new restaurant.

f. We use *at* with the beginning, the end, the top, the bottom and the side.

At the beginning of the ceremony, all of us stood up for prayer.

My name was at the top of the list.

g. We use *at* to state the age at which somebody does something.

I left my village at the age of 16.

She learnt swimming at 10.

h. We also use *at* to specify the rate of speed.

The car was going at 100 kms per hour.

The wind blew at a speed of 200 kms per hour.

Use this to mind map to remember a few preposition of time and place

Task 1 

Fill in the blanks with "in/on/at".

1. When you are_____ the road, obey traffic rules.

2. Stop _____ traffic junctions, when the signal turns red.

3. Do not touch any un-attended baggage _____ the rail or bus stations.

4. He is _____ Kerala at the moment.

5. Why don't you sit _____ the floor?

6. We met her _____ the IIT in New Delhi.

From/till/until

a. We use *from* to indicate the beginning and *to /till/until* to indicate the end of an action.

Children started playing cricket from 3 p.m.

Children played cricket from 3 p.m to 6 p.m.

We started swimming in the pool from 2 p.m.

The crowd cheered until the end of the game.

Goodbye till we meet again.

We swam in the pool from 2 pm till the sunset.

By

a.We use *by* to mean not later than the time mentioned.

Can you return the book by Monday?

By 11 a.m, we had crossed Chennai.

b. We use *by* to mean near, at the side of or beside somebody or something.

She sat by the phone and waited for the call.

He stood by the door.

The little boy slept by his mother. (=beside)

An old woman sat by me. (=beside)

c. We use *by* to show who or what does, causes or creates something. This is usually done in passive constructions.

The fire was caused by a short circuit.

The play is an adaptation of Macbeth by Shakespeare.

d. We use *by* to show how or in what way something is done.

This part of the building is powered by solar energy.

Can I pay by card?

She goes to work by the metro.

Task 2

Complete the sentences using *until* or *by*.

1)Can you mail the report to me _____ Monday morning?

2) Let us wait _____ Dad comes back home.

3) Would you like to wait in this cabin _____ the manager is in?

4) I don't think I can reach you _____ 8 p.m.

Task 3

Write a sentence about each ruler using *from..to / till/ until*.

1)1526-1530 Babur. Babur ruled from 1526- 1530.

2)1530-1540 Humayun. _____.

3)1556-1605 Akbar. _____.

4)1605-1627 Jehangir. _____.

Since

a. One of the common uses of *since* is to mean from a point of time in the past until a later point of time in the past or until now.

How long have you been in Pune?

I have been here since 2009.

What a terrible weather!

It has been like this since Monday.

b. We use *since* after the present perfect tense or the present perfect continuous tense. After *since* we always use a specific point of time such as *10 p.m ,* Sunday, July 2010 and 15th century.

Our M.D. has been in town since Tuesday.

It has been raining since ten this morning.

Schools have been closed since last Friday.

For

a. One of the common uses of *for* is to indicate a period of time during which something happened. It tells us how long an action lasted.

I will be away for just 2 days.

Deepthi has been living in Kerala for six years.

She is going to Delhi for five days.

Note: *For* is used after any tense.

Task 4

Correct the mistakes.

1) It has not rained since a week.
2) The repair work will last since a month.
3) I haven't slept well since two days.

Task 5

Write sentences using *since.*

1) He met with an accident. His fever started then.
   He has had fever since he met with an accident.

2) I moved into this house in 2009. I have lived in this house then onwards.

3) He left for the US in January. We have not heard from him after that.

Before, after and during

a. We use *before* to mean "earlier than somebody or something".

Always wait for people to exit an area before you enter.

In case of fire, exit the building before you SMS your friends about it.

b. We use *after* to mean "later than something".

They left soon after dinner.

We met again after nine years.

c. We use *during* to mean "all through" or "at some point in a period of time".

Please do not use your mobile phones during the lecture.

I met him during my summer internship.

Note: *Before*, *After* and *during* are always followed by a noun phrase: *before* Diwali, *after* the flood, *during* the journey.

While

a. We use *while* to connect two sentences. So, it is also a conjunction. We use *while* to mean during the time that something is happening.

I was watching T.V. The power went off.

The power went off while I was watching T.V.

The prepositions *before* and *after* and the conjunction *while* can be followed by an –ing form of a verb.

Before leaving the aircraft, please check your belongings.

After speaking to the doctor, she went out and bought the medicines.

Task 6

Complete each sentence using *before*, *after* or *while* and a verb from the box.

Before, after, while	leaving home	doing the dishes
parking the car	taking the picture	
sleeping	turning at the sharp curves	

a) The road is slippery. Be careful <u>while turning at the sharp curves.</u>
b) _____,we went into the mall.'
c) _____, I checked all the doors and windows.
d) He snores loudly _____
e) She went to have a shower _____
f) _____, I checked my wallet.
g) _____ , the photographer checked the intensity of light.

below, above, under, over, in front of, behind, opposite, between, among

a. We use these prepositions to talk about the position of a person or a thing in relation to another person or thing.

b. We use *below and above* to mean to a lower or higher level or position than somebody or something.

The water is below the knee level.

The water is above the knee level.

c. We use *opposite* to mean on the other side of somebody or something, usually facing them. We use *in front of* to mean outside but not opposite.

The two cars are opposite each other.

The small car is in front of the big car.

The cars are in front of the house.

d. We use *under* to mean "a position below something". We use *over* to mean "a position higher than but not touching something or somebody".

The mechanic is under the car.

The chandelier is over the dining table.

e. We use *behind* to mean "at the back of somebody or something". We use *between* to mean in the space separating two or more points, objects, people, etc.

The old man is behind the wall.

The man is standing between the two pillars.

f. We use *among* to mean with many things or people.

She was sitting among the children

Task 7

Complete the sentences using *above, below, opposite, under, over or between.*

1) The baby elephant is _____ the two big elephants.

2) There is a painting _____ the T.V.

3) The aircraft is flying _____ the clouds.

4) The man is standing _____ the aircraft.

5) We made the shelves in the space _____ the window.

6) The two men are pulling in the _____ direction.

across, along, down, into, off, over, out of, past, round, though, under, up

a. All these prepositions indicate the direction of movement.

The children are walking across the road. The girl is jogging along the road.

He is bending down. *The kids are jumping into the water.*

The fish is coming out of the water. *The naughty boy is looking through a keyhole.*

The bus is going off the road. *The car is going past a red light.*

The woman is walking under a ladder. *The dogs are jumping over the fence.*

Task 8

1) Fill in the blanks with the correct prepositions.

a) A monkey walked ___ my living room when I was reading the newspaper. Suddenly the steam _____ the pressure cooker went _____. The monkey gets scared and ran _____ of the room _____ the rear door.

b) Last summer we made a trip _____ Darjeeling. The journey _____ the hills _____ the toy train was exciting. A few children got scared when the train went _____ tunnels. The train became slow as it started climbing _____. I could see a few people jumping _____ the train and getting _____ it again at the next curve. It was indeed a sight to see the train going _____ sharp curves.

about, with, of

a. We use *about* to mean "on the subject of somebody or something". This preposition is usually used with verbs such as *hear*, *know*, *speak, talk* and *think*.

Did you hear about the accident?

I knew nothing about it until I reached Bangalore.

I want to speak to you about something important.

They love to talk about partying all the time.

I think we should think about moving to a better house.

b. We use *with* to mean "in the company or presence of somebody or something".

She went on a trip with her friends.

c. We use *with* to mean using something.

I lost my key. I managed to open the lock with a wire.

d. We use *with* to mean having or carrying something.

I want to buy a jacket with a hood.

He looked at me with a sense of guilt.

e. We use *of* to mean belonging to , relating to , or connected with.

The highlight of the show is at the end.

I always dreamed of being rich and famous.

f. Of is used to indicate reference.

This is a picture of my family.

g. Of is used to indicate an amount or number

I drank three cups of milk.

Task 9

Fill in the blanks with the correct prepositions.

1) I was _____ a few of my colleagues.

2) Do you have any news _____ the match?

3) I'm calling _____ my order Number.120.

4) Can we talk _____ next week's reception?

5) She bought two packets _____ sweets.

Task 10

Choose the correct prepositions.

1) We are late. So you think we should go in /by a taxi?

2) She is living by/with an old classmate of hers.

3) Are you looking for a jar by/with a handle?

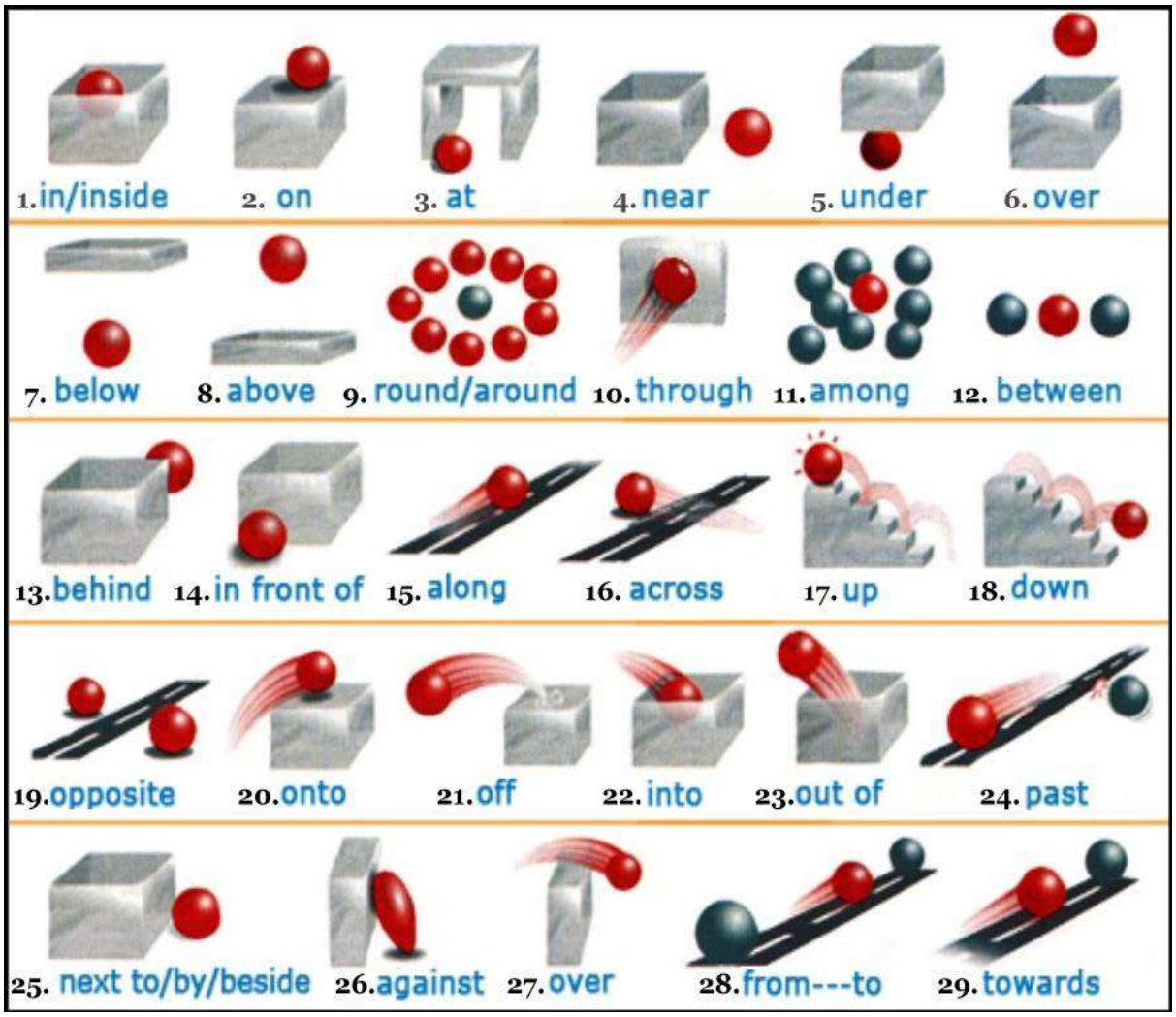
4) The dog sat at/by the fireplace.

5) The water level in the dam rose at/by 2 cms every hour.

6) Do you know anything of/about their plan?

Task 11

Practise the prepositions in the diagram with your teacher using the objects in your classroom.



Unit II

(20 hours)

Listening and Speaking

a. Listening to famous speeches and poems

b. Making short speeches- Formal: welcome speech and vote of thanks. Informal occasions- Farewell party, graduation speech

1. Reading and Writing

a. Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic)

b. Reading poetry

b.i. Reading aloud: (Intonation and Voice Modulation)

b.ii. Identifying and using figures of speech - simile, metaphor, personification etc.

2. Word Power

a. Idioms & Phrases

3. Grammar in Context

Conjunctions and Interjections

LISTENING AND SPEAKING

1. Listening and Speaking

a. Listening to famous speeches and poems

Lesson One

A speech is usually a formal address delivered to an audience. Great speeches are excellent examples of ideas well expressed. Listening to speeches by people from various walks of life on a variety of subjects will not only increase your vocabulary but will also make you familiar with the different ways in which one uses ones tone and body language to communicate your ideas effectively.

Kinds of Speeches:

A speech could be made, at both formal and informal occasions, to inform, persuade, or entertain. Speeches by historians and scientists are largely informative. A speech which is meant to persuade an audience could be made by managers during a sale's pitch or by politicians to encourage people to vote in favour of something or take some actions. Entertaining speeches are given at informal gatherings like dinner parties, team parties and weddings to raise a toast. These are not meant to teach anything to the audience. These speeches rely heavily on anecdotes and humour while in the other kinds of speeches they may be used sparingly.

There is no hard and fast rule that one needs to adhere to while preparing a speech. However, to fulfil ones purpose and to communicate effectively one should equip oneself to both prepare and deliver speeches. You would come across several occasions both now, while in college and later in your career, when you may have to deliver a speech. For instance, you may have to prepare a speech for an event in college – a welcome speech or deliver the vote of thanks, or a speech to share the concept note of an event, or you might make a speech at an oratorical competition. Most of you would make a seminar presentation in the classroom or summarise your project at a viva-voce. In all these instances you would have to prepare a speech.

Types of Speeches

Based on the type of delivery speeches could be classified as:

1. Speech from memory
2. Delivery based on a manuscript
3. Extempore
4. Impromptu

Although speeches could be composed and delivered in different ways, they generally follow a common format. The introduction contains a hook to draw the audience's attention. It highlights what would be spoken about in the speech, the purpose and prepares the audience to pay attention to what is to follow. The hook may be an anecdote, a joke, or interesting facts or statistics that is gripping. The body has the main points supported by details, real time examples, or statistics. In a persuasive speech the speaker presents arguments and counterarguments to convince the audience in believing their point of view. The conclusion summarises the key points made and ends with a powerful thought. The speaker makes an appeal for a specific action or motivates the audience to decide in the concluding remarks of a persuasive speech.

The easiest way to learn to make a good speech is to learn from examples. History is filled with landmark speeches made by world's top leaders and performers.

Activity 1

Research on the internet to make a list of a few famous orators and the occasions at which they made their most popular speech.

Example:

Jawaharlal Nehru – A tryst with Destiny - Delivered on the eve of India's Independence

Activity 2

Pre-Listening Activity:

1. *Search on the internet and find out who is Malala?*
2. *In which year was she awarded the Nobel Prize?*
3. *Discuss some qualities of Malala, the young achiever, that you would like to emulate.*

Listening Practice: Listen to the Nobel Peace Prize acceptance Speech by Malala Yousafzai The transcript of the speech is given below.

https://www.youtube.com/watch?v=c2DHzlkUI6s

Activity 3: Familiarize yourself with the key components of a good speech by analysing one.

Discuss these questions which would help you analyse the speech and familiarise you to some important elements of a well-structured and confidently delivered speech.

1. *What type of speech is it?*
2. *Do you think Malala has prepared the entire speech in advance?*
3. *Based on your listening to the speech, do you think Malala had an idea about her audience, explain your stance.*
4. *Is she reading out every line from a manuscript?*
5. *Has she memorised every line that she was speaking?*
6. *Does Malala use any anecdote in her speech?*
7. *Identify if there is a clear structure to the speech?*
8. *What does she say in the introduction?*
9. *Identify words and phrases that suggest it is an introduction.*
10. *What supporting points does she use in the body of her speech?*
11. *Are there phrases that suggest that she is referring to another speaker who has probably preceded her presentation?*
12. *List out words and phrases Malala repeats. Why do you think she uses repetition?*
13. *Pick out phrases and sentences in the speech that point out that Malala has used humour in her speech.*
14. *Identify the rhetorical questions that Malala uses in her speech and explain why she use these devices.*
15. *How does she conclude her speech?*

Transcript of Malala's Speech

Bismillah hir rahman ir rahim.

In the name of God, the most merciful, the most beneficent.

Your Majesties, Your royal highnesses, distinguished members of the Norwegian Nobel Committee. Dear sisters and brothers, today is a day of great happiness for me. I am humbled that the Nobel Committee has selected me for this precious award.

Thank you everyone for your continued support and love. Thank you for the letters and cards that I still receive from all around the world. Your kind and encouraging words strengthen and inspire me. I would like to thank my parents for their unconditional love. Thank you to my father for not clipping my wings and for letting me fly. Thank you to my mother for inspiring me to be patient and to always speak the truth – which we strongly believe is the true message of Islam. And also thank you to all my wonderful teachers, who inspired me to believe in myself and be brave.

I am proud, well in fact, I am very proud to be the first Pashtun, the first Pakistani, and the youngest person to receive this award. Along with that, along with that, I am pretty certain that I am also the first recipient of the Nobel Peace Prize who still fights with her younger brothers. I want there to be peace everywhere, but my brothers and I are still working on that.

I am also honoured to receive this award together with Kailash Satyarthi, who has been a champion for children's rights for a long time. Twice as long, in fact, than I have been alive. I am proud that we can work together, we can work together and show the world that an Indian and a Pakistani, they can work together and achieve their goals of children's rights.

Dear brothers and sisters, I was named after the inspirational Malalai of Maiwand who is the Pashtun Joan of Arc. The word Malala means grief stricken", sad", but in order to lend some happiness to it, my grandfather would always call me Malala – The happiest girl in the world" and today I am very happy that we are together fighting for an important cause.

This award is not just for me. It is for those forgotten children who want education. It is for those frightened children who want peace. It is for those voiceless children who want change.

I am here to stand up for their rights, to raise their voice… it is not time to pity them. It is not time to pity them. It is time to take action so it

becomes the last time, the last time, so it becomes the last time that we see a child deprived of education.

I have found that people describe me in many different ways.

Some people call me the girl who was shot by the Taliban.

And some, the girl who fought for her rights.

Some people, call me a "Nobel Laureate" now. However, my brothers still call me that annoying bossy sister. As far as I know, I am just a committed and even stubborn person who wants to see every child getting quality education, who wants to see women having equal rights and who wants peace in every corner of the world.

Education is one of the blessings of life—and one of its necessities. That has been my experience during the 17 years of my life. In my paradise home, Swat, I always loved learning and discovering new things. I remember when my friends and I would decorate our hands with henna on special occasions. And instead of drawing flowers and patterns we would paint our hands with mathematical formulas and equations.

We had a thirst for education, we had a thirst for education because our future was right there in that classroom. We would sit and learn and read together. We loved to wear neat and tidy school uniforms and we would sit there with big dreams in our eyes. We wanted to make our parents proud and prove that we could also excel in our studies and achieve those goals, which some people think only boys can.

But things did not remain the same. When I was in Swat, which was a place of tourism and beauty [and which] suddenly changed into a place of terrorism, I was just ten then. More than 400 schools were destroyed. Women were flogged. People were killed. And our beautiful dreams turned into nightmares.

Education went from being a right to being a crime.

Girls were stopped from going to school.

When my world suddenly changed, my priorities changed too.

I had two options. One was to remain silent and wait to be killed. And the second was to speak up and then be killed. I chose the second one. I decided to speak up.

We could not just stand by and see those injustices of the terrorists denying our rights, ruthlessly killing people and misusing the name of Islam. We decided to raise our voice and tell them: Have you not learnt, have you not learnt that in the Holy Quran Allah says: if you kill one person it is as if you kill the whole humanity? Do you not know that Mohammad, peace be upon him, the prophet of mercy, he says, do not harm yourself or others".

And do you not know that the very first word of the Holy Quran is the word Iqra", which means read"?

The terrorists tried to stop us and attacked me and my friends who are here today, on our school bus in 2012, but neither their ideas nor their bullets could win.We survived. And since that day, our voices have grown louder and louder.I tell my story, not because it is unique, but because it is not. It is the story of many girls.

Today, I tell their stories too. I have brought with me some of my sisters from Pakistan, from Nigeria and from Syria, who share this story: My brave sisters Shazia and Kainat who were also shot that day on our school bus. But they have not stopped learning. And my brave sister Kainat Soomro who went through severe abuse and extreme violence, even her brother was killed, but she did not succumb.

Also my sisters here, whom I have met during my Malala Fund campaign: my 16-year-old courageous sister, Mezon from Syria, who now lives in Jordan as refugee and goes from tent to tent encouraging girls and boys to learn. And my sister Amina, from the North of Nigeria, where Boko Haram threatens, and stops girls and even kidnaps girls, just for wanting to go to school.

Though I appear as one girl, one person, who is 5 foot 2 inches tall, if you include my high heels. (It means I am 5 foot only) I am not a lone voice, I am not a lone voice, I am many.

I am Malala. But I am also Shazia.

I am Kainat.

I am Kainat Soomro.

I am Mezon.

I am Amina. I am those 66 million girls who are deprived of education. And today I am not raising my voice, it is the voice of those 66 million girls.

Sometimes people like to ask me why should girls go to school, why is it important for them. But I think the more important question is why shouldn't they, why shouldn't they have this right to go to school.

Dear sisters and brothers, today, in half of the world, we see rapid progress and development. However, there are many countries where millions still suffer from the very old problems of war, poverty, and injustice.

We still see conflicts in which innocent people lose their lives and children become orphans. We see many people becoming refugees in Syria, Gaza and Iraq. In Afghanistan, we see families being killed in suicide attacks and bomb blasts.

Many children in Africa do not have access to education because of poverty. And as I said, we still see, we still see girls who have no freedom to go to school in the north of Nigeria.

Many children in countries like Pakistan and India, as Kailash Satyarthi mentioned, many children, especially in India and Pakistan are deprived of their right to education because of social taboos, or they have been forced into child marriage or into child labour.

One of my very good school friends, the same age as me, who had always been a bold and confident girl, dreamed of becoming a doctor. But her dream remained a dream. At the age of 12, she was forced to get married. And then soon she had a son, she had a child when she herself was still a child – only 14. I know that she could have been a very good doctor.

But she couldn't … because she was a girl.

Her story is why I dedicate the Nobel Peace Prize money to the Malala Fund, to help give girls quality education, everywhere, anywhere in the world and to raise their voices. The first place this funding will go to is where my heart is, to build schools in Pakistan—especially in my home of Swat and Shangla.

In my own village, there is still no secondary school for girls. And it is my wish and my commitment, and now my challenge to build one so that my

friends and my sisters can go there to school and get quality education and to get this opportunity to fulfil their dreams.

This is where I will begin, but it is not where I will stop. I will continue this fight until I see every child, every child in school.

Dear brothers and sisters, great people, who brought change, like Martin Luther King and Nelson Mandela, Mother Teresa and Aung San Suu Kyi, once stood here on this stage. I hope the steps that Kailash Satyarthi and I have taken so far and will take on this journey will also bring change – lasting change.

My great hope is that this will be the last time, this will be the last time we must fight for education. Let's solve this once and for all.

We have already taken many steps. Now it is time to take a leap.

It is not time to tell the world leaders to realise how important education is – they already know it – their own children are in good schools. Now it is time to call them to take action for the rest of the world's children.

We ask the world leaders to unite and make education their top priority.

Fifteen years ago, the world leaders decided on a set of global goals, the Millennium Development Goals. In the years that have followed, we have seen some progress. The number of children out of school has been halved, as Kailash Satyarthi said. However, the world focused only on primary education, and progress did not reach everyone.

In year 2015, representatives from all around the world will meet in the United Nations to set the next set of goals, the Sustainable Development Goals. This will set the world's ambition for the next generations.

The world can no longer accept, the world can no longer accept that basic education is enough. Why do leaders accept that for children in developing countries, only basic literacy is sufficient, when their own children do homework in Algebra, Mathematics, Science and Physics?

Leaders must seize this opportunity to guarantee a free, quality, primary and secondary education for every child.

Some will say this is impractical, or too expensive, or too hard. Or maybe even impossible. But it is time the world thinks bigger.

Dear sisters and brothers, the so-called world of adults may understand it, but we children don't. Why is it that countries which we call "strong"

are so powerful in creating wars but are so weak in bringing peace? Why is it that giving guns is so easy but giving books is so hard? Why is it, why is it that making tanks is so easy, but building schools is so hard?

We are living in the modern age and we believe that nothing is impossible. We have reached the moon 45 years ago and maybe will soon land on Mars. Then, in this 21st century, we must be able to give every child quality education.

Dear sisters and brothers, dear fellow children, we must work… not wait. Not just the politicians and the world leaders, we all need to contribute. Me. You. We. It is our duty.

Let us become the first generation to decide to be the last, let us become the first generation that decides to be the last that sees empty classrooms, lost childhoods, and wasted potentials.

Let this be the last time that a girl or a boy spends their childhood in a factory.

Let this be the last time that a girl is forced into early child marriage.

Let this be the last time that a child loses life in war.

Let this be the last time that we see a child out of school.

Let this end with us.

Let's begin this ending … together … today … right here, right now. Let's begin this ending now.

Thank you so much.

Activity 4

Listen to the following speeches and analyse them. While listening to them pick out phrases, words and sentences that you may wish to use while preparing a speech of your own.

1. Sundar Pichai Inspirational Video
https://www.youtube.com/watch?v=m050iy5_2ng

2. BTS speech at the United Nations
https://www.youtube.com/watch?v=oTe4f-bBEKg

Lesson Two

Listening to Poems

Listening to a poem read aloud is both a source of entertainment and learning. Most poems are meant to be read aloud to reveals its rhythmic, melodic, and alliterative qualities.

Listening to authors read their own work brings us very close to the work's tone. Listen to recordings of poems to read along with them. It will help you to tune in with the appropriate rhythm to reveal the meaning of the poem.

Activity 1

1. Listen to the "The Road Not Taken" BY ROBERT FROST read by Dana Gioia and discuss it.

https://www.poetryoutloud.org/competing/listen-to-poems/

Activity 2

Listen to any poem of your choice and practice reading it and present it aloud in your class.

You will find the audio of a variety of poems at Poetry Foundation.org

https://www.poetryfoundation.org/poems/browse#page=1&sort_by=recently_added&filter_poetry_audio=1

Making Short Speeches

Welcome Speech

A Welcome speech signals the commencement of any event or occasion that requires a formal opening. A meeting, a conference, a workshop, or a celebration could be officially opened with a welcome speech. Being the first item in a programme, the welcome speech has to be planned with extra care as it sets the tone of the day's proceedings.

How will you structure a welcome speech? Here is the sequence that you should adopt:

1. Greet everybody
2. Acknowledge and welcome important guests
3. Welcome all the guests, mention the name of the event/occasion and its host and thank them for being there
4. Present a brief introduction of the host - the institution, the organization, the founder
5. Introduce the occasion
6. Introduce the Chief guest
7. Conclude with a remark that makes everybody feel comfortable and look forward to what is in store.

A few tips that you could follow while preparing a welcome speech:

1. Brevity: Keep it short! A welcome speech should not be long. It is recommended that one does not speak for more than three minutes.
2. Prepare a list of names and designations of people who have to be welcomed. Make a list of groups of people who have to be thanked and welcomed.
3. Practise pronouncing the names of guests, organisations and places that you not familiar with.
4. Introduce the event and highlight its significance both for the organisers and those who are participating.
5. Introduce the chief guest and special invitees.
6. Thank the organisers, sponsors and others and welcome all.
7. Avoid redundancy like , "one and all present here", "on my own behalf",

8. Do not use too many adjectives, for example, " it is a great privilege to have amidst us the super star of the ceremony, the shining and dazzling and ever bright Mr Manimaran".

Expressions for Welcoming:

- a warm welcome…
- hearty welcome…
- cordial welcome…
- delighted to welcome…

We are honored to have… *We are honoured with the presence of .... A long pending desire has been fulfilled today with the presence of Mr. ..... in our midst, I welcome you, sir*

Vote of Thanks

A "vote of thanks" speech is a concluding speech at an event. It is proposed by the host to thank all the people who helped to organise the event, the guests and people who have participated. Generally, it is a speech made to express gratitude. However, one could express very briefly a few concluding remarks about the event's proceedings. Remember this is probably the last item of the event so keep it short and sweet.

Structure of a Vote of Thanks

1. Greet everybody
2. Briefly talk about the successful completion of the event
3. Thank the important guests and speakers
4. Thank the hosts of the event/occasion
5. Thank all the members who helped organize the event – the team behind the scenes
6. Thank the sponsors
7. Thank all the participants
8. Include any concluding remark

Some useful Expressions for Vote of Thanks

On behalf of the college, I thank…

I extend my heartfelt thanks to…

Our gratitude is due to…

I cannot thank everyone enough…

I specifically thank….

We are grateful to…

Making Short Speeches: Informal Occasions

Speeches grace occasions, whether they are formal or informal. Informal occasions are like birthday parties, wedding anniversaries, farewell parties (at the college or workplace), to name a few.

Sample Speeches

1. Birthday Felicitations

On this happy occasion of the celebration of the 40th birthday of our dear friend Sudhir, I have been asked to say a few words. First of all, let me congratulate Sudhir on maintaining his youthful appearance after completing four decades. Birthdays are also occasions for thanksgiving. We thank God for Sudhir who is a gift to his parents, his wife and friends.

As, Sudhir's friend, I would like to share a few words about his unique personality. I have the privilege of knowing him for 35 years. Our association goes back to 1st standard at the Government school at Dindivanum. We lived in the same village and went to the same school. Sudhir's parents. Thiru and Tmt. Soundirarajan have earned the respect of the entire village because they brought up their son very well.

Rarely can you find people who have studied together from class 1 to graduation. But Sudhir and I have that rare privilege. It is a big challenge to encapsulate 35 years of friendship in three minutes. Nor do I wish to dampen the celebratory spirit of this occasion with a long speech. But, as I said earlier, I would like to say a few words as thanksgiving, both to God and the wonderful people in Sudhir's life.

Sudhir and I come from a humble background. But today, we are holding good positions, thanks to the gift of education which both of us valued. We were study partners, always doing each day's homework together, when we were children. We prepared together for the engineering entrance exams and both of us got through. Sudhir opted for architecture (B.Arch), and I for Mechanical engineering. Sudhir's artistic talent led him in this direction. He is gifted with spatial perception – both outdoors and indoors - which

has made him the celebrated landscape artist, architect and interior designer that he is.

He has been blessed with a wife who shares his interest in design, only with this difference, that she is a fashion designer. The common denominator for Sudhir and his wife Anu is creativity. They are an ideal couple.

I am so grateful that Sudhir's parents, Thiru.and Tmt. Soundirarajan understood his talents and guided him in the right path. They made many sacrifices to help their son realise his dreams. Today, at 40, he is a fulfilled man.

I wish Sudhir Many Happy Returns of the Day!

Let's give Sudhir a big hand !

(Applause)

What are the points to be kept in mind while making an informal speech?

- Mention the occasion
- Mention your association/connection with those who have asked you to speak
- If it is a felicitation of an individual, mention the good qualities of the person.
- Conclude with greetings and wishes pertinent to the occasion (birthday, farewell on promotion or retirement and so on)

Activity 1: Speaking

Prepare a two-minute welcome address for the following formal events and present it.

1. Sports Day
2. Independence day Celebrations
3. A workshop organised by your department
4. Teacher's day celebrations
5. An intercollegiate competition
6. A guest lecture in your department
7. An award giving ceremony in an international event

Activity 2: Speaking

Prepare a two-minute speech to be given on the following informal occasions

1. The 25th Wedding Anniversary of a relation
2. To your juniors at a Farewell organised by them.

3. At the retirement function of a friend.

NB: The above "speaking" activities could also be given as written work.

READING AND WRITING

Writing Opinion Pieces

The ability to articulate your opinion is one of the skills required of social and professional life. One cannot make rash or baseless statements. The ability to articulate one's opinion with clarity of thought and good diction is one of the marks of an educated mind: writing which is based on one's power of observation and analytical thinking is very powerful. This unit on writing opinion pieces will teach you to express yourself on any subject of your choice like travel, food, films and books.

What do you mean by opinion? An opinion is considered

- A thought or a feeling about someone or something.
- A judgement made about something or someone.
- A view or a point of view…
- A belief or a value

You might recall that in Semester 1, you had a lesson on Diary Writing. The points emphasised in that lesson were that you could maintain a journal (diary) and express your thoughts and feelings about events that occurred in your day. Diary writing gives you an opportunity to describe events of the day or write your reflections on them.

Writing opinion pieces builds on the practice you have with diary writing. However, writing an opinion piece, while having a strong personal orientation, is writing that comes from a reflective and well-informed mind.

You might have come across the Op-Ed section of a newspaper. Do you know what Op-Ed stands for? Op-Ed is the short form of "opposite the editorial." The Cambridge English dictionary defines Op-Ed as "a piece of

writing that expresses a personal opinion and is usually printed in a newspaper opposite the page on which the editorial is printed"

Today the term is used more widely to allude to a column that represents the opinion of a writer on an issue of relevance, which could range from lifestyle (like interest in travel, cuisine, fitness) to more serious writings expressing opinions on social trends and politics.

What are some of the distinguishing characteristics of an opinion piece?

- It is short – not more than 750 words (this is short when compared to the lengthy editorials in newspapers)
- It has a clearly defined point of view and is characterised by "clarity" in thinking.
- The topic is usually stated in the first paragraph
- It is well/adequately researched. Even though it expresses a personal standpoint, the writer does adequate background study to substantiate his/her point of view. The research might involve fieldwork – going to the scene, interviewing people and such work or, using library and reliable internet resources. Though it is an opinion piece, the writer has the obligation to write responsibly.
- An opinion piece carries the "voice" of the writer. "Voice" here refers to the writer's beliefs and convictions. It also refers to the style of writing, which could be descriptive, humorous, or informative, among other possibilities.

Sample Opinion Piece

Child Health: A Nation's Priority

Our country is home to the largest child population in the world. A substantial 41 per cent, around 450 million, are children. However, only 4 percent of the GDP is spent on their education, health and protection. Children should be recognised as a priority and the necessary budgetary allocations should be made.

It was observed that of the patients visiting government hospitals, 70 per cent were child labourers. These children are constantly exposed to

smoke, dust, noxious gases, chemicals and high temperatures. As a result the lungs, eyes, and other vital organs of children are affected. The moral responsibility for the plight of these children rests with manufacturers who exploit them as inexpensive labour. If exploitation of this kind continues, we will be left with a great national liability. The working children of today are virtually the liabilities of tomorrow. A large portion of the government's budgetary allocation will have to be accorded for health care and reparations in the foreseeable future. This will have a crippling effect on the development agenda. Such oversight should be condemned strongly by all opinion holders.

The statistics in relation to children is alarming. The health indicators of children in India are among the worst in the world with only 65.3 per cent of the under-five children fully immunised. Eighty per cent of the children under three years of age are anaemic and every 3 out of 5 children are malnourished. Over nine lakh children in India die before their first birthday.

Data also suggest that India accounts for nearly 50 per cent of child brides in the world who are married before the age of 15 — threatening their personal well-being, development and, most often, their fundamental rights to health, education and freedom. What's more, the air quality in northern India has reached an alarming stage. There is a strong link between pollution and children's cognitive function. Early exposure to toxic air has lifelong consequences for them.

The Ministry of Health needs to work in collaboration with the Ministry of Women and Child Development, Labour, Education, and other agents involved with children if they have to be effective in achieving child health.

(Adapted from Op-Ed article Healthy Children Build Healthy Nations (Kailash Satyarthi https://www.thehindu.com/sci-tech/health/Healthy-children-build-healthy-nations/article16668437.ece)

Read the following Op-Ed articles

1. The Book in My Hand (by Ramachandra Guha). https://www.thehindu.com/books/The-book-in-my-hand/article16443755.ece
2. Coordinates of Safety. (https://www.thehindu.com/opinion/op-ed/Coordinates-of-safety/article16643102.ece)

Write opinion pieces on the topics given below

1. Organic farming
2. Fitness Culture
3. "Reading Maketh a Full Man": The Benefits of Cultivating the habit of Reading
4. Extravagant Indian Weddings: A Waste of Money
5. Peer Pressure: A Major Distraction for Youth.

Reading Poetry

Reading poetry is certainly a different experience from reading a simple story. What makes poetry? Poetry normally employs linguistic devices like rhetorical questioning, figures of speech like simile, metaphor, and personification. Sometimes poetry can be understood at the first reading but in many cases the reader has to read deeper and also know the meanings of words which are not obvious. A seemingly simple poem may not be that simple.

Harlem
By Langston Hughes

What happens to a dream deferred?

Does it dry up

like a raisin in the sun?

Or fester like a sore—

And then run?

Does it stink like rotten meat?

Or crust and sugar over—

like a syrupy sweet?

Maybe it just sags

like a heavy load.

Or does it explode?

(https://www.poetryfoundation.org/poems/46548/harlem, accessed on 13.12.20)

This poem looks very simple yet it is not. Let the readers read the poem aloud.

The key word is "deferred," and let the students look up the dictionary and try to make sense of the poem.

Task 1

Making the student find meaning of key words and help them explore the meaning themselves.

Task 2

Reading poetry.

The first line is a question and all the other lines also are questions except for the last line.

The questions are always read with a rising intonation. So this poem with its many questions gives ample scope to practise how to read.

Task 3

Learning the figures of speech.

Simile is an explicit comparison with words "like," "as," and so on.

Metaphor

A comparison that is made literally, either by a verb (for example, John Keats' "Beauty is truth, truth beauty" from his "Ode on a Grecian Urn") or, less obviously, by a combination of adjective and noun, noun and verb, etc. (for example, Shakespeare's sonnet on the "the marriage of true minds"), but in any case without pointing out a similarity by using words such as "as," "like," or "than." (https://rpo.library.utoronto.ca/glossary#letter_m accessed on 14.12.20)

Points of Discussion

Here the key term is "dream deferred,"

1. What are the similes present to portray the dream deferred?

   Example : What dries up like the raisin in the sun?

   The phrase "like a raisin in the sun" is a simile.

2. Is there a rhyme scheme in the poem?

3. How many similes are there?

4. Why is the phrase, "*or does it explode,"* italicized by the poet?

Task 4

The students can see the meaning of the title of the poem, "Harlem." It is a proper noun, name of a place. If students stop with this they will not learn about the historical background.

The implication of the place Harlem has to be probed. Harlem was the cultural centre and refuge for African Americans who were discriminated against. Langston Hughes was an African American poet who lived during dark times for African Americans, whose dreams were not allowed to see the light of day. The final comparison he uses in the poem is like that of a big sand bag that sags him down. So when you are reading poetry explore the deeper meanings that are evident in the presented text.

WORD POWER: IDIOMS AND PHRASES

In the sentences given below, some phrases are underlined. What do you think these phrases mean? Try to guess the meaning from the context.

1. Susanna was <u>on cloud nine</u> when she found that she had won the scholarship.
2. When his father asked Dennis who ate the cookies, Dennis <u>spilled the beans</u> and said that his brother had done it.
3. It is <u>raining cats and dogs</u> outside; the roads are completely waterlogged.
4. My sister is so busy that I get to see her only <u>once in a blue moon</u>.
5. Shanta was the <u>apple of her</u> grandmother's <u>eye</u>; the elderly woman would do anything the little girl wanted.

In each case, the literal meanings of the phrases is not the correct one. Susanna obviously did not climb up to cloud number nine and Dennis did not take a packet of beans and spill them. The underlined phrases are idioms.

An idiom is a phrase or a group of words that has only a metaphorical or figurative meaning. The meanings of these groups of words have become an accepted part of language. For example, 'on cloud nine' means to be very happy, 'to spill the beans' is to reveal something before it is supposed to be revealed, to 'rain cats and dogs' means to rain very heavily etc. Almost every language has idioms.

Why do we use idioms? For a number of reasons.

Using idioms makes our writing interesting and vibrant. 'I see my sister once in a blue moon' reads better than 'I see my sister very rarely'; using the idiom makes it clear just how rarely I see my sister.

Also, using idioms makes our writing nearly always less formal and more sophisticated. Saying that Shanta was the apple of her grandmother's eye is a more sophisticated and personal way of saying that Shanta's grandmother adored her.

Where can we find idioms? There are a number of dictionaries of idioms such as the Oxford Dictionary of English Idioms. www.theidioms.com and www.idioms.online have a large collection of idioms. We can use any of these, or any other online or physical resource that we have access to in order to find the meanings of idioms.

Very often, we get confused between an idiom and a proverb. The major difference between an idiom and a proverb is that a proverb gives advice, while an idiom does not. Grammatically, proverbs are often complete sentences, whereas idioms are most often phrases that need to be included within a sentence (of course, there are idioms that can function as complete sentences too – like "curiosity killed the cat". But, "Honesty is the best policy" is a proverb: it is a complete sentence and gives useful advice. "Once in a blue moon" is an idiom – it is a phrase and does not give any kind of advice.

Activity 1

Guess the meaning of the underlined idioms from the context. After that, check an online or physical resource to see if your guess was correct.

1. Winning the competition was a piece of cake for Rahul – he made it seem so effortless.
2. Tanya's parents never had a problem with cleanliness; her room was always in apple-pie order.
3. Our quiz team was on a roll that day; we hardly got a question wrong.
4. In order to finish studying all the portions for the exam, we had to burn the midnight oil.
5. Sanaaya is as good a singer as her mother – she is a chip off the old block.

Activity 2

Each of the following pictures represents an idiom. Identify the idiom and then find out its meaning. The, use the idiom in a sentence. The first one is done for you. Unless otherwise attributed, the pictures have been sourced from creative commons licenses.

1.

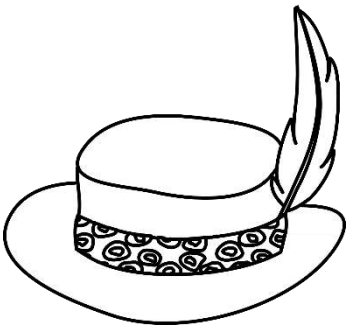
Not my cup of tea.

The idiom refers to something the speaker does not like.

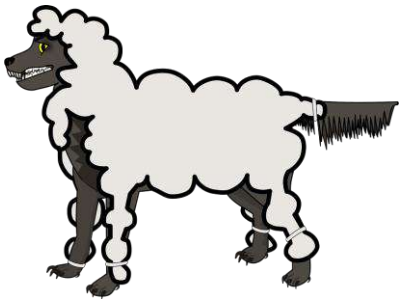
Sitcoms are not my cup of tea; I'd rather watch detective shows.

2.

3. 

4. 

5. 

6. 

7. 

(Picture source: https://tidusminolists.wordpress.com/2018/12/17/etymology-bury-the-hatchet-the-meaning-and-origin-of-phrase/)

8. 

9. 

10.

Activity 3

In each of the following sentences, replace the underlined phrases with a suitable idiom. Choose the idiom from the list given at the end.

1. She has been having a difficult time with her health; <u>be a little lenient with her</u>.
2. The family did not know what to do when the ship carrying their cargo went missing; <u>it was completely unexpected and they were not at all prepared for it</u>.
3. Sarayu's fever has subsided and her body pain has also vanished. She is <u>perfectly fine</u> now.
4. We can't always blame only the person who takes bribes; the one who gives is also responsible. <u>The blame lies on both sides</u>.
5. My mother who is a workaholic keeps telling me to take breaks; <u>she is criticizing me when she is just as bad as me</u>.
6. I have to speak at a Conference on New Methods of Teaching English. I want to prepare well for it. I don't want to <u>tell them what they already know</u>.
7. Let us not worry about problems before they have happened; we will <u>deal with them when we face them</u>.
8. There are so many Swaminathans in our College. <u>Finding out</u> the address of <u>one</u> student named Swaminathan <u>from among all others</u> is going to be a very difficult task.
9. That session influenced him so much that he has <u>completely reformed</u>.
10. When the teacher asked Sharad if he had copied, he <u>did not give her a straight answer; he kept avoiding the question</u>.

cross the bridge when we come to it	turned over a new leaf	it takes two to tango
chip off the old block	carry coal to Newcastle	fit as a fiddle
cut her some slack	bolt from the blue	beat around the bush
looking for a needle in a haystack	pot calling the kettle black	

GRAMMAR IN CONTEXT

CONJUNCTIONS

Listen to the following conversation between a mother and her children:

Mom: Its getting late. Vicky, will you have Dosai for breakfast?

Vicky: Yes ma.

Mom: What about you Raji?

Raji: Even I will have Dosai ma.

Mom: Rinku, where are you.... is dosai okay for you?

Rinku: Hmm...

Mom: Quick, tell me, dosai or bread and butter?

Rinku: Bread and butter ma.

Mom: So Vicky and Raji will have dosai. I'll make it ready after I prepare bread and butter for Rinku.

In the above conversation we find that

1. Rinku wants to have 'bread and butter'.
2. Vicky and Raji want to have dosai.
3. The mother asks Rinku if she wants dosai or bread and butter.

Look at the first sentence.

Rinku wants to have 'bread and butter'.

The word 'and' is used to join the words 'bread' and 'butter'.

Take a look at the second sentence.

Vicky and Raji want to have dosai.

Again in this sentence the word 'and' is used.

What idea does the sentence express? The sentence expresses two ideas:

Vicky wants to have dosai.

Raji wants to have dosai.

The ideas of the above two sentences are related. The sentences seem repetitive. Hence the word 'and' is used to join these two sentences. and the same idea is expressed in a single sentence.

This makes the sentence compact.

Look at the third sentence.

The mother asks Rinku if she wants dosai or bread and butter.

Here the word 'or' is used to express and join the two choices.

The words 'and' and 'or' are joining words or conjunctions. They make sentences more direct while retaining the meaning.

Conjunctions are words that join words, groups of words, or sentences.

Some commonly used conjunctions are

and	yet	
or	when	
but	though	although
because	unless	while
after	since	
before		

CLASSES OF CONJUNCTIONS

Conjunctions are divided into two classes: Co-ordinating and Subordinating

A Co-ordinating Conjunction joins together clauses of equal rank or importance.

What is a clause?

A clause has a subject and a verb. Look at the group of words in italics in the following sentences:

1. He can't succeed *without hard work*.
2. He can't succeed *unless he works hard*.

In the first sentence look at the group of words, 'without hard work". It does not make complete sense. It does not contain a finite verb. It has no subject and predicate of its own. Hence it is a phrase.

Hence a Phrase is a group of words that is used as a single part of speech and does not contain a Subject and Predicate of its own.

In the second sentence the group of words, 'unless he works hard', contains a subject (he) and a predicate (works hard). A group of words which forms part of a sentence, and contains a Subject and a Predicate of its own, is called a Clause.

The chief Co-ordinating Conjunctions are

And, but, or, for, nor, either.... or, neither.....nor

The conjunction 'and' is used to join words and sentences that have related or similar ideas.

It means the same, similar or equal; without contrast
For example

1. It's cold and windy today.
2. He put on his cap and went out. .
3. Raji and Mahesh are neighbours.

The conjunctions 'but' is used to join words and sentences that have opposite ideas.

1. He wants to watch the film but he has to complete his project.
2. She read the mail but she did not reply.

The conjunction 'but' is also used to express something that is unexpected and to express the idea of difference.

1. They played well but they lost the match.
2. Sindhu is right-handed but her brother is left-handed.

In the first sentence the idea that they would lose the match is unexpected because they played well. The conjunction 'but' makes this clear.

In the second sentence the conjunction 'but' expresses the idea of difference.

Conjunction 'or' is used to join words and sentences in order to show choice. It is used before an alternative.

1. Would you have coffe or tea?
2. Shall we go out or shall we stay at home?

When conjunction joins a group of three or more items (words, phrases or clauses), it is usually placed before the last member of the group.

1. He boarded the bus, got the ticket and took a seat.
2. What would you like to have? Coffee, tea or fruit juice?

Some Conjunctions are used in pairs.

Either ---- or Neither ----- nor Both ------- and Not only ------ but also whether ----- or

Conjunctions which are thus used in pairs are called Coorelative Conjunctions or Correlatives.

When conjunctions are used as correlatives, each of the correlated words should be placed immediately nefore the words to be connected.

He visited not only Delhi, but also Mumbai. --- Correct

He not only visistd Delhi, but also Mumbai ----- Incorrect

either ..... or Either-- Raju or Peter will take you home.

neither ..... nor --- He was neither smart nor hard-working.

SUBORDINATING CONJUNCTIONS

Subordinating conjunctions are used to combine a main clause and a subordinate clause. A Subordinating conjunction joins a clause to another on which it depends for its full meaning. It begins a subordinate clause and connects it to an independent clause.

The crop failed because there was no rain.

Main clause Subordinating clause

The word 'because' is used as the subordinating conjunction. It combines the main clause with the subordinating clause.

The sentence contains two clauses one of which, 'because there was no rain', is *dependent* on the other. Hence the Conjunction introducing the *dependent* or *subordinate* clause is called a Subordinating Conjunction.

Notice how the subordinating conjunctions are different from co-ordinating conjunctions.

The subordinate conjunctions are part of the subordinate clauses they introduce. But the co-ordinate conjunctions are not part of either of the clauses they join together.

For example,

1. She was angry /but/ she listened quietly.

main clause 1 main clause 2

.2. Although she was angry, /she listened quietly.

subordinate clause main clause

The chief Subordinating Conjunctions are :

After	before	because	if
though	although	till	that
unless	as	when	where
while			

Subordinating Conjunctions may be classified according to their meaning, as follows:-

Time, Cause or Reason, Purpose, Result or Consequence, Condition, Concession and Comparison

Time

before --- Come home before it gets dark.

till ---- We shall wait till she gets the key.

after -- She entered the class after the attendance was taken.

when -- *You may join us when you are ready.*

Cause or Reason

Since -- Since there was power shutdown, we didn't complete the work.

As --- As he was in a hurry, he took an auto.

because -- She did not go to college, because she was not feeling well.

Purpose

that, so that, in order that

that --- We work hard that we may succeed in life.

so that --- Iwill send the documents by speed post so that you will get it tomorrow.

that .....

in order that -- The pamphlet was given in order that all might know the usage rules.

Result or Consequence

so .... that --- He is so weak that he cannot move about.

such .... that -- It is such a good movie that you can watch more than once.

Condition

if -- If you will fill in these columns, I can sign the form.

unless-- Do not answer unless you are sure.

Concession

though --- She listened to me patiently though he was angry.

although--- Although they played the match well, they did not win.

Comparison

than ---- He works harder than his brother does.

EXERCISE 1: Fill in the blanks with suitble conjuctions -- and, or, but, although, till, beccause, though

1.Prem called out to her to stop, _____ she continued walking. but

2. How does the fruit taste? sweet _____ sour? or

3. Is Rani playing _____ studying? or

4. John _____ David went to the library yesterday. and

5. I lost the prize _____ I tried my best

6. Can you buy for me pens, pencils _____ notebooks?and

7. *They reached late _____their train was delayed.*

8.He played well _____ scored two goals.

9. _____he was poor he came forward to help the poor.

10. Will you wait _____ I return?

EXERCISE 1:

Combine the sentences using conjunctions given in brackets:

1. You will pass. Work hard. (if)
2. I will call you. I finish my work. (when)
3 He will buy a bike. He will buy a car. (either...or)
4 He will cook. He will wash clothes. (neither ..... nor).
5 Sheela is a good singer. she is also a good dancer.(not only ....but also)
6 He waited. The train arrived. (till)
7 You will be late. You hurry. (unless)
8 It was dark. I couldn' t find my bag. (so....that)
9.He sold the car. He was in need of money. (because)

9. He ran fast. He missed the train. (though)

10 *Go to the port. You can visit the light house. (if)*

THE INTERJECTION

Listen to the conversation between two friends Dinesh and Sam. Dinesh has come from abroad and is meeting Sam after many years. First read through the conversation 'A' and then the conversation 'B'.

A	B
Dinesh: Sam, how are you? Sam: Is this Dinesh? Dinesh: Yes. Sam: When did you come back from abroad? Dinesh: Last week [Dinesh looks at a painting] Dinesh: This is a nice painting.	Dinesh: *Hi* ! How are you Sam? Sam: *Hey*, Isn't this Dinesh? Dinesh: Yeah, its me ... Sam: How nice, when did you come back from abroad. Dinesh: Just last week [Dinesh looks at a painting] Dinesh: *Wow* ! what a beautiful paining.

Which conversation does express the feeling of surprise?
It is conversation B
Look at the words that are in italics. Such words s Hi! Hey, Wow! etc., are called Interjections.
Interjections is a part of speech used to express sudden emotions like happiness, surprise, grief and sympathy.

An Interjection is not grammatically related to the other words in a sentence. An interjection is set off from the rest of the sentence by an exclamation mark or a comma. An exclamation mark indicates strong emotion. A comma indicates mild emotion.

An Interjection is a word which expresses some sudden feeling or emotion.

Here is a list of a few Interjections in use:

Hi	Hurrah		Alas	Hush
Ah	Hey	Well	Wow	

Oh Ouch Gosh

Examples:

Hello ! What are you doing there?
Ah ! Have they gone?
Oh ! I got a fright.
Ouch! That hurts!
Well, I think that is my argument.

Here is a list of Interjections and what they express----

Hurrah ! huzza ! -- Joy
Aah ! --- Call for help / when scared
Ahh! ---- Realization / acceptance
Uh --- Indicates a pause / need for more time
bravo ! --- Approval
Er --- Not knowing what to say
Hmm --- Thinking / hesitating about something
Hmph ---- Indicate displeasure
ha ! what ! --- Surprise
Eww --- Dislike or disgust
Oops --- When do something by mistake
alas ! --- Grief
Shh ---- An indication for silence
Whew --- Amazement and/or relief
Wow --- Surprise or admiration
Yeah --- strong affirmation or approval

Certain groups of words are also used to express some sudden feeling or emotion:

Ah me! ------ Ah me, wheres shall I go?
For shame! --- For shame, leave that poor ma alone.
Well done! ---- Well done! You have done a good job.

Activity 1:
Fill in the blanks with suitable interjections:
1. _____ We have won!
2. _____, Mithun! How are you?
3. _____ He is dead.
4. _____ Now I understand!
5. _____ That's really a great news!
6. _____ That's the winning goal!
7. _____ The baby is sleeping.

8. _____ We've lost the battle.
9. _____ my young friends, play the game.
10. _____ that feels wonderful.

Actvity 2:
Write two sentences each using interjections to express
1. Surprise
2. Joy
3. Attention
4. Grief
5. Silence
6. Dislike
7. Think about something
8. Do something by mistake
9 Admiration
10.Strong affirmation

Unit III

(18 hours)

1. Listening and Speaking
    a. Listening to TED talks
    b. Making short Formal presentation with PPT
    c. Interactions during and after the presentations
2. Reading and writing
    a. Writing emails of complaint
    b. Reading aloud famous speeches
    c. Reading longer fictional / non-fictional pieces in which all the reading skills can be brought into play
    d. Preparing outlines for short assignments
3. Word Power
    a. One Word Substitution
4. Grammar in Context

Sentence Patterns

LISTENING AND SPEAKING

a. Listening to TED Talks:

TED talks can be found on YouTube. They are on a wide range of subjects ranging from science to art and sport. TED Conferences LLC is an American media organization which was only a conference. However it broadened its perspective to include talks on many scientific, cultural, political, humanitarian and academic topics. TED Talks carries the slogan, "Ideas Worth Spreading". The most unique thing about TED talks it that they are not only informative, they are also highly motivational. Listening to a TED talk infuses you with positive energy and positive thinking. In short, you are 'inspired'!

Activity:

Watch the following ideas and listening carefully to understand how the information is properly arranged and shared:

1. The Rise of Cricket, The Rise of India by Harsha Bhogle https://www.youtube.com/watch?v=LbIXYEW9CSQ
2. A Well-Educated Mind Versus a Well-Formed Mind by Sashi Tharoor. https://www.youtube.com/watch?v=kcW4ABcY3zI
3. Your Body Language May Shape Who You Are by Amy Cuddly

Exercise:

1. Note how the speakers begin and end the TED talks
2. Go through the following beginning and ending phrases of TED talks and prepare a ted-talk on the topic of your interest using the following beginning and ending phrases:

A few opening phrases/sentences used in Ted Talks

- I want to interact with you about why we need to work harder to achieve today.…
- Few weeks back I saw something that I thought I would never tell anyone but I feel obliged to discuss it here…
- You will have a chance to add a few months of life span as you watch this talk…
- When I was in the boy scouts, I got a chance to meet a rare and exquisite creature…
- Albert Einstein said that ….
- Do you think it is possible to overcome procrastination just by blindly working…
- Imagine yourself ten years from now…

Closing phrases/sentences

- …this is how I made it possible and I call upon your action as a part of the successful contribution.
- …now this is the big picture the world and I have been discussing all along
- … I call for your questions

- … let me up sum up
- …Recognize and understand these things as early as possible to avoid them and to live a peaceful life. Thank you.
- … all you need is to recall these few minutes everyday and say them to yourself

b. Making Short Formal Presentations with PPT:

What is a Presentation?

Presentation is a formal communication that uses both verbal and non-verbal language. There are various forms of oral presentation and they have different functions to perform. Usually short presentations are given within 15-20 minutes duration in academic and professional environment where a subject expert generally delivers the presentation to give information about the chosen topic.

Tips to make a good presentation:

- Have a definite purpose of the presentation
- Prepare the content of the presentation well in advance
- Know your audience well
- Change the content and style of the presentation
- Collect adequate information and assimilate

A successful presentation lies in the efficient use of textual content, verbal content and visual content. The preparation of the textual content is the first step in the preparation of presentation. The textual content refers to the verbal content. To prepare the verbal content 5Ws and 1H formula is the best method. The 5Ws are

- What – the main idea that you are likely to present
- Why – the purpose of the presentation
- Whom – age and socio-cultural environment of the audience
- When - the time of your presentation
- Where – the venue of the presentation

- How - involvement of verbal and visual contents

Exercise:

Prepare the verbal and visual content for short presentations on the following topic:

a. Pro and Cons of modern media culture

b. How to learn second language in an easy way?

c. What is feminism in the modern era?

d. How does 80s parenting differ from current parenting

e. Green Campus is the need of the Hour

f. Evolution of lifestyle in the Internet era

g. How to clean a house : Smart way

Common Barriers for Effective Presentation:

- Inadequate presentation
- Poor organization of the content
- Improper time management
- Length of the presentation
- Lack of practice
- Inadequate and inefficient use of visual aids

are the common barriers for the effective presentation. Overcome these barriers to make an effective presentation.

Activity:

1. Make small presentation on the following topic to identity the problems that they encounter during the presentation like stage fright, inability to coordinate the verbal and visual content.

How to start a presentation?

A beginning of the presentation is as important as the content preparation of the presentation.

- Soon after the greetings, make sure to establish the relevance and importance of the topic in contemporary context.
    a. In the current scenario…,
    b. It's high time to think the importance of …
- You may begin the presentation with the anecdote.

  All the world's a stage, said Shakespeare in his *As you like it.* Today I am going to talk about the role of integrity and consistency in making a human being in this digital era…..
- You may begin with telling a story relevant to the topic
    a. During 1960s in India…
    b. In the mid of 18th Century India had ….
- You may also quote an article that you read yesterday/couple of weeks age/ a month earlier etc
        a. In an article that I read in *The Hindu* yesterday…
        b. In a conference that I attended last year on ….
        c. When the India was struck by Tsunami in December 2004…..
- Make use of quotations for beginning a speech:
    a. If Winter comes, can Spring be far behind? Said Shelley once. Now we are here to talk about the importance of positive thinking

Tips to prepare an effective Power Point Presentation (PPT):

Do's:

- Use proper font that is easier to read on the screen
- Check the spelling
- Include info-graphics that is easy to understand

- Include key point alone to highlight
- Let the slip be simple and elegant

Have a look at the following slide for preparing effective PPT

https://lacstraining.wordpress.com/2012/04/26/presentations-tips-for-effective-powerpoint-design/

Don'ts:

- Don't underline and add hypertexts for short presentations
- Don't use smaller size smaller than 24
- Avoid graphic background
- Don't use animation

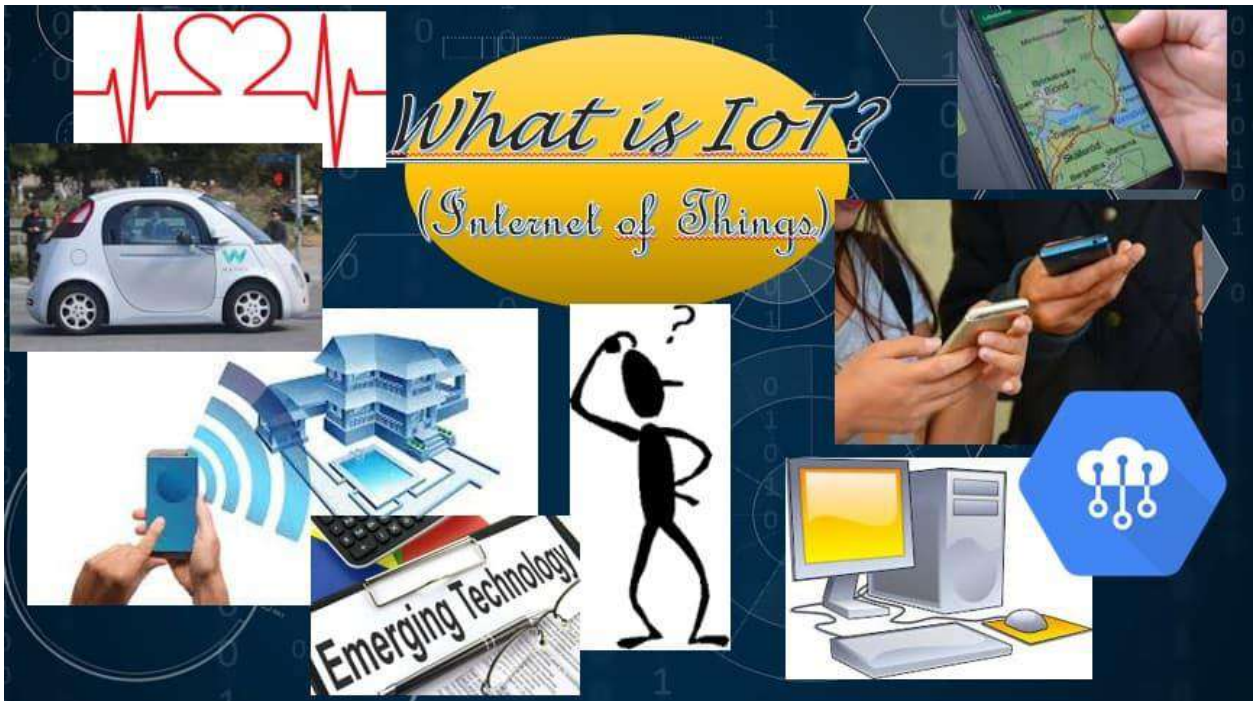
For instance, have a look at the following slides:

How to make a Good First Impression

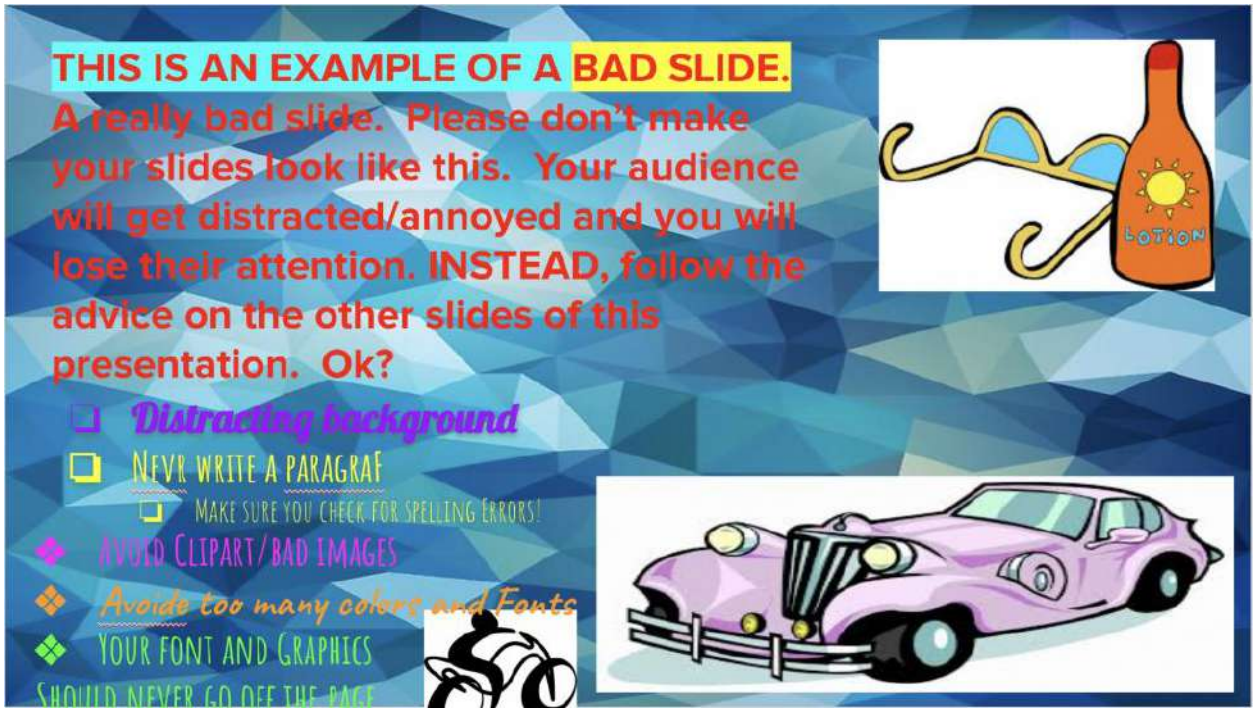
Making a first good impression can be vital when looking for a new job. Whether we like it or not, people do judge a book by their cover. The first few seconds with someone can be critical to your career.

- Be on time. The person you are just meeting is probably not interested in your excuses, even if it is the first time you are late in your whole life. All they are going to know is that you are not keeping up with a previous agreement. The image you are leaving behind is of someone that is not reliable. Make an extra effort and make sure to arrive on time. Too early is always better than too late.
- Be prepared. Before going to your interview you should have done your research about the company, the position you're applying for, and so on. Think about what kind of questions you could be asked, and how you would answer them. In one word, practice!
- Take care of your clothes and your overall grooming. It has been said that 55% can be determined by the person's appearance. So be careful when choosing how to present yourself in an interview. Dress to impress, maintaining in mind the job you are applying to, and when in doubt, choose the most conservative choice.
- Take into consideration non-verbal communication. You might bee feeling nervous, but studies have shown that people who present themselves in a more friendly, confident manner usually have better results. Something as simple as a smile can make a difference.

https://interactive.america.gov/webchat-tips/



https://24slides.com/presentbetter/bad-powerpoint-examples-you-should-avoid/



https://interactive.america.gov/webchat-tips/

https://www.emaze.com/2020/08/22/6-worst-presentation-slides-ever/

There is a common enemy for presentation. That is “Stage Fright”.

There are few signs that will confirm the presence of stage fright in an individual. They are:

- Shaking legs
- lack of focus
- negative thoughts about a performance
- “butterflies” in the stomach
- shaky voice
- dry mouth
- sweaty hands
- racing heart
- hyperventilation
- muscle tension
- fidgeting

How to overcome the stage fright?

- The first step to overcome the problem is to accept that you have stage fright.
- Practice more: Adequate amount of practice will increase self-confidence. Practice in front of your friends, family members and mirror.
- Reach the venue well in advance and make yourself familiar with the stage and audience.
- Take a deep breath if you feel anxiety
- Above all the best way is to IGNORE the symptoms and focus more on the content of the presentation.

Activity:

Watch the following videos:

Academic skills – presenting effectively

https://www.youtube.com/watch?v=qFLL-XB56UU

Problem – Solution Presentation

https://www.youtube.com/watch?v=rtljk2C_laQ

Designing effective scientific presentations

https://www.youtube.com/watch?v=Hp7Id3Yb9XQ

Techniques of Delivering the Speech:

Techniques of delivering a presentation is similar to methods of making the effective speaking. A brief revisiting of the same is presented here:

- Maintain a relaxed upright posture
- Don't rush through the presentation. Pace your presentation with pauses in reasonably regular intervals.
- Make sure of your pronunciation and enunciation
- Avoid high pitched voice
- Ensure the pronouncing of the last syllable of every word.
- Avoid monotony of the voice
- Follow interactive method
- Read the mind of the audience through their body language
- Strictly avoid reading from the slide but explain the main points covered in the slide
- Finally presence of mind and natural humour will add spice to your presentation.

C. Interactions during and after Presentation:

As effective presentations require sufficient skill, even interacting during and after presentation require adequate skill and awareness. Both the presenters and the listeners are expected to interact during and after presentation.

As a presenter, you may interact with the audience during the beginning of the presentation to build a rapport with them. For example you make use the following questions to the audience without intimidating them:

- Put your hands up if you are familiar with the incident I just said.
- How would you feel if you stood on the stage?
- What kind of experience did you gain after hearing the presentation?
- Can you recall a memory of yourself ...
- What is the reason for you participate in the presentation?

To make your presentation more lively allow the audience gently to ask questions and answer them firmly with politeness. It is also one of the ways to ensure them that they are valued. While such interactions you may use the following examples:

1. Well, it's great question…
2. Yes, I agree with you. I think I have highlighted the same in slide no: 9…
3. Sure, I will explain…
4. No, though the idea sound noble, it cannot be taken into consideration, because….
5. Great, I think it's time for 5 minutes break…

As listeners, when there a need for clarification on the topic, make sure to inform the presenter that you are in need of clarification by raising you hand. You can also make use of the following phrases:

1. Excuse me, Could you please explain the idea that…..
2. It is an amazing presentation. But I have certain doubts on ….
3. Congratulations for your fantabulous presentation! I have few ideas to complement to discussion…
4. What do you mean by ...
5. It is wonderful venture, but could you please highlight how well your words be relevant after five years of the current presentation?

READING AND WRITING

WRITING EMAILS OF COMPLAINT

How to write an email of complaint:

Following points to be noted:

2. Be precise and concise
3. Use simple and polite language
4. Avoid sarcasm or threatening language
5. Add all references, documents, receipts etc.
6. Be clear about the exact intention of the complaint

Sample Email of Complaint

From: name@service provider

Subject: Complaint

Reference: Details of receipts with date, etc.

To:name@serviceprovider

Body of the email:

Dear Sir/Madam,

I wish to complain about the --------(name of the product or service, with serial number or account number) that I purchased on ------- (date and location of transaction).

The product -------- name, ----------(mention the nature of fault/misfunction)

Kindly respond regarding your plan of action, if a replacement of the -------- (product or service) will be possible. If not, kindly make arrangements for a refund of the payment made towards the purchase.

Copies of the receipt and warranty details are attached for your reference. Please do the needful at the earliest.

Yours sincerely,

Tasks

Write an email of complaint about any two of the following issues:

1. To an electronic accessory company about a faulty printer delivered
2. To a Fibernet service provider regarding an intermittent internet connection
3. To an online clothing company regarding an error in the size of a dress ordered and paid for
4. To a mobile phone company regarding excessive post-paid billing received
5. To a courier service complaining the delay in the delivery of a product couriered

READING ALOUD FAMOUS SPEECHES

One effective way of developing language skills is reading aloud. Even if you are not sure about the pronunciation, just read. After you have a practice of reading, there are many ways of learning pronunciation. Firstly the pronunciation of most of the words can be accessed as sound files in the internet. So you can search and learn the pronunciation. Secondly listen to speeches or news reading in English. This will help you learn how to pause and read, proper pronunciation, right intonation etc.

Read the passage loudly.

If you want to change the world, start off by making your bed by Admiral H. Mcraven

If you make your bed every morning you will have accomplished the first task of the day. It will give you a small sense of pride, and it will encourage you to do another task and another and another. By the end of the day, that one task completed will have turned into many tasks completed. Making your bed will also reinforce the fact that little things in life matter. If you can't do the little things right, you will never do the big things right.

And, if by chance you have a miserable day, you will come home to a bed that is made — that you made — and a made bed gives you encouragement that tomorrow will be better.

If you want to change the world, start off by making your bed.

…….

It is on Wednesday of Hell Week that you paddle down to the mud flats and spend the next 15 hours trying to survive the freezing cold mud, the howling wind and the incessant pressure to quit from the instructors. As the sun began to set that Wednesday evening, my training class, having committed some "egregious infraction of the rules" was ordered into the mud.

The mud consumed each man till there was nothing visible but our heads. The instructors told us we could leave the mud if only five men would quit — just five men — and we could get out of the oppressive cold. Looking around the mud flat it was apparent that some students were about to give up. It was still over eight hours till the sun came up — eight more hours of bone-chilling cold.

The chattering teeth and shivering moans of the trainees were so loud it was hard to hear anything. And then, one voice began to echo through

the night, one voice raised in song. The song was terribly out of tune, but sung with great enthusiasm. One voice became two and two became three and before long everyone in the class was singing. We knew that if one man could rise above the misery then others could as well.

The instructors threatened us with more time in the mud if we kept up the singing but the singing persisted. And somehow the mud seemed a little warmer, the wind a little tamer and the dawn not so far away.

If I have learned anything in my time traveling the world, it is the power of hope. The power of one person — Washington, Lincoln, King, Mandela and even a young girl from Pakistan, Malala — one person can change the world by giving people hope.

So, if you want to change the world, start singing when you're up to your neck in mud.

(https://jamesclear.com/great-speeches/make-your-bed-by-admiral-william-h-mcraven accessed on 14.12.20)

Listen to the above speech in this link :
https://www.youtube.com/watch?v=3sK3wJAxGfs

After listening to the speech, read the passage aloud again.

More Reading Passages:

The passage above is a motivational speech; there are no dramatic ups and downs. It is more persuasive. But the passage spoken by Mark Antony in Julius Caesar is an example of dramatic speech where every word of his aimed at provoking the hearers. He uses repetition, powerful imagery, rhetorical questioning, and so on. As this speech is poetic, practice a little longer to read. You can hear the speech as spoken by Charlton Heston from the movie *Julius Caesar*
https://www.youtube.com/watch?v=0bi1PvXCbr8

Speech: "Friends, Romans, countrymen, lend me your ears" – *Julius Caesar*
By William Shakespeare
*(*from *Julius Caesar,* spoken by Marc Antony*)*

Friends, Romans, countrymen, lend me your ears;
I come to bury Caesar, not to praise him.
The evil that men do lives after them;
The good is oft interred with their bones;
So let it be with Caesar. The noble Brutus
Hath told you Caesar was ambitious:
If it were so, it was a grievous fault,

And grievously hath Caesar answer'd it.
Here, under leave of Brutus and the rest–
For Brutus is an honourable man;
So are they all, all honourable men–

Come I to speak in Caesar's funeral.
He was my friend, faithful and just to me:
But Brutus says he was ambitious;
And Brutus is an honourable man.
He hath brought many captives home to Rome
Whose ransoms did the general coffers fill:
Did this in Caesar seem ambitious?
When that the poor have cried, Caesar hath wept:
Ambition should be made of sterner stuff:
Yet Brutus says he was ambitious;
And Brutus is an honourable man.
You all did see that on the Lupercal
I thrice presented him a kingly crown,
Which he did thrice refuse: was this ambition?
Yet Brutus says he was ambitious;
And, sure, he is an honourable man.
I speak not to disprove what Brutus spoke,
But here I am to speak what I do know.
You all did love him once, not without cause:
What cause withholds you then, to mourn for him?
O judgment! thou art fled to brutish beasts,
And men have lost their reason. Bear with me;
My heart is in the coffin there with Caesar,
And I must pause till it come back to me.

PREPARING SHORT ASSIGNMENTS

Write a short assignment on the topic, "Climate Change Crisis"The topicrequires an understanding of the topic, Climate change as posing a problem to the livelihood of all living beings in the world. The Introduction should explain the meaning of the topic stating what is meant by 'climate change'

Climate change indicates that there has been change in the pattern of weather conditions in recent times compared to how it was years ago.

> Climate change indicates that there has been change in the pattern of weather conditions in recent times compared to how it was years ago.
>
> The explanation as examples for 'climate change' as affecting the seasonal occurrence of monsoon as having a drastic effect on the agricultural practice of most of the farmers. It also indicates that if there is monsoon rain, it leads to heavy rainfall that only creates disaster through floods, affecting the crops as well as habitats of people. On the one hand the heat level increases, on the other hand severe frost leads to crops and animals suffering from these extreme weather conditions. Unpredictable natural disasters like Tsunami, cyclones, typhoons, floods, etc lead to difficulties for human survival.
>
> There should be an awareness among people in following necessary steps to check further damage to our environment. Hence its important for people to understand the need to adopt the eco-friendly lifestyle to curb climate change crisis.
>
> To write in a sustained manner, it is important to organise points relevant to the topic. By identifying the three parts to any assignment as 1) introduction 2) discussion and 3) conclusion, a clarity will be established.
>
> Conclusion, in an assignment, will sum up all the major points of discussion as well as the supporting details.

Topic Sentence
Main Idea
Supporting Idea
Supporting Idea
Concluding Sentence

The different steps to be followed while preparing/writing a short assignment are:

Pre-write Process

Brainstorming

Organising Ideas

Rough Draft

Edit & Revise

Final Draft

Write a short assignment on the given topics, following a structure of 1) Introduction 2) Discussion and 3) Conclusion.

1. Youngsters spending unreasonable time on social media
2. The need for better healthcare in India
3. Reasons for your preference of a tourist place
4. A book or a movie you liked a lot
5. Your opinion on farmer’s condition in India

ONE WORD SUBSTITUTION

Suggested number of sessions: 1

Read the following passage paying special attention to the phrases that are underlined and given in bold.

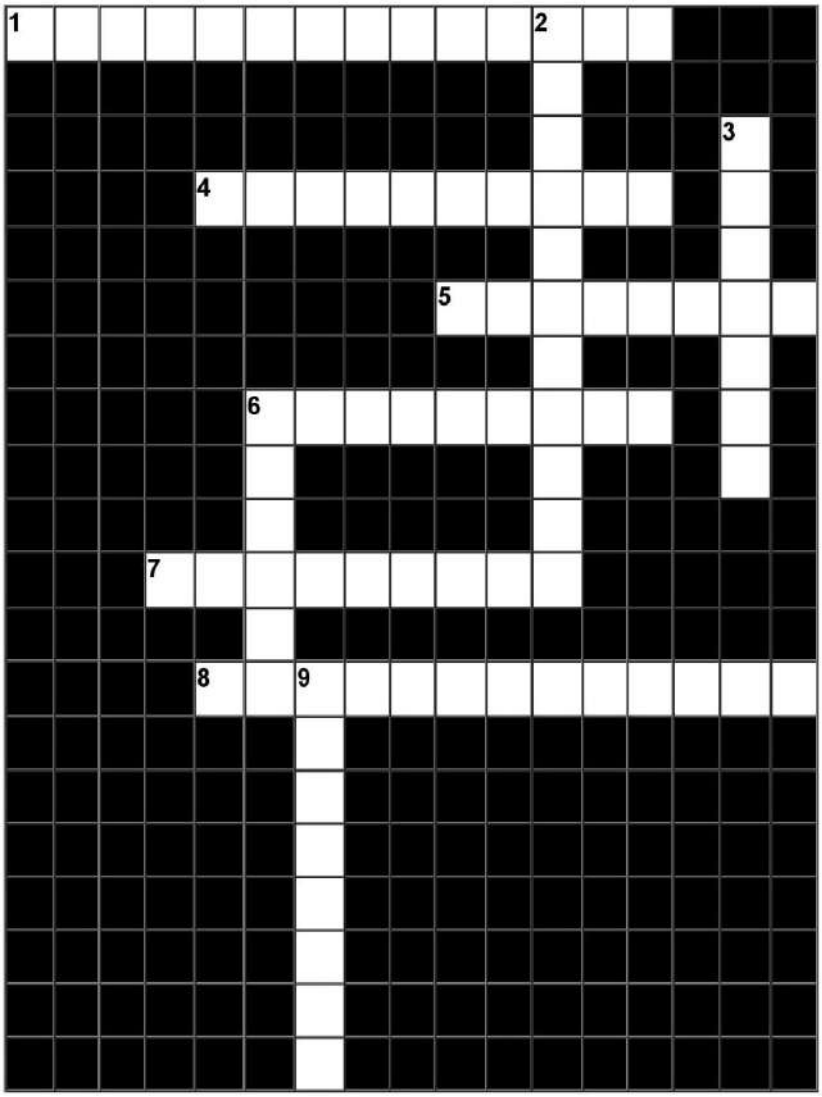
1. The class had a very interesting discussion on skills the other day and they found out that many of them had skills that the others did not know about. For example, Sara could use either hand with equal ease, Sandeep was a very critical judge of food while Taufiq was equally a good and critical judge of paintings. The class also found out that they had a number of hobbies between them – Catherine was a coin collector, while Shagufta acted in theatre groups, though not in a professional capacity.

You will notice that each of the phrases underlined and given in bold in the passage can be replaced by a single word. Given below are the one word equivalents for the underlined phrases:
Found out: discovered
Use either hand with equal ease: ambidextrous
A very critical judge of food: gourmet
A good and critical judge of paintings: connoisseur
Coin collector: numismatic
Doing something not in a professional capacity: amateur

Why do we need to know the one word substitutes?
Using one word in the place of many makes our writing more precise. This means that our meaning will be clearer if we use one word than it would be if we used many words. A shorter and crisper passage is much easier to read and understand than a passage with more words and phrases.

Activity 1

Fill in the crossword grid using the clues given.



Across:

1 People living during the same period

4 a person in love with herself/himself

5 a person who has left one country and moved to another

6 a person trained in spacecraft

7 a person emplyed to drive a car

8 a person who suffers from imaginary illnesses

Down:

2 a person who supervises in the examination hall

3 a palce where grain is stored

6 a large enclosure or building for keeping birds

9 a person who can speak many languages

Activity 2

Match the phrases underlined and given in bold in the sentences in Column A to the word in Column B that best matches them.

Column A	Column B
a. Dr. Salim Ali was one of the best-known experts in the study of birds in India.	i. autobiography
b. When Sharan broke his hand, his parents rushed him to a doctor who specialised in treating illnesses of the bones.	ii. soliloquy
c. Most religions believe in a God who is all powerful.	iii. communicate
d. Manish's hobby is collecting books.	iv. chronic
e. That witness left out a lot of important details.	v. see
f. This paper has too many mistakes; the writer has not been able to get the message across.	vi. pharmacist
g. My grandmother often fondly remembers the past days when she was a young girl.	vii. arrange
h. The character in that play gave a lot of speeches no one else was nearby.	viii. yield
i. Many famous people write the stories of their own lives.	ix. souvenir
j. The meeting will carry on in your absence.	x. verbatim
k. That small island is ruled by a person from the royal family.	xi. ornithologist
l. Her wheezing has been occurring repeatedly for a long time.	xii. bibliophile
m. In order to study the history of the period, she visited a number of places where objects from the past were stored and exhibited.	xiii. continue
n. In the darkness, I could not make out if it was a dog or cat in the street.	xiv. Orthopaedician
o. The Inspector said that he would see to the security of the place.	xv. Nostalgically
p. Tara's mother owns a shop that sells medicines.	xvi. omitted
q. The government refused to give in to the demands of the terrorists.	xvii. indelible
r. The scar that will be left on her arm because of the accident cannot be removed.	xviii. museums
s. I keep that shawl as a fond reminder of my trip to Iceland.	xix. monarchy

t. The editor told the reporter that the words spoken by the politician had to be quoted <u>using exactly the same words as the original</u> speech.	xx. omnipotent

Activity 3

For each the words given in bold and <u>underlined</u> in the following sentences identify their equivalent phrases from the list given at the end.

1. One of the first things a scholar is taught that is that it is wrong to <u>plagiarise</u>.
2. One of the guiding principles of any kind of writing is to write about the events <u>chronologically</u>.
3. We must realise that however clever or intelligent we may be we are never <u>infallible</u>.
4. That school has a very well equipped <u>gymnasium</u>.
5. We were very lucky to get a <u>chef</u> who was familiar with different kinds of cuisine.
6. Female <u>foeticide</u> has been one of the major issues in our country.
7. King Edward VIII's decision to <u>abdicate</u> the throne has become <u>legendary</u>.
8. In the stories by Richmal Crompton, William Brown's father often told him that he was <u>incorrigible</u>.
9. The box contained an <u>assortment</u> of chocolates.
10. Many spiritual leaders tell us that it is important to <u>introspect</u>.

Incapable of making mistakes or being wrong

Professional cook

To renounce the throne

Beyond reform

To pass off another's work as one's own

Remarkable and therefore very famous

Look inwards to examine one's motives

A collection of different types of the same thing

Killing of an unborn child (in the womb)

A room equipped for gymnastics, games and physical exercise.

GRAMMAR IN CONTEXT: SENTENCE PATTERNS

Basic Sentence Pattern

In English, our sentences usually operate using a similar pattern: subject, verb, then object. The nice part about this type of structure is that it lets your reader easily know who is doing the action and what the outcome of the action is.

A subject performs the action in a sentence.

- For instance, in the sentence, "Madhan eats dosa," *Madhan* is the subject because he is the one eating the dosa.

A verb is a word that usually indicates some type of action. There are two basic types of verbs in English: action verbs and linking verbs. An action verb represents something the subject of a sentence does, whereas a linking verb connects the subject to a specific state of being. In other words, a linking verb describes a subject instead of expressing an action. Linking verbs are also known at state of being verbs, and the most common one in English is the verb *to be*.

- If we consider the above sentence, "Madhan eats dosa," the verb is *eats*, which is an action verb because it tells us what Matt does – he eats.
- In this sentence, "Madhan is hungry," our verb is *is*, which is a form of *to be*, a linking verb. Notice how Matt does not do anything in this sentence. Instead, the verb *is* describes how Matt feels – hungry. *Is* links Matt with hunger.

An object usually appears after the verb. There are two (2) types of objects in the English language: direct and indirect.

- A direct object takes or receives the action of the verb. In other words, the subject of the sentence acts on the direct object.
    - The direct object in our sample sentence "Madhan eats dosa" *is* pizza. Madhan eats what? dosa.

An indirect object tells us to whom or for whom an action is done. To understand this concept, we need to come up with a longer sentence.

- Our new sample sentence will be, "Madhan shares the dosa with Nathan." In this sentence, our subject is Madhan, our verb is *shares*, the direct object is *the dosa*, and our indirect object is *Nathan*. With whom does he share the dosa? He shares it with Nathan.

So, remember, this is the basic pattern of an English sentence: SUBJECT + VERB + OBJECT.

Six Basic Patterns

There are six basic or simple sentence patterns:

1. Subject/Predicate, Action Verb
2. Subject/Predicate, Action Verb/Direct Object
3. Subject/Predicate, Action Verb/Adverb
4. Subject/Predicate, Linking Verb/Predicate Nominative
5. Subject/Predicate, Linking Verb/Predicate Adjective
6. Subject/Predicate, Action Verb/Indirect Object/Direct Object

Examples of the six basis sentence types:

1. Subject/Predicate, Action Verb

- The class studied.
- The students and the teacher read.
- The students sat and read.
- The students and the teacher sat and read.

2. Subject/Predicate, Action Verb/Direct Object

- The class took a test.
- The class took a test and a quiz.

3. Subject/Predicate, Action Verb/Adverb

- The class worked carefully.
- The students sit here.
- The class worked like a team.
- Before school, in the gym, the class worked like a team.
- In the gym, the class worked like a team before school.
- Like a team, the class worked before school in the gym.

4. Subject/Predicate, Linking Verb/Predicate Nominative

- The teacher is Mr. Satish.
- The teachers are Mr. Satish and Ms. Leena

5. Subject/Predicate, Linking Verb/Predicate Adjective

- The teacher is kind.
- Ms. Kalki is kind and helpful.

6. Subject/Predicate, Action Verb/Indirect Object/Direct Object

- The teacher gave the class a test.
- Mr. Satish gave Kannan and John a test.

Exercises

Identify the pattern of the following sentence:

1. He was going to the market
    a) SVO
    b) SVA
    c) SVCA
2. I met my friend at the airport
    a) SVIODO
    b) SVOC
    c) SVOA
3. Anitha grew tired after the dance
    a) SVCA
    b) SVIODP
    c) SVOC
4. Exercise made him a healthy man
    a) SVOC
    b) SVIODO
    c) SVOA
5. They named the child Kanmani
    a) SVAC
    b) SVOC
    c) SVCA
6. Sheela’s father is a doctor
    a) SVC
    b) SVA
    c) SVIODO
7. Revathy sang me a song melodiously
    a) SVOC
    b) SVOA
    c) SVIODOA
8. This bag is large
    a) SVO
    b) SVC
    c) SVA
9. His mother gave him his lunch bag
    a) SVC
    b) SVOC
    c) SVIODO
10. The headmaster entered the room
    a) SVO
    b) SVA

c) SVC

11. Pickpockets should be punished severely
    a) SVA
    b) SVC
    c) SVO
12. We wear cotton clothes in summer
    a) SVOC
    b) SVIODO
    c) SVOA
13. I shall meet you tomorrow
    a) SVO
    b) SVIODO
    c) SVOA
14. He answered my question angrily
    a) SVOA
    b) SVCA
    c) SVIODO
15. We completed the work on time
    a) SVOC
    b) SVAC
    c) SVOA

Unit IV (16 hours)

1. Listening and Speaking
    a. Participating in a meeting: face to face and online
    b. Listening with courtesy and adding ideas and giving opinions during the meeting and contributing concluding remarks.
2. Reading and Writing
    a. Reading visual texts – advertisements
    b. Preparing first drafts of short assignments
3. Word Power
    a. Denotation and Connotation
4. Grammar in Context:
    a. Sentence Types

LISTENING AND SPEAKING
PARTICIPATING IN A MEETING: FACE TO FACE AND ONLINE

How to Prepare to be a participant of a meeting?

Meetings are a common feature in professional life. You have to equip yourself to be an active participant in meetings. Meetings are an essential component as a means of constant communication with management, employees, and other stakeholders in an organization. They are an appropriate channel through which information is shared, problems are solved, and progress of projects is reviewed. Meetings could either be informal or formal. The size of meeting could range from two people to several hundred depending on the purpose and size of the organisation. In order to be an active participant you need to some preliminary work.

What to Do Before the Meeting

Be informed about the following:

- Purpose of the meeting-
- What items will be discussed
- Who are the people who will be attending the meeting
- Location for Face to face meeting.
- Platform and login details for Online meetings
- Start and end times

Most importantly, make sure that you know what's expected of you during the meeting, and whether you need to do any reading or other research beforehand.

What to Do During the Meeting

If the agenda is discussed at the beginning of the meeting, as any good organizer is sure to arrange, you can raise the point about something you'd like to be covered.

As items are being covered, keep an eye on the notes you jotted down beforehand about the topics of interest to you.

Avoid talking too much, as that could dilute your impact on the more important subjects.

If somebody else has already said what you wanted to say, there's no need to make the same point a second time.

If you want to show support for what was already said, you can provide an abbreviated version of the arguments, or you can simply nod or provide short verbal cues, such as, "yes," or "I agree.".

When the time is right to make a point, make sure that you have the organizer's permission to speak, and then clearly state what you have to say.

Respect the rights of other people to disagree. Remember, it's not your meeting, and other people want to move on to different subjects.

If you don't agree with something, let people know how you feel, but do not monopolizes the discussion.

What to Do After the Meeting

When the minutes are published, read them carefully and compare them with your own memory of what was discussed. Let the organizer know right away about any significant differences.

Make sure that you know what actions were assigned to you, and follow up on them as quickly as you can.

If you have a good feeling about the meeting, let the organizer know. After all, everybody likes to hear positive feedback.

An extra Byte for online meeting and etiquettes

LISTENING WITH COURTESY

Useful Courtesy Markers to follow during a meeting:

Be a little more judicious about communicating negative views about how the meeting was run and the value of the topics covered.

Phrases to help you participate in a meeting both online and offline

To Interrupt:

- *I’m sorry to interrupt but…*

- *I hate to interrupt but…*
- *I'm sorry to cut this short but…*
- *Sorry to interrupt but may I ask a question?*
- *I'm sorry for the interruption but I have a quick question.*

To seek clarification

- *I'm sorry for interrupting but I don't quite understand...*
- *Sorry for the interruption but could you repeat...*
- *This will only take a minute. Would you mind telling me...*
- *I apologize for the interruption but I have an important question about...*
- *Excuse me, could you please clarify*
- *I'm not sure I understand what you mean by*
- *I'm sorry, I don't quite follow*

To add a point

- *May (or) Can I add something here?*
- *I couldn't help overhearing…*
- Do you mind if I say something?

To express an opinion

- I firmly believe that…
- I'm absolutely convinced that…
- I'm certain that…
- I have no doubt that…
- As far as I am concerned…
- In my opinion,
- From my point of view,
- To my mind,
- In my eyes,
- I hold the view that,
- guess that,
- It seems to me that,
- I am under the impression that,
- It is my impression that,
- As far as I can say,
- I gather that,

To express agreement:

- *I completely agree.*
- *I couldn't agree more.*
- *You're absolutely right.*
- *Exactly!*
- *That's just how I see it.*
- *I'm with Priya on this.*
- *Well, it depends.*
- *I agree with you up to a point, but…*
- *I agree with you in principle, but…*

To ask for inputs

- What's your opinion of…?
- What's your position/view on…?
- What do you think of…?
- Rekha, can I get your input on…?
- Murali, could you share your impression?
- *What does everyone think about…?*
- *I'd like to get your feedback on…*
- *What are your thoughts about… ?*
- *What are your views on… ?*

Concluding Remarks

- *In summary, we're going to*
- *This is what we've agreed on:*
- *So we've decided to*
- *I guess that will be all for today. Thanks for coming*.

Activity

Role Play In groups organise a meeting to discuss the following, ensure to use appropriate phrases from the list above.

1. An educational trip or an Industrial visit
2. An international student's conclave
3. A product launch
4. Change of college/office timings

READING AND WRITING

Reading Advertisements

There is a saying, "A picture says a thousand words." That is the power of the visual. Advertisements in print media and videos have a powerful impact.

The ability to read visual texts is natural and based on an ability called "visual literacy". Visual literacy can be cultivated further and you can be adept at "visual language"

Visual literacy is defined as, "The ability to decode, interpret, create, question, challenge and evaluate texts that communicate with visual images as well as, or rather than, words." (Dr. Diana Dumetz Carry, https://www.literacytoday.ca/primary/reading/reading-strategies/reading-visual-texts/)

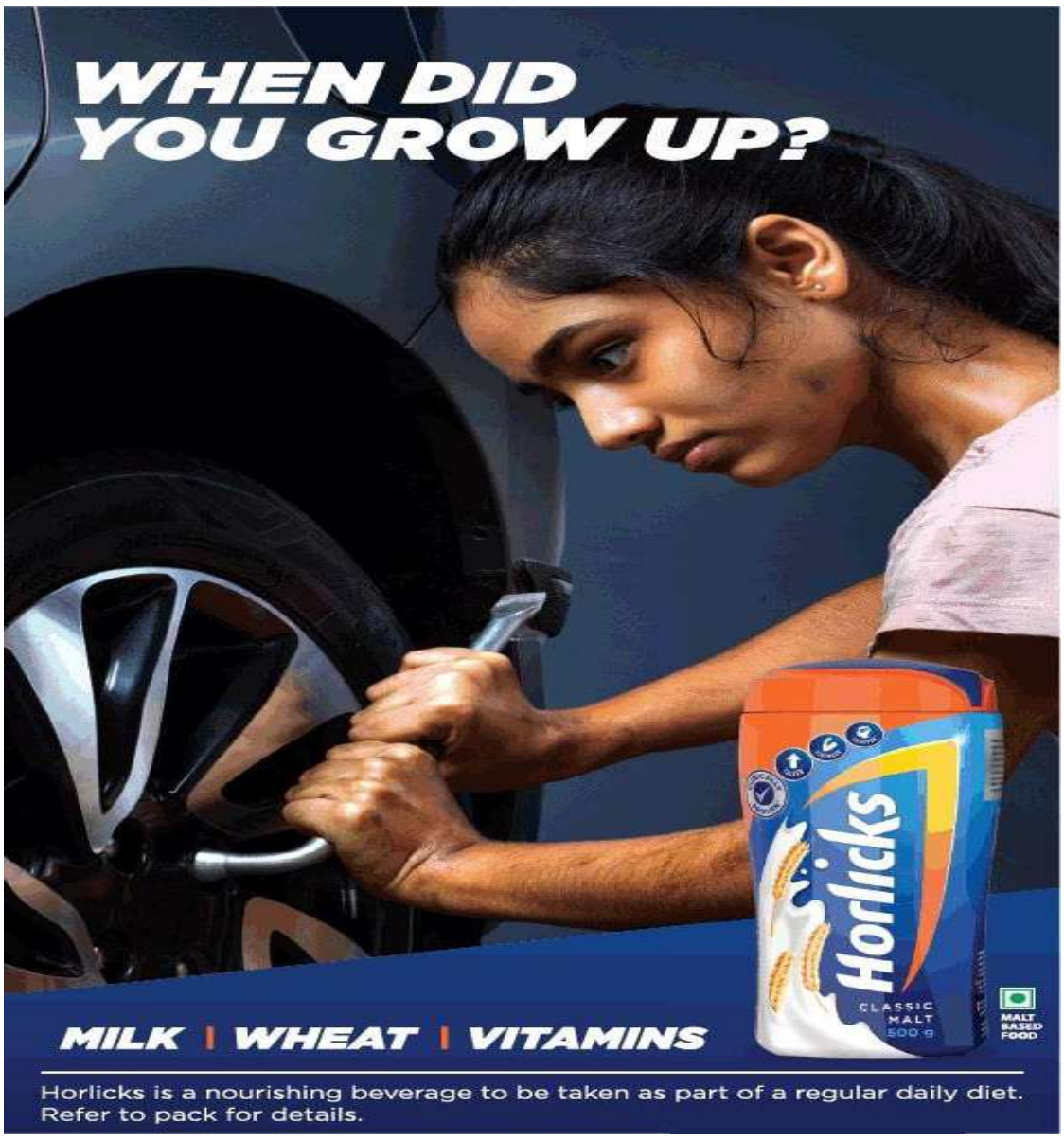
The ability to understand the way visual language works to convey meaning is required to read visual texts. Exercising our minds in reading visual texts (photographs, advertisements, paintings, cartoon), helps us to think critically about images that constitute our world. Visual language works in very much the same way as words printed on the page because words create "word-pictures" through images, symbols, metaphors and other devices of figurative language. A visual text has to be decoded in almost the same way as a text written with words.

Reading between the Lines

Advertising is a powerful medium of communication. Advertisements not only convey a message but also persuade and coerce people in making them believe that they have to own something that they need not necessarily require. Advertisements also play a very important role in gender stereotyping. For example, a woman's traditional role in society as the homemaker is more often reinforced by advertisements. For example, most of the cleaning, cooking, washing products are essentially portrayed by a woman. At the same time, a few advertisements challenge the stereotype, like when a husband makes coffee for his wife. But advertisements for cars, bikes, house constructions invariably are represented as man's world. Today, for our discussion, let us take one such recent advertisement that challenges the deeply embedded

stereotype that women cannot handle manual work or repair pertaining to a vehicle.

Go through this advertisement and make a discussion of the questions that follow.



https://www.advertgallery.com/newspaper/horlicks-when-did-you-grow-up-ad/ accessed on 16.12.20

1. From the discussion above, explain what is meant by gender stereotyping?

2. What are the usual roles attributed to women?
3. How is this advertisement challenging the accepted stereotypes?
4. What is your opinion about this advertisement? Discuss in pairs.
5. Pick any advertisement of your choice and discuss the gender stereotyping either reinforced or challenged in it.

On a daily basis we are bombarded on all sides with various information, pictures, sounds, videos, short messages and in all, this melee, advertisements too vie a spot for attention in your mind. So, advertisers resort to a lot of techniques to grab and hold your attention as there is a lot of competition around. You might have noticed in some places there will be a huge billboard with just a phone number and a word, "Call." The advertiser is exploiting the curious nature of the reader to advance his or her idea.

In our daily life we come across many advertisement flyers. The task today is how do we read advertisements and process the information given.

Check out this flyer:

https://www.zomato.com/hi/mumbai/kfc-dombivali-east-thane/menu
accessed on 14.12.20

1. How do you process the information given above?
2. With which restaurant will you compare prices?
3. How is the visual appeal?
4. Does the colour red catch your attention?
5. Will you order because you are hungry or because you are smitten by the appeal of the advertisement?

Exercises

1. Read this visual text, the advertisement for Mahindra's Thar and offer your comments:

2. Comment on the layout and tagline of this advertisement for "'Oreal Paris.

WRITING

Writing a Brochure

This focus of this lesson is on "writing" a brochure. There are many sites where you can learn the about the printing and design aspects of brochure making. Brochures are great ways of disseminating information about a programme or a product.

Here are some tips that will be of help when you need to prepare a brochure for academic programmes or marketing purposes at your workplace.

Points to remember in preparing a brochure

1. Be focussed on the purpose of your brochure. This involves writing for an audience. If its for an academic conference, you will be sending the brochure to professors and research scholars. If it is about a product or services that are provided (servicing of cars and bikes, doorstep delivery of food, groceries), keep your customers in mind.
2. The language should be in keeping with your purpose – to give information/persuade the reader to purchase/participate.
3. In writing the text for your brochure, be concise and accurate. Write short sentences with positive language and in active voice (if you are promoting a product). You could use the passive voice when you are narrating the history of an institution or organisation. For example, "Great Lakes college was started in 1984…."
4. With regard to graphics, don't use too many colours and image. Don't make it too flashy or cluttered
5. Give contact details clearly.

Activities

Draft the written text for the brochure of

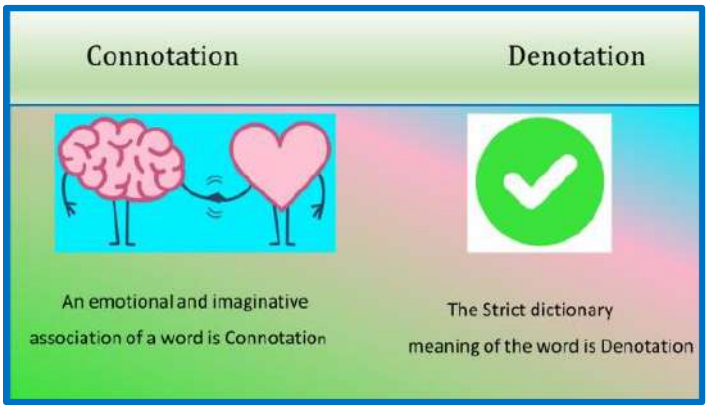
1. A cultural event of your choice.
2. An academic event of your choice
3. A product (like beauty product/ vehicle) of your choice
4. A service (like an online grocery store) of your choice.

WORD POWER: CONNOTATION AND DENOTATION

Connotations and Denotations

The *denotation* of a word or phrase is its direct meaning. Another way to think of it is as the associations that a word usually elicits for most speakers of a language, as distinguished from those elicited for any individual speaker because of personal experience.

A Connotation is a commonly understood cultural or emotional association that the same word means literally. The direct meaning is its denotation.



The *connotation* of a word or phrase is the associated or secondary meaning. It is the idea which a word invokes for a person in addition to its literal meaning. In other words, connotation of a word is an idea or feeling suggested by a particular word though it is not the direct meaning. it can be something suggested or implied by a word or thing, rather than being explicitly named or described.

A connotation is often described as either positive or negative, with regards to its pleasing or displeasing emotional connection.

For example, the words *home* and *house* have similar *denotations* or primary meanings: a *home* is "a shelter that is the usual residence of a person, family, or household," and a *house* is "a

building in which people live." However, for many, these terms carry different associations or secondary meanings, also known as *connotations*. Many people would agree that *home* connotes a sense of belonging and comfort, whereas *house* conveys little more than a structure.

The *connotation* of a word depends on cultural context and personal associations, but the *denotation* of a word is its standardized meaning within the English language. One way to remember the difference between the terms is to take a hint from the prefixes: *con–* comes from Latin and means "together; with," reminding us that the *connotation* of a word works *with* or alongside its more explicit meaning or *denotation*.

In semantics, connotation is synonymous with intention, whereas denotation is a synonymous with extension.

Three types of connotations.

Connotations create emotional associations that can be either positive, negative, or neutral.

1. Positive connotation. Words that invoke a favorable emotional response are positive connotations. For example, describing someone ambitious as a "high-flier" or someone who is lively and curious as "youthful."
2. Negative connotation. A negative connotation presents the person or thing in a negative perspective. For example, describing someone ambitious as a "overachiever" or someone who is lively and curious as "childish."
3. Neutral connotation. Neutral connotations present the neutral point of view and it does not present any attached positive or negative connotation. The statement, "He is ambitious" suggests a person works hard and strives to achieve, without judgment on whether the ambition is a good or a bad thing.

Positive Connotation	Neutral Connotation	Negative Connotation
thrifty	economical	miserly
economical	inexpensive	cheap
exceptional	unusual	strange
youthful	young	childish
illustrious	famous	notorious
slender	thin	skinny
prudent	timid	cowardly
laid-back	inactive	lethargic
persevering	persistent	stubborn
overwrought	nervous	high-strung
up-to-date	new	newfangled
visionary	inventor	dreamer
save	store	hoard
hilarious	laughable	ludicrous
assertive	aggressive	pushy
employment	work	drudgery
strategy	plan	scheme
fragrance	smell	stench

Connotation is an essential part of word choice in a language. Words carry weight and can create a certain tone for a sentence, passage, scene, or entire story. Connotation is also used to draw emotion out of a language.

Connotative Words

A few examples of denotations that have positive, neutral or negative connotations are given below.

Word	Denotations	Positive connotations	Negative connotations
Youthful	Young	Childlike	Childish
Poised	Confident	Courageous	Conceited
Utilize	Use	Employ	Exploit
Merry	Happy	Elated	Maniac
Juvenile	Adolescent	Innocent	Immature
Probe	Questioning	Interested	Nosy
Choosy	Selective	Meticulous	Picky
Lean	Thin	Slim	Skinny

Forceful	Tenacious	Steadfast	Stubborn
Economical	Saving	Thrifty	Stingy
Contrast	Different	Unique	Peculiar
Elderly	Old	Vintage	Decrepit

Activity 1

Fill in the blanks with the sample responses that follow below.

1. I recognized the familiar _____ of my Mom's cooking.
   Negative connotation: stench
   Positive connotation: aroma
   Neutral connotation: smell
2. Idly is _____ meal.
   Negative connotation: a cheap
   Positive connotation: a thrifty
   Neutral connotation: an inexpensive
3. Rahim's interest in planting trees has turned into a _____.
   Negative connotation: obsession
   Positive connotation: avocation
   Neutral connotation: hobby
4. Robinhood lived in the Sherwood in a _____ deep in the woods.
   Negative connotation: shack
   Positive connotation: cabin
   Neutral connotation: hut
5. Marco Polo was an _____ traveller.
   Negative connotation: foolhardy
   Positive connotation: courageous
   Neutral connotation: adventurous
6. We stopped for lunch at a _____ in Chennai.
   Negative connotation: small hotel
   Positive connotation: café.

Neutral connotation: restaurant.

7. My friends are committed _____.

   Negative connotation: tree huggers

   Positive connotation: environmentalists

   Neutral connotation: conservationists

8. My _____ camera has finally broken.

   Negative connotation: dilapidated

   Positive connotation: venerable

   Neutral connotation: old

9. In a quiet and _____ way, Messi scored a goal against the opponent team.

   Negative connotation: sneaky

   Positive connotation: cunning

   Neutral connotation: stealthy

10. The teacher was mildly intimated by Raju's _____ behaviour.

    Negative connotation: bossy

    Positive connotation: confident

    Neutral connotation: assertive

GRAMMAR IN CONTEXT

SENTENCE TYPES

Let’s begin with a funny song!

You can sing the song in two groups, one representing HENRY and the other LIZA. Henry’s speech is in regular font and Liza’s in italics.

There's a Hole in the Bucket

There's a hole in the bucket, dear Liza, dear Liza,
There's a hole in the bucket, dear Liza, a hole.

Then mend it, dear Henry, dear Henry, dear Henry,
Then mend it, dear Henry, dear Henry, mend it.

With what shall I mend it, dear Liza, dear Liza?
With what shall I mend it, dear Liza, with what?

With a straw, dear Henry, dear Henry, dear Henry,
With a straw, dear Henry, dear Henry, with a straw.

The straw is too long, dear Liza, dear Liza,
The straw is too long, dear Liza, too long,

Then cut it, dear Henry, dear Henry, dear Henry,
Then cut it, dear Henry, dear Henry, cut it.

With what shall I cut it, dear Liza, dear Liza?
With what shall I cut it, dear Liza, with what?

With a knife, dear Henry, dear Henry, dear Henry,
With a knife, dear Henry, dear Henry, with an knife.

The knife is too dull, dear Liza, dear Liza,
The knife is too dull, dear Liza, too dull.

Then sharpen it, dear Henry, dear Henry, dear Henry
Then sharpen it, dear Henry, dear Henry, sharpen it.

On what shall I sharpen it, dear Liza, dear Liza?
On what shall I sharpen it, dear Liza, on what?

On a stone, dear Henry, dear Henry, dear Henry,
On a stone, dear Henry, dear Henry, a stone.

The stone is too dry, dear Liza, dear Liza,
The stone is too dry, dear Liza, too dry.

Well wet it, dear Henry, dear Henry, dear Henry,
Well wet it, dear Henry, dear Henry, wet it.

With what shall I wet it, dear Liza, dear Liza?
With what shall I wet it, dear Liza, with what?

Try water, dear Henry, dear Henry, dear Henry,
Try water, dear Henry, dear Henry, water.

In what shall I fetch it, dear Liza, dear Liza?
In what shall I fetch it, dear Liza, in what?

In a bucket, dear Henry, dear Henry, dear Henry,
In a bucket, dear Henry, dear Henry, a bucket.

There's a hole in my bucket, dear Liza, dear Liza,
There's a hole in my bucket, dear Liza, a hole.

Use your head, then! dear Henry, dear Henry, dear Henry,
Use your head, then! dear Henry, dear Henry, use your head!

(http://www.scoutsongs.com/lyrics/theres-a-hole-in-the-bucket.html)

Now that you have enjoyed the song, you can work on observing the types of sentences in this song.

A **sentence** is a group of words that makes complete sense.
We classify sentences into four kinds based on the meaning they convey-

Assertive /Declarative, Interrogative, Imperative and Exclamatory.

Assertive (declarative) sentences make statements.
Look at the sentence from the above song:
There's a hole in the bucket.

This is an Assertive sentence.

Examples are:
Her name is not in the team.
Her sister is in college.

Identify the other assertive sentences in the song.

Assertive sentences may be categorized into-- Affirmative and Negative

Affirmative sentences have an affirmative meaning.

Examples are:
They go to school.
I am feeling hungry.

Negative sentences have a negative meaning. They use negative words.

Examples are:
No one can predict the final outcome
He was never interested in sports.
There is no good playground.

An **Interrogative** sentence asks a question.
The following sentence from the song is an interrogative sentence--

With what shall I mend it dear Liza?

Examples are:
Do you play tennis?
Where is the Manager?
Have you ever seen this man?

Identify the other interrogatives in the song.

Imperative sentences give instructions of many kinds like orders,

commands, request, entreaty etc. 'You' is the subject of the sentences.

"Mend it" –- This sentence from the song is an imperative sentence.
Examples are:
Stop it at once.
Call the witness.
Please pass the circular.
Have some pity.

Identify the other imperatives in the song.

Exclamatory sentences express strong feelings of joy, grief, warning, concern, and fear.

"Use your head!" --- This sentence from the song is an Exclamatory sentence.

Examples are:
Hurrah! We have done it!
Alas! The President is no more!
Beware! There is a pothole in front!
Oh dear! You have fever!
Help! There is a thief in room!

Exercise 1

Read the sentences and below and say whether they are assertive, interrogative, imperative or exclamatory. Note the use of punctuation.

There are only three punctuation marks which end a sentence: full stop, exclamation point and question mark. Students should note how the use of punctuation changes the tone of a sentence.

They have invited us.
What a shame!
Stop it.
She does not like knitting.
Please pass it on.
If only I could finish it in time!
This is not enough.
Nobody was happy with him.
He has only done two projects.
Is this large enough?
Oh that I were Miss Universe!
She was waiting for the bus.

Please note it down.
The parrot is a beautiful bird.
Is she waiting for us?

Exercise 2 Whole group activity
The teacher prints the four sentence types and posts them at the four corners of the classroom.
Then a sentence is read out or written on the board. Students are to move to the corner with the appropriate sentence type. Students who are in the wrong corner are OUT and leave the game.
The students who remain at the end of ten minutes are the champions!

Exercise 3 Pair Work
Students are encouraged to converse with their partners for one minute using only one type of sentence.

Exercise 4

Students can select any passage or use the one given below. They are asked to underline the sentences according to the following colour code system:

Assertive: pink
Imperative: green
Interrogative: yellow
Exclamatory: blue

Last week Ajay and I found a puppy. I named the puppy Tommy. We found him by the playground. I asked my mom, " Can I keep it?" She said, " No!" Then, she said, "Go and clean your room." While I was cleaning my room, I thought about how I could convince my mother to let me keep Tommy.

Exercise 5: Imperatives.
Use of the imperative to give instructions:

Tell the class to write detailed instructions for a simple recipe. Supply vocabulary as required.
Example:

Use the imperative to express how to
Make a cup of tea
Boil an egg
Make a cup of coffee
Make a salad/ fruit salad

Or give detailed instructions on:

How to open a door
Put on a shirt
Cross the road
Wash your face…

Students can exchange instructions and the partner could correct any mistakes or omissions.

Exercise 6: Interrogatives.

Students are asked to practice short dialogues with each other.
Example:
A: What are you doing?
B: Going outside.
A: Why? Why are you going outside?
B: None of your business.

In order to avoid boredom they could be asked to use a squeaky voice, a gruff voice, a low/ high voice.

Unit V

(18 hours)

1. Listening and Speaking
    a. Informal interview for feature writing
    b. Listening and responding to questions at a formal interview
2. Reading and Writing
    a. Writing letters of application
    b. Readers' Theatre:
    c. Dramatizing everyday situations/social issues through skits. (writing scripts and performing)
3. Word Power
    a. Collocation
4. Grammar in Context: Working with Clauses

LISTENING AND SPEAKING

a. Informal Interviews for feature writing:

Interview is an oral form of presentation in which the interviewer asks questions to the interviewee to test the ability of the person. The interviewer refers to the person who asks question and interviewee is the one who answers the questions. Job interview is a common form interview that happens in the professional environment. Few interviews are informal interviews that an individual may take up with people whom they know or come across regularly or worthy of knowing. In such interviews you listen more than speaking. In order to make then speak you are expected to frame your question in such that it leads the interviewee to share more about him/her. Though it is a fun task, it can be productive also. Based on the facts that you collected from the interview you can write feature articles for your college magazine or blogs. For such interviews use open ended questions. These types of questions will enable the interview to speak more through which you gather adequate information required for your purpose as the answers will be mostly in a descriptive form and never would be one word or a sentence. Here are few examples of open- ended questions that you may use during the informal interviews:

1. Tell me about yourself
2. What does make you to choose this profession?
3. What it is likes to be in college for the first day?
4. When did you decide to choose this profession?
5. Could you please share an anecdote from your college days?
6. What is your formula of success?

Exercise:

7. Imagine that you are interviewing your college principal to write a feature for your college magazine and prepare the questions.
8. Prepare few questions to interview the road-side venders to know the impact Covid pandemic situation on their profession.

9. Prepare few sets of questions to interview Police personnel to write a feature on the stress management during work hours.

B. Listening and responding to a formal interview:

There are two stages of interview preparation that is being done before and during the interview. In an interview, the person's attitude towards life, his/her clarity of thought and logical ability, professional skills and communicative abilities are tested.

Preparing for the interview:

Before appearing for the interview, the candidates are expected to fulfil the following steps for ensuring the preparedness:

- A careful scrutiny of the advertisement to analyze the requirements of the job.
- Keep a copy of the application and make yourself familiar with the details and information included in the application.
- Revise the subject meticulously
- Choose the dress to wear on the day of interview and make sure that it properly washed and ironed.
- Arrange the necessary certificates in order and take it alone with you to the interview hall.

- Listen to the questions carefully.

https://www.thebalancecareers.com/communication-interview-questions-and-best-answers-2061251

The interviews will mostly ask for some personal information.

May I know your name?

Tell us about your qualification

Do you have any experience in this field?

Why do you choose this job?

For such expected question you may prepare the answers well in advance with the following phrases:

Beginning phrases for open ended questions

Open ended questions	Beginning phrases
Introducing yourself.	I am a hard working employee.....

What motivated you to work here?	one of my biggest motivator is .....
What is your opinion about our company?	Over the years of my experience in this field....
Tell me about your experience in the previous company you worked.	The years I worked there was....
How would you define failure?	In my opinion, Failure is ....
Give me an example of what you consider a successful attempt in your career?	A few years before, ...

READING AND WRITING

Writing letters of application

Letter of Application-Sample/Template:

Points to Remember:

1. Length of the letter should not exceed a page.
2. Single-spaced with a space between each paragraph. Use about 1” margins and align the text to the left.
3. Use always Times New Roman or Arial or Calibri.

A rightly formatted letter has three parts namely Salutation, Body of the letter and a Complimentary close.

Salutation- A formal way of addressing the person, to whom the letter is written

Dear Sir/Madam…

Body of the letter is divided into three short paragraphs.

First paragraph - you mention the job position or title of the job, you are applying for and the reference to the source of your information regarding the notification or advertisement for the job was placed.
Second paragraph – Mention your qualification with reference to your academic achievements and other additional skills acquired by you with or without certification mentioned appropriately. You can also give your various other extra accomplishments that you find relevant for this job position. Any relevant work experience/internships need to be added to showcase how you are apt for this job.

Third paragraph – Thank for the opportunity to apply and assure your best in the event of being selected for the job.

Complimentary close – Sign off with a closing wish such as: Regards, yours sincerely, Best wishes, etc. followed by your name.

Task

Write a letter of application

1. To a retailer of domestic appliances for the post of a store manager.
2. To the Principal of an arts and science college, applying for the post of an Assistant Professor.
3. To an editor of a newspaper for the post of a sports reporter

RESUME

How to Write a Resume:

There are three types of Resume: Chronological Resume, Functional Resume and

Combination Resume.

https://resumegenius.com/resume-samples/human-resources-hr-resume-example

Chronological Resume requires the details of educational qualification mentioned from
Under graduate to post graduation and other further qualifications in the chronological
Order. The details of certifications or diplomas obtained as well as internship details
are to be included in chronological order.

Functional Resume focuses more on highlighting the strong features of the resume in
terms of educational qualification/technical as well as soft skills acquired and mastered,
and various other additional achievements/accomplishments. This type is presently more
popular as it showcases the applicant's positive, job-specific qualification.

Combination Resume draws from the best of both types. It gives information about the
applicant's history of education in a chronological manner while also highlighting the
strong features of the applicant's many skills and internship experiences that reinforce
the aptness of the applicant as a suitable candidate for the job.

Template for an Effective Resume:

Applicant's Name:
Contact Information…

Qualification Summary:

Educational Qualification:

Skill Based Training(if any):

Relevant Skills (Career specific):
(Technical Skills)

Soft Skills:

Experience Summary:

Internship History:

Short-term Job (if any):

Recent/Current Job Position:

Additional accomplishments/Achievements:

Any other Talents

Languages known: To speak, read & write

Declaration
(To declare that all the information given above are true)

Signature

References: Letters of Reference from teachers/mentors/previous employer
(Optional)

READERS' THEATRE/ DRAMATIZED READING

Just as there are different discourses in writing, there are different ways of reading too. We have so far acquainted with reading a short story, poem and how to speak to an audience.

In this section, let us see how to act in dramas. Plays and dramas require a highly stylized version of reading. When one acts in a drama their roles are spoken with a lot of intensity, intonation changes and in a loud voice. To play a part in a drama, one has to have a good grasp of the language, should know how to read the commas and periods, should speak in an understandable accent and with proper punctuation and pronunciation.

Activity

The class can be divided into groups of six and made to play each part by reading aloud. The teacher can help in the intonation and presentation of the text.

Given below is an excerpt from Luigi Pirandello's play *Six Characters in Search of an Author.* This is quite an interesting play as a playwright who wrote a play did not complete it by staging the play. So the characters of the play whom Pirandello portrays as real people go in search of a theatre director and ask him to stage them. The manager is bewildered, but the characters start playing their part right there. The actors and the original actors are bemused, but the drama goes on. Pirandello mixes both the real and imagined and presents that life is more imagined than real or vice versa.

Door-keeper [*cap in hand*]. Excuse me, sir . . .
The Manager [*rudely*]. Eh? What is it?
Door-keeper [*timidly*]. These people are asking for you, sir.
The Manager [*furious*]. I am rehearsing, and you know perfectly well no one's allowed to come in during rehearsals! [*Turning to the* CHARACTERS.] Who are you, please? What do you want?
The Father [*coming forward a little, followed by the others who seem embarrassed*]. As a matter of fact . . . we have come here in search of an author . . .
The Manager [*half angry, half amazed*]. An author? What author?
The Father. Any author, sir.
The Manager. But there's no author here. We are not rehearsing a new piece.
The Step-Daughter [*vivaciously*]. So much the better, so much the better! We can be your new piece.
An Actor [*coming forward from the others*]. Oh, do you hear that?
The Father [*to* STEP-DAUGHTER]. Yes, but if the author isn't here . . . [*To* MANAGER.] unless you would be willing . . .
The Manager. You are trying to be funny.
The Father. No, for Heaven's sake, what are you saying? We bring you a drama, sir.
The Step-Daughter. We may be your fortune.

The Manager. Will you oblige me by going away? We haven't time to waste with mad people.

The Father [*mellifluously*]. Oh sir, you know well that life is full of infinite absurdities, which, strangely enough, do not even need to appear plausible, since they are true.

The Manager. What the devil is he talking about?

The Father. I say that to reverse the ordinary process may well be considered a madness: that is, to create credible situations, in order that they may appear true. But permit me to observe that if this be madness, it is the sole *raison d'être* of your profession, gentlemen. [*The* ACTORS *look hurt and perplexed.*]

The Manager [*getting up and looking at him*]. So our profession seems to you one worthy of madmen then?

The Father. Well, to make seem true that which isn't true . . . without any need . . . for a joke as it were . . . Isn't that your mission, gentlemen: to give life to fantastic characters on the stage?

The Manager [*interpreting the rising anger of the* COMPANY]. But I would beg you to believe, my dear sir, that the profession of the comedian is a noble one. If today, as things go, the playwrights give us stupid comedies to play and puppets to represent instead of men, remember we are proud to have given life to immortal works here on these very boards! [*The* ACTORS, *satisfied, applaud their* MANAGER.]

The Father [*interrupting furiously*]. Exactly, perfectly, to living beings more alive than those who breathe and wear clothes: beings less real perhaps, but truer! I agree with you entirely. [*The* ACTORS *look at one another in amazement.*]

The Manager. But what do you mean? Before, you said . . .

The Father. No, excuse me, I meant it for you, sir, who were crying out that you had no time to lose with madmen, while no one better than yourself knows that nature uses the instrument of human fantasy in order to pursue her high creative purpose.

The Manager. Very well, -- but where does all this take us?

The Father. Nowhere! It is merely to show you that one is born to life in many forms, in many shapes, as tree, or as stone, as water, as butterfly, or as woman. So one may also be born a character in a play.

The Manager [*with feigned comic dismay*]. So you and these other friends of yours have been born characters?

The Father. Exactly, and alive as you see! [MANAGER *and* ACTORS *burst out laughing.*]

The Father [*hurt*]. I am sorry you laugh, because we carry in us a drama, as you can guess from this woman here veiled in black.

The Manager [*losing patience at last and almost indignant*]. Oh, chuck it! Get away please! Clear out of here! [*To* PROPERTY MAN.] For Heaven's sake, turn them out!

https://www.ibiblio.org/eldritch/lp/six.htm accessed on 14.12.20

Questions for Discussion:

1. The character *Father* says, "we carry in us a drama…" Do you think this is true of all people born in this world?
2. Discuss Shakespeare's famous lines, "All the world is a stage…"

Task 2

Take the story of Seasons of Life that is presented in the first unit, and give it as a group assignment to the class. Let each group be of five people, as there are five characters in the story. Let each one choose a part and memorise it and stage it as a play. Encourage the students to be creative and do backdrop of trees in different seasons. They can also manage the setting. The teacher can mark this activity as a group assignment.

WRITING SCRIPTS

DRAMATIZING EVERYDAY SITUATIONS THROUGH SKITS

Prakrithi's Journey: A Skit on Nature Conservation

Characters:

Prakrithi

Carpenter

Tree

Fish

Carpenter: Prakrithi, where are you? Would you like to acoompany me to the forest?

Prakrithi: Yes appa. I'll come with you

Carpenter: You can play in the river or wander around while I chop a few trees. I have got an order to make a king size bed.

(Prakrithi and the Carpenter walk together)

Carpenter: Here we are, Prakrithi! I'll do my work of chopping and you run around and enjoy this beautiful place.

Prakrithi: Carry on appa. I'll keep mysef

Tree: Prakrithi !

Prakrithi: Who's calling me? Doesn't sound like appa.

Tree: It's me, the tree, Prakrithi. I can't believe that I will soon be made into pieces and part of a table or cupboard or some such piece of furniture.

Prakrithi: I feel terrible about this. Let me talk to my father and prevent him from doing this to you.

Tree: What will you tell him?

Prakrithi: I will tell him not to be cruel to you.

Tree: Yes, not just to me, but to the entire tree world;

(Prakrithi suddenly feels something heavy on her shoulder)

Prakrithi: Hey! What is this? A fish on my shoulder?

Fish: Hello, I'm Fish. Unfortunately I am now a fish out of water.

Prakrithi: But why did you jump out of your home? The water in the river is fresh.
Fish: I jumped out to get your attention.
Prakrithi: Oh no! It seems as if we are in the midst of a crisis. I just heard a tree talking to me. Now, a fish is talking.
Fish: Prakruthi, just look at me! I have lost my sheen and I also have problems with digestion.
Prakrithi: That must be so difficult for you. How did that happen?
Fish: From your house and the entire apartment complex, the waste water from kitchens and toilets. Just come to the banks of the river where you used to play. Can you see a steady stream of black water enter?
Prakruthi: Yes, I can see and I hang my head in shame.
Carpenter: Prakrithi. I have been calling out your name for sometime now
Prakrithi: I'm sorry. But appa,…… I was talking to the same tree which you have chosen to chop down and while we were talking a fish came along. From now on the three of us, Tree, Fish and I will be good friends.
Carpenter: What about our plan to cut the tree?
Prakrithi: I'm afraid that won't work out. Tree explained to me that it he was not speaking only about himself. He showed me how many creatures have their home in his tree. There are birds which live in the burrows of a tree. They keep their young ones in these burrows. Insects and butterflies are a part of this ecosystem, the Tree. Appa. We are not only responsible for the cutting of trees: we also need to protect our water bodies from contamination."
Carpenter: So, the new way of thinking seems to suggest that I will not be able to make any furniture and my entire livelihood is lost.
Prakrithi: Appa. I also used to think that we as humans, right over creation and creatures. But this conversation has moved me and I realise that I was wrong: I have to do my part in making our planet sustainable. Thank you !

Activity:

The class can be divided into groups and each group can write a short skit on a social issue of their choice and enact it before the class.

WORD POWER

COLLOCATIONS

What is a collocation?

A collocation is a combination of two or more words that often go together. The word Collocation refers to how words are combined together to form fixed relationships. Collocation made from combinations of verb, noun, adjective etc. Collocations can be adjective + adverb, noun + noun, noun + verb, verb + noun, verb + expression with preposition and verb + adverb are the seven main types of collocation.

1. adverb + adjective

- The twins have completely different personalities.

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2. adjective + noun

- *She reads a lot of books and has a* rich vocabulary.
- We were walking in a heavy rain.

3. noun + noun

- Peter likes to buy a sports Bike.
- The ceasefire agreement came into effect from today.

4. noun + verb

- The lion started to roar when it heard the dog barking.
- There was heavy snowfall when our plane took off.

5. verb + noun

- The prisoner was hanged for committing murder.
- I always try to do my homework in the morning, after making my bed.

6. verb + expression with preposition

- We had to return home because we ran out of money.
- When Kamali returned home after a long time, she burst into tears.

7. verb + adverb

- Salma placed her keys gently on the table and sat down.

- I vaguely remember that we were playing football when it started raining.

Strong Collocations

Some collocations always go together. They are called Strong Collocations. Strong collocations are perfect combinations of words that sounds correct. Correct use of strong collocations shows an excellent command of the English language. Strong collocations are with words that do not match to many other words. The connection is quite strong because there are very few other acceptable options. For example, the expression "turn on the light" is a strong collocation, whereas "start a light" or "activate a light" are weak collocations.

Weak collocations are completely the reverse of this. The expression "very interesting" is commonly used, but the collocation is weak: "extremely interesting", and "really interesting" are all acceptable substitutes.

The correct usage of some commonly used collocations are given below.

	
High earnings	Big earnings
Long-range planning	Long-time planning
Strong coffee	Heavy coffee
Heavy traffic	Large traffic
Express mail	Quick mail
Partly cloudy	Slightly cloudly
Happily married	Gladly married
Bars of soap	Bricks of soap
Round of applause	Noise of applause
Prices fall	Prices descend
Lion roars	Lion shouts
Put on clothes	Wear on clothes
Make a bed	Do a bed
Make a coffee	Do a coffee
Do the dishes	Make the dishes
Respond quickly	Respond swiftly
Comments on the work	Comments about the work
Explain to someone	Explain at someone
Drive safe	Drive secure
Choose wisely	Choose smartly

There are dictionaries such as the Oxford Dictionary of Collocations that can help you learn these common collocations.

A list of 100 commonly used collocations is given below.

1. above average - more than average, esp. in amount, age, height, weight etc.
2. absolutely necessary - totally or completely necessary
3. achieve a goal - to do what you'd planned or hoped to do
4. act suspiciously - to behave in a way that makes people suspicious
5. against the law - illegal
6. answer the door - open the door after someone knocks the door
7. arrive on time - to arrive exactly when expected or scheduled to

8. ask a favour - to ask someone for help
9. ask for directions - to ask someone to tell you the way to a place
10. bad temper - a tendency to become angry quickly and easily
11. bare essentials - things that are needed the most
12. bear a resemblance - to look like, or be similar to, somebody or something
13. big deal - something that's very important or very special
14. bitterly cold - extremely cold, of weather, wind, rain, etc.
15. blind faith - unquestioning belief in something
16. blow your nose - to clear your nose of mucus by forcing air through it
17. boost morale - to increase morale or enthusiasm within a group of people
18. break news - to tell someone bad news
19. breaking news - current news that media gives special or live coverage to
20. bring to justice -to make somebody face trial or punishment for their crime
21. call attention to - to make someone notice or consider someone or something
22. can't afford - unable to buy or do something
23. cast a spell - to use magic to make something happen
24. catch a cold - to become sick after being infected with a cold virus
25. catch a glimpse - to see something or someone for a moment only
26. change course - to go in a different direction
27. come to a conclusion - to conclude on something after thinking about it
28. come to rescue - to save someone or something from danger or failure
29. cut costs - to reduce costs
30. deafening silence - a silence that everyone notices
31. deeply rooted (in) - strongly connected to the past, esp. of beliefs or culture
32. drive crazy - to make somebody feel very annoyed or upset
33. drop the subject - to stop talking about something
34. endangered species – animals or plants in the verge of extinction
35. ethical standards - ethically acceptable levels of behaviour
36. fail miserably - to fail very badly
37. fair deal - a reasonable deal in business or a morally correct arrangement
38. familiar face - someone you know personally
39. fight a fire - to try to put out a fire
40. flat battery - a battery that no longer works, or needs recharging
41. flat tyre - a tyre that doesn't have enough air in it
42. get changed - to put on different clothes
43. get dressed - to put on clothes
44. get going – start moving / depart

45. get into trouble - to become involved in a bad or difficult situation
46. get rid of - to stop, or remove, something or someone that's annoying
47. give a hand - to give help, support or assistance
48. give way - to collapse due to weight or pressure
49. hardly any - almost none
50. hardly ever - almost never
51. have a word - to talk about something with somebody
52. keep a promise - to do what you promised to do
53. keep in touch - to have regular contact with somebody
54. keep still - to not move
55. lay the groundwork - to do preliminary work in preparation for future work
56. lose your temper - to suddenly become angry
57. make a bed - to neatly arrange the sheets, blankets and pillows on a bed
58. make a fortune - to make a huge amount of money
59. make a fuss - to create unnecessary excitement or concern about something
60. make a note (of) - to write down something so that you don't forget it
61. make sense – Idea or action that is sensible and rational and not likely to fail.
62. neat and tidy - not messy
63. nervous wreck - a person who's very stressed or nervous
64. null and void - having no legal effect or force
65. offer an explanation - to explain why something was done
66. owe an apology - If you think you owe somebody an apology
67. owe an explanation - If you think someone owes you an explanation
68. pack a suitcase - to put clothes and other possessions into a suitcase
69. pay a visit - to visit someone or something
70. pay attention - to watch closely or listen carefully to someone or something
71. point of view - a particular perspective or way of seeing things
72. pose a threat - create the threat of danger or harm
73. put on weight - to become heavier or fatter, of a person or an animal
74. put out a fire - to stop a fire from burning
75. rapid growth - fast growth, or growth in a short period of time
76. restore order - to bring back order after a period of revolt or disorder
77. room for improvement - the possibility or need for something to improve
78. root cause - the main or fundamental cause of something
79. run the risk of - to do something risky, or that could have a bad result

80. runny nose - Liquid mucus is running from your nose.
81. safe and sound - not harmed, hurt or damaged in any way
82. sense of humour - an ability to see and express humour
83. serve a purpose - to be useful, esp. in achieving an aim or performing a work
84. stand trial - to be judged for a crime in a court of law
85. stay put - to stay in the same place or situation
86. take pride in - to be proud of your talent, skills, work, achievements, etc.
87. take turns - If people take turns, they do something one after the other
88. take your time - to take as long as you like, without rushing
89. tight schedule - a schedule with little time between meetings or other works
90. travel light - to travel without much luggage
91. ulterior motive - the hidden reason or purpose behind an action
92. U-turn - a sudden and complete change of policy
93. utterly ridiculous - completely ridiculous or unreasonable
94. vague idea - an approximate or imprecise idea
95. vague memory - unclear or incomplete memory
96. vital role - a very important role
97. wear and tear - damage caused by normal use over time
98. x-ray vision - the ability to see through objects made of non-transparent materials
99. yield results - to produce or provide results
100. zero tolerance - absolutely no tolerance for something

Activity 1

Choose the correct words to complete the collocations

1. The Menu looks good. What are you going to order for your _____?
   a) main course b) main meal c) main food d) main item
2. The Pandiyan Super-Fast Express Train _____ Chennai at 4.10 am
   a) arrives in b) arrive on c) arrives at d) arrives into
3. I have'nt been able to _____ the stain in my shirt
   a) clean out b) get rid of c) close d) take out

4. The woman I saw was completely _____ green.
   a) dressed with b) dressed in c) wearing in d) clad with
5. The firemen courageously jumped into the office to _____ the fire.
   a) Put out b) put off c) clear out d) stop
6. As the lawyer could not produce suitable documents, the case went _____.
   a) lost out b) empty c) null and void d) cancelled
7. Many _____ species can be found in African and Amazonian forests.
   a) Imperiled b) risky c) unlucky d) endangered
8. I haven't _____my mind where to go for higher studies. Can you help me decide?
   a) changed over b) given into c) crossed d) made up
9. The government took a _____ in the policy on exports and imports.
   a) new idea b) U-turn c) big turn d) new thought
10. Kapil Dev and Dhoni played a _____ in winning the Cricket World Cups for India.
    a) vital role b) important role c) equal role d) good role

Activity 2

Choose the most suitable collocations.

1) The mobile phone is <u>faulty / wrong</u>

2) My motorcycle is quite old. So, getting spare / exchange parts is difficult.
3) When you are parking in the parking lot, you should not leave the engine working / running.
4) The fireman had to wear the breathing masks / apparatus while putting out the forest fire.
5) I had to walk six flights of stairs because the lift was out of order / service.
6) Can I ring you again / call you back?
7) Could you please put it into the contract, please? I would like to have it in ink / black and white.
8) The flora and fauna / flowers and animals of this island are unique.
9) The important role of detective / investigative journalism is uncovering corruption.
10) Please do not sing out of tune / off the tune.

Activity 3

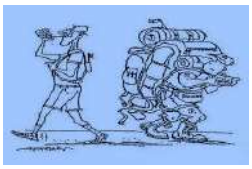
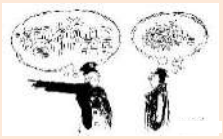
Fix the following nouns in the correct column

a difference	a break	a noise
a bath	a mess	a mistake
trouble	a drink	breakfast
the shopping	a haircut	lunch
dinner	progress	trouble
a favour temperature	a look	someone's
a phone call	nothing	money
a taxi	an effort	your best
furniture	the washing up	the dishes
your hair	your time	homework
sense	a word	business
a fortune	a risk	a word

DO	HAVE	MAKE	Take

Activity 4

Match the following sets

	Travel	Clear	Travel Light
	X-Ray	Light	
	Flat	Tidy	
	Ask for	Diet	
	Crystal	Vision	
	Neat and	Deal	
	Utterly	Ingredient	
	Active	Tyre	
	Balanced	Directions	

	Close a	Ridiculous	

GRAMMAR IN CONTEXT

Working With Clauses

"When" is a word which when articulated gives you the pleasant feeling of blowing a candle. If you want to understand the power wielded by the word, "when", read this beautiful poem.

WHEN I HEARD THE LEARN'D ASTRONOMER

(By Walt Whitman)

When I heard the learn'd astronomer,
When the proofs, the figures, were ranged in columns before me,
When I was shown the charts and diagrams, to add, divide, and measure them,
When I sitting heard the astronomer where he lectured with much applause in the lecture-room,
How soon unaccountable I became tired and sick,
Till rising and gliding out I wander'd off by myself,
In the mystical moist night-air, and from time to time,
Look'd up in perfect silence at the stars.

The experience narrated in this poem could be paraphrased in this way:

I sat in the astronomy class. I couldn't understand any of the charts or diagrams. So, I just went out and looked at the stars.

However, the poet uses the word "When" to emphasise his experience. He narrates, every part of that difficult experience, with the word, "When". He wants to emphasise what it felt like "when" he couldn't understand the charts and figures.

Note that the poem's opening line is NOT,

"I heard the learn'd astronomer…" but

"When I heard the learn'd astronomer"

I heard the astronomer (is an Independent clause)

"When I heard the learn'd astronomer" (Dependent clause)

When the class on the stars sounded boring, the narrator chose to walk out of the class and appreciate the beauty of the stars!

The poem "When I Heard the Learn'd Astronomer" was a prelude to a more intensive discussion on the subject of clauses.

A clause is a group of words containing a subject and predicate and functioning as a member of a complex or compound sentence.

Independent and Subordinate Clauses

An independent (or main clause) expresses a complete thought and can stand by itself as a sentence. A subordinate (or dependent) clause does not express a complete thought and cannot stand alone as a sentence.

For example

Jeevan studied in the college cafeteria for his exam. (Independent clause)

When Jeevan studied in the college cafeteria for his exams, he couldn't concentrate.

Adding the dependent marker "When" before Jeevan makes the independent clause a dependent one.

Some common dependent markers are: after, although, as, as if, because, before, even if, even though, if, in order to, since, though, unless, until, whatever, when, whenever, whether, and while.

Examples:

- *After I met* him, I was a different person.
- *Although the tree hasn't grown* to its full height, it is healthy.
- *As I need a cup* of coffee, I am heading to the restaurant.
- *I am a successful person because* a friend showed me the way.

- *Before you leave* the hall, please throw your paper cups in the dustbin.
- *Even if you rush* at 90 kmph, you will not reach on time.
- *If you plan* in advance, you will complete it well in time.
- *In order to survive* in the fashion industry you have to be fit.
- *Since he is a close relation*, we have to include him in the programme.
- *Though her friend betrayed her*, she was never angry or bitter.
- *Unless you save on a regular basis* you will not have money in your hour of need
- *Until he got a job*, he managed to live carefully on his scholarship.
- *Whatever you do*, do it quickly
- *When the teacher enters the class*, the students become silent.
- *Whenever we go to Kerala*, we buy banana chips.
- *Whether it will be available* in the market, is not certain.
- *While you are looking for the book*, let me make you a cup of tea.

TYPES OF CLAUSES

The types of clauses are Noun clause, Adjective Clauses and Adverb Clauses

NOUN CLAUSES

A Noun Clause is a group of words which has a subject and a predicate of its own, and does the work of a Noun.

Example

I wish to get a guitar

I wish that I could get a guitar

The first group of words “to get a guitar”, does not have a subject and a predicate of its own. It therefore is a phrase. This phrase is the object of the verb “wish” and hence does the work of a noun. It is a noun phrase.

The second group of words, “that I could get a guitar” has a subject and a predicate of its own. It is a clause and is the object of the verb “wish” and hence does the work of a noun. Therefore it is a noun clause.

Since the noun clause does the work of a noun, it can be”

- The subject of a verb

- The object of a transitive verb
- The object of a preposition.
- The complement of a verb.

1. The Subject of a Verb

   Whether it will rain today, is not certain.
   What they told you against her is not true.
   Where he lives I do not know
   When we will get there, is hard to predict.

2. The Object of a Transitive Verb
   Let me know *if the doctor is in*
   Tell me *where I can buy a microwave oven*.
   No one knows *who built that temple.*
   Tell me *why you didn't inform me*.

3. The object of a Preposition.

   He laughed at *what the boys were saying*.

   They are impressed by *what he told them*.

4. The Complement to a Verb
   Life is *what we make of it*.
   This was *how they became millionaires*.

   Exercise 1

   Replace the word in italics with suitable noun clauses:

Example:

He predicts a change in the weather

Answer: He predicts that the weather will change.

1. I know about his honesty
   Answer: I know that……
2. I heard of your success
   Answer: I heard that ……
3. He confessed the truth
   Answer: He confessed that……

4. The College President acquainted the freshers with mode of opening a bank account for scholarships.
   Answer: The college president told the "freshers" how to ……
5. *His departure* was expected.

ADJECTIVE CLAUSES

A group of words which has a subject and a predicate of its own, and does the work of an adjective is an adjective clause.

1. The mug *with the stains* is his
2. The mug *which has stains* is his

The first group of words, "with the stains" describes the coffee mug: it qualifies the noun "cup" and does the work of an adjective. It is an adjective phrase

The second group of words, "which has stains" also describes the mug and does the work of an Adjective; but because it has a subject and predicate of its own, it is called an adjective clause.

1. An adjective clause is introduced by a relative pronoun or by a relative adverb as in:
   The book *that I borrowed* is lost.
   The reason *why he resigned* is not known.
   We visited the home *in which the great painter lived*
   The house *where the accident took place* is near the traffic signal.

2. The Relative Pronoun or the Relative Adverb is sometimes not expressed in an adjective clause; as
   This is the lady, I met yesterday
   (Here the relative pronoun *whom/that* is understood)
   The plan you suggest suits us.
   (ere the relative pronoun *that* is understood)

   Exercise 2:
   Pick out the Adjective Clauses:
   1. The dog that barks seldom bites.
   2. The saree that you chose pleased me.
   3. Akshay has a car that glides smoothly.
   4. God helps those who help themselves.

5. People who live in glass houses should not throw stones.

Exercise 3

Replace the Adjective Clauses by Adjectives or Adjective Phrases:

1. Uneasy lies the head that wears the crown.
2. Which is the path that leads to the market?
3. The day when we will receive our degrees is drawing near.
4. The reason why Smitha failed is obvious.
5. The girl who sits near me is my best friend.

ADVERB CLAUSES

An adverb clause is a group of words which has a subject and a predicate of its own, and does the work of an adverb.

They left *at daybreak*

They left *when it was daybreak*

(Both sentences speak of "when" they left)

The words in italics in the first sentence are an adverb phrase and those in the second are an adverb clause. Both the groups of words do the work of an adverb by modifying the verb "left".

And adverb clause is used as an adverb to tell us how, when, where, why, how much or under what conditions something happens or takes place.

KINDS OF ADVERB CLAUSES

An adverb clause does the work of an adverb. It can be of the following kinds:

Time
Place
Manner
Cause or Reason
Purpose
Result or Consequence
Comparison
Condition
Supposition or Concession

1. Adverb Clauses of Time

Adverb Clauses of Time are introduced by subordinating conjunctions like *when, whenever, since, before, after, till* and *as*.

- As I entered the room, people turned and looked at me.
- They *arrived after the British*.
- *Before you leave*, kindly meet me.
- Please wait *till your turn comes.*
- As soon as I heard the news I rushed to the spot.

2. Adverb Clauses of Place
   Adverb clauses of place are introduced by subordinating conjunctions like where, wherever, whence.
   The puppy followed the boy *wherever he went*.
   Where the eagles soar, no bird can reach.

3. Adverb Clauses of Manner
   Adverb clauses of manner are introduced by subordinating conjunctions like *as, if,* and *though*
   - Do to others *as they have done* to you
   - *As you sow*, so shall you reap.
   - The cat sprang off the wall *as if it had seen a ghost*.
   - He talked *as if he knew us for many years*.

4. Adverb Clauses of Cause or Reason
   Adverb clauses of cause or reason are introduced by subordinating conjunctions like *because, since, that,* and *as*

   - The child was frightened because it was lonely.
   - *As he was absent*, we couldn't meet him.
   - He was glad *that he met his roommate* from his college days.
   - Since she procured it for me, I must pay her.

5. Adverb Clauses of Purpose
   Adverb clauses of purpose are introduced by subordinating conjunctions like that, in order that, so that and lest.

   - Work hard *that you may succeed* in your game.
   - Take care *so that you don't lose* the data.
   - She lives frugally *in order that* she may pay her sister's tuition fees.

- Memorials are erected *lest we forget*

6. Adverb clauses of result or consequence
   Adverb clauses of result or consequence are introduced by subordinating conjunctions like that (normally preceded by so or such in the main clause) Sometimes, the conjunction is understood:

   - He ran *so fast that he was terribly out of breath.*
   - The foreigner spoke with *such a thick accent* that nobody understood him
   - The place was so far off, that we set out early i

7. Adverb clauses of comparison
   Adverb clauses of comparison of degree are introduced by one of the subordinating conjunctions, or relative adverbs like *as* and *then*

   - She is as beautiful as she is beautiful.
   - He is not as foolish as you take him to be.

8. Adverb clauses of condition

Adverb clauses of condition are generally introduced by subordinating conjunctions

- If it rains, the pitch will be spoit
- I must do my best whether I like it or not
- If I were you, I would take the trouble

9. Adverb clauses of supposition or connection
   Adverb clauses of supposition or concession are introduced by subordinating conjunctions like although, though,

   - He is successful though he doesn't work hard
   - Although it was a holiday, he went to his office.

   Exercise 4:
   Underline the adverb clauses in the following sentences:
   1. We must get some vinegar so that we can prepare pickle
   2. Place your bag where you can locate it
   3. As soon as this work is finished, I will go to sleep.
   4. When we were young, we used to cycle all over town
   5. She talks as though everything can change overnight.

Exercise 5:

Replace the adverb phrase with an adverb clause:

1. The soldiers fought bravely
2. The price is too high for an a second-hand vehicle.
3. Snow is lighter than ice.
4. A rose by any other name would smell as sweet.
5. They lifted the heavy box with all their might.

Exercise 6

Replace the Adverb Clause with an Adverb or Adverb Phrase:

1. The heat was so scorching that people walking barefoot suffered.
2. When the just rule, the people are happy.
3. This story is too complicated for me to remember the details
4. When she sees a lizard, she shrieks.
5. He was kind to me because I was kind to his mother.

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL – 624 101

COMMON COMPUTER PAPER FOR UG

COURSE CODE	U21CSS31 / U21CSS42	COMPUTER SKILLS FOR OFFICE MANAGEMENT	L	T	P	C
SKILL BASED ELECTIVE			2	-	-	2

Learning outcome

- Students will exhibit improved understanding of computer operations
- Students will gain skills & knowledge to browse and get updated worldwide information
- Students will gain practical exposure on spread sheet
- Students will gain practical skill on power point presentation
- Students will acquire practical knowledge on Internet

Unit-1 Definition of Operating System

Functions of OS - Types of OS: Single user, Multi-User, multi-task, RTOS, Single-user, Multi-tasking – Windows Desk top – Windows Utilities: Paint, Notepad, Networks, Control Panel.

Unit-2: Introduction to Office - Open Office – Writer

Word - Working with Documents-Open Office writer-formatting documents-Creating Tables- Table settings, Borders, Alignments, Insertion, deletion, Merging, Splitting, Sorting, and Formula, Insertion of Objects: Equation Editor, Organizational Chart, Drawing - Inserting Clip Art Pictures - Spell Checks, Mail merge, Templates, Creating contents for books, Creating Letter/Faxes, Creating Web pages, Using Wizards, Tracking Changes, Security, Digital Signature. Printing Documents – Shortcut keys.

Unit-3: Introduction to Excel

Spread Sheet & its Applications, Opening Spreadsheet, Menus - main menu, Formula Editing, Formatting, Toolbars, Using Icons, Using help, Shortcuts, Spreadsheet types. Working with Spreadsheets- Formatting Spreadsheets-OpenOffice-Calc - Introduction – Introduction to Spreadsheets, Overview of a Worksheet, Creating Worksheet & Workbooks, Organizing files, Managing files & workbooks, Functions & Formulas, Working with Multiple sheets, Creating Charts & Printing Charts – Operating with Excel documents, which are already created and saved in Excel.

Unit-4 Introduction to Access and Power point

Access: Introduction, Designing a Database, Starting Access, Access Screen, Creating a New Database, Creating Tables, Working with Forms, Creating queries, Finding Information in Databases, Creating Reports, Types of Reports- Power point: Introduction to presentation – Opening new presentation, Different presentation templates, Setting backgrounds, Selecting presentation layouts. Creating a presentation - Setting Presentation style, Adding text to the Presentation

Unit-5 Internet and advanced Communication

Internet and Web Browsers-internet browsing, searching - Search Engines - Portals - Social Networking sites- Blogs - viewing a webpage, downloading and uploading the website; Creating an email-ID, e-mail reading, saving, printing, forwarding and deleting the mails, checking the mails, viewing and running file attachments, addressing with cc and bcc-Introduction to various devices & Applications: Other than the computers, (electronic gadgets), which are widely using by executives in the Offices – Tablet, Smart Phone – concept of mobile phone and Tablet and their uses – Various applications using by Tablets and Smart Phones such as UC browser, WhatsApp, Maps, Skype, e payments.

Reference Books:

1. Sathish Jain, M.Geetha, Karthika, "MS-Office 2010 – Training Guide", BPB Publications, 2010.
2. Bittu Kumar, "Mastering MS-Office: Computer Skill Development: be Future Ready", BPB Publications, 2017.

Course Outcome

Upon completion of this course, the students will be able to

K6,K2, K4	**CO1**	enable the students to identify the components of a computer Acquaints them with the knowledge on hardware, peripherals and software.
K2, K5	**CO2**	acquaints them with the knowledge on hardware, peripherals and software
K6,K5	**CO3**	makes them to understand High Level Language, Low Level Language, testing and directory
K3,K2,K5	**CO4**	enables them to understand the application of computers in our daily life
K5,K6	**CO5**	makes the participants to understand various services based on online and offline

ज्ञान-विज्ञान विमुक्तये
प्रो. (डॉ.) जसपाल एस. सन्धू
सचिव
Prof. Dr. Jaspal S. Sandhu
MBBS, MS (Ortho), DSM, FAIS, FASM, FAFSM, FFIMS, FAMS
Secretary

सत्यमेव जयते

विश्वविद्यालय अनुदान आयोग
University Grants Commission
(मानव संसाधन विकास मंत्रालय, भारत सरकार)
(Ministry of Human Resource Development, Govt. of India)
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Bahadur Shah Zafar Marg, New Delhi-110002
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D.O.No.F.1-2/2017(CPP-II) 19th June, 2017

Dear Sir/Madam,

In continuation to this office letter of even number dated 20th July, 2014 and letter No. 13-1/2000(EA/ENV/COS-I) dated 07.08.2014, 20.11.2014 and 30.03.2015 regarding compulsory implementation of module syllabus on Environmental Studies for undergraduate course of all branches of higher education in universities and colleges as per directives of the Hon'ble Supreme Court of India, University Grants Commission with the help of an Expert Committee has framed 8 units module syllabus for Ability Enhancement Compulsory Courses (AECC-Environmental Studies) under CBCS. The module is available on University Grants Commission website www.ugc.ac.in. I request you to take necessary steps for implementation of the directions of the Hon'ble Supreme Court.

It is brought to your notice that non-implementation of the order of Hon'ble Supreme Court, in its letter and spirit, amounts to contempt of court. This may also be informed to all the Colleges affiliated to your esteemed University.

With kind regards,

Yours sincerely,

(Jaspal S. Sandhu)

The Vice-Chancellor of all Universities.

Copy to :

The Publication Officer, University Grants Commission for uploading on UGC website.

(Jaspal S. Sandhu)

Ability Enhancement Compulsory Courses (AECC – Environmental Studies)

Unit 1: Introduction to environmental studies

- Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere.
- Scope and importance; Concept of sustainability and sustainable development.

(2 Lectures)

Unit 2: Ecosystems

- What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems:
  a) Forest ecosystem
  b) Grassland ecosystem
  c) Desert ecosystem
  d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

(6 Lectures)

Unit 3: Natural Resources: Renewable and Non-renewable Resources

- Land Resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- Heating of earth and circulation of air; air mass formation and precipitation.
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

(8 Lectures)

Unit 4: Biodiversity and Conservation

- Levels of biological diversity :genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

(8 Lectures)

Unit 5: Environmental Pollution

- Environmental pollution : types, causes, effects and controls; Air, water, soil, chemical and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste..
- Pollution case studies.

(8 Lectures)

Unit 6: Environmental Policies & Practices

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
- Environment Laws : Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC).
- Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context

(7 Lectures)

Unit 7: Human Communities and the Environment

- Human population and growth: Impacts on environment, human health and welfares.
- Carbon foot-print.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management: floods, earthquakes, cyclones and landslides.
- Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

(6 Lectures)

Unit 8: Field work

- Visit to an area to document environmental assets; river/forest/flora/fauna, etc.
- Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

(Equal to 5 Lectures)

Suggested Readings:

1. Carson, R. *2002. Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R.1993. This *Fissured Land:* An Ecological History of India. Univ. of California Press.
3. Gleeson,B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P.H. 1993. Water in *Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. *Principles of Conservation Biology*.
   Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. McCully, P.1996. *Rivers no more: the environmental effects of dams*(pp. 29-64). Zed Books.
8. McNeil, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, h.T. & Andrews, J.1971. *Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. *Waste Water Treatement*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. *Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M.L. 2001. *Environmental law and policy in India*. Tripathi 1992.
14. Sengupta, R. 2003.*Ecology and economics:* An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. 1998. *Land of the Tiger: A Natural History of the Indian Subcontinent*.
18. Warren, C.E. 1971. *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E.O. 2006. *The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on environment and Development. 1987. *Our Common Future*. Oxford University Press.
21. www.nacwc.nic.in
22. www.opcw.org

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL

SYLLABUS FOR MALAYALAM

(Choice Based Credit System)

From 2021-2022 Onwards

Syllabus for UG Part- I- MALAYALAM(CBSC)

For those who joined in 2021-2022 academic year and after.

First Semester

Paper -1 History of Malayalam Literature

Syllabus

This Paper will have the following five units:-

Unit- I Brief history about Malayalam literature - Paattu – Manipravalam- gaatha.

Unit –II Ezhuthachan and his works - Kunjan Nambiar and his works.

Unit-III Brief history of Kathakali, attakkatha and thullal

Unit –IV Brief History of Modern Malayalam Poetry.

Unit-V Brief history of Malayalam Novel, Short story and Dramma.

Reference Books:

1. Kerala Sahithya Charitram- Ulloor (University of Kerala)
2. Kairaliyude Kadha- Krishnan Pillai (D C Books, Kottayam)
3. Sahithya Charitram Prasathanangalilude –Dr.K.M.George (D C Books, Kottayam)
4. Malayala Novel Sahithya Charitram- K.M.Tharakan(Kerala Sahithya Academy)

Second Semester

Paper II Prose

Syllabus

This Paper will have the following five units:-

Unit –I Novel

Unit-II Novel

Unit-III Collection of Short stories

Unit-IV Collection of Essays

Unit-V Biography/ Autobiography

Text Books:

Unit-I "Gurusagaram" - O.V. Vijayan (D C Books, Kottayam)

Unit-II Randitangazhi – Thakazhi Siva Sankaran Pillai (DC Books, Kottayam)

Unit-III 1)Uthuppante Kiner-Karoor Neelakantapillai (DC Books, Kottayam)

2) Ente Priyapetta Kadhkal- (First two short stories)-M.T.Vasudevan Nair (D C Books, Kottayam)

3) Nadiyum thoniyum – M.Mukundan (D C Books, Kottayam)

Unit-IV Theranjedutha Prabanthangal (First THREE Essays)- M.K.Sanu. (D C Books, Kottayam)

Unit-V Kannerum Kinavum -V.T. Bhattathiripadu.(D C Books, Kottayam)

Third Semester

Paper III Poetry

Syllabus

This Paper will have the following five units:-

Unit-I Khandakaviyam

Unit-II Khandakaviyam

Unit-III Four poems of Modern Malayalam poetry.

Unit-IV and V Bhakthi Kaviyam

Text Books:

Unit I -Chinthavishtayaya Seetha-Kumaranasan (National Book stall, Kottayam)

Unit II- Achanum makalum- Vallathol (D C Books, Kottayam)

Unit -III 1) Odakkuzhal-G.Shankarakurup (D C Books)

2) Maambazham- Vylopilli Sreedharan Menon (D C Books)

3) Kadevide Makkale- Ayyappa Panniker (D C Books, Kottayam)

4) Venal Mazha- Sachidanandan (D C Books, Kottayam)

Unit IV "Lokame Yathra" - Sr. Mary Banenja (D C Books, Kottayam)

Unit V Gajendramoksham- Sugathakumari (D C Books, Kottayam)

Fourth Semester

Paper IV Inter Disciplinary and Allied topics

Syllabus

This Paper will have the following five units:-

Unit I–Drama

Unit II - Drama

Unit- III and IV – Folklore

Unit-V – Film script

Text Books:

Unit I - Kanyaka- N. Krishnapillai (D C Books, Kottayam)

Unit II - Avan Veendum Varunnu- C.J.Thomas (Kerala Sahithya Academy, Thrissur)

Unit-III & IV – Potten,theyyam - Prof. Lizy Mathew (Kerala Bhasha Institute,Trivandrum)

Unit –V – Kadavu- M.T.Vasudevan Nair (D C Books, Kottayam)

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL – 624102

COMMON PAPER FOR UG

COURSE CODE	**U21CSS31 / U21MSS42**	**MANAGERIAL SKILLS**	**L**	**T**	**P**	**C**
SKILL BASED ELECTIVE			**2**	**-**	**-**	**2**
Cognitive Level	**K2: Understand** **K3: Apply** **K4: Analyse** **K5: Evaluate**					
Course Objectives	**The course aims** 1. To make students well versed with the managerial skills 2. To strengthened managerial skills, like decision-making skills, team development, conflict management and time management. 3. To develop critical thinking skills and the ability to use a process for decision making.					

Unit 1: Managing Self and Others
Importance of Knowing Oneself - Process of Knowing Oneself - SWOT Analysis -Stages in Interpersonal Relationship - Relationship Building

Unit 2: Managing Time
The 80:20 rule - Time Management Matrix - Scheduling - Grouping of Activities - Overcoming Procrastination - Time Circle Planner

Unit 3: **Decision Making**
Decision Making Process - Steps in Effective Decision Making - Effective Decision Making in Teams - Decision Making Styles

Unit 4: **Team Building and Leadership**
Skills Needed for Teamwork - Characteristics of an Effective Team - Leadership Traits - Leadership Styles

Unit 5: Conflict Resolution and Stress Management

Sources of Conflict - Functional vs. Dysfunctional Conflict - Managing Conflicts - Importance of Work-Life Balance - Achieving Work-Life Balance

Text Book

1. Alex K., Managerial Skills, S. Chand, 2013

Reference:

1. McGrath E. H., Basic Managerial Skills for All, PHI, 2011
2. Harvard Business Review Manager's Handbook: The 17 Skills Leaders Need to Stand Out (HBR Handbooks), Harvard Business Review Press, 2017

Course Outcomes

On successful completion of the course, the students will be able to,

K2	**CO1**	identify and reflect the personal characteristics of students that helps them achieve and expand their objectives within the workplace.
K3	**CO2**	understand the importance of time management and exhibit self-management by setting reasonable boundaries.
K3	**CO3**	equip to understand and influence the decision-making processes of other individuals and groups.
K5	**CO4**	enhance creativity, confidence, teamwork, and problem-solving skill
K4	**CO5**	understand the key practical and theoretical concepts of managing and resolving conflicts.

K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

DEPARTMENT OF ENGLISH AND FOREIGN LANGUAGES
SYLLABUS FOR
PART-II ENGLISH
III & IV SEMESTER

2021

BOARD OF STUDIES HELD ON 29-04-2021

SEMESTER-III
U21LEN33- PART II ENGLISH- GENERAL ENGLISH-I

Total Number of Hours: 90

Course Objectives:

To sensitize students to learn Language through Literature

- To develop their skills in comprehension and communication
- To improve their fluency in the English language
- To enhance their LSRW skills
- To enable them to appreciate the nuances of Language with the integration of Technology

UNIT I: Prose(Practice)

1. Speaking and listening
    a. Participating in group discussions
2. Reading and writing
    i. Reading aloud
    ii. Identifying mood, tone, point of view
    iii. Working with diction

A.G. Gardiner	**All About a Dog**
Ernest Hemingway	**A Day's Wait**
Anton Chekhov	**The Lottery Ticket**
Swami Vivekananda	**Chicago Address 1893**
Ruskin Bond	**The Thief**

UNIT II: Poetry-(Practice)

1. Speaking and Listening
    a. Making short presentations
    b. Interactions during and after the presentations
2. Reading and Writing
    a. Reading poetry
        i. Reading aloud: (Intonation and Voice Modulation)
        Identifying and using simile, metaphor, personification

John Donne -	**The Flea**
Lord Byron	**She Walks in Beauty**
Robert Frost	**Stopping by Woods on a Snowy Evening**
Rabindranath Tagore	**Where the Mind is Without Fear**
Nissim Ezekiel	**Night of the Scorpion**

UNIT III: Fiction

1. Speaking and Listening
    a. Listening to an understanding different accents
2. Reading and Writing
    Reading visual texts
    Writing short assignments

Prema Srinivasan : And Finally, A Blessing!

UNIT IV: Grammar

1. Grammar in Context with the prescribed prose/fiction

Tenses and Types and its usage
Agreement
Degrees of Comparison

UNIT V: Composition

Letter Writing
Report Writing
Writing a Paragraph on General Topics

RECOMMENDED BOOKS:

Wisdom and Experience: An Anthology for Degree Classes. Board of Editors, Orient Longman Limited, 2007
LalithaNatarajan&SasikalaNatesan*English for Excellence: Poetry* Anuradha Publications
Literary Pursuits: Board of Editors, Orient Longman Limited, 2015
Literary Pinnacles: An Anthology of Prose and Poetry. Board of Editors, Orient Longman Limited, 2015
Brookside Musings: A Selection of Poems and Short Stories: Board of Editors, Orient Longman Limited, 2009
The Approach to Life: A Selection of English Prose: Orient Longman Limited, 2009
Srinivasan, Prema : And Finally, A Blessing!, Authors Upfront (21st January 2021)

E-RESOURCES:

Lord Byron: She walks in Beauty
https://poets.org/poem/she-walks-beauty
John Donne: The Flea
https://www.poetryfoundation.org/poems/46467/the-flea
Anton Chekhov: The Lottery Ticket
https://www.classicshorts.com/stories/lottery.html
Ruskin Bond: The Thief
http://short-storylovers.blogspot.com/2012/07/thief-by-ruskin-bond.html
Prema Srinivasan: And Finally, A Blessing!

Amazon India -
https://www.amazon.in/dp/9387280888/

Course Outcome:
Upon the completion of the course, students will be able to,

- develop their skills in comprehension and communication
- improve their fluency in the English language
- enhance their LSRW skills
- appreciate the nuances of Literature and Language with the integration of Technology
- use English effectively for study purpose across the curriculum;

SEMESTER-IV

U21LEN44- PART II ENGLISH- GENERAL ENGLISH-II

TOTAL NUMBER OF HOURS: 90

COURSE OBJECTIVES:

 To sensitize students to learn Language through Literature
 To develop their skills in comprehension and communication
 To improve their fluency in the English language
 Todevelop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing;
 To enable them to appreciate the nuances of Languageand Literature
To use English effectively for study purpose across the curriculum;

UNIT I: PROSE

1. Speaking and listening
    i. Participating in group discussions
2. Reading and writing
    i. Reading aloud
    ii. Identifying mood, tone, point of view
    iii. Working with diction

A.J.Cronin	The Best Investment I Ever Made
R.K.Laxman	The Gold Frame
C.V.Raman	Water, the Elixir of Life
Leo Tolstoy	God Sees the Truth, But Waits

UNIT II: POETRY

1. Speaking and Listening
   i, Making short presentations
   ii. Interactions during and after the presentations

3. Reading and Writing
   a. Reading poetry
      i. Reading aloud: (Intonation and Voice Modulation)
      ii. Identifying and using simile, metaphor, personification

Alfred Noyes	The Highwayman
Wallace Stevens	The Emperor of Ice cream
Langston Hughes	The Ballad of the Landlord
Kamala Das	My Grandmother's House

UNIT III: DRAMA

1. Speaking and Listening
   i. Listening to an understanding of different accents, tone and intonation
   ii. Participation in discussion and dialogues
2. Reading and Writing

i. Reading visual texts
   ii. Writing short assignments
      ii. Dramatizing everyday situations/social issues through skits. (writing scripts and performing)
      iii. Girish Karnad*Tughlaq*

UNIT IV: GRAMMAR

1. Grammar in Context with the prescribed prose / Drama

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

UNIT V: COMPOSITION

1. Speaking and Writing

Self Introduction and Introducing Others
Note Making
Narration and Description

RECOMMENDED BOOKS:

Wisdom and Experience: An *Anthology for Degree Classes*.Board of Editors, Orient Longman Limited, 2007

Lalitha Natarajan &SasikalaNatesan*English for Excellence: Poetry* Anuradha Publications
Literary Pursuits: Board of Editors, Orient Longman Limited, 2015
Literary Pinnacles: An Anthology of Prose and Poetry. Board of Editors, Orient Longman Limited, 2015
Brookside Musings: A Selection of Poems and Short Stories: Board of Editors, Orient Longman Limited, 2009
The Approach to Life: A Selection of English Prose: Orient Longman Limited, 2009

E- RESOURCES:
A.J Cronin: The Best Investment I ever made
https://www.youtube.com/watch?v=e75YgGoj-U
R.K Lakman: The Gold Frame
https://www.slidshare.net/kaushal111/the- gold-frame -by-rk-laxman
Raman: Water .The Elixir of life ppt
http://cms.gcg11.ac.in/attachment/article/96/The Elixir of Life.pdf
Leo Tolstoy: God sees the truth but waits
http://www.lonestar.edu/departments/english/tolstoy god sees.pdf

Course Outcome:
Upon the completion of the course, students will be able to,

- learn Language through Literature
- develop their skills in comprehension and communication
- improve their fluency in the English language
- develop and integrate the use of the four language skills i.e. Reading, Listening, Speaking and Writing;
- appreciate the nuances of Language and Literature
- use English effectively for study purpose across the curriculum
- narrate simple experiences and series of events to convey its essence and intention,
- describe accurately what they observe and experience

As per TANSCHE, External Examination Model:

Prose	-15Marks
Poetry	-15 Marks
Drama/ Novel/ Short Story	-10 Marks
Communicative Skills-	-35Marks

Total -75 Marks

MOTHER TERESA WOMEN'S UNIVERSITY, KODAIKANAL

Part – I – Common Tamil

பொதுத்தமிழ்

(From the year 2021 onwards)

முதலாம் ஆண்டு – முதல் பருவம்

தாள் - 1 - **இக்கால இலக்கியம்**

அலகு – 1. கவிதை இலக்கியம்.

1.1 பாரதியார் கவிதைகள் - 20. செந்தமிழ் நாடு
21. தமிழ்த்தாய்
22. தமிழ்
23. தமிழ்மொழி வாழ்த்து
25. வாழிய செந்தமிழ் ---------- 5 கவிதைகள்

1.2. பாரதிதாசன்
1. தமிழின் இனிமை
2. இன்பத் தமிழ்
3. தமிழ் உணவு
4. தமிழ்ப் பேறு
5. எங்கள் தமிழ்
6. தமிழ் வளர்ச்சி ---------- 6 கவிதைகள்

மீரா - குக்கூ கவிதைகள் கவிதை எண் - 1,2,3,6,7,8,10,14,15,16,20,21,23,26,27------ 15 கவிதைகள்

அலகு – 2. புதின இலக்கியம்

கல்கி - தியாக பூமி (124 பக்கங்கள்) மதுரை மின்நூல் தொகுப்புத்திட்ட நூலகம்

அலகு – 3. சிறுகதை இலக்கியம்

என் சொக்கன் - அறிவியல் கதைகள், சென்னை, பாரதன் பப்ளிக்கேஷன் பிரைவேட் லிமிடெட்

அலகு – 4 நாடகம் / கட்டுரை இலக்கியம்

துருவன் கோபாலகிருஷ்ணன் - சாகுந்தலம் (கவிதை நாடகம்) சென்னை உலகத் தமிழ் ஆராய்ச்சி நிறுவனம்

மறைமலை அடிகள்- தனித்தமிழ் மாட்சி – (9 கட்டுரைகள்) (47 பக்கங்கள்)மதுரை மின்நூல் தொகுப்புத்திட்ட நூலகம்

அலகு – 5 இக்கால இலக்கியம் - கவிதை, சிறுகதை, புதினம், நாடகம், உரைநடை ஆகியவற்றின் தோற்றம், வளர்ச்சி, வரலாறு.

மொழிப்பயிற்சி:

- 20 தமிழ்ச் சொற்களுக்கு அகராதி பார்த்துத் தமிழில் பொருள் எழுதுதல்
- 20 தமிழ்ச் சொற்களுக்குக் கணினி இணைய வழி ஆங்கில மொழிபெயர்ப்பைத் தேடிக் கண்டறிந்து தருதல்.
- நாளிதழில் இருந்து பத்து தொடர்களை எழுதி, அவற்றில் இடம் பெற்றிருக்கும் பெயர்ச் சொற்கள், மூவிடப் பெயர்கள், பெயரடைகள்,வினைச்சொற்கள், வினையடைகள், வேற்றுமை உருபுகள்,காலம் காட்டும் வினை உருபுகள், பால் காட்டும் விகுதிகளை அடிக்கோடிட்டுத் தனித்தனியாகக் குறிப்பிட வேண்டும்
- நேர் கூற்றில் அமையும் 5 தொடர்களைக் கொண்ட உரையாடலை எழுத வேண்டும்.
- ஐந்து தொடர்களை அயற்கூற்றில் மாற்ற வேண்டும்.

பாட நூல்கள்:

1. பாரதியார் - பாரதியார் கவிதைகள்
2. பாரதிதாசன் - பாரதிதாசன் கவிதைகள்
3. மீரா - குக்கூ கவிதைகள் (தமிழ் இணைய கல்விக்கழக நூலகம்)
4. கல்கி - தியாக பூமி (124 பக்கங்கள்) மதுரை மின்நூல் தொகுப்புத்திட்ட நூலகம்
5. என் சொக்கன் - அறிவியல் கதைகள், சென்னை, பாரதன் பப்ளிக்கேஷன் பிரைவேட் லிமிடெட்
6. துருவன் கோபாலகிருஷ்ணன் - சாகுந்தலம் (கவிதை நாடகம்) சென்னை உலகத் தமிழ் ஆராய்ச்சி நிறுவனம்
7. மறைமலை அடிகள் - தனித்தமிழ் மாட்சி – (9 கட்டுரைகள்) (47 பக்கங்கள்) மதுரை மின்நூல் தொகுப்புத்திட்ட நூலகம்

முதலாம் ஆண்டு - இரண்டாம் பருவம்

தாள் - 2 - இடைக்கால இலக்கியம்

அலகு – 1 – சிற்றிலக்கியம்

1.1. ஸ்ரீ கோதை நாச்சியார் தாலாட்டு - பெரியன் சீனிவாசன், ஆழ்வார் திருநகரி முத்திரைப் பிரசுராலயம் 1928. (மதுரை மின்நூல் தொகுப்பு திட்டம்)

1.2. திருத்தக்க தேவர் - நரி விருத்தம் (மதுரை மின்நூல் தொகுப்பு திட்டம்)

1.3. தண்டலையார் சதகம் - முதல் பத்து பாடல்கள்

அலகு – 2 காளமேகப் புலவர் - சிலேடைக் கவிகள் - 5

1. முத்திருக்கும் கொம்பசைக்கும்....
2. வாரிக் களத்தடிக்கும் .....
3. நஞ்சிருக்கும், தோலுரிக்கும்...
4. ஆடிக்குடத்து அடையும்...
5. பெரிய விடமே சேரும்...

2.2 .குணங்குடி மஸ்தான் சாகிபு - பராபரக் கண்ணி–(1 முதல் 10 கண்ணிகள் மட்டும்)

2.3. வேதநாயக சாஸ்த்திரியார் - பெத்லகேம் குறவஞ்சியில் (நாடு, நகர், மலைவளம் கூறும் பகுதிகள் மட்டும்)

அலகு – 3. சைவ, வைணவ இலக்கியம்

3.1. சைவ இலக்கியம் - காரைக்காலம்மையின் திருவிரட்டை மணி மாலை முழுதும்.

3.2. தொண்டரடிப் பொடியாழ்வார் - திருமாலை – முழுதும் (45 செய்யுட்கள்)

அலகு – 4. தமிழச் சிற்றிலக்கியம், சமய இலக்கியங்கள் குறித்த வரலாறு.

அலகு – 5 மொழிப் பயிற்சி - 1. தன் விவரக் குறிப்பு எழுதுதல்
2. விண்ணப்பக் கடிதம் எழுதுதல்
3. தன் வரலாற்றுக் கட்டுரை எழுதுதல்
4. இலக்கியக் கட்டுரை எழுதுதல்

பாட நூல்கள்:

1. ஸ்ரீ கோதை நாச்சியார் தாலாட்டு - பெரியன் சீனிவாசன் ஆழ்வார் திருநகரி, முத்திரைப் பிரசுராலயம் 1928. (மதுரை மின்நூல் தொகுப்பு திட்டம்)
2. திருத்தக்க தேவர் - நரி விருத்தம் (மதுரை மின்நூல் தொகுப்பு திட்டம்)
3. தண்டலையார் சதகம்
4. குணங்குடி மஸ்தான் சாகிபு
5. வேதநாயக சாத்திரியார் - பெத்லகேம் குறவஞ்சி
6. காரைக்காலம்மையின் திருவிரட்டை மணி மாலை
7. தொண்டரடிப் பொடியாழ்வார் - திருமாலை

இளங்கலை இரண்டாம் ஆண்டு - மூன்றாம் பருவம்
பகுதி – 1 – பொதுத் தமிழ்
தாள் - 3- காப்பிய இலக்கியம்

அலகு – 1

1.1- சிலப்பதிகாரம்
1. மங்கல வாழ்த்துப் பாடல்
2. மனையறம் படுத்த காதை
3. அரங்கேற்று காதை

1.2. மணிமேகலை
சிறைக்கோட்டம் அறக்கோட்டம் ஆக்கிய காதை மட்டும்

அலகு – 2

2.1 - கம்பராமாயணம் - 5. சுந்தர காண்டத்தில் ஆறாவது சூடாமணிப் படலம் மட்டும்
2.2. திருவிளையாடல் புராணம் - தருமிக்குப் பொற்கிழி அளித்த படலம்

அலகு - 3 - சீறாப் புராணம்
3.1. ஹிஜிறத்துக் காண்டம் - அதில் ஏழாவதாக வரும் மதீனம் புக்க படலம் மட்டும்.
3.2. இரட்சணிய யாத்திரிகம் - ஞானாசிரியனைக் கண்ணுற்ற படலம்

அலகு - 4. தமிழில் காப்பியங்கள் பற்றிய வரலாறு கூறும் தமிழ் இலக்கிய வரலாற்றுப் பகுதி

அலகு - 5. மொழிப் பயிற்சி
தமிழ் எழுத்துருவை அலைபேசியில் பதிவிறக்கம் செய்து ஐந்து தொடர்களைத் தமிழில் கணினியச்சு செய்தல் -

1. தமிழ் மின்நூலகங்கள் - ஒன்றைப் பற்றிக் குறிப்பிட வேண்டும்
2. தமிழ் மின்நூலகங்கள் - ஒன்றைப் பற்றிக் குறிப்பிட வேண்டும்.
3. தமிழ் மின் இதழ்கள் - ஒன்றைப் பற்றி அறிதல்.
4. தமிழில் கட்டற்ற மென்பொருட்கள் - தமிழ் மென் பொருட்கள் பற்றி அறிதல்

இது மாணவரது கணித்தமிழ் பயிற்சிக்காக மட்டுமே. இதில் வினா ஏதும் கேட்கப்படக் கூடாது.

பாட நூல்கள்:

1. சிலப்பதிகாரம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ் இணையக் கல்விக் கழக நூலகம்
2. மணிமேகலை - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ் இணையக் கல்விக் கழக நூலகம்
3. கம்பராமாயணம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ் இணையக் கல்விக் கழக நூலகம்
4. திருவிளையாடல் புராணம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ் இணையக் கல்விக் கழக நூலகம்
5. சீறாப்புராணம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ் இணையக் கல்விக் கழக நூலகம்
6. இரட்சணிய யாத்திரிகம் - மதுரை மின்நூல் தொகுப்பு திட்ட நூலகம், தமிழ் இணையக் கல்விக் கழக நூலகம்

இளங்கலை – பொதுத்தமிழ் - பகுதி – 1
இரண்டாம் ஆண்டு – நான்காம் பருவம்
தாள் - 4 – பழந்தமிழ் இலக்கியம்

அலகு – 1- சங்க இலக்கிய எட்டுத்தொகை நூல்களில் இடம் பெற்றுள்ள ஐந்திணைசார் செய்யுட்கள்

1. குறிஞ்சித்திணைச் செய்யுள் - அகநானூறு - 82
2. மருதத்திணைச் செய்யுள் - குறுந்தொகை -75 - படுமரத்து மோசி கீரனார்
3. நெய்தல் திணைச் செய்யுள் - ஐந்குறுநூறு -18 - தொண்டிப்பத்து - அம்மூவனார்
4. முல்லை திணைச் செய்யுள் - கலித்தொகை - முல்லைக்கலி – 102 சோழன் நல்லுருத்திரன்
5. பாலைத் திணைச் செய்யுள் - நற்றிணை - 137 – பெருங்கண்ணனார்

அலகு – 2. பத்துப்பாட்டில், திருமுருகாற்றுப்படை மட்டும்

அலகு – 3 புறநானூற்றில் அரசர்கள், அரச மகளிர் இயற்றிய செய்யுட்கள்

1 செய்யுள் -71 - ஒல்லையூர் தந்த பூதப்பாண்டியன் பாடல்
1 செய்யுள் -182 - கடலுள் மாய்ந்த இளம்பெருவழுதி
3 செய்யுள் -214,215,216 - கோப்பெருஞ்சோழன்
1 செய்யுள் -74 - சேரமான் கணைக்கால் இரும்பொறை
1 செய்யுள் -245 - சேரமான் கோட்டம்பலத்துத் துஞ்சிய மாக்கோதை.
1 செய்யுள் -173 சோழன் குளமுற்றத்துத் துஞ்சிய கிள்ளி வளவன்.
1 செய்யுள் -190 - சோழன் நல்லுருத்திரன்
2 செய்யுள் -73,75 - சோழன் நலங்கிள்ளி
1 செய்யுள் -185 - தொண்டைமான் இளந்திரையன்
1 செய்யுள் -188 - பாண்டியன் அறிவுடைநம்பி
1 செய்யுள் -183 - பாண்டியன் ஆரியப்படை கடந்த நெடுஞ்செழியன்
1 செய்யுள் -112 - பாரி மகளிர்
1 செய்யுள் -246 - பூதப்பாண்டியன் தேவி பெருங்கோப்பெண்டு ----------**16 செய்யுட்கள்**

அலகு – 4 அற இலக்கியம்

4.1. திருக்குறள் - கல்வி(40) கேள்வி (42) அறிவு உடைமை (43) கல்லாமை (41)
முதுமொழிக் காஞ்சி – 2. அறிவுப் பத்து 10. தண்டாப் பத்து.

அலகு - 5. இலக்கிய வரலாறு – சங்க இலக்கிய வரலாறு – பதினெண் கீழ்க்கணக்கு வரலாறு – செவ்வியல் இலக்கிய வரலாறு.

மொழிப் பயிற்சி:

1. ஏதேனும் ஒர் தமிழ் நூலை இணையத்தில் தேடிக் கண்டறிதல்
2. தமிழ் நூலை இணையவழித் தேடி பெறுவதற்குரிய நெறிமுறைகள் - பதிவிறக்கம் செய்தல் -விலைக்குப் பெறுதல்
3. வணிகக் கடிதம் எழுதுதல்
4. இரண்டு பக்க அளவில் சிறுகதை எழுதுதல்
5. பதினைந்து அடிகளில் புதுக்கவிதை எழுதுதல்

இப்பகுதி மாணவியருக்குப் பயிற்சி தருவது. இதிலிருந்து தேர்வுக்கான வினாக்கள் கேட்கக் கூடாது.

பாட நூல்கள்:

1. சங்க இலக்கியம் - மூலமும், உரையும் - ச.வே. சுப்பிரமணியம்,சென்னை, மணிவாசகர் பதிப்பகம், 2014
2. பத்துப்பாட்டு - மூலமும், உரையும் - ச.வே. சுப்பிரமணியம், சென்னை, மணிவாசகர்பதிப்பகம், 2014
3. செவ்வியல் நூல்கள் (தொ.நூ) - தஞ்சைத் தமிழ் பல்கலைக்கழகம்
4. தமிழ் இலக்கிய வரலாறு (மு.வரதராசன், சாகித்திய அகாதெமி பப்ளிகேஷன்)

Mother Teresa Women's University,
Kodaikanal
Value Education
Syllabus

<table>
<tr><td>Course Title & Code</td><td colspan="3">VALUE EDUCATION - U21VAE21</td></tr>
<tr><td>Semester</td><td>Semester-II</td><td>Credits:3</td><td>Hours/weeks: 3</td></tr>
<tr><td>Cognitive Level</td><td colspan="3">K1: Recall
K2: Understand
K3: Apply</td></tr>
<tr><td>Learning Objective</td><td colspan="3">At the end of the course the student will be able to
acquire the knowledge of nature, concepts of Values
explain the aims and objectives of value education.
develop skill to integrate value education in the present curriculum.
understand the various sources of Values.
describe the role of various agencies in fostering values.
discuss the need for Value Education at the tertiary Level.</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">Upon completion of this course, the students will be able to<table><tr><th>CO</th><th>Course Outcomes</th><th>Knowledge Level</th></tr><tr><td>CO1</td><td>gain knowledge on nature and classification of values</td><td>K1, K2</td></tr><tr><td>CO2</td><td>understand the sources of values and values of society and culture-Religion</td><td>K1, K2, K3</td></tr><tr><td>CO3</td><td>acquire knowledge on individual and collective values</td><td>K1, K2, K3</td></tr><tr><td>CO4</td><td>attain knowledge on need for value Education</td><td>K1, K2, K3</td></tr><tr><td>CO5</td><td>understand the importance of role of Parents-Role of Teachers</td><td>K1, K2, K3</td></tr></table></td></tr>
</table>

UNIT I: NATURE AND CONCEPT OF VALUES

Values: Meaning and Definitions- Nature and Concept of Values-Classification of Values- Instrumental Values: Personal values, Social values, Family values, Cultural values, Democratic values, Aesthetic Values, institutional values, spiritual values and Spirituality

Spiritual Self-sufficiency- Terminal values: Happiness, Self-Contentment, Self-Actualisation, Peace, Wisdom.

UNIT II: SOURCES OF VALUES

Sources of Values: Socio-Cultural Tradition: Demographic values, Values of Society and Culture-Religion: Hinduism, Christianity, Muslim and Jainism and Constitutional Values: Preamble of Indian Constitution, Democratic values, Secularism, Unity in Diversity-Universal Values: International Understanding, Universal Brotherhood, Eternal Bliss, Truth and Peace.

UNIT III: INDIVIDUAL AND COLLECTIVE VALUES

Individual Values: Self-respect, Self-motivation, Self Confidence, Self-Motivation, Honesty, Integrity, regularity, punctuality and Truthfulness- Psychological Values: Understanding Self: Innate Self and Acquired Self and Powers of Self, Purity in thoughts/words/deeds, Self-esteem, self-Recognition, Emotional Intelligence, Cognitive Ability- Collective values: Societal Values, Social Responsibilities of Individuals- -Healthy Responsibilities-Corporate Social Responsibility-Environmental Values- Eradication of Child Labour and bonded Labour and Child Marriage.

UNIT III: VALUE EDUCATION

Aims and Objectives of Value Education- Comments of the Various Committees on Value Education- Need for Value Education at the Tertiary Level (HEI): Anti ragging, Anti-drug, Harassment and Violence against Women -Value Education in 21st Century: Humanistic values for the 21st century, secular, democratic, and pluralistic, familial and global.

UNIT V: ROLE OF VARIOUS AGENGIES IN FOSTERING VALUES

Role of Parents-Role of Teachers: Personal Values and Code of Conduct for teachers-Role of Society- Role of Peer Group- Role of Religion- Role of Mass Media- Role of Voluntary Organizations- Role of Government.

PRACTICUM:

- Values though Dramatization,
- Practicing democratic and secular values through skit and dramas.

Text Book:

- Dr. Kiruba Charles., & V.Arul SelviValue Education, Neel Kamal Publications PVT. LTD. Educational Publishers, New Delhi, 2012.

Reference:

- Government of India, National Policy on Education (1968), New Delhi, 1968.
- Atkin, J., Values and Beliefs about Learning to Principles and Practice, Seminar Series no. 54. Incorporated Association of Registered Teachers of Victoria, Melbourne, 1996.
- Bhardwaj, I., Value-oriented Education, Journal of Value Education, Volume 5, Page 9-24, 2005.
- Prof.S.P.Rubela & Prof.Raj Kumar Nayak, Value Education and Human Rights Education, Neel Kamal Publications PVT. LTD, New Delhi, 2011.
- Dr. Sarojini - Biographical Values, Arasi Publishing House, Dindigul
- Ananda Valli Mahadevan and Rs. Jaya Kothaipillai (Editors) - Feminism, Mother Teresa Women's University, Kodaikanal, 2004.
- Ramathal,K.M. and Others, Protection of Women from Domestic Violence Act, 2005.
- Elamadhi Jannakiraman.K, and Others, Tamil and World Unity, Subramania Bharathiar Tamil Field, University of New Delhi, Pondicherry,2006.
- Eraianbu. Et. Al - Seventh Knowledge (Part 2), Thirst Publication, Chennai, 2002.
- Sinivasan.N.A.,Microeconomics(Part 2), Meenakshi Publishing, Madurai, 1998
- Saroja Pandian, Non-violent Resources and Ways of Violence in the Fourteenth Century, Pandian Publishing, Madurai, 2002.
- Paul's Firsts, Spirituality - Falsehood and Truth, Published by St. Mary's Church, Dindigul, 2001.
- Prema.R - Feminism, Tamil Bookshop, Chennai, 2005.
- Philipsudagar.C.S.,Religion-Literature - Manudam, Tamilkanal Publication, Dindigul, 2003.
- Vedathiri Maharishi, Psychological Art, Vedathiri Publishing, Erode, 1994.
- Shiv Kera (A. Gopal in Tamil) - You Can Win, Macmillan India Ltd., Chennai, 2002.
- ShanthiGhose– The Feeding and Care of Infants and Young Children, UNICEF, SEAR, Delhi, 1976.
- Adiseshiah,M.S., Report of the National Review Committee on Higher Secondary Education with Special Reference to Vocationalisation. Govt. of India, New Delhi, 1978.

MOTHER TERESA WOMEN'S UNIVERSITY

M.A. ENGLISH

REGULATIONS & SYLLABUS

(from 2021-2022)

Curriculum Framework and Syllabus for

M.A. ENGLISH

(For the candidates to be admitted from the academic year 2021-2022)

(UNDER CHOICE BASED CREDIT SYSTEM- CBCS)

Mother Teresa Women's University
Department of English & Foreign Languages

Choice Based Credit System (CBCS)

(2021-2022 onwards)

M.A. English

1. About the Programme

A degree in English language and literature is designed to get students reading books, analyzing theories, critiquing prose and verse, and taking a more critical look at the signs and words surrounding us every day. The aim is to get students thinking creatively and analytically about the English language; this differs from other modern language degrees as it is intended for students already proficient in written and spoken English. A course with a focus on English literature typically allows students to study literary texts from throughout history. The programme modules cover a diverse range of literature from different periods. The programme enables students to study and analyze passages, relating texts to their cultural, social, historical and political contexts.

An English language-focused degree will train students to analyze the workings of the English language outside of literature, including language-based communication in all kinds of forms and contexts. This could include analysis of casual spoken conversation, text speak, advertising methods or the uses of language in specialized legal and medical discourse.

2. Programme Educational Objectives

PEO1	To educate the students in both the artistry and utility of the English language through the study of literature and other contemporary forms of culture.
PEO2	To provide them with the critical faculties necessary in an academic environment, on the job, and in an increasingly complex, interdependent world.
PEO3	To graduate them who are capable of performing research, analysis, and criticism of literary and cultural texts from different historical periods and genres.
PEO4	To assist students in the development of intellectual flexibility, creativity and cultural literacy so that they may engage in life-long learning.
PEO5	To provide students with the critical faculties necessary in an academic environment, and in the complex and interdependent world.

3. Eligibility

A candidate who has passed and secured 50% in any UG degree courses of this University or any other University accepted by the syndicate is eligible for admission to the M.A. Programme. A relaxation of 5% in the total percentage will be given to SC, ST candidates.

4. General Guidelines for PG Programme

i. **Duration:** The programme shall extend through a period of 4 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	13	25	13	25
External	38	75	38	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	A	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	B	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	C	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 90**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade
(Performance in a Course/Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance less than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the PG Programmes are also applicable for this Programme.

M.A ENGLISH

Sl. No	Course Code	Course Title	Credits	Hours		(CIA)	(ESE)	Total
				L	P			
Semester I								
1.	P21ENT11	Core I: Indian Writing in English	4	5	-	25	75	100
2.	P21ENT12	Core II: Chaucer and the Elizabethan Age	4	6	-	25	75	100
3.	P21ENT13	Core III: The Augustan and the Romantic Age	4	6	-	25	75	100
4.	P21ENT14	Core IV: Children's Literature	4	6	-	25	75	100
5.	P21ENT15	Core V: Women's Writings	4	5		25	75	100
6.	P21ENS11	**Skill-based Supportive Course -I**Technology in Teaching English	2	2		25	75	100
		Total	**22**	**30**		**-**	**-**	**600**
Semester II								
7.	P21ENT21	Core VI: Indian Literature in English Translation	4	4	-	25	75	100
8.	P21ENT22	Core VII: The Victorian Age	4	4	-	25	75	100
9.	P21ENT23	Core VIII: The Contemporary Literature	4	4	-	25	75	100
10.	P21ENT24	Core IX: Subaltern Literature	4	5	-	25	75	100
11.	P21ENT25	Core X: Literary Criticism – I	4	5	-	25	75	100
12.		**Non Major Elective**	4	4	-	25	75	100
13.	P21CSS22	**Supportive Course- II:** Computer Skills for Web Designing and Video Editing	2	-	4	25	75	100
		Total	**26**	**30**		**-**	**-**	**700**
Semester III								
14.	P21ENT31	Core XI: Post-colonial	4	5	-	25	75	100

		Literature						
15.	P21ENT32	Core-XII: Eco-Literature	4	5	-	25	75	100
16.	P21ENT33	Core-XIII: Translation – Theory and Practice	4	5	-	25	75	100
17.	P21ENT34	Core-XIV: Literary Criticism – II	4	5	-	25	75	100
18.	P21ENT35	Core-XV: Research Methodology	4	4	-	25	75	100
19.	P21ENT36	Core-XVI: Intensive Study of an Author	4	4	6	25	75	100
20.	P21WSS33	**Skill-based Supportive Course III** - Women Empowerment	2	2	-	25	75	100
		Total	**26**	**30**				**700**
Semester IV								
21.	P21ENE411 / P21ENE412	Elective I* English for Careers/Presentations Skills/Any MOOC Course[$]	4	4	-	25	75	100
22.	P21ENE421 / P21ENE422	Elective II* English Grammar and Usage / English Language Teaching/ Any MOOC Course[$]	4	4	-	25	75	100
23.	P21ENR41	Project	8		22	25	75	100
		Total	**12**	**30**				**300**
Total			**90**	**120**				**2300**

Non-Major Elective

The candidates, who have joined the PG Programme, can also undergo Non-Major Elective offered by other Departments.

Non-Major Elective (NME) offered by the Department of English and Foreign Languages

NME P21ENN211-Writing Skills/P21ENN212-Art of Public Speaking

*Those who have CGPA 9 and want to do the project in industry/institution during 4th semester., these two paper can be opted in third semester

[$]The students can also take either one 4-credit course or two 2-credit courses in MOOC, with the approval of Departmental Committee.

Short-term and Value-added courses offered by the department to all PG students

Code	Title	Credit	Semester
P21ENV11	Media Writing (Value added Course)	2	First
S21SET21	Short Term Course in Spoken English	2	Second
P21ENO31	Online Course – MOOC	2	Third
S21FRT31	Short Term Course in French	2	Third
P21ENV42	Appreciation of Films- Value Added Courses	2	Fourth
P21ENI21	Internship/Industrial Training	2	End of Second Semester

Outside Class Hours (Attendance compulsory)

- Health, Yoga and Physical fitness.
- Library information access and utilisation
- Employability Training.
- Students Social Responsibility.

PROGRAMMEOUTCOMES(POs)

On successful completion of the M.A., (Eng. Lit) Degree Programme, the learners of the course would have attained:

PO1	Mastery of English language skills and forms to be used in explicitly meaningful contexts through literature and criticism.
PO2	Linguistic competence to be mastered in various real-life situations.
PO3	Appreciation and evaluation of the components, organizations, and structure of academic texts.
PO4	Capability to become full-fledged literary critics with a good attitude towards objective criticism and unbiased conclusions.
PO5	Integrated human values to become respectful humans and law-abiding citizens.
PO6	Managerial skills to work independently and in groups so that they could transform themselves into job-ready candidates and achieve their career goals
PO7	Widened perspective to face the literary and artistic challenges and incorporate ICT skills to clear competitive examinations like NET, SET, UPSC, TNPSC etc.

PROGRAMMESPECIFICOUTCOMES(PSOs)

Upon completion of the M.A., Degree Programme, the students must be able to

PSO1	gainknowledge of modern literature and technical aspects.
PSO2	prepareresearch articles and write creatively.
PSO3	acquirecompetency over the subjects learnt.
PSO4	scorewell in competitive and qualifying examinations.
PSO5	imbibehuman values in making model citizens.

SEMESTER - I

Course Code	P21ENT11	INDIAN WRITING IN ENGLISH	L	T	P	C
CORE- I			5	-	-	4
Cognitive Level	K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create					
Learning Objectives	**The course aims to** • analyze poetic techniques and themes in Indian writing in English • distinguish strategies and topics in Indian English Literature from that of Western models • assess literature as a kind that portrays the country with specific accentuation on postcolonial Indian experience of the country, its set of experiences, governmental issues and the job of memory • evaluate current composition as a portrayal of India's varietyintegrate writing and society discussing the social construction of Indian culture and Human Rights issues.					

Unit – I: Poetry

Nissim Ezekiel - Goodbye Party for Miss Pushpa T.S

A.K.Ramanujan - A River

Extended Family

Kamala Das - A Hot Noon in Malabar

An Introduction

Sarojini Naidu - Palanquin Bearers

Unit – II: Prose

R.K.Narayan – Headache

In the Confessional

Jawaharlal Nehru - For the Light that Shone in this Country was No Ordinary Light

The Role of Youth in Modern India

GowriRamnarayan - The Patriarch of Carnatic Music

Unit – III: Short Story

Mulk Raj Anand - The Terrorist

Anita Desai - Circus Cat, Alley Cat

Kushwant Singh - The Portrait of a Lady

Unit – IV: Drama

GirishKarnad - The Fire and the Rain

Unit – V: Novel

AravindAdiga - The White Tiger

Books for Reference:

1. Bharat, Meenakshi (ed.). Desert in Bloom: Contemporary Indian Women's Fiction in English. Pencraft International, 2004.
2. De Souza, Eunice. Talking Poems: Conversations with Poets. OUP, 1999.
3. Khair, TabishBabu. Fictions:Alienation in Contemporary Indian English Novels. OUP, 2001.
4. King, Bruce (ed.). Modern Indian Poetry in English. OUP, 2001.
5. Needham, AnuradhaDingwany. Using Master's Tools: Resistance and the Literature of the African and South Asian Diasporas. St. Martin's Press, 2000.
6. Mehrotra, Arvind Krishna (ed.). An Illustrated History of Indian Literature in English. Permanent Black, 2003.
7. Mukherjee, Meenakshi. The Perishable Empire: Essays on Indian Writing in English. OUP, 2000.
8. Sanga, Jaina C. Salman Rushdie's Postcolonial Metaphors: Migration, Translation, Hybridity, Blasphemy, and Globalization. Greenwood Press, 2001.
9. Lau, Lisa and E. Dawson Varughese, Indian Writing in English and Issues of Visual Representation.Macmilliam. 2010.
10. Mukherjee, Upamanyu. Postcolonial Environments: Nature, Culture and the Contemporary Indian Novel in English. Palgrave Macmillan. 2010.

E- Reference :

1. https://books.google.co.in/books?id=oWSqCQAAQBAJ&lpg=PP1&ots=HFajB8hmQh&dq=indian%20writing%20in%20english%20books&lr&pg=PP1#v=onepage&q&f=false
2. https://books.google.co.in/books?id=kFOCDAAAQBAJ&lpg=PP1&ots=G3T6bsyAhM&dq=indian%20writing%20in%20english%20literature%20books%20published%20after%202010&lr&pg=PP1#v=onepage&q&f=false

Course Outcomes:

At the end of the course, the students will be able to:

K1, K2	**CO1**	distinguish strategies and topics in Indian English Literature from that of Western models
K1, K2	**CO2**	analyze poetic techniques and themes in Indian writing in English
K5, K4	**CO3**	assess literature as a kind that portrays the country with specific accentuation on postcolonial Indian experience of the country, its set of experiences, governmental issues and the job of memory
K5, K1	**CO4**	evaluate current composition as a portrayal of India's variety
K6, K3	**CO5**	integrate writing and society discussing the social construction of Indian culture and Human Rights issues.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code	P21ENT12	CHAUCER AND THE ELIZABETHAN AGE	L	T	P	C
CORE- II			6	-	-	4
Cognitive Level	K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create					
Learning Objectives	The course aims to • introduce the great masters of the early period such as Chaucer, Spencer, Shakespeare, Marlowe and Donne. • introduce students to the seminal practitioners of English Literature and laying the foundation for contextualising specific texts against definite historical backdrops. • introduce the music and quaintness of the English sounds and vocabulary of the earliest period in English literary history to the students to enable them to have a historical perspective of the developments over the centuries.					

Unit – I:Poetry

Geoffrey Chaucer – 'The Squire', 'The Parson', 'The Prioress' and 'The Host' in "The General Prologue" from The Canterbury Tales

Edmund Spenser – Epithalamion

Shakespeare's Sonnets and Poems:

Sonnet – 1 (From fairest creatures we desire increase)

Sonnet – 18 (Shall I compare thee to a summer's day?)

Sonnet – 33 (Full many a glorious morning have I Seen)

Sonnet – 73 (That time of year thou mayst in me behold)

The Phoenix and the Turtle

Unit – II: Prose

Francis Bacon – Essays

Of Studies

Of Great Place

Of Travel

Of Wisdom for Man's Self

Unit – III: Drama

Christopher Marlowe - Tamburlaine

Ben Jonson – Volpone

Unit – IV: Drama

Shakespeare – 1.Antony and Cleopatra
2. Hamlet

Unit – V: Fiction

John Webster - The Duchess of Malfi
AphraBehn – Oroonoko

Books for Reference:

1. Broadbent, John. Milton: An Introduction. Cambridge: Cambridge University Press, 1973.
2. Cunningham, Valentine, ed. Victorian Poets: A Critical Reader features a collection of critical essays focusing on various aspects of Victorian-era poetry from the 1830s to the 1890s. New Jersey: Wiley-Blackwell, 2014.
3. Gardner, Helen, ed. The Metaphysical Poets. New Delhi: Rupa and Co., 1980.
4. Hammond, Gerald. Elizabethan Poetry: Lyrical and Narrative - A Selection of Critical Essays.UK: Palgrave Macmillan, 1984.
5. Higgins, Michael, Clarissa Smith, John Storey. ed. The Cambridge Companion to Modern British Culture. Cambridge: Cambridge University Press, 2010.
6. Persson, James and Watson.R. Robert. Encyclopedia of British Poetry 1900 to the Present. Facts on File. 22 April 2015.

E- Reference:

1. https://books.google.co.in/books?id=KJ1bAgAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false Cronin, Richard. Reading Victorian Poetry. Wiley. 21 December 2015.
2. https://books.google.co.in/books?id=gFl_BwAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false

Course Outcomes:

At the end of the course, the students will be able to:

K1, K2	**CO1**	gain in-depth knowledge of the variety of writers and genres of the Elizabethan era
K1, K2	**CO2**	comprehend the literary merits of the writers of this period
K5, K4	**CO3**	approach the texts with the knowledge of the socio-economic background of the period
K5, K1	**CO4**	analyze the works of the poets and dramatists of the age
K6, K3	**CO5**	understand and apply the creative writing ability by contextualizing the ideas of the writer

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code	P21ENT13	THE AUGUSTAN AND THE ROMANTIC AGE	L	T	P	C
CORE- III			6	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create				
Learning Objectives		The course aims to • make them understand the religious, political, literary, and social problems as reflected in the literature of these periods • help students appreciate the seminal works of prominent writers of these periods • enable students to understand the characteristics of the Metaphysical poetry • enhance the students' understanding of the literary conventions followed during these periods • highlight the salient features of Comedy of Manners				

Unit – I:Poetry

John Donne - The Canonization
Andrew Marvell - The Garden
John Milton – Paradise Lost Book - IX (Lines 473 – 531, 550 – 610, 677 – 695, 745 - 784)

Unit – II: Poetry

Alexander Pope - Canto III in "The Rape of the Lock"
John Dryden - Mac Flecknoe
Thomas Gray - Elegy Written in a Country Churchyard
William Wordsworth - Resolution and Independence
John Keats - Bright star, would I wrested fast as thou art
S.T.Coleridge - The Eolian Harp
P.B.Shelley–Ozymandias

Unit – III: Prose

Jonathan Swift – "The Spider and Bee Episode" from The Battle of the Books
Joseph Addison – Sir Roger at Church
Richard Steele – "Trumpet Club" from TheCoverley Papers
Charles Lamb – In Praise of Chimney Sweepers
William Hazlitt – On the Difference between Writing and Speaking

Unit – IV: Fiction

Johnathan Swift - Gulliver's Travels
Oliver Goldsmith - She Stoops to Conquer

Unit – V: Fiction

Daniel Defoe - Moll Flanders
Jane Austen – Emma

Books for Reference:

- Bloom, Harold. How to Read and Why. New York: Simon & Schuster, 2001.
- Di Mauro, Laurie. Modern British Literature. Detroit: St. James Press, 2000.
- Gross, John. The New Oxford Book of English Prose. Oxford: OUP, 2000.
- Knott, William C. The Craft of Non-Fiction. Reston Publishing Company, 1974.
- Lewin, Gerald. Prose Models. Harcourt Brace Jovanovich, 1964.
- Mayne, Andrew and John Shuttleworth. Considering Prose. Hodder&Stongton, 1988.
- Minto, William. A Manual of English Prose Literature. Atlantic Publishers, 1995.

Cognitive Domain:

K1 / Knowledge = Remember
K2 / Comprehension = Understand
K3 / Application = Apply
K4 / Analysis = Analyze
K5 / Evaluation = Evaluate
K6/ Synthesis = Create

COURSE OUTCOMES

Upon completion of this course, the students will be able to

K1, K2	**CO1**	gain thorough knowledge of the contribution of the writers of this period
K1,K2	**CO2**	understand and apply the judicious outlook on the notable writers of this age
K2,K3	**CO3**	analyze critically the construction of a text
K5, K2,K3	**CO4**	appreciate the aspects of literary texts by the writers of this age
K6, K3	**CO5**	evaluate different themes, strategies and techniques employed by the writers of this age

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code	P21ENT14	CHILDREN'S LITERATURE	L	T	P	C
CORE- IV			6	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create				
Learning Objectives		The course aims to • provide an overview of the history of children's literature from its origins as oral literature intended for adults to written literature encompassing all major genres • indicate historical shifts in the purposes for children's literature: as didactic literature intended to provide moral instruction, or as literature intended to stimulate the imagination or provide useful information in interesting ways • show how different purposes are related to different ways of viewing childhood • examine the history and characteristics of the various genres of children's literature • examine the work of major illustrators of the nineteenth and twentieth century and how illustrations in a picture book convey meaning				

Unit – I: Poetry

S.T. Coleridge - A Child's Evening Prayer
T.S. Eliot – Macavity, the Mystery Cat
Jacqueline Woodson – A Girl named Jack
R.L. Stevenson - From a Railway Carriage
A.A. Milne - Buckingham Palace
Roald Dahl - Little Red Riding Hood
Hilaire Belloc – Matilda

Unit – II: Short Stories

Grimm Brothers – The Juniper-Tree
Rudyard Kipling – Rikki-Tikki-Tavi
Beatrix Potter – The Tale of Peter Rabbit
Nathaniel Hawthorne - The Snow Image
Hans Christian Anderson - The Snowqueen
Brothers Grimm - Rapunzel
James Baldwin - Androcles and the Lion

Unit – III: Drama
Terence Patrick Hughes – Lines
Holly Groome - Henry, the Monster

Unit – IV: Fiction
Lewis Caroll – Alice in the Wonderland
Suzanne Collins - The Hunger Games

Unit - V: Fiction
Patrick Ness - A Monster Calls
C.S. Lewis - The Lion, the Witch and the Wardrobe

Books for Reference:
Russell, D.L. (2015). Literature for Children: A Short Introduction, 8th Ed. Pearson ISBN-10:0-13-352226-1.

COURSE OUTCOMES
Upon completion of this course, the students will be able to

K1, K2	**CO1**	gain knowledge of literary texts meant for children
K1, K2	**CO2**	understand and demonstrate the knowledge of diverse value systems
K2,K3	**CO3**	analyze the moral and cultural values of the works
K5, K2,K3	**CO4**	make a collection of works for children from the traditions
K6, K3	**CO5**	create works of the same sort for children of their region

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	P21ENT15	WOMEN'S WRITING	L	T	P	C
CORE- V			5	-	-	4
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		**The Course aims to** • make students understand Gender and Women's Studies as an academic field of study • be familiar with its major concepts, history, assumptions, and theories/theorists, and recognize its epistemological and methodological diversity and character. • analyze the ways in which societal institutions and power structures impact the material realities of women's lives. • evaluate information derived from various women's writing. • interpret information from a variety of sources including Print and electronic media, film, video, and other information technologies and Cater to the needs of women in Society proactively.				

Unit – I: Poetry:
Judith Wright – Woman to Child, Legend
Maya Angelou – Phenomenal Woman
Elizabeth Barrett Browning –How do I love thee?
Anne Finch – How shall I woo thegentlest
P.K. Page – Adolescence

Unit – II: Prose:
Virginia Woolf – A Haunted House
Meena Alexander – Fault Lines
Bessie Emery Head – Heaven is not closed

Unit – III: Drama:
Charlotte Keatley – My Mother said I never should

Unit – IV: Fiction:
Miles Franklin – My Brilliant Career

Unit – V: Criticism:

Simon de Beauvoir –The Second Sex – "History" from Volume – I
John Stuart Mill – On the Subjection of Women

Books for Reference:

1. Kuumba, M. Bahati. (2003). "Gender and Social Movements". Rawat Publications, New Delhi.
2. Peterson.H. Linda. The Cambridge Companion to Victorian Women's Writing. Cambridge University Press. 2015.

E- Reference:

https://books.google.co.in/books?id=_72TCgAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false

COURSE OUTCOME

On successful completion of the course, the students will be able to

K1,K2	**CO1**	gain knowledge of the literary texts across genres, historical periods and cultural contexts
K1,K2	**CO2**	understand the range of feminist perspectives, towards the gender issues
K3,K4	**CO3**	analyze the common and particular challenges that women face
K4,K5	**CO4**	evaluate the standards of the society and the result of them on the womenfolk
K3,K6	**CO5**	become creative writers and voicing out their views

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	M	S	S	S	S	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 Marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 Mark

Course Code	P21ENS11	TECHNOLOGY IN TEACHING ENGLISH	L	T	P	C
SUPPORTIVE SKILLS - I			2	-	-	2
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives:		The main objective of this course is to • acquaint participants with technology tools, learn to implement network-related programs with concepts of Web Developing. • integrate these tools into their English language teaching. • enhance English language teaching professionals around the world acquire and maintain basic knowledge and skills in technology for professional purposes. • help participants utilize technology in lesson planning, materials development, feedback, and assessment. Practice different phases of software/system development. • facilitate professional communication, collaboration, and efficiency improvement by participating in online discussions .Students will be able to demonstrate adequate skills in oral and written communication for technical English language, actively participate in group discussions and interviews and exhibit evidence of vocabulary building				

Unit I: Definition -Virtual- Learning Environment:
Meaning- Web-Based Learning Environment, Virtual- Learning Environment
Web Tools, Effective Web Tools in Teaching, and Classroom Tools

Unit II: Webpage Development:
How to develop a webpage, Hostingthe Web page, Meta Data Development.
Content Writing, Creating Ads
Wikipedia Development: How to develop and edit Wikipedia.

Unit III:Computational Linguistics:
Introduction to speech recognition (SR) systems, text-to-speech (TTS) synthesizers, Interactive voice response (IVR) systems, search engines, text editors and language instruction materials.

Unit IV—Lexicography
Introduction to Lexicography, Dictionary Development (e- Dictionary), WorldNet, Thesaurus.
Language Teaching: First Language and Second Language Teaching,
Various methods ofLanguage Teaching.

Unit V: E-Learning
Asynchronous E-Learning Vs Synchronous E-Learning of Language
E-Learning Challenges and Solutions.
Application: Machine Translation.

Reference Books:

1. Anderson, T. (ed.) The Theory and Practice of Online Learning Athabasca AB: Athabasca University Press, 2008.
2. Bates, A. and Sangrà, A. Managing Technology in Higher Education San Francisco: Jossey–Bass/John Wiley and Co, 2011.
3. Butcher, N. and Wilson-Strydom, M.) A Guide to Quality in Online Learning Dallas TX: Academic Partnerships, 2013
4. Batson, T., & Bass, R. Teaching and learning in the computer age.Change, Mar-Apr., 1996.

Course Outcomes:
Upon completion of this course, the students will be able to

K1, K2	**CO1**	understand the digital system, its organization and architecture
K1, K2	**CO 2**	identifyneeds and aspirations on a broader spectrum, Able to recognize the evolving role of Digital Technologies.
K2, K4	**CO 3**	discusshow technology affects language learning and teaching today.
K2, K6, K3	**CO 4**	usestrategies to teach vocabulary growth through social media. convertsource code for a novel language into machine code for a novel computer.
K4, K6	**CO5**	identifyappropriate grammar activities that include opportunities for learners to discover, analyze, and produce English grammar during language interactions.

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	M	S	S	S	S	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 Marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 Mark

SEMESTER – II

Course Code	P21ENT21	INDIAN LITERATURE IN ENGLISH TRANSLATION	L	T	P	C
CORE- VI			4	-	-	4
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		**The Course aims to** • create awareness among the students of the rich and diverse literary cultures of ancient India • introduce students to the major literary works of Indian classical dramatist. • understand the importance of devotion and dedication in human life. • enable the students to appreciate the Indian classical literature and to realize its value in practical aspects of life. • understand the didacticism and ethical value contained in Indian classical literature.				

Unit -I: Poetry

Kabir – Songs – 91, 112
Ghalib – Temple Lamp
G. M. Muktibodh – The Void
Mirabai – No one knows my invisible life

Unit -II: Prose

Thiruvalluvar – Thirukkural – (i) The Power of Righteousness
(ii) Gratitude
V. M. Bashir – 'My Darling' from Hunger
Prem Chand – The Shroud
IsmatChugtai – The Quilt
Suresh Joshi – On Interpretation

Unit -III: Drama

Kalidasa – Sakuntala

Unit -IV: Drama

Mohan Rakesh – Halfway House

Unit – V: Fiction

Bama – Sangati
G. KalyanRao – Untouchable Spring

Course Outcomes:

Upon completion of this course, the students will be able to

K1, K2	**CO1**	attain accessibility to regional literary genres
K1, K2	**CO 2**	develop a comparative perspective in the study and analysis of the texts
K2, K4	**CO 3**	feel sensitized to the philosophical, cultural and social reinforcement of people across India
K2, K6, K3	**CO 4**	gain an understanding of the Indianness in the pieces of literature of different regions
K4, K6	**CO5**	practice the ability to translate literature in Indian languages

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	S	M
CO5	S	S	S	S	S	S	M	S	S	S	S	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code	P21ENT22	THE VICTORIAN AGE	L	T	P	C
CORE VII			4	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4:Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims at • providinga wide spectrum of literary exuberance of the great masters of The Victorian Age for the young minds to revel in the luxury of representative literary pieces in each genre and to be informed and inspired. • helpingthe students imbibe the abiding human and moral values through the study of great pieces of literature. • developingcritical and creative faculties in students.				

Unit – I: Poetry

Alfred Lord Tennyson - Tithonus
Robert Browning - Andrea delSarto
Matthew Arnold - The Scholar Gipsy
G.M. Hopkins - The Windhover

Unit – II: Prose

John Ruskin - Of Queen's Garden (Part – II) from Sesame and Lilies
Thomas Carlyle – On History

Unit – III: Drama

John Galsworthy - The Silver Box
Oscar Wilde - The Importance of Being Earnest

Unit -IV: Fiction

Charlotte Bronte - Jane Eyre
Henry Fielding – Tom Jones

Unit – V: Fiction

Charles Dickens - Nicholas Nickleby
Thomas Hardy - Tess of d'Urbervilles

Books for Reference:

1. Brown, John Russell. The Oxford Illustrated History of Theatre. UK: Oxford University Press, 2001.
2. Long, William J. English Literature: Its History and Its Significance for the English-Speaking World. New Delhi: Rupa, 2015.
3. Watson, G.J. Drama. London: Macmillan Education, 1983.
4. Wiggins, Martin and Catherine Richardson. British Drama, 1533-1642: 1609-1616.

E-Reference:

1. Oxford University Press. 2012. https://books.google.co.in/books?id=3B_uCgAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false
2. Killick, Tim. British Short Story Fiction in the Early Nineteenth.Century: The Rise of the Tale.Britain:Ashgate Publishing company, 2008.
3. Bentley, Nick Ed. British Fiction of the 1990s. Taylor & Francis. 2007. https://books.google.co.in/books?id=iTx-AgAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false

Course Outcomes

Upon completion of this course, the students will be able to

K1,K2	**CO1**	gain knowledge of literary texts produced by various literary personalities of this age
K1,K2	**CO2**	understand and appreciate the intense emotional, and intellectual response in the literary texts of the age
K2,K3	**CO3**	analyzecritically the literary quality of the texts
K5,K2,K3	**CO4**	evaluate the works of the poets, prose writers and novelists of this age
K6, K3	**CO5**	develop imaginative and creative writing by following the literary style of the writers

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	P21ENT23	THE CONTEMPORARY LITERATURE	L	T	P	C
CORE- VIII			4	-	-	4
Cognitive Level		K1:Knowledge K2: Understand K3: Apply K4 Analyze K5 Evaluate K6 Create				
Learning Objectives		The course aims the students to • apply key concepts, terminology and methodologies in the analysis of contemporary works • identifycontemporary literary works, historical, social, political, cultural and aesthetic contexts. • articulatehow literary works respond to and influence societies and cultures, ethically, politically and historically. • engage with literary works through other media: e.g. film, drama, concerts, lectures or readings				

Unit – I: Poetry

T.S.Eliot - The Waste Land
W.H.Auden - Shield of Achilles
Dylan Thomas - Light Breaks Where No Sun Shines
Ted Hughes - The Thought-Fox
Philip Larkin - MCMXIV
Carol Ann Duffy – The Last Post

Unit – II: Prose

George Orwell – Shooting an Elephant
G.K. Chesterton – The Worship of the Wealthy
Robert Lynd - In Praise of Mistakes
Aldous Huxley – Pleasures
Katrina Best – Bird Eat Bird

Unit – III: Drama

T.S. Eliot - Murder in the Cathedral
Harold Pinter - Birthday Party

Unit – IV: Fiction

James Joyce - A Portrait of the Artist as a Youngman
William Golding – Lord of the Flies

Unit – V: Fiction

Iris Murdoch – The Sea, the Sea
Angela Carter – The Bloody Chamber

Books for Reference:

1. Bradbook, M.C. Themes and Conventions of Elizabethan Literature. Cambridge: OUP, 1935. Browne, E. Martin. The Making of T.S. Eliot's Plays: The Critic. London: Cambridge University Press, 1969.
2. Birch, Dinah and Hooper Katy. Oxford Concise Companion to English Literature. Great Britain: Oxford.University Press, 2012.
3. Cross. L. Wilben.The Development of the English Novel. Ludhiana: Lyall Bool Depot, 1968.
4. Draper, R.P. Hardy. The Tragic Novels. London: Macmillan, 1987.
5. George Hahn, Behm Carl. The Eighteenth-Century British Novel and its Background. USA: Scarecrow Press,1985.

Course Outcomes

Upon completion of this course, the students will be able to

K1,K2	**CO1**	gain knowledge of new concepts in modern British Literature
K1,K2	**CO2**	comprehend the literary merits of the writers of this period
K2,K3	**CO3**	analyzethe various perspective as reflected in the literary texts
K5,K2,K3	**CO4**	assess the literary texts concerningthe social life of this age
K6, K3	**CO5**	compare and contrast the literary texts of the modern age with those of the other periods

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	S	S	M	S	S	M	S	M
CO2	S	M	S	M	S	S	M	S	S	M	S	M
CO3	S	S	S	S	S	S	M	S	S	S	S	M
CO4	S	M	S	S	S	S	M	S	S	S	S	M
CO5	S	M	S	M	S	S	M	S	S	S	S	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	P21ENT24	SUBALTERN LITERATURE	L	T	P	C
CORE IX			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims to • have a wider knowledge of the trials and tribulations endured by downtrodden people • enhance their ability to read text analytically to understand the social discrimination • cultivate ability to analyze the elements and strategies of various genres • comprehend literary writing as a platform for recording the voice of the voiceless • evaluate the power of creative writing as a means to recover and to redeem one to get better job.				

Unit - I: 20th Century

John Betjeman-A Subaltern's Love Song
Gabriel Okara -Once upon a Time
MervynGooneratne -There was a Country
Langston Hughes-The Negro Speaks of Rivers

Unit - II: Middle Age

Chinua Achebe- "The Trouble with Nigeria" (pp. 22 – 64) from An Image of Africa
Homi.K. Bhabha -The Location of Culture
DipeshChakraborty-A Small History of Subaltern Studies: 2000 from Habitation of modernity: Essays in the Wake of Subaltern Studies. (pp3-19)
Nadine Gordimer - Once Upon a Time
BaburaoBagul– Mother

Unit - III: Drama

George Ryga -The Ecstasy of Rita Joe

Unit – IV: Fiction

BapsiSidhwa -The Crow Eaters

Unit - V: Postcolonial Age

GayathriSpivak - Can the Subaltern Speak?
Richard Wright - Blue Print for Negro Writing

Reference:

1. Deivasigamani. T. Subaltern Discourses. MJP Publisher. 2019.
2. Morris, Rosalind. Can the Subaltern Speak?: Reflections on the History of an Idea. Columbia University Press. 2010.

E-Reference:

1. https://books.google.co.in/books?id=TzmbDwAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false
2. https://books.google.co.in/books?id=cXInuU4BUDYC&lpg=PP1&pg=PP1#v=onepage&q&f=false

Course Outcomes

Upon completion of this course, the students will be able to

K1,K2,K4	**CO1**	gain knowledge of the marginalized, oppressed and exploited on the cultural, political, social and religious grounds
K3,K4,K5	**CO2**	comprehend the themes such as oppression, marginalization, gender discrimination, subjugation of lower and working classes
K2,K4,K3	**CO3**	analyzethe condition of the third world countries and the marginalized groups in the society
K1,K2,K3,K4	**CO4**	evaluate the political and cultural autonomy of the people who were subdued in colonial domains, as reflected in literature
K4,K5, K6	**CO5**	imbibe social consciousness of the plight of the underprivileged people and working for their welfare

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code	P21ENT25	LITERARY CRITICISM - I	L	T	P	C
CORE X			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims to • introduceto the basics of Literary Criticism Widens the knowledge of literary and focuses on their importance • helpto write a critical appreciation • providean insight of practical criticism • ingrainthe mind towards creative writing, appreciation, critical thinking and critical • analyseand accentuate expression of thoughts and views for critical appreciation and judgmental reviews				

Unit – I:Classical Period

Longinus
Plato
Aristotle
Ben Johnson
Philip Sidney

Unit – II:Age of Dryden and Pope

John Dryden
Joseph Addison
Alexander Pope
Dr. Johnson

Unit – III: Romantic Age

William Wordsworth
S.T. Coleridge

Unit – IV:Modern Age

Walter Pater
T. S. Eliot
I.A. Richards
F.R. Leavis

Unit – V:Practical Criticism:

Analysing a work of art, by applying the critical standards of the above-said writers.

Books for Reference:

1. Prasad. A Background to English Criticism, Macmillan Publications.1965.
2. Goulimari, Pelagia. Literary Criticism and Theory: From Plato to Postcolonialism. Taylor &Francis. 2014.
3. Vaughan, Charles. English Literary Criticism. Good Press. 2019.

Web Sources:

1. https://books.google.co.in/books?id=IiODBAAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false
2. https://books.google.co.in/books?id=PtfCDwAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false

Course Outcomes

Upon completion of this course, the students will be able to

K1,K2,K4	**CO1**	gain knowledge of the basic critical concepts and the evolution of criticism
K3,K4,K5	**CO2**	apply the critical theories to works of literature and testify their standard
K2,K4,K3	**CO3**	analyzethe various forms of literature from the perspective of a literary critic
K1,K2,K3,K4	**CO4**	gain the ability to discriminate the different standards of literature
K4,K5, K6	**CO5**	be motivated to know about the forth-coming critical theories and approaches

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 Marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 Mark

Course Code	P21ENN211	WRITING SKILLS	L	T	P	C
NME-I			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Course Objectives		Course aims to • introduce the students to the structure, mechanics, vocabulary and different modes of writing. • master the structure of Language • prepare the students for Competitive Exams. • enable the students to write error-free English error-free on various topics				

Unit I: Sentence Structure
Examples with exercises
Kinds of Sentence structure
Prepositional Phrase
Verbs and Verbal Phases

Unit II: Signal Words
Examples with Exercises
Conjunction and Preposition
Giving Reasons: as, because of, etc.,

UnitIII :Mechanics of Writing
Examples with Exercises
Definition, Types and functions and importance of Punctuation
Essential Elements of Writing: Unity, Coherence, Completeness

Unit IV: Vocabulary
Examples with Exercises
Types of Vocabulary: Listening, Speaking, Reading and Writing Vocabulary
Importance of Vocabulary in Writing and Ways to Expand Vocabulary
Commonly misspelt words

Unit V: Writing

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

Reference Books:

1. Warneir, John E. English Composition and Grammar (I Course) Chicago: Harcourt Brace Jovanovich Publishers, 1998.

2. Hewings, Martin. A Remedial Grammar for Advanced Students, New Delhi: CVP, 2004

Course Outcomes:

Upon completion of this course, the students will be able to

K1	**CO1**	gain knowledge of the various modes of writing
K2	**CO2**	comprehend the types of writing depending on the occasion
K3	**CO3**	apply the acquired styles of writing and practising them
K6	**CO4**	develop a style of writing of their own and becoming better writers
K6	**CO5**	market the skill of writing to fix themselves in better jobs

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code	P21ENN212	ART OF PUBLIC SPEAKING	L	T	P	C
NME-II			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Course Objectives		Course aim • toenrich the knowledge of English Oral Communication skill. • tospeak error-free English confidently. • toprepare the students for Competitive Exams. • to enable the students to speak and write in English fluently on various topics				

Unit I :Elements of Public Speaking

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

Unit II : Mastering Public Speaking

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

Unit III: Ceremonial Speaking

Speeches for Special Occasions –Excerpts

a. “Chicago” – Swami Vivekananda

b. “ I Have a Dream” – Martin Luther King.

c. “Blood Toil and Tears” – Churchill

Unit IV :Competitive Speaking

Extemporary Speeches, Agreeing and Disagreeing.

Unit V: Speech Writing

Principles of Speech Writing: Choosing the Topic, Analysing the Audience, Sourcing the Information and Outlining and organising the speech Content.

Drafting a Speech (Practical for Internal Assessment)

Reference Books:

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

E- Reference:

1. https://www.myperfectwords.com ›
2. https://www.lovelearningtutors.com

Course Outcome

Upon completion of this course, the students will be able to

K1	**CO1**	plan and prepare speeches that inform, persuade, or fulfil the needs of a special occasion.
K2	**CO2**	use presentation aids to enhance your speeches.
K3	**CO3**	conduct meaningful research on a variety of topics.
K6	**CO4**	analyze your audience and design speeches to reflect your analysis.
K6	**CO5**	evaluate speeches based on a variety of verbal and non-verbal criteria.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

SEMESTER – III

Course Code	P21ENT31	POST-COLONIAL LITERATURE	L	T	P	C
CORE- XI			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Course Objectives		The courseaims to • introducethe elements of Post-colonial literature. • introducecreative writing in English from countries formerly colonised by Britain. • makethe students understand the texts about postcolonial theory. • offerthe ideas of nuances handled by the authors of different regions. • providethe picture of different landscapes				

Unit – I: Poetry

Langston Hughes - I, Too, Sing America
Pablo Neruda - Tonight I can Write the Saddest Line
Derek Walcott – Omeros
Allen Curnow - Time
Richard Nitru - The Shapes of Fear

Unit – II: Short Story

NagibMahfuz - The Answer is No
Chinua Achebe - Girls at War
Bessie Head - The Collector of Treasure
Albert Wundt - A Resurrection
NardineGordimer - Six Feet of the Country

Unit – III: Drama

George Ryga - The Ecstasy of Rita Joe

Unit – IV: Drama

Wole Soyinka - The Strong Breed

Unit – V: Novel

V.S.Naipaul - A House for Mr.Biswas

Books for Reference:

1. Ashcroft; et al.. Postcolonial Studies: the key concepts, 3rd ed. Routledge. 2013.
2. Loomba, Ania.Colonialism/Postcolonialism. Random House, 1997
3. Huddart, David. "Homi K. Bhabha", Routledge Critical Thinkers, 2006
4. Mullaney, Julie. Postcolonial Literatures in Context. Continuum. 2010.
5. Rushdie, Salman. Imaginary Homelands: Essays and Criticism 1981-1991. London: Granta Books. 1991.
6. W. Said, Edward. Culture and Imperialism (1st Vintage Books ed.). New York: Vintage Books.1994.
7. Loh, Lucienne, and Malcolm Sen. Postcolonial Literature and Challenges for the New Millennium.Taylor & Francis. 2017.

E- Reference:

1. https://books.google.co.in/books?id=kmFQDwAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false

Course Outcomes

Upon completion of this course, the student will be able to

K2, K1	**CO1**	identify the key postcolonial authors and texts in their historical and cultural contexts
K3,K4	**CO2**	examine central concepts, questions and debates in postcolonial studies
K4,K2	**CO3**	analyze the colonial and indigenous cultural traditions
K5,K4	**CO4**	engage with relevant critical discourse
K6,K5	**CO5**	identify the key postcolonial authors and texts in their historical and cultural contexts

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	P21ENT32	ECO-LITERATURE	L	T	P	C
CORE-XII			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims • to analyse creative representations of human relationships with the non-human world • to compare environmental literary texts from a range of periods, with attention to their contexts and their formal qualities • to consider issues of environmentalism and sustainability from cultural, historical, and ethical perspectives • to recognise how the present-day landscapes and cultures of the British and Irish islands have been shaped by long- term ecological and political processes				

Unit -I: Poetry

W. B. Yeats – Wandering of Oisin
William Bryant – A Forest Hymn
Ted Hughes – The Thought Fox
Sarojini Naidu – Summer Woods

Unit -II: Prose

Emerson – Nature
Roald Dahl – Taste
Raymond Williams – The Green Language

Unit -III: Drama

John Heywood – The Play of the Weather

Unit – IV: Fiction

AmitavGhosh – The Hungry Tide

Unit – V: Criticism

R.L. Stevenson – "The Biosphere" from Mankind and Mother Earth

Books for Reference:

1. Glotfelty, Cheryll& Harold Fromm. The Ecocriticism Reader. Athens: The U of Georgia P, 1996. Print

2. Bate, Jonathan. Romantic Ecology: Wordsworth and the Environmental Tradition. London: Routledge, 2013. Print
3. Devall, Bill and George Sessions. Deep Ecology: Living as if Nature Mattered. Salt Lake City, Utah: Peregrine Smith, 1985.
4. Garrard,Greg.Ecocriticism: New Critical Idiom Series. London: Routledge2004. Print
5. Zapf, Hubert. Literature as Cultural Ecology. Bloomsbury Publishing. 2016.

E- Reference:

1. https://books.google.co.in/books?id=_F93CwAAQBAJ&lpg=PP1&pg=PP1#v=onepage&q&f=false

COURSE OUTCOMES

Upon completion of this course, the student will be able to

K2, K1	**CO1**	gain knowledge of ecology and its relationship with mankind
K3,K4	**CO2**	comprehend the difference between ecology and environmentalism
K4,K2	**CO3**	apply the theories of eco-criticism and analyzing the literary texts
K5,K4	**CO4**	synthesize the learning of eco-consciousness with real life
K6,K5	**CO5**	imbibe the importance of protection of flora and fauna

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S) - 3 Marks

Moderately Correlating (M) - 2 marks

Weakly Correlating (W) - 1 Mark

No Correlation (N) - 0 mark

Course Code	P21ENT33	TRANSLATION – THEORY AND PRACTICE	L	T	P	C
CORE-XIII			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		The course aims to make students • understandthe evolution of the translation studies as an academic discipline. • recognizemajor milestones in the history of translation. • gain an in-depth awareness of the theoretical under pinning of translation as cross-linguistic endeavour • translatedifferent types of text in both source and target languages. • evaluate translations on the basis of select criteria				

Unit – I: Introduction

History of Translation

The Concept & the Definition of Translation

Theories of Translation

Unit – II: Procedures, Types and Trends in Translation:

Translation Procedures

Types of Translation

- Administrative, Commercial, Computer and Economic Translation
- Financial, General, Legal and Literary Translation

Trends in Translation

- Machine Translation, Computer-assisted Translation and Cultural Translation

Unit-III:Trends in Translation

Machine Translation, Computer-assisted Translation and Cultural Translation

Unit – IV: Translated Texts:

Poetry:

Tiruvalluvar - Tirukkural (Translated by G. U. Pope)

- Chapter-8: The Possession of Love
- Chapter-11: Gratitude
- Chapter-40: Learning

SubramaniaBharathi - Much Adored Face is Forgotten

There is no fear

Mu. Mehta - Charge Sheet

AdavanTheetchanya - Self-Realization

Prose:

The Bhagavad Gita - Chapters - III, IV, XII

The Bible - Sermon on the Mount – Chapters V, VI, VII

The Quran - Women

Short Stories:

Leo Tolstoy - Two Hussars

U. R. Anantha Murthy - A Horse for the Sun

Vaikom Muhammad Basheer- Walls

Ambai (C.S.Lakshmi) - Gifts

Fiction:

SundaraRamaswamy - Tamarind History

Drama:

GirishKarnad - Nagamandala

Unit –V: (Practice)

Translation of Statements, Proverbs, Headlines

Translation of Paragraphs

Translation of Official Letters

Translation of Articles

Translation of Literary Articles

Translation of Religious Texts

Books for Reference:

1. Bassnett, Susan: Translation Studies, 3rd ed. London: Rutledge Newmark, 2002.
2. Newmark, Peter: Approaches to Translation, Oxford. Pergaman Press, 1982
3. Bassnett, Susan &Lefevere Andre: Translation, History and Culture, Pinter Publishers, 1990.
4. Nida, E. The Theory and of Practice of Translation. Leiden:E.J.Brill,1969
5. Steiner, G. After Babel: Aspects of Language and Translation. Oxford: Oxford University Press, 1978.

COURSE OUTCOMES

Upon completion of this course, the student will be able to

K2, K1	**CO1**	acquire knowledge about various aspects and nuances of translation.
K3,K4	**CO2**	identify different text types, the problems of the translator and ways of overcoming those problems
K4,K2	**CO3**	gain skill in the comparison and evaluation of translations.
K5,K4	**CO4**	identify cultural differences with an impact on the target language of translation and ways to overcome such difficulties
K6,K5	**CO5**	gain hands-on training in various forms of Translations

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S	M	S
CO5	S	S	S	S	S	S	S	S	S	S	S	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 Marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 Mark

Course Code	P21ENT34	LITERARY CRITICISM - II	L	T	P	C
CORE-XIV			5	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims to • Introduce to the basics of Literary Criticism • Widen the knowledge of literary and focuses on their importance • Help to write a critical appreciation • Provide an insight of practical criticism • Ingrain the mind towards creative writing, appreciation, critical thinking and critical • Analyse and accentuate expression of thoughts and views for critical appreciation and judgmental reviews				

Unit I: New Criticism, Formalism and Structuralism

I. A. Richards: Four Kinds of Meaning

Roman Jakobson : Linguistics and Poetics

Ferdinand de Saussure : Course in General Linguistics, Chapter III&IV

Gerard Gennette - Structuralism and Literary Criticism

Unit II :Poststructuralism and Deconstruction

Roland Barthes: The Death of the Author

Derrida, Jacques. : Structure, Sign and Play in the Discourse of the Human Sciences

M.H. Abhrams: The Deconstruction Angel

Unit III: Psychology, Post-colonialism, Marxism

Sigmund Freud -The Theme of the Three Caskets

HomiBhabha - The Commitment to Theory

Edmund Wilson - Marxism and Literature

Unit IV: Reader Response and Eco-criticism

Michael Foucault - What is an Author

Wolfgang Iser - The Reading Process: A Phenomenological Approach

William Rueckert - Literature in Ecology: An Experiment in Eco Criticism

Unit V: New Historicism and Cultural Studies

Stephen Greenblatt - The Circulation of Social Energy

Stuart Hall – Encoding / Decoding

Judith Butler – Performity's Social Magic

Books for Reference:

- Lodge, David. 20th Century Literary Criticism: A Reader. London: Longman, 1986. Print.
- Sethuraman, V.S. Contemporary Criticism: An Anthology. S.G. Wasani for Macmillan India Limited, 1989. Print.
- Leitch, Vincent B. The Norton Anthology of Theory and Criticism. W.W.Norton& Company, 2001. print
- Hans Bertens: Literary Theory: The Basics Foundation Books, 2010.
- Wilber Scott: Five Approaches to Literature.
- S. Ramasamy& V.S. Sethuraman: English Critical Tradition, Vol I & II.
- Peter Barry: Beginning Theory: An Introduction to Literary and Cultural Theory, II Ed, 2002.
- Philip Rice and Patricia Waugh: Ed, Modern Literary Theory; A Reader: IV Ed, Oxford University Press.
- N. Krishnaswamy, John Varghese &Sunitha Mishra: Contemporary Literary Theory: A Students Companion, Macmillan, 2001.
- Barker, Chris. Cultural Studies: Theory and Practice. III Ed. Los Angeles: Sage, 2008.

Course Outcomes

Upon completion of this course, the student will be able to

K1,K2,K4	**CO1**	gain knowledge of the various aspects of literary theory
K3,K4,K5	**CO2**	understand and sharpen the critical acumen based on the theory
K2,K4,K3	**CO3**	apply the modern literary theories to literary texts
K1,K2,K3,K4	**CO4**	be competent to evolve a methodological framework
K4,K5, K6	**CO5**	acquire proficiency in theoretical terminology

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 Marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 Mark

Course Code	P21ENT35	RESEARCH METHODOLOGY	L	T	P	C
CORE- XV			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		This course is designed to • introduce students to the methods in research writing • familiarize students with various stages of writing research paper • train students in using appropriate language in writing research projects • enable the students to read and review the literary texts and language • be familiarized with the methods in research writing				

Unit – I: Foundations of Research

Meaning,
Objectives,
Motive
Utility,
Empiricism
Deductive and Inductive theory

Unit – II: Bibliography

Compiling a Working Bibliography
Evaluating Sources

Unit – III: Plagiarism

Plagiarism and Academic Integrity

Unit – IV: The Mechanics of Writing

Unity, Order, Coherence, Completeness
Importance of Mechanics of Writing
Spelling, punctuation, Capitalization,& Abbreviation

Unit – V: Formatting

The Format of the Research Writing
Abbreviations
Documentation

Books for Reference:

1. MLA Handbook for Writers of Research Papers: Joseph Gibaldi VIII Edition: Affiliated East – West Press, New Delhi, 2000.
2. Ralph Berry. The Research Project How to Write it, London: Routledge and Hegean Paul, 1995.
3. Bateson, F. W. The Scholar Critic. Abingdon: Routledge&Kegan Paul Books;1972.
4. Tracy Bowell and Gary Kemp Critical Thinking: A Concise Guide
5. Thorpe, J. Aims and Methods of Scholarship in Modern Languages and Literature. New York: MLA of America, 1963.
6. William Campbell. Form and Style in Thesis Writing. New York. Houghton Mifflin Company, 1978.
7. Williamson, Karp & Others. The Research Craft: An Introduction to Social Research Methods. Glenview, Ill.: Scott, Foresman, 1982.

Course Outcomes

Upon completion of this course, the student will be able to

K1,K2,K4	**CO1**	gain knowledge in applying critical tools and research methodology
K3,K4,K5	**CO2**	becomewell versed in the mechanics of thesis writing.
K2,K4,K3	**CO3**	comprehend the language of research
K1,K2,K3,K4	**CO4**	acquireanalytical and critical thinking
K4,K5, K6	**CO5**	becomean informed and competent researcher

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 Marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 Mark

Course Code	P21ENT36	INTENSIVE STUDY OF AN AUTHOR	L	T	P	C
CORE-XVI			4	-	-	4
Cognitive Level		**K1: Recall** **K2: Understand** **K3: Apply** **K4: Evaluate** **K5: Analyze** **K6: Create**				
Learning Objectives		This course is designed to enable students • to acquire knowledge of the writer chosen for detailed research study. • to comprehend the common themes handled by him/her in his/her writings • to analyze the works of the writer in the socio, political and religious background • to evaluate the merits and messages conveyed by the writer and assessing him/her as a writer				

(All topics are on the writer chosen by the learner for project work)

Unit – I:Background Study

A Study of the Social, Economic, Political and Religious Background of the author
Life and Works of the author
The Essence of his/her writings

Unit – II: Primary Research

A Brief Survey of the works

Unit – III:Characterisation

A Study of the characters in the works

Unit – IV: Major Narrative

Various themes and issues in the works

Unit – V:Common techniques

Narrative Techniques
Style of Writing

Course Outcomes:

Upon completion of this course, the student will be able to

K1,K2,K4	**CO1**	acquire knowledge of the writer chosen for detailed research study
K3,K4,K5	**CO2**	comprehend the common themes handled by him/her in his/her writings
K2,K4,K3	**CO3**	analyzethe works of the writer in the socio, political and religious background
K1,K2,K3,K4	**CO4**	evaluate the merits and messages conveyed by the writer and assessing him/her as a writer
K4,K5, K6	**CO5**	carry out the detailed research work on the chosen works of the writer

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

SEMESTER – IV

Course Code	P21ENE411	ENGLISH FOR CAREERS	L	T	P	C
ELECTIVE I – Option - 1			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		The course aims to • give the students an understanding of the scope of English Language Teaching as a discipline. • Introduce key issues pertaining to Second Language Acquisition. • Provide a broad overview of English language learning, teaching and testing. • Make the students aware of the specific challenges of teaching English in India.				

Unit – I: Effective Writing

Features of Effective Writing

Business correspondence

E-Mail

Report writing

Technical Writing

Unit – II: Administrative Process

Agenda preparation

Preparing minutes

Unit – III: Communication

Presenting Data in Verbal modes

Presenting Data in Non-verbal modes

Unit – IV: Effective lecturing

Preparing Lectures on Topics

Preparing Persuasion Talks

Unit – V: Telephone Etiquette

Business Talks over Telephone

Discussion on Career Prospects and Advancements

Books for Reference:

V.Saraswathi&Maya.K.Mudbhatkal: English for Competitive Examinations, Emerald Publishers, Chennai 2000

Course Outcomes

Upon completion of this course, the student will be able to

K1,K2,K4	**CO1**	gain knowledge of the various modes of official correspondence and presentation
K3,K4,K5	**CO2**	comprehend the right use of English at official works
K2,K4,K3	**CO3**	apply the acquired styles of occupational skills and practising them
K1,K2,K3,K4	**CO4**	pick up the official behaviour and becoming better doers
K4,K5, K6	**CO5**	market the skill business correspondence and fixing themselves in better jobs

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 Marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 Mark

Course Code	P21ENE412	PRESENTATION SKILLS	L	T	P	C
ELECTIVE I-Option-2			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		The course aims to • consider ways of grabbing the listener's attention, holding their interest, and concluding strongly. • use body language and tone of voice to enhance their presentations. • market the skill of presentation to fix themselves in better jobs • use slides and visual aids effectively.				

Unit – I: Speech Format

Welcome Address
Vote of Thanks
Keynote Address
Convocation Address

Unit – II: Types of speech

Great Speeches (any 3)
Soliloquies/ Monologues (any 3)
Great Poems (any 3)

Unit – III: Effective writing

Motivational Writing
Argumentative Writing

Unit – IV: Kinds of Writing

Narrative Writing
Descriptive Writing

Unit – V: Literary Adaptation

Conversion of a Story into Drama
Conversion of a Drama into a Story

Book Recommended:

Brown Michael: Making Presentations Happen. Allen &Unwin, Australia, 2004.

Course Outcomes

Upon completion of this course, the student will be able to

K1,K2,K4	**CO1**	gain knowledge of the various modes of official correspondence and presentation
K3,K4,K5	**CO2**	comprehend the right use of English at official works
K2,K4,K3	**CO3**	apply the acquired styles of occupational skills and practising them
K1,K2,K3,K4	**CO4**	pick up the official behaviour and becoming better doers
K4,K5, K6	**CO5**	market the skill business correspondence and fixing themselves in better jobs

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	S	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	S	M	S	S	S	S	M	S	M
CO3	S	S	S	S	M	S	S	S	S	S	M	M
CO4	S	S	S	S	M	S	S	S	S	M	M	S
CO5	S	S	S	S	S	S	S	S	S	S	M	S

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

Course Code	P21ENE421	ENGLISH GRAMMAR AND USAGE	L	T	P	C
Elective II (Option –1)			4	-	-	4
Cognitive Level		K1: Knowledge K2: Understand K3: Apply K4: Analyze K5: Evaluate K6: Create				
Learning Objectives		**The Course aims to** • make students attain writing skills by making them applying the usage of grammar. • develop fluency among the students. • assess the experience and fluency in English transforming their personality. • learn and brighten up their career. • strengthen the communication skills through exercise and Quiz.				

Unit – I: Grammar

Exercises with Usage

Parts of Speech
Voice
Tenses
Speech
Clause Analysis

Unit – II: Vocabulary

Exercises with Usage

Synonyms
Antonyms
Homonyms
Spotting Error Zones
Cloze Test
Single Word Substitutes
Rewriting Sentences in the right order

Unit – III: Official Writing

Different types of letters-Personal / Social / Commercial
Letters to Newspapers
Letters of Complaints and Suggestions

Unit – IV: Writing for Media

Writing dialogue in a given context
Writing advertisements: Matrimonial/Exhibition/Industry/Fairs/Seminars/Films
Writing reply to Advertisements
Appreciation of a film/play

Unit – V: Creative Writing

Reporting an incident / an experience
Note-making
Expansion of axioms and proverbs
General Essays

Course Outcome

At the end of the course, the students will be able to:

K1, K2	**CO1**	gain comprehensive knowledge about the nuances of the grammatical structures and vocabulary
K1, K2	**CO2**	practise basic grammatical structures in short conversations and discussions
K5, K4	**CO3**	gain the ability to practice the grammar skills involved in writing sentences and short paragraphs
K5, K1	**CO4**	master the skill to write various types of writing including journals, and personal /academic paragraphs
K6, K3	**CO5**	acquire confidence to communicate with the external world with the strong grammatical background

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
CO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S) - 3 Marks
Moderately Correlating (M) - 2 marks
Weakly Correlating (W) - 1 Mark
No Correlation (N) - 0 mark

Course Code	P21ENE422	ENGLISH LANGUAGE TEACHING	L	T	P	C
ELECTIVE II (OPTION – II)			4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Evaluate K5: Analyze K6: Create				
Learning Objectives		Course aims to • gain knowledge of the various aspects of the language • comprehend the different roles played by the English language in all spheres of life • analyze the impact of English at different socio-political levels genres • evaluate the quality of teaching English in India and other countries as well • analyze and find out innovative methods of teaching English in India				

Unit – I: Concept of English

English as an International, Colonial and National Language
English in Post- Independence India

Unit – II: Aims of teaching English

Objectives of Teaching English
Practical Use of English

Unit – III: Methods of teaching

The Direct Method
The Reading Method
The Army Method

Unit – IV: Methodology

The Oral Approach
Situational Language Teaching
Structural Approach
Total Physical Response
The Silent way

Unit – V: Scope of Teaching

Language Pedagogy and the Teaching of English
Community Language Teaching
Use of ICT in ELT
Modern Applied Linguistics

Books for Reference:

1. N.Krishnaswamy&LalithaKrishnaswamy, Teaching English: Approaches, Methods and Techniques, Macmillan.2003.
2. KripaK.Gautam, English Language Teaching: A Critical Study of Methods and Approaches.
3. New Delhi: Harman Publishing House, 1988.
4. Harold B Allen.Teaching English as a Second Language. Bombay: Tata McGraw Hill
5. Publishing Company, 1965.

Course Outcome

At the end of the course, the students will be able to:

K1, K2	**CO1**	gain confidence and will be able to be assertive with the skilful acquisition of language and communication skills.
K1, K2	**CO2**	overcome the fear of learning a second language or a foreign language and equip themselves
K5, K4	**CO3**	demonstrate how technology can be used for learning the language.
K5, K1	**CO4**	identify and classify strategies to teach language
K6, K3	**CO5**	analyze and find out innovative methods of teaching English in India

Mapping of COs with POs& PSOs:

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	S	M	S	M	M	S	S	S	S	S	S	M
CO2	S	S	S	S	S	S	S	S	S	S	S	M
CO3	S	M	S	M	S	S	S	S	S	S	S	S
sCO4	S	S	S	S	M	S	S	S	S	S	M	M
CO5	S	M	S	M	S	S	S	S	S	S	M	M

Strongly Correlating (S)	-	3 Marks
Moderately Correlating (M)	-	2 marks
Weakly Correlating (W)	-	1 Mark
No Correlation (N)	-	0 mark

VALUE ADDED COURSES

(JUNE 2021 onwards/ (First & Forth Semester)

Duration	**:**	Minimum 30 Hours	
Mode	**:**	Concurrent	
No. of Papers	**:**	1	
Maximum Marks for each paper :	100		
Evaluation	**:**	**Internal 25Marks**	**External 75 Marks**
Total Marks	**:**	**100**	
Passing Minimum	**:**	**50%**	
Question Pattern:			
External - Total Marks	**:**	**75**	
Part A: 10 Multiple Choice Questions:		**10x2 =20**	
Part B: 5 out of 7 questions	**:**	**5x5 =25**	
Part C: 2 out of 4 questions	**:**	**2x15 =30**	
Internal Total Marks	**:**	**25 Assignment-(15) and Quiz-(15)**	

Course Code	P21ENV11	MEDIA WRITING	Total Hours	C
VALUE ADDED COURSE - I			30	2
Course Objectives:		Course aims to • develop the ability to write articles in journals and magazines. • apply the acquired knowledge in writing columns and editorials • distinguish the writing style for print and broadcast media • exhibit a command over language and general knowledge • develop their communication skills		

Unit I -Media
Mass Media
Characteristics and Techniques, Ethics for Media Writing

Unit II - Print Media
Writing Headlines, News Features, Advertisements
Writing Reviews- Book and Film

Unit III News broadcaster
Visual Media
News Anchoring

Unit IVe-media
Creating a blog
Writing Scripts

Unit V Internet based applications
Social Media
Face book Profile, Twitter

Text Books:
1. Kumar, KevalJ .Mass Communication in India. Delhi: Jaico Publishing House, 2013. Print.
2. Meera, RaghavendraRao N. Feature Writing. New Delhi: PHI Learning Private Limited, 2009. Print.

Books for Reference:
1. Nick, Ceramilla and Lee Elizabeth. Cambridge English for the Media. New Delhi: Cambridge University Press, 2008. Print.

2. Schiff, Richard. Foreword. Writing for TV and Radio: A Writers'& Artists' Companion by Sue Teddem and Nick Warburton.Eds. Carole Angier and Sally Cline. Bloomsbury. London: 2016. Print.

Course Code	P21ENV42	APPRECIATION OF FILMS (FILM VERSIONS OF LITERARY TEXTS)	Total Hours	C
VALUE ADDED COURSE - II			30	2
Course Objectives		Course aims to • recognize types of films and their impact on society. • understand the concepts behind storytelling, setting &surrounding of an event and cinematography. • compare and contrast the written form (books) and adapted form (movies). • evaluate the role of films on the lives of the people. • understand narrative techniques and stage directions used in films.		

Unit I- Film Adaptation

What is Film Adaptation? – Key Factors that matter in a Film

Adaptation – Advantages and disadvantages of adopting a written art into visual art.

Mise-en-scène: Setting, Props, Actors, Costumes, Performance, Sound, Lighting & Colour and Composition

Shakespeare (1564-1616): A Midsummer Night's Dream

Unit II

Jane Austen (1775-1817) : Emma

Unit III

Charles Dickens (1812-1870): Oliver Twist

Unit IV

George Bernard Shaw (1856-1950): Pygmalion (My Fair Lady)

Unit V

Yann Martel (b 1963) : Life of Pi

Note:

(Recent BBC versions of films are recommended)

Books for Reference:

1. Corrigan, Timothy. Ed. Film and Literature: An Introduction and Reader. India: Pearson, 1998. Print.
2. Dix, Andrew. Beginning Film Studies. New Delhi: Viva Books, 2010. Print.
3. Bordwell, David and Kristin Thompson. Film Art: An Introduction. New York: McGraw-Hill, 2010. Print.

SEMESTER II-SHORT TERM COURSE IN SPOKEN ENGLISH

Duration : Minimum 30 Hours
Hours : 2 hrs / week
Eligibility : Any Graduate
Evaluation : Internal - 100 %
I **Test (75) + Assignment (15) + Seminar/Quiz(10) = 100**

Total : 100
Duration of the Practical Examination : 3 Hrs
No. of Papers : 1

Passing minimum : 50%

Course Code	S21SET21	SHORT TERM COURSE IN SPOKEN ENGLISH	Total Hours	C
SHORT TERM COURSE			30	2

Course Objectives :

To enable the students to converse freely in English and deliver a public speech effectively.

To facilitate the students to be placed in suitable jobs.

Unit – I: Speaking Skill through Self Introduction

Self Introduction

Questioning and Answering

UNIT – II: Speaking Skill through Extempore

Speak for a Minute

Extempore

Turncoat

Debate

UNIT – III: Engage in Dialogues and Narration

Dialogues in Formal and Informal Situations

Narrating Experiences

UNIT – III: Engage in Conversation and Story Telling

Conversation in Formal and Informal Situations

Narrating Stories

UNIT – V: Involvement in Discussion

Discussion

Argument

Books Recommended:

1. Krishna Mohan and N.P.Singh: Speaking English Effectively, Macmillan India Limited, 2000.
2. Leo Jones: Activities for Intermediate Students of English, Students Book, Cambridge University Press, 1992.
3. G.RathakrishnanPillai and K.Rajeevan: Spoken English for you,Emerald Publishers, Chennai, 2002.
4. KothurAdhan.Spoken English II for Under Graduates.
5. V.Sasikumar, P.V.Dhamija: Spoken English: A Self LearningGuide to Conversation Practice. New Delhi: Tata McGraw-Hill Pub. Co., 2005.

Course Code	S21FRT31	SHORT TERM COURSE IN FRENCH	L	T	P	C
SHORT TERM COURSE			30	-	-	2

General objectives of the course:

- Develop the two basic language skills of the learner of a foreign language: comprehension and speaking.
- Initiate the learner into French civilization.
- Help the learner have a better insight into French culture and society.

Prescribed Text Book:

Karla Moreira BostosPalmieri :Écho –A1, uneméthodeVeritablementactionnelle.

UNIT I

Leçon 0 – Parcoursd'initiation

Leçon 01 – VousComprenez?

Leçon 02 – Au travail!

UNIT II

Leçon 03 – On Se détend?

Leçon 04 – Racontez - moi

Leçon 05 – Bon Voyage!

UNIT III

Leçon 06 – Bon appétit!

Leçon 07 – QuelleJournée!

UNIT IV

Leçon 08 – Qu'onestbienici!

Leçon 09 – Souvenez–Vous

UNIT V

Leçon 10 – On S'appelle?

Leçon 11 – Un bon conseil!

Leçon 12 – Parlezmoi de vous

MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL-624102

M.COM (CHOICE BASED CREDIT SYSTEM)

(Full-time)

SYLLABUS, REGULATION AND SCHEME OF EVALUATION

(From 2021-2022 onwards)

PROGRAMME NAME: M.COM (Choice Based Credit System)

1. About theProgramme:

The Two-year Programme in Commerce is intended for students who have completed the first degree Programme at University level, to get specialized knowledge in the areas of commerce and accountancy. The Programme is based on Choice Based Credit System that offers a wide range of Courses for keeping the students abreast with current knowledge in the field and shaping them as holistic personalities. The core and allied courses of study are suitably designed to provide core knowledge in commerce and various specialized accounting systems and also to develop skills in application of computers in business for befitting the learners in better job positions.

2. Programme Educational Objectives (PEOs)

On completion of M.Com. Degree Programme, the students will be able to

PEO-1: become well versed and competent in the core concepts of the Programme.

PEO-2: be recognized for quantitative, qualitative, cognitive and analytical skills to identify, analyze, design and create business opportunities in a dynamic environment on the Global map.

PEO-3: become successful entrepreneurs and finance professionals in the field of Banking, Insurance, Manufacturing, Transport, Telecom, Service, Hospitality, IT and to pursue career in teaching and for advanced studies.

PEO-4:contribute to the creation, transmission and application of knowledge in the field of Commerce and other related fields adapting to a rapidly changing environment through lifelong learning.

PEO-5: become professional with integrity and humanitarian values to fulfill the societal needs at regional, state, national and global levels

3. Eligibility:

A candidate who has passed any one of the following degree Programmesof this University or any other University accepted by the syndicate as equivalent there subject to such conditions as may be prescribed therefore, will be eligible for admission to the M.Com Programme:

B.Com., B.Com. (CA), B.Com. (e-Commerce), B.Com.(Corporate Secretaryship), BCS, B.A. (Corporate Secretaryship), B.B.A., (Bachelor of Business Administration), B.B.M. (Bachelor of Business Management), B.B.M., (Bachelor of Bank Management) B.Com. (Cooperation) and B.A., (Cooperation).

4. General Guidelines for PG Programme

i. **Duration:** The programme shall extend through a period of 4 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	**13**	**25**	**13**	**25**
External	**38**	**75**	**38**	**75**

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions(MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 90**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance less than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the PG Programmes are also applicable for this Programme.

9. Programme Outcomes(POs)

On completion of the Programme the students will be able to

PO1: acquire in-depth knowledge of Commerce discipline, with wider and global perspectives, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integrate the same for enhancement of knowledge. **(Academic result & International / global reach)**

PO2: analyze complex business problems critically; apply independent judgment for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context. **(Research and Innovation)**

PO3: think laterally and originally, conceptualize and solve Business problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise at the national and international levels. **(International / global reach)**

PO4: extract information pertinent to unfamiliar industry issues through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct survey, analyze and interpret data, demonstrate higher order skill and view things in a broader perspective, submit a report about the study in commerce. **(Practical managerial analytical skills & Industry interaction)**

PO 5: demonstrate ability to understand Commerce in multifunctional areas like Banking and Finance, Auditing and taxation, Marketing & Entrepreneurship. Also they will be able to demonstrate ability to understand and derive meaningful inferences about organizational performance. **(Functional Specialization)**

PO6:adapt updated technology and appropriate resources required for establishment / expansion of business practice through self-paced and self-directed learning and apply professional ethics and engage with responsibility to the multicultural business stakeholders. (**Technology and Professional Ethics)**

PO 7: communicate ideas, write, and present reports with clarity and execute plans effectively at higher level research, business and professional career and function efficiently as an individual and as a member or leader in assorted teams and multidisciplinary settings. **(Presentation and Preparation of Reports and Execution of functions).**

10. Programme Specific Outcomes(PSOs)

PSOs:

On completion of the Programme the students will be able to

PSO 1: display knowledge and understanding of group dynamics, recognize opportunities and contribute positively to collaborative-multidisciplinary management research, demonstrate a capacity for self-management and teamwork, decision-making based on open-mindedness, themselves as well as others. **(Team Work)**

PSO 2: demonstrate knowledge and understanding of commerce principles and apply the same to one's own work, as a member and leader in a team, manage projects in the work environment efficiently in respective disciplines and multidisciplinary environments after considering the economic and financial factors. **(Industry interaction)**

PSO3: communicate with society at large, regarding complex managerial activities confidently and effectively, such as, being able to comprehend and write effective reports and design

PSO4: document by adhering to appropriate standards, make effective presentations, and give and receive clear instructions. Also they will demonstrate an ability to communicate effectively, both in writing and orally **(Speaking / Writing skills)**.

PSO5: recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously. **(Continuing education awareness)**

PSO6: display commitment towards professional and intellectual integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society. **(Values, ethics, professional integrity and contribution to society)**

PSO 7: observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback. **(Independent and Reflective Learning)**

PSO 8: identify a timely opportunity and use business innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large. **(Successful career, immediate employment & entrepreneurship).**

M.Com Programme Structure from the Academic Year 2021-2022 onwards

Sl.No	Course Code	Course Title	Credits	Hours		Continuous Internal Assessment (CIA)	End Semester Exam (ESE)	Total
				T	P			
Semester I								
1	P21COT11	Core I Marketing Management	4	5	-	25	75	100
2	P21COT12	Core II International Trade and Practice	4	5	-	25	75	100
3	P21COT13	Core III Advanced Financial Management	4	6	-	25	75	100
4	P21COT14	Core IV Management Accounting	4	6	-	25	75	100
5	P21COP11	Core V Computerized Accounting with Tally (Practical)	4	-	6	25	75	100
6	P21COS11	Supportive Course I– Employability Skills(Practical)- Soft Skill Development	2	2	-	25	75	100
		Total	**22**	**24**	**6**	**-**	**-**	**600**
Semester II								
7	P21COT21	Core VI Modern Banking and Insurance	4	4	-	25	75	100
8	P21COT22	Core VII Advanced Cost Accounting	4	5	-	25	75	100
9	P21COT23	Core VIII Business Research Methods	4	4	-	25	75	100
10	P21COT24	Core IX Quantitative	4	5	-	25	75	100

		Techniques for Business Decisions						
11	P21COT25	Core X Investment Analysis and Portfolio Management	4	4	-	25	75	100
12		NME-I	4	4	-	25	75	100
13	P21CSS22	Supportive Course II– Computer Skill for Web Designing and Video Editing	2	-	4	25	75	100
		Total	**26**	**26**	**4**	**-**	**-**	**700**
Semester III								
14	P21COT31	Core XI Indirect Taxation	4	5	-	25	75	100
15	P21COT32	Core XII Financial Markets and Services	4	5	-	25	75	100
16	P21COT33	Core XIII Advanced Corporate Accounting	4	5	-	25	75	100
17	P21COT34	Core XIV Strategic Management	4	4	-	25	75	100
18	P21COT35	Core XV Income Tax and Tax Planning	4	5	-	25	75	100
19	P21COT36	Core XVI Business Analytics	4	4	-	25	75	100
20	P21WSS33	Supportive Course III (Women Empowerment)	2	2	-	25	75	100
		Total	**26**	**30**	**-**			**700**
Semester IV								
21	P21COE411/ P21COE412	Elective I: 1.Managerial Economics	4	4		25	75	100

		2.Business Ethics						
22	P21COE421/ P21COE422	Elective II: 1.Business Environment 2.Organisational Behaviour	4	4		25	75	100
23	P21COR41	Project	8	22		25	75	100
		Total	**16**	**30**				**300**
Total			**90**	**120**	**-**			**2300**

Non Major Elective(NME)

1.**NME I - P21CON211**-Fundamentals of Marketing

2. **NMEII- P21CON212**-Fundamentals of Banking

Additional Credit Courses (Two Credit courses)

1. **P21COV11** - Value Added Program I-Two Credits (First Semester)- Excel Skills for Commerce
2. **P21COI21** - Internship/Industrial Training – Two Credits- (End of Second Semester)
3. **P21COO31** - Online Courses (MOOC Courses)-Two Credits- (Third Semester)
4. **P21COV42** - Value Added Program II-Two Credits (Fourth Semester) - Data Analysis Using SPSS: Inferential Analysis
    - Those who have CGPA 9 and want to do the project in industry/institution during 4thsemester, these two papers can be opted in third semester.
    - Students can take one 4 credit course in MOOC as elective or two 2 credit course in MOOC as elective with the approval of Departmental Committee.

Outside Class Hours

- Health, Yoga and Physical fitness.
- Library information access and utilisation
- Employability Training.

SEMESTER -I

COURSE CODE	P21COT11	MARKETING MANAGEMENT	L	T	P	C
CORE I			5	-	-	4

Course Objectives:

The objectives of the course are

- To understand the trends in, Marketing Management and to make aware of regulations of foreign trade practices in the era of globalization.
- To know the elements of Marketing Management
- To assess of buying behavior and consumer behavior.
- The student will understand the overview of Marketing Management

Unit I: Introduction to Marketing Management

Introduction to Marketing Management – nature and scope – Concepts of marketing – Functions and problems of marketing management – Traditional marketing – Modern Marketing – Responsibilities of marketing manager – Role of marketing management in Indian economy.

Unit II: Consumer Behaviour

Buyer behavior – Consumer behavior vs. business buying behavior – Factors affecting consumer behavior – Consumer research – Importance – Consumer research process – Consumer research design – Steps in consumer research.

Unit III: Promotion

Promotion – Tools of promotion – Communication process – Characteristics of promotion- Merits – Demerits – Designing a promotion campaign – Promotion – mix – Determinants – Promotion tools – Advertising – Sales promotion – Public relations.

Unit IV: Marketing organization and control

Marketing organization and control – Emerging trends and issues in marketing – Rural marketing – Social marketing – On – line marketing – Green marketing – network marketing.

Unit V: Customer satisfaction

Customer satisfaction – Difference between consumer and customer – Consumerism – Rights of consumers – Customer expectation – Changing perceptions of customer – Benchmarking – Total quality management.

Text Book

1. R.S.N. Pillai and Bagavathi, Modern Marketing – Principles and Practices, S.Chand& Co, 2010.

Books for Reference

1. V.S. Ramaswamy and S. Namakumari, Marketing Management: Global Perspective, Indian Context, Om Books publisher, 2009.
2. R.L. Varshney and B. Bhattacharya, International Marketing Management – An Indian perspective, Sultan Chand and Sons, 2015.

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon completion of the course, the students will be able to

CO1: Explain the marketing concepts

CO2: Identify the strategies adopted for buyer's behavior.

CO3: Analyse the tools for promotion, sales promotion and Advertising.

CO4: Assess the marketing organization and control.

CO5: Assess Customer Satisfaction, Benchmarking and Quality Management.

Mapping Outcomes COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	3	9	3	9	9	9	87/15=5.8
CO2	9	3	3	3	3	3	9	3	3	3	3	3	3	3	9	63/15=4.2
CO3	9	3	9	9	3	3	9	3	9	9	3	3	9	3	9	93/15=6.2
CO4	9	9	9	9	3	9	9	3	9	3	3	3	3	3	3	87/15=5.8
CO5	9	9	9	9	3	9	9	9	3	9	3	9	3	9	3	105/15=7
Weightage																**29/5=5.8**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT12	INTERNATIONAL TRADE AND PRACTICE	L	T	P	C
CORE II			5	-	-	4

Course Objectives:

The objectives of the course are

- To understand the global trends in business, marketing and trade and to make aware of regulations of foreign trade practices in the era of globalization.
- To get awareness about International Business Environment.
- To know the foreign exchange and Foreign institutions.
- The student will get knowledge on Global Level Business.

Unit-I: International Business and BOP

International Business: Meaning, Nature, Objectives – Strategic decisions in International Business – Special Problems in International business – Reasons for firms for going international – Drivers and Restrainers of Globalization – Types of International Business activities – BOP: Components – Disequilibrium – Correction of Disequilibrium.

Unit-II: International Business Environment

International Business environment: Meaning – Significance – Political Environment – Economic Environment – Cultural Environment – Technological Environment.

Unit-III: International Marketing

International marketing – Introduction – Meaning – Definition – International Marketing Vs Domestic marketing - Problems – International marketing environment - Market Entry Strategies – Information requirements for international marketing – Sources of information – International marketing channels

Unit-IV: International Trade strategies

International trade – Trade strategies – Types of Trade barriers – GATT – WTO – GATS – TRIMs – TRIPs – IPRs – Patents – IMF – World Bank.

Unit-V: India's Trade performance

India's Trade Performance: Determinants of Exports and Imports - Major Exports and Imports - Direction of Trade - Trade in Services - Major Problems of India's Export Sector. Foreign exchange market: Meaning, Nature and Functions – Determination of exchange rates – Exchange Rate system – Foreign exchange risk – FEMA.

Text Book:

1. Francis Cherunilam, International Business, PHI Learning Pvt. Ltd., New Delhi, 2013.

Reference Books:

1. Francis Cherunilam, International Trade and Export Management, Himalaya Publishing house, 2019.
2. Varshney.R.L. and Bhattachariya.B, International Marketing Management- An Indian perspective, Sultan Chand and Sons, 2015.
3. SubbaRao, P, International Business, Himalaya Publishing House, New Delhi, 2014
4. Vershney, R.L. and Bhattacharya, B., International Marketing Management, Sultan Chand & Sons, New Delhi, 2012.
5. B.S.Rathor, B.M.Jani and J.S.Rathor, International Marketing, Himalaya Publishing, Mumbai, 2001

Note: Question paper shall cover 100% Theory

Course Outcomes:

Upon completion of the course, the students will be able to

CO 1: Understand the concepts of international marketing and environment.
CO 2:Analyze the determinants of market selection and market entry methods
CO 3: Evaluate the various determinants of international marketing channels
CO 4: Analyse the Export Procedure and Documentation
CO 5: Examinethe sources of Export Finance and Payment Terms.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	3	9	3	9	9	3	81/15=5.4
CO2	9	3	3	3	3	3	9	9	3	3	3	9	3	3	9	75/15=5
CO3	9	3	9	9	3	3	9	9	9	9	3	3	9	3	3	93/15=6.2
CO4	9	9	9	9	3	9	9	3	9	3	3	9	3	3	3	93/15=6.2
CO5	9	9	9	9	3	9	9	9	3	9	3	3	3	9	3	99/15=6.6
Weightage																**29.4/5=5.88**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's*(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT13	ADVANCED FINANCIAL MANAGEMENT	L	T	P	C
CORE III			6	-	-	4

Course Objectives:

The objectives of the course are

- To gain knowledge on the fundamental concepts on financial management.
- To know the valuation of securities
- To understand the theories of capital structure and working capital management
- The student will able to understand an overview of financial management

Unit-I: Introduction to Financial Management

Financial Management: Meaning, Scope, Objectives, Functions, Relationship with other areas of Management – Functions of Financial Manager – Sources of Finance – Short term and long term finance – Financial decisions – Concepts of valuation: Time value of money – Compounding and Discounting – Risk and Return trade off.

Unit-II: Valuation of Securities

Valuation of Securities: Valuation of Asset – Bond Valuation – Valuation of Preference shares, Equity valuation. Dividend Policy: Meaning, Objectives, Forms of Dividend, Different dividend theories – Factors determining Dividend Policy.

Unit-III: Capital Structure

Capital Structure: Patterns of capital structure – Factors affecting Capital Structure – Optimum Capital Structure - Theories of Capital Structure. Leverages: Meaning, Types – Financial, Operating and Combined.

Unit-IV: Cost of Capital

Cost of Capital: Meaning, Significance, Concepts, Cost of Debt, Equity, Preference and Retained Earnings – Weighted Average Cost of Capital. Capital Budgeting: Concept - Evaluation Techniques: Payback, Accounting Rate of Return, NPV, IRR, Profitability Index, Comparison of DCF Techniques.

Unit-V: Working Capital Management

Working Capital: Concept, Need, Types, Factors affecting Working Capital – Estimation of Working Capital – Components of Working Capital – Management of Working Capital Components – Cash, Inventories, Accounts Receivable and Accounts Payable – Working Capital Financing: Trade Credit, Bank finance & Commercial Papers.

Text Book:

1. S.N.Maheswari, Financial Management Principles and Practice, Sultan Chand & Sons, New Delhi, 2013.

Reference Books:

1. I.M.Pandey, Financial Management, Vikas Publishing House Pvt. ltd, New Delhi, 2016.
2. James C. Van Horne, John M.Wachowicz., Jr, Fundamentals of Financial Management, PHI Pvt. Ltd, New Delhi, 2008.
3. Prasanna Chandra, Financial Management Theory and Practice, Tata McGraw – Hill Publishing Company Ltd, New Delhi, 2017.
4. Preeti Singh, Fundamentals of Financial Management, Ane Books Pvt. Ltd, Bangalore, 2009.
5. P.V. Kulkarni& B.G. Sathyaprasad, Financial Management, Himalaya Publishing House, Mumbai, 2015.

Webliography:

a. http://icmai.in/studentswebsite/studymat.php
b. http://164.100.133.129:81/eCONTENT/Uploads/Advanced_Financial_Management.pdf
c. http://opentuition.com/acca/p4/acca-p4-lectures/
d. http://cma-classes.in/
e. sol.du.ac.in/mod/book/view.php?id=1546&chapterid=1530

Note: Question paper shall cover 40% Theory and 60% Problems

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Explain the various techniques of financial management and financial planning

CO2: Make use of the relevance of capital structure, cost of capital and dividend policy with the value of the firm

CO3: Analyze the financial plan, leverages, capital structure and cost of capital of a company

CO4: Determine the optimal capital structure and value of a firm

CO5: Estimate the cost of capital, optimum dividend and working capital requirements of business firms.

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	3	3	81/15=5.4
CO2	9	3	9	9	3	3	9	9	3	9	3	9	3	3	9	93/15=6.2
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	3	105/15=7
CO4	9	9	9	9	3	9	3	3	9	3	3	9	3	3	3	87/15=5.8
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	3	111/15=7.4
Weightage																**31.8/5=6.36**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT14	MANAGEMENT ACCOUNTING	L	T	P	C
CORE IV			6	-	-	4

Course Objectives:

The objectives of the course are

1. Develop an insight of principles and techniques of Management Accounting.
2. Familiarize the utilization of accounting information for planning, and decision-making
3. Effective control of business ventures.
4. The students will get the knowledge to prepare financial statements, other analysis and evaluations themselves.

Unit I: Introduction to Management Accounting

Management Accounting: Nature - Scope - Management accounting Vs Financial accounting. Management reporting system – Designing and installation – Types of reports.

Unit II: Financial Statement Analysis

Analysis of financial statement – Concept of funds – Importance – Preparation of Fund Flow Statement and Cash Flow Statement – Comparison of Fund Flow and Cash Flow Statement

Unit III: Standard Costing

Standard Costing – Introduction - Importance – Limitations- Material, Labour, Overhead, Sales and Profit.

Unit IV: CVP Analysis

Cost-Volume Profit analysis – Techniques – Break Even Analysis – Profit-Volume (P/V) analysis – Role and Limitations of CVP analysis.

Unit V: Capital Budgeting

Nature of Capital Budgeting – Importance of Capital Budgeting – Difficulties – Rationale – Evaluation techniques – Average rate of return – Pay back method – Discounted cash flow techniques – Net present value method - Internal rate of return method.

Text Book:

1. Pillai, R.S.N. and Bagavathi, Management Accounting, S.Chand& Co Ltd., 2010.

Reference Books:

1. Gupta, S.P., Management Accounting, SahityaBhavan Publications. Agra.
2. Khan M.Y. and Jain, P.K. 2007.Management Accounting. 4th Edn. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
3. Maheswari, S.N. 2009. Management Accounting & Financial Control. Sultan Chand & Sons, Delhi.

4. Sharma,R.K. and Sashi,K. Gupta. 2007. Management Accounting. 15th Revised Edn. Kalyani Publishers, Ludhiana.
5. Vinayakam.N and. Sinha, I.B. 2005. Management Accounting – Tools & Techniques – Kalyani Publishers, Ludhiana.

Webliography:

- https://www.cpaaustralia.com.au/documents/study-manual-management-accounting.pdf
- http://management-accountant.com/
- www.learnerstv.com/Free-Management-Video-lectures-ltv638-Page1.htm
- http://www.wiley.com//college/managerialvideos/

Note: Question paper shall cover 20%Theory and 80% Problems

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Define financial statement, cash flow statement, marginal costing, budgetary control and capital budgeting.

CO2: Identify the types of ratios, cash flow activities, budgets, capital expenditure decisions

CO3:Analyse the financial position of a business, cash flow, cost / volume / profit, master budget and investment proposals

CO4: Interpret the results of ratios, cash flow activities, contribution, functional budget and capital budgeting

CO5: Solve the managerial problems by adapting the techniques of management Accounting

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	9	3	87/15=5.8
CO2	9	3	9	9	3	3	9	9	3	9	9	9	3	3	9	99/15=6.6
CO3	9	9	9	9	3	9	9	9	9	9	9	3	9	3	3	111/15=7.4
CO4	9	9	9	9	3	9	3	3	9	3	3	9	3	9	3	93/15=6.2
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	9	117/15=7.8
Weightage																**33.8/5=6.76**

Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COP11	COMPUTERIZED ACCOUNTING WITH TALLY	L	T	P	C
CORE V			-	-	6	4

Course Objectives:

The objectives of the course are

- To provide basic knowledge of computerized accounting to deserving students under self – learning mode.
- To know the preparation of budget and vouchers
- To prepare the final accounts and fund flow statement
- The student will get employment after learning the paper

Unit – I: Introduction to Tally

Introduction – Role of computer in Accounting – Extended enterprise features – Accounting and Inventory control features – sales and purchase order processing. To start tally – menus and options – Accounting with Tally – Pre defined groups of accounts – Golden rules of accounts – Double entry systems – ledger creation.

Unit – II: Groups

Groups: Accounts Information – Primary groups of capital nature – revenue nature – To create groups using single mode – Multiple mode – Types of Budget – type of vouchers – Restart numbering – Foreign Exchange Transactions – stock Group Creation– Inventory information – Single stock group creation – Multiple stock group creation – create stock category using single mode – Multiple mode – Configuration settings for inventory – costing method – FIFO – LIFO – create stock items in multiple mode – Trading Business.

Unit – III: Vouchers

Gateway of Tally – Voucher entry – Type of Voucher – Inventory allocations – Purchase and Sales order vouchers entry – Invoice entry – Optional and Regular Vouchers – Balance Sheet – Profit and Loss Account

Unit – IV: Accounting Statements

Trial Balance – Accounting Books and Statements – Inventory Reports and Statements – Cash Flow / Funds Flow Statement – Gateway of Tally – Multi Accounting Printing – Types of Printing - Configuration Options.

Unit – V: Financial statement analysis

Reconciliation of Bank Accounts and other Miscellaneous option – Stock Summary Ratio Analysis – Import and Export of Data – Backup and Restore of data – loading a company – creating a group company – Reconciliation of Bank accounts – Security control - Types of Security.

Text Book:

1. Implementing Tally ERP 9: A.K Nadhani and K.K Nadhani, BPB Publications, 2018

Reference Books:

1. MamrataAgrawal, Tally 9, Dream Tech Press, New Delhi, 2013
2. Tally Software Package – manual, 2019.
3. GarimaAgarwal, Computerised Accounting, Himalaya publications, 2018
4. A. Murali Krishna, Computerised Accounting, Vaagdevi publications, 2015
5. Dinesh Maidasani, Mastering Tally, Firewal Media, 2010
6. J.S. Arora, Tally ERP 9, Kalyani Publications, 2017

Note: Question paper shall cover 100% Practical

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Possess skills to create a company with accounting and inventory features.

CO2: Work with the well-known procedure for recording the transactions in accounting and inventory vouchers.

CO 3: Prepare Bank reconciliation statement and debtors, creditors management

CO4: Analyze the reports like Day Book, Trial Balance, Profit & Loss A/c, Income and Expenditure Account, Balance Sheet & Printing option

CO 5: Examine the legal aspects of GST and Income Tax calculations.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	3	9	3	9	3	3	75/15=5
CO2	9	3	3	3	3	3	9	9	3	9	3	9	3	3	9	81/15=5.4
CO3	9	3	9	9	3	3	9	9	9	9	3	3	9	3	3	93/15=6.2
CO4	9	9	9	9	3	9	9	3	9	3	3	9	3	3	3	93/15=6.2
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**29.8/5=5.96**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COS11	EMPLOYABILITY SKILLS –SOFT SKILL DEVELOPMENT (PRACTICAL)	L	T	P	C
SUPPORTIVE COURSE I			2	-	-	2

Course Objectives

The objectives of the course are

- To enhance the employability skills.
- To develop interpersonal skills that provides good work environment.
- To effectively prepare and present in a job interview

Unit I: Etiquettes and Manners

Etiquette – Meaning & Importance, Etiquette Vs Manners, Business and Workplace Etiquette, Ways of introducing oneself, Handshakes, Telephone Etiquette, Email Etiquette

Unit II: Interpersonal skills

Understand Self – Different Categories; Diagnosis of Type of Self - Identifying own type of self, Positive character traits, Effect of Interpersonal Behaviour on Interpersonal Relationship, Formal Interpersonal skills, Emotional Intelligence

Unit III: Leadership skills

Leadership – Definition, Role & Functions of a Good Leader; Traits of Leadership, Leadership styles, Developing Leadership skills

Unit IV: Group Discussion

Group Discussion as a Selection process, Kinds of topics for discussion, Structure of GD, Initiation Techniques, Handling Questions, Outcome of GD, Preparation for GD

Unit V: Interview Skills

Types of Interview, Employment Interview, preparing for Face- to face interview, Interview Body language, Questions commonly asked during Interview

Text Books:

1. Alex K, Soft Skills, Sultan Chand Company, 2014
2. Gopalaswamy Ramesh, The Ace of Soft Skills: Attitude, Communication And Etiquette For Success, Pearson Education, First Edition, 2013

Reference Books:

1. K. RavikanthRao, Life Skills Education, Neelkamal, 2016
2. Neera Jain and ShomaMukherji, Effective Business Communication, Tata McGraw Hill Education Pvt. Ltd., 2013
3. M.S. Rao, Soft Skills: Enhancing Employability, I.K. International Publishing House Pvt. Ltd., 2011
4. UrmilaRai and S.M.Rai, Business Communication, Himalaya Publishing House, 2010
5. SarveshGulati, Corporate Soft Skills, Rupa Publications India Pvt. Ltd., 2007

Note: Question paper shall cover 100% Practical

Course Outcomes:

On completion of the course, student will be able to–

CO1: Effectively communicate through verbal/oral communication and improve the listening skills

CO2: Write precise briefs or reports and technical documents.

CO3: Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.

CO4: Become more effective individual through goal/target setting, self-motivation and practicing creative thinking.

CO5: Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								**Mean Score of COs**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	3	9	3	9	3	9	3	9	75/15=5
CO2	9	3	3	3	3	3	9	3	3	9	3	9	3	3	3	69/15=4.6
CO3	9	3	9	9	3	3	9	3	9	9	9	9	9	3	9	105/15=7
CO4	9	9	9	9	3	9	9	9	3	3	3	9	3	3	9	99/15=6.6
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**30.2/5=6.04**

Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

SEMESTER – II

COURSE CODE	P21COT21	MODERN BANKING AND INSURANCE	L	T	P	C
COREVI			4	-	-	4

Course Objectives

The objectives of the course are

- To enable the students to obtain knowledge on the important areas that help in Banking and its services
- To know the types of banking, e-banking and its services
- To understand the basic concept of insurance
- The student will able to operate online banking and to know the banking and operations

Unit – I: Modern Banking Services

Banking Services – Traditional Vs Modern – Mobile banking – Facilities in mobile banking — Internet Banking – Tele banking – Home banking – Corporate banking- Electronic Fund Transfer (EFT) – Evolution – Steps in EFT – Need and advantages of EFT – NEFT – Advantages – Electronic Clearing Services (ECS) – Advantages of ECS – Disadvantages – RTGS – Features – Security features of RTGS – Advantages – Disadvantages.

Unit – II: E-Banking

E-Banking – Facets of E-banking– E-banking transactions – Electronic delivery channels– Truncated cheque and electronic cheque – Models for E-banking – M - Cheque product – Electronic cheque - Advantage and constraints in E-banking – Security measures- Overview of Foreign Exchange-CIBIL Score.

Unit – III: Debit and Credit Cards

ATM – Features – Mechanism – Functions- Importance – Procedure for cash withdrawal – Debit cards – Concept – Mechanism – Dangers – Credit cards – Origin and history – Features – Classification – Validity and renewal — Credit card frauds - Benefits of credit card – Drawbacks – Indian Scenario – Future outlook.

Unit – IV: Principles of Insurance

General Insurance in India – Basic Principles of Insurance: Utmost good faith, Insurable Interest- Indemnity, Misrepresentation, Subrogation, Proximate cause -Role of Insurance Companies as financial intermediaries- Insurance schemes – Assessing risk- product pricing - promotion measures - claim valuation methods-Intermediaries in insurance business – agency.

Unit – V: General Insurance

Scope of general insurance covering theft, fire, vehicles, products, transport, travel, building and understanding the underlying conditions thereof- claims for compensation and procedure there of -Regulatory authorities and their functions

Text Book

1. Sundaram and Varshney, Banking Law Theory and Practice, Sultan Chand Co., 2019
2. S. Guruswamy, Banking Theory Law and Practice, 3rd Edition, Vijay Nicholes Imprint Pvt. Ltd., Chennai, 2020.

Reference books:

1. ShelaghHefferman, Modern Banking theory and practices, John wiley and sons, 2012
2. N.C.Majumdar, Fundamentals of modern banking, New central Book Agency, 2015
3. D.P.Gupta and R.K.Gupta, Modern banking in India, Asian Books, 2019
4. Indian Institute of Banking and Finance, Banking and insurance law and practice, Taxmann Publication Private Limited, 2018
5. B. Santhanam, Banking and Financial Systems, Margham Publishers, 2017
6. S.N. Maheswari, Banking Law Theory and Practice, Kalyani Publications, 2018.

Webliography:

1. www.hindustanuniv.ac.in/video_lecture_series
2. www.tcyonline.com/video-lectures
3. www.atozinbanking.com
4. www.higherbanking.com
5. www.rbi.org.in

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon Completion of the course, the students will be able to

CO1: Understand and remember the principles of lending, credit, cash and marketing management aspects of the banking sector

CO2: Identify the procedures for lending & recovery of loan and marketing risks

CO3: Analyse the causes for NPA, norms for credit appraisal and market segmentation

CO4: Assess the management practices of banks

CO5: Adapt the principles of credit, cash and risk management

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	3	9	3	9	3	9	3	3	69/15=4.6
CO2	9	3	3	3	3	3	9	3	3	9	3	9	3	3	9	75/15=5
CO3	9	3	9	9	3	3	9	3	9	9	9	3	9	3	9	99/15=6.6
CO4	9	9	9	9	3	9	9	3	9	9	9	9	3	3	9	111/15=7.4
CO5	9	9	9	9	3	9	9	3	3	9	9	3	3	9	3	99/15=6.6
Weightage																**30.2/5=6.04**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT22	ADVANCED COST ACCOUNTING	L	T	P	C
COREVII			5	-	-	4

Course Objectives

The objectives of the course are

- To enable the students to obtain knowledge on the important areas that help in decision making.
- To understand the basic concepts of cost accounting
- To know the elements of costing and types of costing
- The student will get an idea to prepare cost sheet and various types of costing.

Unit – I: Introduction to Cost Accounting

Cost Accounting – Meaning and Definition – Importance –Cost concept – Differences between Financial Accounting and Cost Accounting – Installation of an Ideal Costing System – Elements of cost – Classification of cost - Preparation of Cost Sheet including Tender.

Unit – II: Material Cost

Material cost control – Fixation of various stock levels – Economic Order Quantity – Purchase procedure – Issue of materials – Pricing of material issues – Inventory control and verification.

Unit – III: Labour Cost

Labour cost control – Time keeping – Wage payment and Incentive schemes – Idle Time and Overtime – Labour turnover.

Unit – IV: Overheads

Overheads – Meaning, Classification according to functions and variability – Apportionment and Reapportionment of Overheads – Absorption of Overheads – Machine hour rate – Reconciliation of cost and financial Profits.

Unit – V: Job costing

Job Costing – Contract Costing – Process Costing – Losses and Gains – Inter Process Transfer Pricing – Equivalent production – Joint and By Products Costing.

Text Book:

1. Maheshwari S.N., Cost Accounting, Sultan Chand & Sons, New Delhi, 2018.

Reference Books:

1. Jain &Narang, Cost Accounting, McGraw Hill, Noida, U.P, 2012.
2. Arora.M.N, Practical Costing, Himalaya Publishing, Mumbai, 2017.
3. Senthilkumar and Maruthamuthu, Advanced Cost Accounting, Vikas Publishing House, New Delhi (Revised Edition), 2018
4. Murthy and Gurusamy, Cost Accounting, Vijay Nicole Publication, Chennai, 2016.

Webliography:

1. icmai.in/studentswebsite/studymat.php
2. http://www.icsi.in/
3. http://www.textbooksfree.org/Managerial%20Accounting%20Videos.htm
4. https://www.vutube.edu.pk/vu-lectures/viewcategory/19/cost-management-accounting-mgt402
   education.svtuition.org/2011/07/cost-accounting-video-lectures.html

Note: Question paper shall cover 20% Theory and 80% Problems

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Explain the concepts of activity based costing, target costing, life cycle costing, standard costing, value chain and value added

CO2: Apply the various cost management techniques

CO3: Analyse the techniques of cost management

CO4: Interpret the results arrived through the cost management techniques

CO5: Adapt the strategic areas of cost management system in a manufacturing concern.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	3	3	81/15=5.4
CO2	9	3	9	9	3	3	9	9	3	9	3	9	3	3	9	93/15=6.2
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	3	105/15=7
CO4	9	9	9	9	3	9	3	3	9	3	3	9	3	3	3	87/15=5.8
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	3	111/15=7.4
Weightage																**31.8/5=6.36**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT23	BUSINESS RESEARCH METHODS	L	T	P	C
COREVIII			4	-	-	4

Course Objectives:

The objectives of the course are

- To enable students to know the concept and process of research and the methods of presenting research report.
- To understand the concepts of various steps and techniques and procedures in Research.
- To enable the student to gain the knowledge of analysis and interpretation.
- The student will get an idea to prepare project report.

Unit – I: Types and Process of Research

Research: Introduction – Characteristics – Objectives – Scope – Importance – Qualities of good researcher – Types of research – Research Process – Identification, Selection and Formulation of research problems.

Unit – II: Research Design

Formulation of hypothesis – Research design – Types – Sampling: Methods and Techniques, Steps – Sample size – Sampling error – Advantages and limitations of sampling.

Unit – III: Data collection

Data collection methods: Techniques of data collection – Primary data and Secondary data– Interview Schedule, Questionnaire and Observation – Pretest – Pilot study – Secondary data sources.

Unit – IV: Data processing

Data processing: Editing – Coding - Classification and Tabulation – Attitude measurement – Scaling technique: L.L.Thurstone, RensisLikert, Emory S. Bogardus - Social distance - Rating and Ranking scales – Data analysis: Statistical tolls used in research – Measure of Central tendency – Standard Deviation – Correlation – regression models – Methods of least square – Multiple regressions. Test of significance – 'T' Test and 'F' test – ANOVA – Chi-Square test

Unit – V: Report writing

Report writing and presentation: Types of report – Contents – Format of report – Steps in drafting report - Presentation of report – Foot note – References – Bibliography - Research Ethics - Plagiarism.

Text Book

1. C.R.Kothari, "Research Methodology", New Age International Publishers, 2020.

Reference Books:

1. Devendra Thakur, Research Methodology in Social Science. Deep & Deep Publications. New Delhi, 2000.

2. Krishnasami, O.R. andRanganathan, M., Methodology of Research in Social Science, 2nd Edn. Himalaya Publishing House, Mumbai, 2014.
3. Michael. V.P., Research Methodology in Management, Kitib Mohan Publications, Alahabad, 2014
4. Ravilochanan, P., Research Methodology. Margham Publications, Chennai, 2007.
5. Saravanavel, P., Research Methodology, KitabMahal, Allahabad, 2008.

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1. https://www.bcps.org/offices/lis/researchcourse/statistics_role.html
2. https://www.mheducation.co.uk/openup/chapters/9780335227242.pdf
3. onlinelibrary.wiley.com/doi/10.1002/0471477435.fmatter/pdf
4. www.statisticslectures.com/
5. http://www.textbooksfree.org/Statistics%20Video%20Lectures.html

Note: Question paper shall cover 80% Theory and 20% Problems

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Explain the conceptual framework of research design
CO2: Apply the suitable statistical tools for analyzing the problem and infer the results
CO3: Analyse the primary and secondary data
CO4: Assess the research problems
CO5: Design the research reports.

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	3	3	9	9	9	9	9	87/15=5.8
CO2	9	3	3	3	3	3	9	9	3	9	3	9	9	3	9	87/15=5.8
CO3	9	3	9	9	3	3	9	9	9	9	3	3	9	3	9	99/15=6.6
CO4	9	9	9	9	3	9	9	3	9	3	3	9	3	9	3	99/15=6.6
CO5	9	9	9	9	3	9	9	9	3	9	9	3	9	9	3	111/15=7.4
Weightage																**32.2/5=6.44**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT24	QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS	L	T	P	C
COREIX			5	-	-	4

Course Objectives:
The objectives of the course are

- To make the students to understand the various concepts in Quantitative techniques,
- To enable the students how various techniques of statistics used in business for taking decisions.
- To provide practical knowledge on quantitative techniques.
- The students will gain sound theory as well as practical knowledge in quantitative techniques.

Unit I: Introduction to Quantitative Techniques

Meaning of Quantitative Techniques – Role of Quantitative Techniques – Advantages and Limitations of Quantitative Techniques – Correlation Analysis – Simple – Partial and Multiple –Regression Analysis – Time Series.

Unit II: Probability

Probability – Problems applying Additional and Multiplication Theorem – Mathematical Expectations – Theoretical Distributions – Binomial – Poisson – Normal Distribution.

Unit III: Significance Tests

Significance Tests in Small Samples (t test) – Testing the significance of the mean of a random sample – Testing difference between means of two samples (Independent and Dependent Samples) – Chi-square test- Analysis of Variance (One way and two way classification).

Unit IV: LPP, Transportation and Assignment Problems

Linear Programming – Graphical Method – Simplex Method – Transportation Problems – Initial Basic Feasible Solution - Modi Method – Assignment Problems.

Unit V: Interpolation and Extrapolation

Interpolation and Extrapolation – Methods of Interpolation – Binomial Expansion Method – Newton's Method – Lagrange's Method – Parabolic Curve Method – Extrapolation – Vital Statistics – Life Tables

Text Books

1. C.R. Kothari, Quantitative Technique, Vikas Publishing House, 2015
2. S.P. Gupta, Business Statistics & Operation Research - Sultan Chand & Sons, 2012

Reference Books:

1. S.C. Gupta, Statistical Methods, Sultan Chand & Sons, 2014
2. S.P. Gupta, Statistical Methods, Sultan Chand & Sons, 2011
3. Richart I. Levin, and Rubin, Statistics for Management, Prentice Hall of India, 2017

4. PA. Navanitham, Business Statistics & Operation Research, Jai Publications, Trichy, 2016.
5. S.P. Rajagopalan& R. Sattanathan, Business Statistics & Operation Research, Vijay Nicole Publications, Chennai, 2011

Note: Question paper shall cover 20% Theory and 80% Problems

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Draw inferences from sample data regarding the relevant population.

CO2: Apply mathematical techniques to problem solving

CO3: Calculate and interpret the nature of correlation between variables

CO4: Apply appropriate mathematical tools to financial data including discounting and investment appraisal

CO5: Explain probability and be able to use a range of techniques to calculate probabilities

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	3	9	9	9	3	9	9	9	93/15=6.2
CO2	9	3	9	9	3	3	9	3	3	9	3	9	3	3	9	87/15=5.8
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	9	111/15=7.4
CO4	9	9	9	9	3	9	3	3	9	3	3	9	3	9	3	93/15=6.2
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	3	111/15=7.4
Weightage																**33/5=6.6**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT25	INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT	L	T	P	C
CORE X			4	-	-	4

Course Objectives

To provide knowledge about various investment avenues, methods of analyzing securities and portfolio management.

Unit – I: Investment Analysis

Investment Analysis: Nature – Scope – Elements of Investment – Risk and return – Objective of investment – Approaches to investment analysis – Securities – Types – Features – Bond Market.

Unit – II: Investment Alternatives

Investment alternative and strategies – Financial investment – Non financial investment – Valuation of fixed income securities and variable income securities (excluding Derivatives)

Unit – III: Fundamental Analysis

Fundamental analysis: Economic, Industry and Company analysis – Sources of information for analysis

Unit – IV: Technical Analysis

Technical Analysis – Types of charts – Dow Theory, Elliott wave theory, Odd-lot theory, Breadth of market, Relative strength analysis – Moving Average analysis – Efficient Market Hypothesis

Unit – V: Portfolio analysis and Management

Portfolio analysis and Management: Portfolio risk and return – Markovitz model – Sharpe model: Single Index Model – CAPM – Arbitrage Pricing Theory

Text Book

1. PunithavathyPandian, “Security Analysis and Portfolio Management”, Vikas Publishing House Pvt. Ltd, 2011

Books for References:

1. Avadhani.V.A, “Security Analysis and Portfolio Management”, Himalaya Publishing House Pvt. Ltd, 2010
2. Kevin.S, “Security Analysis and Portfolio Management”, PHI Learning Pvt. Ltd, 2015
3. Donald E. Fischer and Ronald J. Jordan, “Security Analysis and Portfolio Management”, Prentice Hall of India, 2018.
4. Prasanna Chandra, “Investment Analysis and Portfolio Management”, Tata McGraw Hill International, 2019

Webliography :

1. https://irfanullah.co/cfa-1-free-2011-video-lectures/
2. www.bcci.bg/projects/latvia/pdf/8_IAPM_final.pdf
3. www.ctre.iastate.edu/gasb34/intropart1.pdf
4. https://www.garp.org/#!/frm/study-materials

Note: Question paper shall cover 75% Theory and 25% Problems

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Illustrate the various investment avenues, theories of security, derivatives and risk management and portfolio management

CO2: Apply the theories of securities analysis and portfolio management

CO3: Analyse the various investment alternatives and derivatives

CO4: Appraise the techniques of derivatives in minimizing the risk

CO5: Choose the best portfolio combination and derivatives

Mapping Outcomes COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	3	9	3	9	9	9	87/15=5.8
CO2	9	3	3	3	3	3	9	9	3	9	3	9	3	3	9	81/15=5.4
CO3	9	3	9	9	3	3	9	9	9	9	3	3	9	9	3	99/15=6.6
CO4	9	9	9	9	3	9	9	3	9	3	3	9	3	3	9	99/15=6.6
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**31.4/5=6.28**

Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

SEMESTER –III

COURSE CODE	P21COT31	INDIRECT TAXATION	L	T	P	C
CORE XI			5	-	-	4

Course Objectives

The objectives of the course are

- To make the students gain knowledge on indirect taxes and legal provisions
- To enable the students to understand theapplications of indirect taxes and its importance.
- To make the students to understand about Goods and Services Tax.
- The student will gain the knowledge about all types of indirect taxes which are levied by government.

Unit- I: Indirect Taxes

Indirect Taxes - Introduction - Features - Objectives of Taxation- Types of taxes- Direct and Indirect taxes - Indirect Tax structure - Merits and Demerits of Indirect Taxes - Recent Developments in Indirect Tax structure - Goods and Services Tax Act 2016 - Introduction – Features – Benefits of Goods and Service Tax.

Unit II: GST

Goods and Service Tax - Important Definitions - Taxable persons – Time of supply of goods and services – Administrative set up – Classes of officers under Central and State Goods and Services Tax Act - Appointment of officers – Powers of officers – Levy and Collection of GST – Powers to grant exemption from GST.

Unit III: Registration Procedures

Registration – Procedure for registration under Schedule III – Special provisions relating to casual taxable person and non-resident taxable person – Amendment of registration – Cancellation of registration – Revocation of cancellation of registration.

Unit IV: GST Assessment

Assessment of GST- Self-assessment – Provisional assessment – Scrutiny of returns – Assessment of non-filers of returns – Assessment of unregistered persons – Assessment in certain special cases – Tax Invoice – Credit and Debit Notes – Input Tax Credit-Payment of Tax – Tax Deducted at Source - Collection of Tax at source.

Unit V: Customs Duty

Customs Act 1962 – Important Definitions – Basics – Importance of Customs Duty – Constitutional authority for levy of Customs Duty – Types of Customs Duty – Prohibition of Importation and Exportation of goods – Valuation of goods for Customs Duty – Transaction Value – Assessable Value – Computation of Assessable Value and Customs Duty.

Text Books

1. National Academy Of Customs Excise and Narcotics, Background Material for Goods and Service Tax. July, 2016.
2. Mehrotra and Goyal. Indirect Taxes, 13thEdn. SahityaBhavan Publications, Agra, 2015.

Reference Books

1. Radhakrishnan, P., Indirect Taxation, 3rdEdn. Kalyani Publishers, New Delhi, 2011.
2. Balachandran, V., Indirect Taxation, 17thEdn. Sultan Chand & Sons, New Delhi, 2016.

Webliography:

1. http://idtc.icai.org/gst-topic-wise-study-material-list.html
2. https://www.gstindia.com/gst-in-india-the-basic-study/
3. http://news.taxindiahindi.in/updated-study-material-on-model-gst-released-by-icai/
4. https://cleartax.in/s/gst-law-goods-and-services-tax
5. www.cbec.gov.in
6. www.gst.gov.in.

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon completion of the course, the students will be able to

CO1: Explain the concepts of Goods and Services Tax Act and Customs Act

CO2: Apply the GSTN Portal in business

CO3: Categorize the transactions under CGST, SGST, IGST and UTGST

CO4: Appraise the mechanism of Goods and Services Tax System

CO5: Prepare the tax planning and tax management for payment of tax and filling of tax returns.

Mapping Outcomes COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	9	9	3	9	3	3	81/15=5.4
CO2	9	3	3	3	3	3	9	9	3	9	3	9	3	3	3	75/15=5
CO3	9	3	9	9	3	3	9	9	9	9	9	3	9	9	3	105/15=7
CO4	9	9	9	9	3	9	9	3	9	3	9	9	3	3	3	99/15=6.6
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**31/5=6.2**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT32	FINANCIAL MARKETS AND SERVICES	L	T	P	C
CORE XII			5	-	-	4

Course Objectives:

The objectives of the course are

- To enable the students to understand the concepts of Indian financial system.
- To provide knowledge on various financial services and financial markets.
- To familiarize the various functions of financial Markets.
- The students will gain thorough knowledge about financial markets and financial services.

Unit – I: Indian Financial System

Indian Financial System: Structure, Functions, Financial System and Economic Development – Financial Market: Meaning, Classification – Financial Services: Meaning, Significance, Features, Challenges in financial service sectors – Financial Products and Services – Emerging Scenario.

Unit – II: Money Market

Money Market – Call Money Market – Treasury Bills Market – Discount Market – Govt. Securities Market – Market for Commercial Paper and Certificates of Deposits.

Unit – III: Stock Market

Stock Market – Stock Exchange – Organization and Functions – Listing of Securities – Trading in Stock Exchanges – On-line Trading of Shares – E-Shares – New Issues Market – Types of New Issues – Problems of New Issue Market.

Unit – IV: Merchant Banking, Mutual funds and Venture capital

Merchant Banking – Meaning, Functions, Services – Guidelines of RBI and SEBI.Mutual Funds – Meaning, Types, Importance, Guidelines of RBI and SEBI.Venture Capital – Meaning, Features, Importance, Guidelines.

Unit – V: Factoring, Forfeiting and Depository system

Factoring - Meaning, Importance – Factoring in India –Factoring Vs. Discounting – Forfeiting – Meaning, Advantages and Limitations, Factoring Vs Forfeiting – Securitization of Debts – Securitization Vs Factoring, Depository System – Meaning, Functions – Advantages and Disadvantages, Depository Participants in India-Credit Rating Agency.

Text Book:

1. Gordon and Natarajan, Financial Markets and Services, Himalaya Publishing House, 2001.

Reference Books:

1. S. Gurusamy, Financial Markets and Institutions, recent edition.
2. Khan, M.Y. Financial Services, Tata McGraw Hill, 1998.
3. Sontomero and babble, Financial Markets, Instruments and Institutions, McGraw Hill, 1998.
4. Vasant Desai, The Indian Financial System, Himalaya Publishing House, 2010.
5. Varsheney, P.N., Indian Financial System, Sultan Chand & Sons, 2000.

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon completion of the course, the students will be able to

CO1: Understand the role and function of the financial system in reference to the macro economy.

CO2: Demonstrate an awareness of the current structure and regulation of the Indian financial services sector.

CO3: Evaluate and create strategies to promote financial products and services.

CO4: Make an informed judgement about whether or to what extent a financial market satisfies the conditions of an efficient market

CO5: Identify the main factors that could detract from that efficiency.

Mapping Outcomes COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	3	3	81/15=5.4
CO2	9	3	9	9	3	3	9	9	3	9	3	9	3	3	9	93/15=6.2
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	3	105/15=7
CO4	9	9	9	9	3	9	3	3	9	3	3	9	3	3	3	87/15=5.8
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	3	111/15=7.4
Weightage																**31.8/5=6.36**

Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT33	ADVANCED CORPORATE ACCOUNTING	L	T	P	C
CORE XIII			5	-	-	4

Course Objectives

The objectives of the course are

- To impart knowledge on accounting methods
- To enable the students to understand the procedures of accounting.
- To enable them to develop skills in the preparation of accounting statements and their analysis.
- To gain the knowledge about Accounting standards and companies' accounts.

Unit – I: Holding Companies

Holding Companies (except inter-company holdings and chain holding).

Unit – II: Banking Companies

Banking Company Accounts – Schedules and Preparation of Balance Sheet.

Unit – III: Insurance Companies

Insurance Company Accounts – Life and Non-life - Schedules and Preparation of Final Accounts.

Unit – IV: Double Account System

Double Account System – Nature – Features – Receipts and Expenditure on Capital Accounts – General Balance Sheet – Revenue Account – Net Revenue Account - Accounts of Electricity Companies and Railways - Replacement and Renewals.

Unit – V: Accounting Standards

Accounting Standards – Indian and International Accounting Standards – Accounting Standards 1,3,6,10,14,21 and 29 - Application – Scope – Formulation – Advantages – Disadvantages – Challenges - Inflation Accounting (Theory only).

Text Book:

1. Reddy, T.S. and Murthy, A., Corporate Accounting. Revised Edn. Margham Publications, Chennai, 2015.

Reference Books:

1. Arulanandam, M.A. and Raman, K.S., Advanced Accounting. 6thEdn. Himalaya Publishing House, Mumbai, 2009.

2. Gupta R.L. and Radhaswamy, Advanced Accountancy. 13th Revised Edn. Sultan Chand & Sons, New Delhi, 2009.
3. Jain, S.P. and Narang, K.L., Advanced Accountancy. 20thEdn. Kalyani Publishers, Ludhiana, 2014
4. Pillai, R.S.N. andBagavthi, Advanced Accountancy. 5thEdn. Chand, S. & Co Ltd., New Delhi, 2012.
5. Rajasekaran, V. andLalitha, R., Advanced Accounts. 1stEdn. Pearson. New Delhi, 2011.

Webliography :

1. http://www.learnerstv.com/video/Free-video-Lecture-22744-Management.htm
2. http://www.businessbookmall.com/Accounting%20Videos.htm
3. http://www.freebookkeepinghelp.com/accounting-lectures.html

Note: Question paper shall cover 20% Theory and 80% Problems

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Outline the basic concepts of corporate accounting

CO2: Identify the accounting procedures of various forms of companies

CO3: Analyse the internal and external reconstruction, performing asset and non-performing asset

CO4: Determine the purchase consideration, capital and revenue profits and profit / loss of bank, insurance and electricity companies

CO5:Prepare financial statements for various companies.

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	3	9	87/15=5.8
CO2	9	3	9	9	3	3	9	9	3	9	3	9	3	3	9	93/15=6.2
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	9	111/15=7.4
CO4	9	9	9	9	3	9	3	9	9	3	3	9	3	3	9	99/15=6.6
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	9	117/15=7.8
Weightage																**33.8/5=6.76**

Level of Correlation between CO's and PO's 1 – Low 3 – Medium 9 – High 0– No Correlation *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT34	STRATEGIC MANAGEMENT	L	T	P	C
CORE XIV			4	-	-	4

Course Objectives:

The objectives of the course are

- To make the students well aware about the concepts of strategic management.
- To help the students to understand the analysis and formulation of management strategies.
- To enable the students to know the procedures for implementation and evaluation of management strategies.
- The student will get the knowledge to identify the strengths and weakness of the firm.

Unit – I: Introduction to Strategic Management

Strategic Management – Definition – Scope – Benefits – Risks – Approaches – Models – Strategic change – Strategic Leadership and Decision making.

Unit –II: Situation Analysis

Situation Analysis – SWOT Analysis - Environmental Scanning and Industry analysis – Forecasting – Internal Scanning - Mission – objectives – Stakeholder Theory – Cyert and March's Behavioural Theory – Objectives of Non-Profit Organizations – Social Responsibility and Business Ethics.

Unit – III: Strategy Formulation

Strategy Formulation – Business Strategy – Corporate Strategy – Divertional Strategy – Portfolio Analysis – BCG Growth /Share matrix – Strategic choice – Development of policies – Strategic Alliances.

Unit – IV: Strategy Implementation

Strategy Implementation – Organization for action – Staffing – Leading – MBO –Total Quality Management – Functional Strategies – Growth Strategies – Diversification, Acquisition and Joint Venture – Recovery – Recession and Divestment Strategies – Management Buyout.

Unit – V: Strategic Control and Evaluation

Strategic Control and Evaluation – Establishing Strategic control – premise control – Implementation control – Strategic Surveillance – Special Alert Control – Evaluation Techniques – Managing change – Strategic issues in Managing Technology and Innovation – Strategic Effectiveness.

Text Book

1. R. M. Srivastava and ShubhraVerma, Strategic Management: Concepts, Skills and Practices, PHI Learning Pvt. Ltd., 2012

Books for References:

1. John A.Pearce II, Richard B.Robinson Jr., Strategic Management – Strategy Formulation and Implementation, A.I.T.B.S. Publishers, 2015.
2. John L.Thompson, Strategic Management – Awareness and change, Cheapman& Hall, 2014
3. J.David Hunger and Thomas L.Wheelen, Strategic Management, Pearson Publications, 2018.
4. Gregory G.Dess and Alex Miller, Strategic Management, Mcgraw-Hill Publications, 2020.
5. W.L.Charles and John Gareth, Strategic Management – An Integrated Approach, Cengage India, 2012
6. John H.Barnett and William D., Strategic Management, Atlantic Publishers and Distributors, New Delhi, 2018.
7. V.S.Ramaswamy and S.Nanakumari, Strategic Planning for Corporate Success, Macmillan Publications, 1994.

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon the completion of the course, the students will be able to understand

CO1: The students will, by means of a large project report written in groups, obtain training in analysing the strategic situation of a real technology based company, and in developing suggestions for change and development of the company's strategy. Thereby, the students will also acquire experience with working in groups as well as with writing reports for a company.

CO2: The students will, by means of lectures and a written exam, be encouraged to reflect on and combine key perspectives and frameworks within the field of strategic management.

CO3: The student will analyse a company strategic situation, with particular emphasis on strategic analyses on the business level, the corporate level, and the network level

CO4: The student will develop suggestions for change and development of a company's strategy.

CO5: The student will understand specific knowledge of perspectives, frameworks and concepts within strategy formation, strategic change, and strategic innovation.

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	3	3	81/15=5.4
CO2	9	3	9	9	3	3	9	9	3	9	3	9	3	9	3	93/15=6.2
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	9	3	111/15=7.4
CO4	9	9	9	9	3	9	3	3	9	3	3	9	3	9	3	93/15=6.2
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	3	111/15=7.4
Weightage																**32.6/5=6.52**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT35	INCOME TAX AND TAX PLANNING	L	T	P	C
CORE XV			5	-	-	4

Course Objectives:

The objectives of the course are

- To provide understanding on Income Tax including Rules pertaining various aspects.
- To make understand the students about the procedures followed by the income tax authorities in concern with income tax.
- To enable the students to know the procedure of file Income Tax returns.
- The students will gain the knowledge on procedures of income tax, payment of tax, and tax planning.

Unit – I: Income Tax Authorities

Income Tax Authorities – Appointment and control – Powers of the Central Board of Direct Taxes – Assessing officer. Deduction of Tax at source – Meaning – Provisions related to TDS from salaries, Income from other sources – Computation of Tax payable and Tax deductible at source.

Unit - II: Advance Tax

Advance payment of Tax – Meaning – Liability for payment of advance tax – condition – Computation of Advance tax. Assessment procedure - Permanent Account Number – Assessment – Forms used for filing the return of income – Voluntary Return of income, Compulsory return, steps for e-filing of Income tax return.

Unit – III: Recovery and Refund of Tax

Recovery and Refund of Tax – Meaning – Modes of Recovery – Refund of Tax. Appeals and Revision – Procedure in appeal – Revision by the Principal Commissioner or Commissioner.

Unit – IV: Penalties

Penalties – Penalties imposable – General principles – Items of penalties – Power of principal Commissioner or Commissioner to waive penalty.

Unit – V: Tax planning

Tax planning for individuals – Tax Evasion – Tax planning – Objectives – Characteristics – Importance – Tax planning under Salaries, House property, Profits and Gains of Business or Profession, Capital gains, Income from other sources and Clubbing of income.

Text Book:

1. Reddy, T.S. and Hari Prasad Reddy, Y. Income Tax Theory. 11th Edn. Margham Publishers, Chennai. - Current year.

Reference Books:

1. Gaur, V.P. and Narang, D.B. Income tax Law and Practice. Kalyani Publishers, New Delhi. - Current year.
2. Murthy, A. Income tax Law and Practice. Vijay Nicole Imprints Private Limited, Chennai. – Current year.
3. Mehrotra, H.C. and Goyal, S.P. Income Tax Law & Accounts. SahityaBhawan Publications, Agra. - Current year.
4. Saha, R.G., Usha Devi, N. Income Tax (Direct Tax). Himalaya Publishing House, New Delhi – Current year.
5. Vinod, K. and Singania. Students Guide to Income Tax. Taxmann Publications, New Delhi. - Current year.

Note: Question paper shall cover 80% Theory and 20% Problems

Course Outcomes

Upon completion of the course, the students will be able to

CO1: Understand the basic concepts of Income Tax Act

CO2: Identify the exempted incomes from all heads of incomes

CO3: Analyse the procedures for computing taxable incomes from five heads.

CO4: Determine the taxable income of different heads of income

CO5: Prepare the statement of tax liability of an individual

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	3	3	81/15=5.4
CO2	9	3	9	9	3	3	9	9	3	9	3	9	3	3	9	93/15=6.2
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	3	105/15=7
CO4	9	9	9	9	3	9	3	3	9	3	3	9	3	3	3	87/15=5.8
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	3	111/15=7.4
Weightage																**31.8/5=6.36**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COT36	BUSINESS ANALYTICS	L	T	P	C
CORE XVI			4	-	-	4

Course Objectives:

The objectives of the course are

- To enable the students to gain basic knowledge of Electronic-Commerce in the area of Business and Financing decisions
- To provide knowledge about the concepts, tools, techniques, and relevance of digital marketing in the present changing scenario.
- To familiarize the applications and tools of Industry4.0

Unit I: Electronic Commerce

Electronic Commerce: Traditional vs. Electronic Business Applications - The Anatomy of E-Commerce Applications - Classification of Electronic Commerce – Applications of Electronic Commerce Technologies- Business Models- Architectural Framework.

Unit II: Digital Marketing

Digital Marketing: Introduction, Concept, scope, and importance - Traditional marketing versus digital marketing - Challenges and opportunities for digital marketing - Digital penetration in the Indian market - Benefits to the customer; Digital marketing landscape: an overview - Ethical issues and legal challenges in digital marketing - Regulatory framework for digital marketing in India - Digital technology and customer-relationship management.

Unit III: Online Marketing

Digital Marketing Presence: Concept and role of Internet in marketing - Online marketing domains - The P.O.E.M framework - Website design and Domain name branding - Search engine optimization: stages, types of traffic, tactics - Online advertising: types, formats, requisites of a good online advertisement - Buying models - Online public relation management - Direct marketing: scope and growth. Email marketing, Facebook marketing, YouTube and Video marketing, Twitter Marketing, Instagram Marketing: types and strategies.

Unit IV: Interactive Marketing

Interactive marketing: concept and options - Social media marketing: concept and tools - Online communities and social networks - Blogging: types and role - Video marketing: tools and techniques - Mobile marketing tools - PPC marketing - Payment options.

Unit V: Application of AI in Industry 4.0

Industrial Revolution: Industrial Revolution 1.0 to 4.0- meaning- Goals and Design Principles - Technologies of Industry 4.0 - Big Data – Artificial Intelligence (AI) – Industrial Internet of Things - Cyber Security – Cloud – Augmented Reality.

Artificial Intelligence in Marketing: Introduction of Artificial Intelligence in Marketing How does AI Work, Benefit of AI in Marketing Automation, Content creation with AI, AI Tools available for Digital marketing

Text Books:

1. Pineet Singh Bhatia, Fundamentals of Digital Marketing", Pearson Publishers, 2019.
2. Bharat Bhasker, "Electronic Commerce: Framework, Technologies and Applications", Tata McGraw Hill Publishing Company Limited, Noida, UP, 2016
3. C.A.Rayudu, "E-Commerce & E-Business", Himalaya Publishing House, Mumbai, 2013
4. P. Kaliraj, T. Devi, "Higher Education for Industry 4.0 and Transformation to Education 5.0, 2020.
5. Gilchrist Alasdair, Industry 4.0, A Press Publishing Company, New york, 2016

Reference Books:

1. Deiss, R&Henneberry, R, Digital marketing for dummies. John Wiley & Sons, 2020 - 21
2. Amir Manzoor, "E-Commerce", Amir Manzoor Publisher, 2014
3. Suresh T.Viswanathan, "The Indian Cyber Law", Bharat Law House, New Delhi, 2015
4. Ustundag Alp," Industry 4.0: Managing The Digital Transformation", Springer International Publishing, Newyork, 2009

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: To gain introductory and application knowledge on ecommerce

CO2: Identify and assess the impact of digital technology in transforming the business environment and also the customer journey.

CO3: Explain the way marketers think, conceptualize, test continuously to optimize their product search on digital platforms.

CO4: Demonstrate their skills in digital marketing tools such as Social media, and Blogging for engaging the digital generation.

CO5: Introduction of AI in Digital Marketing

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	3	3	9	3	9	9	9	81/15=5.4
CO2	9	3	3	3	3	3	9	3	3	9	3	9	3	9	9	81/15=5.4
CO3	9	3	9	9	3	3	9	3	9	9	3	3	9	3	3	87/15=5.8
CO4	9	9	9	9	3	9	9	3	9	3	3	9	9	9	9	111/15=7.4
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**31/5=6.2**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

SEMESTER IV

COURSE CODE	P21COE411	MANAGERIAL ECONOMICS	L	T	P	C
ELECTIVE - I			4	-	-	4

Course Objectives

The objectives of the course are

- To develop managerial perspective to economic principle as an aid for decision making under given environmental constraints.
- To understand the concepts of demand analysis and cost of production analysis
- To know the types of competition, pricing decisions and profit management
- The student will understand the concepts of managerial economics

Unit – I: Managerial Economics

Managerial Economics: Nature and Scope, In relation with other disciplines - Role and Responsibilities of Managerial Economist - Goals of Corporate Enterprises: Maximization of profit – Value of enterprises.

Unit – II: Demand Analysis

Demand analysis: Demand determinations - Demand distinctions – Types of Elasticity of demand – Demand forecasting: For industrial goods – Consumer goods – Factors determining demand forecasting – Methods of demand forecasting.

Unit – III: Cost and production analysis

Cost and production analysis: Cost concepts, Classifications and Determinants – Cost and output relationship – Short run and Long run – Cost functions – Economics scale of production – Cost control – Cost reduction - Production functions – Break-even analysis

.

Unit – IV: Price and Output analysis

Pricing and output decisions indifferent market situations: Perfect competition – Monopoly and Monopsony – Monopolistic competition – Oligopoly and Oligopsony – Pricing policies – Pricing methods – Pricing forecasting.

Unit – V: Profit management

Profit management: Nature, Measurement – Profit policies – Profit planning and forecasting - Business cycles and Business policies – Economic forecasting – Input Output analysis - National income.

Text Book:

1. R.L. Varsheny ,C.L.Maheshwari, "Managerial Economics", Sultan Chand & Sons, New Delhi, 2002

Reference Books:

1. Cauvery, SudhaNayak and Others - Managerial Economics - S. Chand and Sons, New Delhi, 2009.
2. Dwivedi D.N. - Managerial Economics - Vikas Publishing House P. Ltd, New Delhi, 2010.
3. Gupta G.S. – Managerial Economics – Tata McGraw Hill, New Delhi, 2014.
4. Mehta P.L. – Managerial Economics – Sultan Chand and Sons, New Delhi, 2015.
5. Mithani D.M. – Managerial Economics – Himalaya Publishing House, Mumbai, 2011.

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Understand the roles of managers in firms

CO2: Understand the internal and external decisions to be made by managers

CO3: Analyze the demand and supply conditions and assess the position of a company

CO4: Design competition strategies, including costing, pricing, product differentiation, and market environment according to the natures of products and the structures of the markets.

CO5: Analyze real-world business problems with a systematic theoretical framework.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	3	9	3	9	3	3	75/15=5
CO2	9	3	3	3	3	3	9	9	3	9	3	9	3	3	9	81/15=5.4
CO3	9	3	9	9	3	3	9	9	9	9	3	3	9	9	3	99/15=6.6
CO4	9	9	9	9	3	9	9	3	9	3	3	9	3	9	9	105/15=7
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**31/5=6.2**

Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix*

COURSE CODE	P21COE412	BUSINESS ETHICS	L	T	P	C
ELECTIVE - I			4	-	-	4

Course Objectives:

The objectives of the course are

- Promote understanding of the importance, for business and the community, of ethical conduct;
- Provide the skills with which to recognize and resolve ethical issues in business;
- Enhance awareness and critical self-examination of one's own values, and to appreciate the relevance of personal values in the business/workplace setting; and
- Encourage reflection on the ethical dimension of your own decision-making in workplace and other settings.

Unit –I: Business Ethics

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

Unit –II: Ethical performance

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

Unit –III: Beliefs and Values

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

Unit – IV: Corporate Governance

Corporate Governance – Meaning – Importance and Features and Corporate Social Responsibility.

Unit –V: Environmental ethics

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

Text Book

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

Reference Books

1. Badi, R.V. and Badi, N.V., Business Ethics. 2nd Edn. Vrinda Publication (P) Ltd., Delhi, 2005.

2. Gene Burton. Manab Thakur. Management today – Principles and Practice. 9th Reprint. Tata McGraw Hill Publishing Company Ltd., Delhi, 2006
3. Jain V.K. and Omprakashbiyani. Business Ethics & Communication. 2nd Revised Edn. S.Chand& Co Ltd., New Delhi, 2008.

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon successful completion of the requirements for this course, students will be able to:

CO1: Re-examine their knowledge of business and economic concepts from an ethical perspective;

CO2: Explain and illustrate the importance, for business and the community, of ethical conduct;

CO3: Recognise and resolve ethical issues in business;

CO4: Reflect on and critically examine their own values and the importance of the ethical dimension in business and workplace decision making; and,

CO5: Confidently apply systematic ethical reasoning to business dilemmas and communicate effectively in oral and written forms these, using the concepts, logic and rhetorical conventions of business ethics.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	9	9	9	3	9	3	9	3	9	87/15=5.8
CO2	9	3	9	9	3	3	9	9	3	9	3	9	9	3	9	99/15=6.6
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	9	111/15=7.4
CO4	9	9	9	9	3	9	3	3	9	3	3	9	9	3	9	99/15=6.6
CO5	9	9	9	9	9	9	9	9	3	9	9	3	9	9	3	117/15=7.8
Weightage																**34.2/5=6.84**

Level of Correlation 1 – Low 3 – Medium 9 – High 0– No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COE421	BUSINESS ENVIRONMENT	L	T	P	C
ELECTIVE - II			4	-	-	4

Course Objectives

The objectives of the course are

- To take business decisions in the situations of organizations which keep changing from time to time the Managers are expected to know about that he/she guess the situation and takes the wise Managerial decisions.
- To enable students to know the concept of Business Environment.
- To enable the student to understand the importance and significance of Business Environment.
- To equip knowledge about business environment at National and International level.

Unit I: Concept of Business Environment

Theoretical Framework of Business Environment: Concept, significance and nature of business environment; Elements of environment – internal and external; Changing dimensions of business environment; Techniques of environmental scanning and monitoring.

Unit II: Economic Environment

Economic Environment of Business: Significance and elements of economic environment; Economic systems and business environment; Economic planning in India; Government policies – industrial policy, fiscal policy, monetary policy, EXIM policy; Public Sector and economic development; Development banks and their relevance to Indian business; Economic reforms, liberalisation and structural adjustment programmes.

Unit III: Political and Legal Environment

Political and Legal Environment of Business: Critical elements of political environment; Government and business; Changing dimensions of legal environment in India, Competition Act, FEMA and licensing policy.

Unit IV: Socio-Cultural Environment

Socio-Cultural Environment: Critical elements of socio-cultural environment; social institutions and systems; Social values and attitudes; Social groups; Middle class; Dualism in Indian society and problems of uneven income distribution; Emerging rural sector in India; Indian business system; Social responsibility of business; consumerism in India, Consumer Protection Act.

Unit V: International and Technological Environment

International and Technological Environment: Multinational corporations; Foreign collaborations and Indian business; Non – resident Indians and corporate sector; International economic institutions – WTO, World Bank; IMF and their importance to India; Foreign trade policies; Impact of Rupee devaluation; Technological environment in India; Policy on research and development; Patent laws; Technology transfer.

Text Books

1. Francis Cherunilam: Business Environment Himalaya Publishing House, Bombay, 2018.
2. Raj Agrawal and ParagDiwan, Business Environment: Excel Books, New Delhi, 2010

Reference Books:

1. Adhikary, M: Economic Environment of Business, Sultan Chand & Sons, Delhi, 2016.
2. Ahluwalia. I.J: Industrial Growth in India, Oxford University Press, Delhi, 2016.
3. Alagh, Yoginder K: Indian Development Planning and Policy, Vikas Publication, New Delhi, 2013
4. Aswathappa, K. Legal Environment of Business, Himalaya Publication, New Delhi, 2016.
5. Chakravarty, S: Development Planning, Oxford University Press, Delhi, 2014.
6. Ghosh, Biswanath: Economic Environment of Business, Vikas Publication New Delhi Govt of India : Survey, Various issues.
7. Ramaswamy, V.S. and NamaKumari: Strategic Planning for Corporate Success, Macmillian, New Delhi, 2009.
8. Sengupta, N.K: Government and Business in India, Vikas Publication, New Delhi, 2008.

Note: Question paper shall cover 100% Theory

Course Outcomes

Upon completion of the course, the students will be able to
CO1: Understand the concepts of business, legal, cultural and global environments.
CO2: Make use of the provisions of business legislations
CO3: Analyse the internal, external, micro and macro business environments.
CO4: Assess the business competitions
CO5: Solve and manage the business related problems.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	3	9	3	9	3	3	75/15=5
CO2	9	3	3	3	3	3	9	9	3	9	3	9	3	3	9	81/15=5.4
CO3	9	3	9	9	3	3	9	9	9	9	3	3	9	3	3	93/15=6.2
CO4	9	9	9	9	3	9	9	3	9	3	3	9	3	3	3	93/15=6.2
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**29.8/5=5.96**

Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COE422	ORGANIZATIONAL BEHAVIOUR	L	T	P	C
ELECTIVE - II			4	-	-	4

Course Objectives

The Course objectives are

1. To enable the students to understand an organization and its behavior.
2. To enable the students to know the needs and ways of human beings at work.
3. To enable the students to understand the importance of organizational behavior and conflict and relationship management.
4. The students will gain the knowledge to survive in the changing organizational environment.

Unit I: Organizational Behavior

Organizational Behaviour (O.B) - Definition – Key elements – Nature and scope – Need for studying Organizational Behaviour – Disciplines contributing to organizational behavior - Organizational behavior process - Applying O.B. knowledge to Management Practices. Hawthorne experiments – O.B. Models.

Unit II: Personality, perception and learning

Individual perspective – Foundation of individual behavior – Personality – Concept – Types- Determinants - Theories – Perception - Perceptual process - Factors affecting perception – Perception and its applications in organizational behavior – Learning – Determinants- Principles – Theories - Learning and behavior.

Unit III: Group Dynamics

Meaning and origin of group dynamics – Concept of group – Types of groups – Formal and Informal groups – Theories of group formation – Group behavior – Group decision making.

Unit IV: Conflict

Concept of conflict – Conflict process – Inter-group conflict- Intra – Individual conflict – interpersonal conflict – Organizational conflicts – Conflict management – Negotiation – Resolution techniques. Organizational culture – Types – Functions of culture – Creating and sustaining and changing a culture – Learning and measuring culture – Communicating culture.

Unit V: Organizational Change

Goal of organizational change – Nature and factors in organizational change – Approaches to organizational change – Perspectives on change – Planned changes for development – Process of planned change – Response to change – Resistance to change – Overcoming resistance to change – Role of change agents.

Text Book

1. Prasad, L.M., Organisational Behaviour. 5th Revised Edn. Sultan Chand and Sons, New Delhi, 2014.

Reference Books

1. Aswathapa, K., OrganizationalBehaviour - Text and Cases. 12thEdn. Himalaya Publishing House, New Delhi, 2008.
2. Chandran, Jit.S.,OrganisationalBehaviour. 3rdEdn.Vikas Publishing House Pvt Ltd., New Delhi, 2008.
3. GvegoryMoorheed and Ricky W. Griftin, OrganisationalBehaviour, Jai Co Publishing House, Mumbai, 2005.
4. Khanka, S.S., OrganisationalBehaviour. 4thEdn. S.Chand& Co. Ltd., New Delhi, 2004.
5. Mishra, M.N., OrganisationalBehaviour. 1stEdn.Vikas Publishing House Pvt Ltd., New Delhi, 2005.

Note: Question paper shall cover 100% Theory

Course Outcomes

On completion of this course, the students will be able to

CO1: Demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.

CO2: Demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.

CO3: Analyze the complexities associated with management of the group behavior in the organization.

CO4: Demonstrate how the organizational behavior can integrate in understanding the motivation(why) behind behavior of people in the organization.

CO5: Synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behavior and improve results.

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	3	3	9	9	9	3	9	81/15=5.4
CO2	9	3	3	3	3	3	9	3	3	3	3	9	9	3	9	75/15=5
CO3	9	3	9	9	3	3	9	9	9	3	3	3	9	3	9	93/15=6.2
CO4	9	9	9	9	3	9	9	9	9	3	3	9	9	3	9	111/15=7.4
CO5	9	9	9	9	3	9	9	9	3	3	3	3	3	9	3	93/15=6.2
Weightage																**30.2/5=6.04**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

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COURSE CODE	P21COR41	PROJECT	L	T	P	C
CORE-XVII			22	-	-	8

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Understand and identify the real life problem which needs the solution

CO2: Make the survey for the collection of the data required for the study

CO3: Test the hypothesis by applying the appropriate statistical tools, infer the results drawn and report the suggestions

CO4: Emerge as a leader by suggesting suitable solutions to the problems

CO5: Co-ordinate and execute research related work as a member of research team and apply ICT tools for research independently.

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	9	3	3	9	3	9	9	9	9	3	9	3	93/15=6.2
CO2	9	9	9	9	3	9	9	9	3	9	3	9	3	9	9	111/15=7.4
CO3	9	9	9	9	3	9	9	3	9	9	3	3	9	9	9	111/15=7.4
CO4	9	9	9	9	9	9	9	3	9	3	3	9	3	9	3	105/15=7
CO5	9	9	9	9	9	9	9	9	3	9	9	3	3	9	9	117/15=7.8
Weightage																**35.8/5=7.16**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

RULES GOVERNING THE EVALUATION OF PROJECT REPORT AND VIVA VOCE EXAM

1. **Selection of Topic:**
   a. Each student shall select a topic for her project in consultation with her Guide and the Head of the Department.
   b. The project report should contain a minimum of 40 pages in A4 format excluding bibliography and appendices.
2. Each student should submit four copies of her project report for evaluation.
3. **Last date for the submission of Project Report:**

The project report should be submitted to the Controller of Examinations (P.G. Courses) through the Guide and the Head of the Department **on or before the last working day** for the students of the University/Collegefor the academic year. If a student fails to submit the project report on or before the last working day, she will not be eligible for getting rank.

4. The project report will be valued for 80 marks by two Examiners, of whom, one will be the Guide and the other will be an External Examiner. The project report will be valued for 40 marks by each Examiner. The sum of marks awarded by both the examiners will be considered to be the final marks. For a pass in the project report, the student should secure a minimum of 50 marks. If a student fails to secure 50 marks in the evaluation of project report, she may be permitted to resubmit her project report once again after incorporating the necessary corrections, if any, as suggested by the Examiners within a period of three months from the date of publication of the results of the Examinations.
5. A student who has secured 40 marks or above in the evaluation of project report would be permitted to appear for the *viva voce*. The *viva voce* carries a maximum of 20 marks and will be conducted jointly by the External Examiner and the Guide. The student should secure a minimum of 10 marks in the *viva voce.* The student who fails to attend the *viva voce* or fails to secure 10 marks in the *viva voce* should reappear for the same after a month but within a period of three months from the date of publication of results. In any case, no student will be permitted to appear for the *viva voce* more than twice. If a student fails during her second appearance also in *viva voce*,she has to choose a new topic for her project and resubmit the Project report within three months after the publication of the results of the second*viva voce* Examination.
6. For resubmission of the project report or reappearance in the *viva voce*, the student has to pay a fee as prescribed by the University.
7. Any other unforeseen problems / situations, not mentioned above if arise regarding the project report and *viva voce,* will be placed in the Academic Committee of the University and suitably resolved.

COURSE CODE	P21CON211	FUNDAMENTAL OF MARKETING	L	T	P	C
(NME)			4	-	-	4

Course Objectives:

The objectives of the course are to understand

- Marketing and its related concepts
- Knowing the position of customer in the merchandising of a product
- Modern marketing concepts, theories on marketing research
- The concepts of marketing management
- Learn about marketing process for different types of products and services

Unit I: Marketing

Marketing: Introduction, Definition of and fundamental principles of marketing, importance of marketing, Marketing and Selling, Marketing and Distribution, Role of marketing in the organization, Marketing in the economic development

Unit II: Marketing Mix

Marketing Mix: Marketing Mix-The Traditional 4Ps, The Modern Components of the Mix- The Additional 3Ps, Developing an Effective Marketing Mix, Marketing Planning, Marketing Implementation and Control, Marketing system, Marketing process, Marketing Functions, Modern Marketing concept: factors, benefits, Social Marketing

Unit III: Customer Relationships

Customer Relationships: Customer needs, wants & demands, Products, services & experiences, Customer value & satisfaction, Target customer, Value proposition, Customer loyalty & retention, Market share & customer equity

Unit IV: Digital Marketing and Marketing ethics

Digital marketing, Marketing Ethics, Brief Overview of B to B marketing. Market Segmentation Marketing Strategies, A More in Depth Look at Targeting and Positioning, Competitive Advantage.

Unit V: Marketing Research

Marketing Research: Meaning, Types, users of marketing research. Advantages and limitations, marketing research process

Text Book:

1. R.S.N. Pillai and Bagavathi, Modern Marketing – Principles and Practices, S.Chand& Co, 2010.

Reference Books:

1. V.S. Ramaswamy and S. Namakumari, Marketing Management: Global Perspective, Indian Context, Om Books publisher, 2009.
2. R.L. Varshney and B. Bhattacharya, International Marketing Management – An Indian perspective, Sultan Chand and Sons, 2015.

Note: Question paper shall cover 100% Theory

Course Outcomes

CO1: Demonstrate understanding of marketing terminology and concepts.
CO2: Identify wants and environmental factors that shape marketing activities for certain target markets.
CO3: Demonstrate knowledge of the individual components of a marketing mix.
CO4: Demonstrate knowledge of key business communication strategies within the marketing field.
CO5: Identify the organizational processes involved in the planning, implementation and control of marketing activities.

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	9	9	3	9	9	3	87/15=5.8
CO2	9	3	3	3	3	3	9	3	3	9	3	9	3	9	9	81/15=5.4
CO3	9	3	9	9	3	3	9	9	3	9	3	3	9	3	9	93/15=6.2
CO4	9	9	9	9	3	9	9	3	9	3	3	9	9	3	9	105/15=7
CO5	9	9	9	9	3	9	9	9	3	9	9	3	9	9	3	111/15=7.4
Weightage																**31.8/5=6.36**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21CON212	FUNDAMENTALS OF BANKING	L	T	P	C
(NME)			4	-	-	4

Course Objectives:

To enable the students to

- Know the relationship between banker and customer
- Tell the instruments used for banking transactions, need for crossing
- Be familiar with the rules on loans and advances

Unit I: Banker and Customer

Meaning and Definitions of Banker and Customer – Types of Customers – General Relationship and Special Relationship between Banker and Customer – KYC Norms

Unit II: Banking Systems

Unit Banking, Branch Banking, Investment Banking – Innovations in banking – E-banking – Online and Offshore Banking, Internet Banking – Anywhere Banking – ATMs – RTGS

Unit III: Deposits

Deposits: Rules for opening accounts - Types of Bank Accounts – Fixed Deposit Account – Savings – Current and Recurring Account – Features – Benefits -Insurance linked savings bank deposits –Non Residence Deposit Account– Senior Citizen Deposit Account – Flexi Deposit Account - Loans and Advances- principles of sound lending, secured and unsecured advances

Unit III: Cheques

Definition of negotiable instruments – Essential Features – Types – Comparison Between Cheque and Bill of Exchange, Cheque Vs draft, Banker's Cheque – Cheque – meaning – definition – essentials.

Unit IV: Crossing of Cheques

Crossing- types, who can cross, endorsement- kinds, regularity of endorsement– Holder in due Course Privileges – Holder for Value – Acceptance for Honour - Account – Reasons for Dishonour a Cheque

TextBook:

1. Sundaram and Varshney, Banking Theory, Law & Practice, Sultan Chand Company, New Delhi, 2012

Reference Books

1. S.M. Sundaram, Banking Theory, Law & Practice, Sri Meenaksi Publications, Karaikudi, 2015
2. M.Kumar and Srinivasa, Banking, New Central Book Agency, 2010
3. M.S. Ramasamy, Banking Law & Practice in India, Sultan Chand Company, New Delhi, 2010.
4. E. Gorden and N. Natarajan, Banking Theory, Law & Practice, Himalaya Publication, 2020.
5. B.Santhanam, Banking Theory, Law &Practice, Margham Publications, Chennai, 2014

Note: Question paper shall cover 100% Theory

Course Outcomes:

C01 -Evaluate the performance of the banking industry.
C02 -Discuss bank lending policies and procedures.
C03 -To elucidate the broad functions of banks
C04 - To grasp the conduct of monetary policy and its effect on the interest rate, credit availability, prices, and the inflation rate
C05- To express opinions about banking in written and oral form, based on the basic knowledge and skills acquired

Mapping Outcomes- COs, POs and PSOs

	PO							**PSO**								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	9	9	3	9	9	3	87/15=5.8
CO2	9	3	3	3	3	3	9	9	3	9	3	9	3	3	9	81/15=5.4
CO3	9	3	9	9	3	3	9	3	9	3	9	3	9	9	3	93/15=6.2
CO4	9	9	9	9	3	9	9	3	9	9	3	9	3	9	9	111/15=7.4
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**31.8/5=6.36**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's*(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

COURSE CODE	P21COV11	EXCEL SKILLS FOR COMMERCE	L	T	P	C
VAP-I				-	30	2

Course Objectives:

After completing this Course, the student will

- Be able to enhance their MS Excel skills through exercise and gaining hands-on experience in various techniques & Tools
- Learn financial modeling and the best utilization of Statistical tools in the areas of research and analysis
- Gain Excel Proficiency like Calculations, Functions, Formulas, Optimization and Statistical Tools and Excel Best Practices in Financial Modeling

Course Description:

Microsoft Excel is a spreadsheet application which the students can use to store, manipulate and present data. This course is taught through a mixture of demonstration and hands-on practice. This course is for experienced Microsoft Excel users and assumes the students already have a good working knowledge of Excel. Also it provides working of Excel for doing financial analysis and building financial models. It will help them to assist in their daily reporting and analysis functions in their job. The students of this course will gear up for campus placements and jobs.

Course Requirements

- Having basic knowledge of operating computer
- Having knowledge on finance formulas

Course Content

- Financial Functions and Applications Related to Excel
- Present and Future Values (PMT,PV, FV, RATE)
- Rate of Return (IRR, MIRR, XIRR)
- Net Present Value(NPV, XNPV)
- Depreciation of Asset
- Payment of a Loan (EMI)
- Coupons
- Price of Security
- Treasury Bills
- Cash Flow Identities (Cash flow Analysis from Financial Statements)
- Univariate Analysis
- Difference of Means and ANOVA
- Correlation and Regression (Multiple Regression - finding out parameters)

- FIND, SEARCH, REPLACE, SUBSTITUTE, CHAR, EXACT
- Introduction to array / CSE formulae
- How to enter an array formulae
- Basic array formulae – INDIRECT and TRANSPOSE

Learning Outcomes

After studying this course, students should be able to:

- Know the basics of Excel 2016
- Work with Cells and Sheets
- Know and use the Formulas and Functions
- Work with finance Data

COURSE CODE	P21COI21	INTERNSHIP TRAINING *(For those admitted in June 2021 and later)*	L	T	P	C
INT-I			-	-	30	2

Course Outcomes

Upon the completion of the course, the students will be able to

CO1: Extend knowledge in the field of commerce and business

CO2: Experiment practically with the operations of the business

CO3: Examine the policies, procedures and practices of the business

CO4: Adapt to the environment of the business / services and work together to achieve the common goal

CO5: Develop skills of team work, co-operation and knowledge of ICT on business through self-packed strategies.

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	9	3	3	9	9	9	3	9	3	9	3	3	87/15=5.8
CO2	9	9	9	9	3	9	9	9	9	9	3	9	9	9	9	123/15=8.2
CO3	9	9	9	9	3	9	9	9	9	9	3	3	9	3	3	105/15=7
CO4	9	9	9	9	9	9	9	3	9	3	3	9	3	9	9	111/15=7.4
CO5	9	9	9	9	9	9	9	9	3	9	9	3	9	9	3	117/15=7.8
Weightage																**36.2/5=7.24**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

Rules governing Internship Training

1. Each student should undergo 15 days practical training during the Second semester vacation. If a student fails to undergo the training programme on medical grounds / due to lack of attendance during the stipulated period, she should undergo the same during the third semester summer vacation, after getting prior permission from the Head of the Department. In such cases, the training report should be submitted within a month after the completion of the 'Internship Training' programme.

2. The students shall undergo the above mentioned 'Internship Training' in such of the Institutions approved by the Department. The list of institutions meant for 'Internship Training' will be prepared by the faculty covering entities such as Research Institutes, Organizations, Banks, Insurance Companies, Co-operative Organisations, Limited Companies, Commercial Outlets and such other organizations found to be worth for imparting training.

3. Each student has to submit TWO copies of the Internship Training report in not less than 20 typewritten pages in A4 format within a month of reopening of the college/University in the third semester, for the training undergone during the Second semester vacation. The training report should not have been submitted elsewhere for any other certificate, diploma or degree course.

4. In case of failure to submit the report within the above stipulated period, the date of submission shall be extended by another 15 days with a fine as prescribed by the /Head of the Department of the University/Principal.
5. If any student fails to submit the report within the stipulated time / within the extension period of 15 days (or) fails in the Internship Training she has to resubmit the report one week prior to the commencement of the ensuing even semester examinations after the completion of the course.

6. The training report will be valued for a maximum of 100 marks of which 40 marks will be awarded by the Internal Examiner or Guide and remaining 60 Marks will be awarded by the entity which host the student for the Internship Training and the student should secure a minimum of 50% marks put together to get a pass.

7. If any student indulges in malpractice while attending the training programme or fails to secure a minimum pass mark she has to undergo 'Inservice Training' programme once again for a period of 20 days at the end of the third semester and resubmit the training report within a period of one month after the completion of the training programme.

COURSE CODE	P21COV42	DATA ANALYSIS USING SPSS: INFERENTIAL ANALYSIS	L	T	P	C
VAP- II			-	-	30	2

Course Objectives:

In this course, student will

- gain proficiency in how to analyze a number of statistical procedures in SPSS
- learn how to interpret the output of a number of different statistical tests
- Learn how to write the results of statistical analyses

Mapping Outcomes- COs, POs and PSOs

	PO							PSO								Mean Score of COs
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	
CO1	9	3	3	3	3	3	3	9	9	3	9	3	9	3	3	75/15=5
CO2	9	3	3	3	3	3	9	9	3	9	3	9	3	3	9	81/15=5.4
CO3	9	3	9	9	3	3	9	9	9	9	3	3	9	3	3	93/15=6.2
CO4	9	9	9	9	3	9	9	3	9	3	3	9	3	3	3	93/15=6.2
CO5	9	9	9	9	3	9	9	9	3	9	9	3	3	9	3	105/15=7
Weightage																**29.8/5=5.96**

- Level of Correlation 1 – Low 3 – Medium 9 – High 0 – No Correlation between CO's and PO's *(Suggested by UGC as per Six Sigma Tool – Cause and Effect Matrix)*

Course Description:

This course provides an application-oriented introduction to the statistical component of IBM SPSS Statistics. Students will review several statistical techniques and discuss situations in which they would use each technique, how to set up the analysis, as well as how to interpret the results. This includes a broad range of techniques for exploring and summarizing data, as well as investigating and testing relationships. Students will gain an understanding of when and why to use these various techniques as well as how to apply them with confidence, interpret their output, and graphically display the results.

This introductory course is for Final Year students who do project and perform statistical analysis using SPSS software. The focus is to give widen understanding of basic concepts of statistics used in social science research and to develop competency in proper selection of statistical techniques while analyzing the data in social sciences research. The course will also develop competency in the use of SPSS for data analysis and develop skills in proper interpretation of the output of SPSS Software.

The course will cover t tests, ANOVA, correlations and linear regression, Factor analysis

Course Requirements

- Familiarity with basic concepts in statistics, such as measurement levels, mean, and standard deviation.
- Familiarity with the windows in IBM SPSS Statistics either by experience with SPSS Statistics (version 18 or later) or completion of the SPSS Statistics Essentials (V25) course

Course Content

- ❖ Data input and output
- ❖ Percentage Analysis
- ❖ One sample t test
- ❖ Independent sample t Test
- ❖ Dependent sample t test
- ❖ ANOVA
- ❖ Correlation and Regression
- ❖ Chi square
- ❖ Factor analysis

Learning Outcomes

After studying this course, students should be able to:

- ❖ understand how to start SPSS
- ❖ enter basic data into SPSS
- ❖ Introduction to statistical analysis
- ❖ Examine individual variables
- ❖ Test hypotheses about individual variables
- ❖ Test the relationship between categorical variables
- ❖ Test on the difference between two group means
- ❖ Test on differences between more than two group means
- ❖ Test the relationship between scale variables
- ❖ Predict a scale variable: Regression
- ❖ Introduction to Bayesian statistics
- ❖ Overview of multivariate procedures

Evaluation Pattern **10X10=100**

1. Creating a data file in the Data Editor
2. Running the Frequencies Procedure in the Data Editor
3. Creating New Variables, Transforming Variables & Adding Verbal Labels
4. Examining the relationship between Gender & dependent - Crosstabs

5. Correlations among variables
6. Using the t-test to Examine Gender Differences
7. Using Paired-Sample t-test
8. Using One-Way ANOVA:
9. Using Two-Way ANOVA
10. Using Two-Way Mixed-Model ANOVA

MOTHER TERESA WOMEN'S UNIVERSITY

KODAIKANAL

DEPARTMENT OF MATHEMATICS

M.Sc. MATHEMATICS

SYLLABUS TO BE IMPLEMENTED FROM THE ACADEMIC YEAR

2021-2022

(CHOICE BASED CREDIT SYSTEM)

Mother Teresa Women's University, Kodaikanal
Department of Mathematics
Choice Based Credit System (CBCS)
(2021-2022 onwards)
M.Sc. Mathematics

1. About the Programme

M.Sc. (Master of Science) Mathematics is a Postgraduate Programme**,** that has a duration of 2-years which is divided into 4 semesters. The main aim of the Programme is intended to provide in-depth knowledge to the students in advanced Pure and Applied mathematics and prepare them for various research activities and career opportunities. The Programme is designed to impart proficiency in Mathematical application in day-to-day in simple and complex situations. The Programme also will enable the learners to shine as collaborators and innovators in addressing social, technical, and business challenges. Programme through its wide range of Courses trains the students as competent citizens with advanced mathematical knowledge and ethically sound humans with its insistence of human ethics. The Programme is intended to promote the culture of interdisciplinary studies and research that is much needed for the current scenario.

2. Programme Educational Objectives (PEOs)

The M.Sc. Mathematics Programme is designed to

PEO1	preparing students for productive careers after the completion of this Programme
PEO2	demonstrate professional acumen through learning new avenues in emerging fields of Pure and Applied Mathematics
PEO3	ensure continuous learning relevant inter–personal skills as an individual, as a member or as a leader throughout the professional career
PEO4	motivate to pursue higher studies and exhibit research skill to meet out academic demands of the country.
PEO5	improvise the women resource that is furnished with the mathematical skills that are necessary in the altering industrial and socio-economic development of the country
PEO6	instil a wide range of mathematical techniques and application of mathematical methods/tools in scientific and engineering domains.
PEO7	develop students' self-confidence in research process independently or within a group and have the ability to pursue multidisciplinary research in universities in India and abroad
PEO8	enhance the awareness of the graduates on public concern and to instill moral and ethical behaviors to shape them as moral humans

3. Eligibility : B.Sc. Mathematics

4. General Guidelines for PG Programme

i. **Duration:** The programme shall extend through a period of 4 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	13	25	13	25
External	38	75	38	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions (MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 90**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 lines space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade (Performance in a Course/Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance lesser than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the abovementioned regulations, any other common regulations pertaining to the PG Programmes are also applicable for this Programme.

9. Programme Outcomes (POs)

On completion of the programme, the students will be able to

PO1	to carry out scientific investigation objectively without being biased with preconceived notions.
PO2	analyze problems, formulate a hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
PO3	pursue research in Mathematical Sciences and allied fields, or careers in industry.
PO4	acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical Sciences.
PO5	to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges

10. Programme Specific Outcomes (PSOs)

On completion of the programme, the students will be able to

PSO1	understand the fundamental axioms in mathematics and capable of developing ideas based on them.
PSO2	pursue research studies in mathematics and related fields
PSO3	have advanced knowledge on topics in pure mathematics and to pursue higher degrees at reputed academic institutions.
PSO4	acquire skills in problem solving, thinking, creativity through assignments, etc.
PSO5	compete in competitive exams e.g. NET, GATE, etc

M.Sc. MATHEMATICS CURRICULUM

S. NO	Course Code	Course Title	Credits	Hours		CIA	ESE	Total
				L	P			
Semester I								
1	P21MTT11	Core I- Algebra	4	5	-	25	75	100
2	P21MTT12	Core-II- Real Analysis-I	4	5	-	25	75	100
3	P21MTT13	Core-III- Ordinary Differential Equations	4	5	-	25	75	100
4	P21MTT14	Core-IV-Graph Theory	4	5	-	25	75	100
5	P21MTT15	Core – V- Computer Oriented Numerical Methods	4	5	-	25	75	100
6	P21CSS11	**Supportive Course- I(Skill)-** Computer Skills for Web Designing and Video Editing	2	-	4	25	75	100
		Total	**22**	**30**		**-**	**-**	**600**
Semester II								
7	P21MTT21	Core VI-Vector Space and Linear Transformation	4	5	-	25	75	100
8	P21MTT22	Core-VII-Real Analysis –II	4	5	-	25	75	100
9	P21MTT23	Core-VIII-Partial Differential Equations	4	4	-	25	75	100
10	P21MTT24	Core-IX-Topology	4	5	-	25	75	100
11	P21MTT25	Core-X- Optimization Techniques	4	5	-	25	75	100
12		**Non-Major Elective-I**	4	4		25	75	100
13	P21MTS22	**Supportive Course II(Skill)-** MATLAB	2	-	2	25	75	100
		Total	**26**	**30**		**-**	**-**	**700**
Semester III								
14	P21MTT31	Core XI- Complex Analysis	4	5	-	25	75	100
15	P21MTT32	Core-XII- Measure Theory	4	5	-	25	75	100
16	P21MTT33	Core-XIII-Differential Geometry	4	4	-	25	75	100
17	P21MTT34	Core-XIV- Classical Dynamics	4	4	-	25	75	100
18	P21MTT35	Core-XV- Calculus of variations and Integral Equations	4	5	-	25	75	100
19	P21MTT36	Core XVI- Functional Analysis	4	5	-	25	75	100
20	P21WSS33	**Supportive Course III** Women Empowerment	2	2	-	25	75	100
		Total	**26**	**30**				**700**
Semester IV								
21	P21MTE411/ P21MTE412/ P21MTE413/ P21MTE414/	Elective-I* Number Theory/Automata Theory/Probability Theory and Statistics/Astronomy / Any MOOC Course[$]	4	4	-	25	75	100

22	P21MTE421/ P21MTE422/ P21MTE423/ P21MTE424/	Elective –II* Fuzzy sets and their Application/ Stochastic Processes /Fluid Dynamics/Tensor Analysis and Special Theory of Relativity/ Any MOOC Course[$]	4	4	-	25	75	100
23	P21MTR41	Project	8	22	-	25	75	100
		Total	**16**	**30**				**300**
		Grand Total	**90**	**120**				**2300**

Non Major Elective

The candidates who have joined the PG Programme, can also undergo Non Major Elective offered by other Departments.

Non Major Elective (NME) offered by Department of Mathematics

S.No	Course code	Non Major Elective Courses
1	P21MTN211	Numerical Methods
2	P21MTN212	Operation Research
3	P21MTN213	Discrete Mathematics
4	P21MTN214	Differential Equations
5	P21MTN215	Fourier series and Laplace Transforms
6	P21MTN216	Statistics
7	P21MTN217	Mathematical Aptitude

Additional Credit Courses (Mandatory)

1. **Semester –I**

Course Code	Course Name	Category	Credit
P21MTV11	Python Language and Python Lab	Value Added Program- I	2

2. **Semester –II**

Course Code	Course Name	Credit
P21MTI21	Internship/Industrial Training	2

3. **Semester –III**

Course Code	Course Name	Credit
P21MTO31	Online Courses - MOOC Courses	2

4. Semester –IV

Course Code	Course Name	Category	Credit
P21MTV42	Mathematical Modelling	Value Added Program- II	2

*Those who have CGPA 9 and want to do the project in industry/institution during IV semester., these two paper can be opted in III semester

$Students can take one 4 credit course in MOOC as elective or two 2 credit course in MOOC as elective with the approval of Department committee

Outside class hours (Attendance compulsory)

- Health, Yoga and Physical fitness.
- Library information access and utilisation
- Employability Training.
- Students Social Responsibility.

SEMESTER- I

COURSE CODE	P21MTT11	ALGEBRA	L	T	P	C
CORE- I			5	-	-	4

Objectives:

- To provide deep knowledge about various algebraic Structures.
- The learner will be able to recognize some advances of the theory of groups.
- Use Sylow's Theorems in the study of finite groups.
- Formulate some special types of rings and their properties.
- Recognize the interplay between fields and vector spaces.
- Apply the algebraic methods for solving Problems**.**

Unit-I: Counting principle:
Introduction about Counting principle – Product of subgroups and order of product subgroups - Normal subgroups and quotient groups – Homomorphisms of into and onto with kernel function- Automorphisms with the property - Cayley's theorem - Permutation groups for symmetric and alternating group

Unit-II: Another counting principle:
Introduction about Another counting principle – Normalizer and its applications - Sylow's theorems and p-sylow subgroup -Third part of p-Sylow's theorem and examples problems - Direct product – internal direct product of normal subgroups-Finite abelian groups-isomorphic abelian groups and non isomorphic abelian group of order prime theorems

Unit-III: Ring:
Definition and examples -Ring of real quaternion's-Some special Classes of Rings - zero divisor – integral domain-division ring- characteristic - Boolean ring – Homomorphisms of rings with kernel examples-Ideal and Quotient Rings- More Ideals and Quotient Rings- The field of Quotients of an Integral Domain

Unit- IV: Euclidean Rings:
Introduction about Euclidean rings -definition with theorems and lemma's - A Particular Euclidean ring with Gaussian integers theorems-Fermat theorem - Polynomial rings – division algorithm-polynomials over the rational field – Primitive polynomial wit Gauss' lemma-Eisenstein criterion theorem-Polynomial rings over commutative rings-Unique factorization domain-primitive and irreducible polynomial lemma's.

Unit -V: Extension Fields:
Introduction about Extension fields –definition of degree and finite extension of field– definition of algebraic and extension theorems -Roots of polynomials – remainder theorem based on lemmas – Splitting field and irreducible extension theorems-More about roots with lemmas and corollary – Definition of Simple extension and theorems-definition of Finite fields and lemmas and theorems

Text Book:

1.I. N. Herstein, "Topics in Algebra", 2nd edition, John Wiley & Sons, Singapore, 2006.

Unit I: Chapter 2: Sections 2.5, 2.6, 2.7, 2.8, 2.9, 2.10
Unit II: Chapter 2: Sections 2.11, 2.12, 2.13, 2.14
Unit III: Chapter 3: Sections 3.1, 3.2, 3.3, 3.4, 3.5, 3.6
Unit IV: Chapter 3: Sections 3.7, 3.8, 3.9, 3.10, 3.11
Unit V: Chapter 5: Sections 5.1, 5.3, 5.5 & Chapter 7: Section 7.1

Reference Books:

1. **John. B. Fraleigh**, "A First Course in Abstract Algebra", 7th Edition, Addison-Wesley, New Delhi, 2003.
2. **P. B. Bhattacharya, S. K. Jain & S. R. Nagpaul, "**Basic Abstract Algebra", Cambridge University Press, USA, 1986
3. **Charles Lanski,** "Concepts in Abstract Algebra", American Mathematical Society, USA, 2010.
4. **J.J. Rotman**, *"*Advanced Modern Algebra", 2nd Edition, Graduate Studies in Mathematics, Vol. 114, AMS, Providence, Rhode Island, 2010.
5. **G. Strang**, *"*Introduction to Linear Algebra", 2ndEdition, Prentice Hall of India Pvt. Ltd, 2013.

Course Outcomes

Upon the successful completion of the course

CO1: **S**tudents will have a working knowledge of important mathematical concepts in abstract algebra such as definition of a group, order of a finite group and order of an element – K2.

CO2: Students will be introduced to and have knowledge of many mathematical concepts studied in abstract mathematics such as permutation groups, factor groups and abelian groups – K3.

CO3: Students will actively participate in the transition of important concepts such homeomorphisms & isomorphism's from discrete mathematics to advanced abstract mathematics - K4.

CO4: **S**tudents will gain experience and confidence in proving theorems. A blended teaching method will be used requiring the students to prove theorems give the student the experience, knowledge, and confidence to move forward in the study of mathematics – K5.

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	M	S	M	S	M	M	S	S	S
CO4	S	S	S	S	S	S	S	S	M	S

S – Strong: M – Moderate L- Low

COURSE CODE	P21MTT12	REAL ANALYSIS- I	L	T	P	C
CORE- II			5	-	-	4

Objectives:

- To convey concepts of real valued functions in detail.
- To provide the deep knowledge about sequences and series.
- To make a clear difference between differentiability and continuity
- To know some basic theorems**.**

Note: The Question paper may contain problems to a maximum of 20%

Unit -I: Countable and Uncountable sets:

Finite Countable and Uncountable sets – definition of enumerable or denumerable, equivalence relation with theorems and examples- Metric spaces –Euclidean spaces examples- Basic definitions of metric spaces and its examples – Open and closed sets -Compact sets- definition of compact sets with union and intersection theorems and its properties- k- cell is compact-Weierstrass theorem

Unit –II: Perfect sets:

Introduction about Perfect sets – definition of perfect set and cantor set and its theorem- Connected sets-real line is connected property theorem- Convergent and divergence sequences in a metric space theorems –Subsequences - Cauchy sequences and complete - Upper and lower limits - Some special sequences theorems and examples– Series – harmonic series and geometric series examples - The number e - The root and ratio tests and its examples

Unit -III: Power series:

Definition of Power series – radius of convergence with problems - Summation by parts – partial summation formula-Leibnitz theorem-absolute convergence – conditionally convergent - definition and theorems and its examples-addition and multiplication of series with problems – Rearrangements

Unit-IV: Continuity function:

Continuity: Limits of functions - Continuous functions and their properties and theorems- continuity and compactness- uniform continuous-theorems -The derivative of a real function with properties and examples-Mean value theorems and generalized Mean value theorem- The continuity of derivatives - L'Hospital' rule

Unit -V: The Riemann-Stieltjes Integral:

Introduction of Riemann-Stieltjes Integral: Definition and existence of the integral – definition of refinement -upper and lower partition theorems-Properties of the Riemann-Stieltjes Integral and its theorems- definition of unit step function-Integration and differentiation –fundamental theorem of calculus- integration by parts- Integration of vector valued functions.

Text Book:

1.Walter Rudin, "Principles of Mathematical Analysis", 3rd Edition, McGraw – Hill International Book Company, Singapore, (1982).

Units I: Chapter- 2: 2.1 to 2.42
Unit II: Chapter- 2: 2.43 to 2.47 and Chapter -3:3.1 to 3.37
Unit III: Chapter- 3: 3.38 to 3.58
Unit IV: Chapter-4: 4.1 to 4.21 and Chapter -5: 5.1 to 5.13
Unit V: Chapter- 6:6.1 to 6.23

Reference Books:

1. **S. Kumaresan**, "Topology of Metric Spaces ", 2nd Edition, Narosa Publishing House, 2011.
2. **S. Ponnusamy**, "Foundations of Mathematical Analysis", Springer Birkhauser, 2012.
3. **S. K. Mappa**, Introduction to Real Analysis, 7th Edition, Sarat Book Distributors, Kolkatta, 2015
4. **Tom Apostol,** "Mathematical Analysis", Addison Wesley Publishing Company, London-1971.
5. **R. G. Bartle & D.R. Sherbert,** "Introduction to Real Analysis", John Wiley & Sons, New York, 1982.
6. **Kenneth A. Ross,** "Elementary Analysis: The theory of Calculus", Springer, New York, 2004.
7. **K. R. Stromberg,** "An Introduction to Classical Real Analysis", Wadsworth, 1981.
8. **G.F.Simmons,** "Introduction to Topology and Modern Analysis", McGraw – Hill, New Delhi, 2004.

Course Outcome:

Upon the successful completion of the course**,**

CO1: Students will be able to demonstrate competence with elementary properties of sets By proving identities involving union and intersection and Cartesian Products of Sets – K2
CO2: Students will be able to demonstrate competence with elementary properties of Functions by proving results involving composite functions and inverse functions – K3
CO3: Students will be able to demonstrate competence with the algebraic and order Properties of real numbers – K4
CO4: Students will be able to demonstrate competence with properties of real numbers by finding supremum and infimum of sets and using the completeness property of real numbers – K5
CO5: Students will be able to demonstrate ability to use Taylor Theorem, the Mean value Theorem, and use L'Hospital's Rule to compute limits of functions – K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	S	M	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	M	S	M	S
CO4	S	M	S	S	M	S	S	S	S	S
CO5	S	S	M	S	S	S	S	S	S	S

S – Strong: M – Moderate L- Low

COURSE CODE	P21MTT13	ORDINARY DIFFERENTIAL EQUATIONS	L	T	P	C
CORE- III			5	-	-	4

Objectives:

- Differential equations arise for many problems in oscillations of mechanical and electrical systems
- It plays a very important role in all modern scientific and engineering studies.
- To give an in-depth knowledge of differential equations and their applications.
- Solve the higher order differential equations in different types with initial and boundary conditions
- Use the method of separation of variables to reduce some partial differential equations to ordinary differential equations of 2^{nd} order.
- To make the students to solve the practical problems used differential equations.

Unit-I: Second Order Linear Equations:

Introduction about Second Order Linear Equations - The General solution of the homogeneous equation– Wronskians - Linearly dependent and independent theorems and lemma's-The use of a known solution to find another –general solution with example- The method of undetermined Coefficients – Problems based on exponentials, sines and cosines, and polynomials. The method of variation of parameters -solving problems

Unit-II: Power Series Solutions:

Power Series definition- A review of power series– definition of power series, converges and diverges – Radius of convergence with examples-Definition analytic function and basic properties-Series solutions of first order equations with initial condition– Second order linear equations - Ordinary point-singular point-Legendre's equation - solving problems.

Unit-III: Special Functions:

Introduction about Special Functions- Regular Points- Singular Points - irregular singular points with examples– Airy equation - Hermite's equation - The generating function - Rodrigues' formula - Bessel equation - Frobenius series - Gauss's hyper geometric equation – The Point at infinity.

Unit-IV: Some Special Functions of Mathematical Physics:

Introduction of Some Special Functions in Mathematical Physics: Legendre Polynomials - generating function and Rodrigues' formula – Properties of Legendre Polynomials – Orthogonality Bessel Functions – The Gamma Function – Properties of Bessel Functions- Bessel function of the first kind and second kind-Proofs of the orthogonality properties.

Unit-V: System of First Order Equations:

System of First Order Equations Introduction - Linear Systems with proof of the homogeneous Linear Systems theorems- Homogeneous Linear Systems with Constant Coefficients -Solving problems– non homogeneous Linear Systems –examples-Nonlinear Systems with examples-Volterra's Prey – Predator Equations.

Text Book:

1. **G.F. Simmons,** "Differential Equations with Applications and Historical Notes", TMH, New Delhi, 1984.
   Unit I - Chapter 3: Sections 15, 16, 18 and 19.
   Unit II -Chapter 5: Sections 26 to 28
   Unit III -Chapter5: Sections 29 to 32
   Unit IV-Chapter8: Sections 44 to 47
   Unit V - Chapter 10: Sections 55 to 57

Reference Books:

1. **Williams E. Boyce and Richard C. Diprima** "Elementary Differential Equations and Boundary Value Problems " 10th edition John Wiley and Sons, New York 2012
2. **M.D. Raisinghania**, " Advanced Differential Equations ", S. Chand & Company Ltd., New Delhi 2012
3. **B. Rai, D.P. Choudhury and H.I. Freedman**, "A Course in Ordinary Differential Equations ", Narosa Publishing House Pvt. Ltd, New Delhi 2012
4. **W.T. Reid,** "Ordinary Differential Equations", John Wiley & Sons, New York, 1971.
5. **E.A. Coddington,** "An Introduction to Ordinary Differential Equation", Prentice Hall of India, New Delhi, 2007.
6. **D.Somasundaram,** "Ordinary Differential Equations", Narosa Publ., House, Chennai - 2002.

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO1: recognize differential equations that can be solved by each of the three methods – direct integration, separation of variables and integrating factor method – and use the appropriate method to solve them – K2

CO2: use an initial condition to find a particular solution of a differential equation, given a general solution – K2

CO3: check a solution of a differential equation in explicit or implicit form, by substituting it into the differential equation – K3

CO4: understand the terms 'exponential growth/decay', proportionate growth rate' and 'doubling/halving time' when applied to population models, and the terms' exponential decay', 'decay constant' and 'half- life' when applied to radioactivity – K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	M	S	S	S
CO2	S	M	S	S	S	M	M	M	M	S
CO3	S	S	M	S	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S

S – Strong: M – Moderate L- Low

COURSE CODE	P21MTT14	GRAPH THEORY	L	T	P	C
CORE- IV			5	-	-	4

Objectives:

- To impart the different types of graphs and operations.
- To give a depth knowledge about vertices and edge connectivity.
- To make knowledge in matching and colourings.
- To study related theorems.
- To shipped from digraphs and additional structure in networks.

Unit-I: Graphs and Trees:

Graphs and Sub graphs: Basic definitions of Graphs and simple graphs-Graph isomorphism : complete graph- Bipartite graph- examples of isomorpihic and nonisomorphic graphs-The incidence and adjacency matrices : Eigen values -proof of automorpshism group of G-Subgraphs: Spanning subgraph-induced subgraph - Vertex degrees: Handshaking theorem - minimum and maximum degrees of graph and its relation- Paths and connection: connected and disconnected graph with proof of the theorems- Cycles - Trees -Cut edges and bonds - Cut vertices -Cayley's formula.

Unit-II: Connectivity, Euler Tours and Hamilton Cycles:

Connectivity: vertex connectivity and edge connectivity with examples and theorems- Blocks-proof of the Merger's theorem-Euler Tours and Hamilton Cycles: Euler tours- Hamilton cycles-Eulerian graph and non Eulerian graph with examples and theorems- Hamiltonian graph non Hamiltonian graph with examples and theorems-Dirac theorem- The Chinese postman problem -The travelling salesman problem.

Unit-III: Matchings and Edge Colourings:

Matchings: maximum and perfect matching's in graphs with examples- augmenting path – matchings and coverings in bipartite graphs: Marriage theorem – minimum covering with proof of the theorems and lemmas-Perfect matchings -Halls and Tutte's theorems -Edge chromatic number - Vizing's theorem.

Unit-IV: Independent Set, Cliques and Vertex Colourings:

Independent Set: maximum independent sets - vertex (edge) independence number and covering number with proof of the theorems- Clique- Ramsey's theorems with examples-Turan's theorem - Chromatic number : vertex colourable and edge colourable-critical graph-properties of critical graphs- Brooks theorem – Hajos Conjecture

Unit-V: Directed Graphs and Networks:

Directed graphs: Directed walk, trail, path, cycle - indegrees and outdegrees with examples - reachable - tournament –directed Hamiltonian path- directed Hamiltonian cycle with proof of the theorems- Networks: capacity function-flows- resultant flow -maximum flow- minimum cuts - The Max-flow Min-cut theorem

Text Book:

1. **J. A. Bondy and U. S. R. Murty,** "Graph theory with applications", The MacMillan Press Ltd., 1976.
   Unit I: chapter 1: 1.1 – 1.7 and chapter 2: 2.1 – 2.4
   Unit II: chapter 3: 3.1 – 3.2 and chapter 4: 4.1 – 4.4
   Unit III: chapter 5: 5.1 – 5.3 and chapter 6: 6.1 – 6.2
   Unit IV:chapter 7: 7.1 – 7.3 and chapter 8: 8.1 – 8.3
   Unit V: chapter 10: 10.1 – 10.3 and chapter 11: 11.1 – 11.3

Reference Books

1. **Narsingh Deo,** "Graph Theory with applications to Engineering and Computer Science", PHI learning Pvt Ltd, New Delhi, 2013
2. **L.R. Foulds**, "Graph Theory Applications", Narosa publishing House, 1993.

Course Outcomes

Upon the successful completion of the course, students will be able to

CO1: state all of the technical definitions covered in the course (such as a graph, tree, colouring, cut edges, cut vertices, connectivity's, cycle and tours, digraph, flows and cuts) – K2
CO2: state all of the relevant theorems covered in the course. – K3
CO3: formulate graph theoretic models to solve real world problems (THE MAX-FLOW MIN-CUT) – K4
CO4: analyze combinatorial objects satisfying certain properties and answer questions related to existence (proving the existence or non-existence of such objects), construction (describing how to create such objects in the case they exist), enumeration (computing the number of such objects), and optimization (determining which objects satisfy a certain external property) – K4
CO5: decision/network will take existing/proposed network /social to avoid ambiguity – K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate; K6- create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	M	S
CO3	S	S	S	S	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

S – Strong: M – Moderate L- Low

COURSE CODE	P21MTT15	COMPUTER ORIENTED NUMERICAL METHODS	L	T	P	C
CORE- V			5	-	-	4

Objectives:

- To develop the mathematical skills of the students in the areas of numerical methods.
- To teach theory and applications of numerical methods in a large number of engineering subjects which require solutions of linear systems, finding Eigen values, Eigen Vectors, Interpolation, and applications, solving ODEs, PDEs and dealing with statistical problems like testing of hypothesis.
- To lay foundation of computational mathematics for specialized studies and research.

Unit – I: Transcendental and Polynomial Equation

Transcendental and Polynomial Equation Introduction- Bisection Method- steps to solve problems in Bisection method - Iteration method based on first degree equation- problems in first degree equation -Iteration method based on second degree equation- problems in second degree equation- Rate of Convergence.

Unit –II: System of Linear Algebraic Equations and Eigen value Problems:

System of Linear Algebraic Equations and Eigen value Problems introduction- Direct Method-Fixed point iteration method-Newton's method- solution of linear system by Gaussian elimination and Gauss –Jordon methods-Iterations Methods- Eigen values and Eigen Vectors-Jacobi method for Symmetric Matrices-Givens Method for Symmetric Matrices-Power Method.

Unit – III: Interpolation and Approximation:

Interpolation and Approximation introduction-Lagrange and Newton Interpolation-Introduction – Formula- Problems in Lagrange and Newton Interpolation -Finite Difference Operators- Interpolating Polynomials Using Finite Differences- Hermit Interpolation-Introduction – Formula- Problems in Hermit Interpolation- Piecewise and Spline Interpolation-Introduction – Formula- Problems in Piecewise and Spline Interpolation

Unit – IV: Differentiation and Integration:

Differentiation and Integration introduction- Numerical Differentiation- - Extrapolation Method- Numerical Integration: trapezoidal and Simpsons 1/3 and 3/8 rules - Formula-Problems in trapezoidal and Simpsons 1/3 and 3/8 rules- Romberg Integration – Double Integration-. Problems in Romberg Integration and Double Integration

Unit –V: Ordinary Differential Equations:

Introduction of Ordinary Differential Equations- Initial Value Problems: Single step Method-Taylor series method-Euler method for first order equation-fourth order Runge-Kutta method for solving first and second order equations-Multi Step Methods : Milne's and Adam's Predictor- Corrector Method

Text Book:

1. **M.K.Jain, S.R.K.Iyengar, R.K.Jain.** "Numerical Methods For Scientific And Engineering Computation "(Fifth Edition). New Age International Publishers. (2007)

Unit-I: Chapter 2: Section: 2.1 – 2.5.
Unit-II: Chapter 3: Section: 3.1, 3.2, 3.4, 3.5, 3.7, 3.8 & 3.10
Unit-III: Chapter 4: Section: 4.1- 4.6
Unit- IV: Chapter 5: Section: 5.1, 5.2, 5.4, 5.6, 5.10 & 5.11
Unit – V: Chapter 6: Section: 6.4, 6.6 & 6.7

Reference Book:

1. **P.Kandasamy, K.Thilagavathi and K. Gunavathi**, "Numerical Methods", S.Chand and Company Ltd , New Delhi 2013.

Course Outcomes

CO	Course Outcomes	Knowledge Level
CO1	Apply numerical methods to find our solution of algebraic equations using different methods under different conditions and numerical solution of system of algebraic equations.	K3
CO2	Apply various interpolation methods and finite difference concepts.	K3
CO3	Workout numerical differentiation and integration whenever and wherever routine methods are not applicable.	K3
CO4	Work numerically on the ordinary differential equations using different methods through the theory of finite differences.	K3
CO5	Work numerically on the partial differential equations using different methods through the theory of finite differences.	K3

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	M	S	S
CO2	S	S	S	S	M	S	S	S	S	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S
CO5	S	S	S	S	M	S	S	S	S	S

S- Strong M-Medium L-Low

SEMESTER- II

COURSE CODE	P21MTT21	VECTOR SPACE AND LINEAR TRANSFORMATION	L	T	P	C
CORE- VI			5	-	-	4

Objectives

- To provide sound foundation in linear Algebra, as well as understanding of the principles underlying in linear Algebra and deep knowledge about various algebraic structures.
- To prepare students to understand principles, concepts necessary to formulate and give a depth knowledge about elementary matrix operations.
- To prepare the students for further courses in higher mathematics and related disciplines and solve linear equation.

Unit-I: Vector Spaces:

Vector introduction – Vector spaces – Subspaces – Linear combinations and systems of linear equations – Exercise problems- Linear dependence and linear independence – Bases and dimensions – Maximal linearly independent subsets- Exercise problems

Unit-II: Linear Transformation:

Introduction of Linear Transformation-The Algebra of Linear transformation - finite dimensional-invertible-range and rank-idempotent - Characteristic Roots and matrices-minimal polynomial-characteristic vector- Exercise problems in Characteristic Roots and matrices- Exercise problems in characteristic vector.

Unit-III: Linear Transformation Cont.:

Types of Linear Transformation -Canonical Forms: Triangular Form- Canonical Forms: Nilpotent transformations- Canonical Forms: A Decomposition of V: Jordan Form-Canonical Forms: rational canonical Form.

Unit-IV: Linear Transformation Cont.

In Linear Transformation Trace and Transpose - characteristic roots based on lemmas- symmetric and skew symmetric matrix- adjoint – determinants - Hermitian, Unitary and normal Transformations-Real Quadratic Forms.

Unit - V: Diagonalization:

Diagonalization Introduction Eigen values and Eigen vectors –Properties of Eigen values and the Cayley Hamilton theorem - Matrix limits and Markov chains – Invariant subspaces - Diagonalizability – similarity transformation and orthogonal transformation of a symmetric matrix to diagonal form- -orthogonal reduction to its canonical form

Text Book:

1. **Stephen H.Friedberg, Arnold J. Insel, Lawrence E. Spence,** "Linear Algebra", Pearson New International Edition, fourth edition , 2014
   Unit I- Chapter 1: Sec1.1- Sec1.7
   Unit V-Chapter 5: Sec 5.1- Sec 5.4
2. **I.N.Herstein**, "Topics In Algebra", Second Edition Published by John Wiley and Sons, Singapore 2006
   Unit II-Chapter 6: Sec 6.1-Sec 6.3
   Unit III- Chapter 6: Sec 6.4- Sec 6.7
   Unit IV – Chapter 6: Sec 6.8- Sec 6.11

Reference Books:

1. **Kenneth M Hoffman and Ray Kunze**, "Linear Algebra", 2nd Edition, Prentice-Hall of India Pvt. Ltd, New Delhi, 2013
2. **John. B. Fraleigh,** "A First Course in Abstract Algebra", 7th Edition, Addison-Wesley,New Delhi, 2003.
3. **S. Kumerason,** "Linear Algebra" Prentoice Hall of India Pvt Ltd New Delhi, 2000.
4. **D.S.Malik, J.N.Mordeson and M.K.Sen**, "Fundamental of Abstract Algebra", McGraw Hill(International Edition),New York. 1997.

Course Outcomes:

Upon successful completion of this course students will be able to

CO1: Determine relationship between coefficient matrix inevertability and solutions to a system of linear equations and the inverse matrices – K2
CO2: Find a basis for the row space, column space and null space of a matrix and find the rank and nullity of a matrix – K3
CO3: Find the matrix representation of a linear transformation given bases of the relevant relevant vector spaces – K4
CO4: Use computational techniques and algebraic skills essential for the study of systems of linear equations, matrix algebra, vector spaces, Eigen values and Eigen vectors, orthogonality and diagonalization. (Computational and Algebraic Skills) – K5
CO5**:** Work collaboratively with peers and instructors to acquire mathematical and understanding and to formulate and solve problems and present solutions – K6
K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	*PO3*	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	*S*	S	S	S	S	S	M	S
CO2	S	S	*S*	M	S	S	S	S	S	S
CO3	S	S	*S*	S	S	S	M	S	M	S
CO4	S	S	*M*	S	S	S	S	S	S	S
CO5	S	S	*S*	S	M	S	S	S	S	S

S- Strong = 3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT22	REAL ANALYSIS-II	L	T	P	C
CORE- VII			5	-	-	4

Objectives:

- To introduce the concept of integration of real-valued functions.
- To give a deep knowledge about the real valued function.
- To know about linear transformation.
- To solve the problems of differentiation of integrals.

Unit-I: Sequences and Series:

Sequences and Series of Functions: Discussion of Main problem - Uniform Convergence – Uniform convergence and continuity - Uniform convergence and Integration – Uniform convergence and differentiation – Equi continuous families of functions

Unit- II: The Stone-Weierstrass Theorem and some special functions:

The Stone-Weierstrass theorem and some special functions statement and proof - corollary - uniform closure -separate points -Power series - Taylor's series -The exponential and Logarithmic functions - The trigonometric functions- solving problems

Unit- III: The algebraic completeness of the complex field:

Introduction of algebraic completeness of the complex field-Fourier series-Trigonometric polynomial - Fourier coefficient - orthogonal -Bessel inequality - Dirichlet kernel - localization theorem - Parseval's theorem - The Gamma functions - Stirling's formula and Functions of several variables: Linear transformations- linear combination- Linear operators on X.

Unit -IV: Differentiation:

Differentiation introduction- Preliminaries- Differentiable- Partial derivatives -Directional derivative-The contraction principle - The inverse function theorem - The implicit function theorem -The rank theorem -null space, range - projections– Determinants - multiplication of theorem -Jacobians- Derivatives of higher order- second order partial derivatives

Unit -V: Differentiation of Integrals:

Differentiation of Integrals introduction- Mean value theorem and its examples-Integration of Differential forms: Integrations- examples -Primitive mappings-Partitions of unity-Change of variables-Differential forms- Stoke's theorem- examples- elementary properties- product of basic k- forms- differentiation-change of variables

Text Book:

1. **Walter Rudin,** "Principles of Mathematical Analysis", 3rd Edition, McGraw – Hill International Book Company, Singapore, 1982.

   Unit I: Chapter 7: 7.1 to 7.25

   Unit II: Chapter 7: 7.26 to 7.33 and Chapter 8: 8.1 to 8.7

   Unit III: Chapter 8: 8.8 to 8.22 and Chapter 9: 9.1 to 9.09

   Unit IV: Chapter 9: 9.10 to 9.41

   Unit V: Chapter 9: 9.42 to 9.43 and Chapter 10: 10.1 to 10.25

References Books:

1. **S. Kumaresan**, "Topology of Metric Spaces ", 2nd Edition, Narosa Publishing House, 2011.
2. **S. Ponnusamy**, "Foundations of Mathematical Analysis", Springer Birkhauser, 2012.
3. S. K. Mappa, Introduction to Real Analysis, 7th Edition, Sarat Book Distributors, Kolkatta, 2015
4. **Tom Apostol,** "Mathematical Analysis", Addison Wesley Publishing Company, London-1971.
5. **R. G. Bartle & D.R. Sherbert,** "Introduction to Real Analysis", John Wiley & Sons, New York, 1982.
6. **Kenneth A. Ross,** "Elementary Analysis: The theory of Calculus", Springer, New York, 2004.
7. **K. R. Stromberg,** "An Introduction to Classical Real Analysis", Wadsworth, 1981.

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO1: Investigate the ideas of continuity and inverse images of open and closed sets, functions continuous on compact sets – K2

CO2: Differentiate the concepts of connectedness and implement them on various sets – K3

CO3: Examine the derivatives of functions and apply few theorems based on it – K4

CO4: Investigate properties of monotonic functions – K5

CO5: Learn the properties of Riemann- Stieltjes integral – K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	M	S	M	S	S	S	S	S
CO4	S	M	S	S	S	S	M	M	S	S
CO5	S	S	M	S	S	S	M	S	S	M

S- Strong = 3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT23	PARTIAL DIFFERENTIAL EQUATIONS	L	T	P	C
CORE- VIII			4	-	-	4

Objectives:

- Differential equations arise for many problems in oscillations of mechanical and electrical systems
- It plays a very important role in all modern scientific and engineering studies.
- To give an in-depth knowledge of differential equations and their applications.
- Solve the higher order differential equations in different types with initial and boundary conditions
- Use the method of separation of variables to reduce some partial differential equations to ordinary differential equations of 2^{nd} order.
- To make the students to solve the practical problems used differential equations.

Unit - I: Partial Differential Equations:

Partial Differential Equations of the First Order: Origins of First order Partial Differential Equations – Linear Equations of First order – Compatible Systems of First order Equations – Char pit's Method - Special types of First order Equations – Solutions satisfying given conditions – Jacobi's Method.

UNIT-II: Second Order Partial Differential Equations:

Partial Differential Equations of the Second order **:** The origin of second order equations – Linear Partial Differential Equations with constant coefficients – Equations with Variable Coefficients – Characteristics Curves of Second order Equations – Separation of variables.

Unit -III: Wave Equation:

Introduction about Wave Equation - Elementary Solutions of the One – dimensional Wave Equation – General Solutions of the Wave Equation - Green's Function for the wave Equation – The Non homogeneous Wave Equation – Riesz's Integrals .problems in this method .

Unit- IV: Laplace and Diffusion Equation:

Laplace and Diffusion Equation introduction - Separation of variables – Elementary Solutions of the Diffusion Equation – Problems in this relevant Exercise. Separation of variables – Use of Green's Functions. Problems in the applications of Green's Functions

Unit -V: Boundary Value Problems:

Introduction of Boundary Value Problems - Eigen values- problems to find Eigen values - Eigen functions Problems using Eigen functions and the vibrating String - The Heat Equation – Sturm Liouville problems. Application in the real time problems.

Text Book:

1. **Ian.N.Sneddon,** "Elements of Partial Differential Equations", Dover Publications, INC, Mineola, Newyork.(2006)
2. **George F.Simmons,** "Differential Equations with Applications and Historical Notes", McGrawhill, Inc, Newyork.(1991)

Unit I: Chapter 2: Section 2.4,9,10,11,12,13 (TB: 1)
Unit II: Chapter 3: Section 3.1,4,5,6,9 (TB: 1)
Unit III: Chapter 5: Section 5.2,6,7,8,9 (TB: 1)
Unit IV: Chapter 4: Section 4.5 and Chapter 6: Section 6.3,4,5,6 (TB: 1)
Unit V: Chapter 7: Section 7.40, 41, 43 (TB: 2)

References Books:

1. **Williams E. Boyce and Richard C. Diprima** "Elementary Differential Equations and Boundary Value Problems " 10th edition John Wiley and Sons, New York 2012
2. **M.D. Raisinghania**, " Advanced Differential Equations ", S. Chand & Company Ltd., New Delhi 2012

Course Outcomes:

Upon the successful completion of the course, students will be able to**;**

CO1: recognize differential equations that can be solved by each of the three methods – direct integration, separation of variables and integrating factor method – and use the appropriate method to solve them – K2

CO2: use an initial condition to find a particular solution of a differential equation, given a general solution – K3

CO3: check a solution of a differential equation in explicit or implicit form, by substituting it into the differential equation – K4

CO4: understand the terms 'exponential growth/decay', proportionate growth rate' and 'doubling/halving time' when applied to population models, and the terms 'exponential decay', 'decay constant' and 'half- life' when applied to radioactivity – K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	M	S	S	S
CO2	S	M	S	S	S	M	M	M	M	S
CO3	S	S	M	S	S	S	S	S	S	S
CO4	S	S	S	M	S	S	S	S	S	S

S- Strong = 3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT24	TOPOLOGY	L	T	P	C
CORE- IX			5	-	-	4

Objectives:

- Students will learn the fundamental concepts of point-set topology.
- Introduce students to the concepts of open and closed sets abstractly, not necessarily only on the real line approach
- Provide the awareness of tools to students to carrying out advanced research work in pure mathematics Course**.**

Unit- I: Topological Spaces and Continuous Functions:

Topological Spaces and Continuous Functions introduction-Topological spaces- Basis for a Topology- The order Topology- The Product Topology on X×Y- The subspace Topology – Closed sets and Limit points- theorems and examples-relation between interior of A and closure of A -Hausdorff spaces and theorems-Continuous Functions- homeomorphism with examples-The pasting lemma-The product Topology-definition of box and product topology-comparison of the box and product topology

Unit - II: Metric Topology and Connectedness:

Metric Topology definition- The Metric Topology- diameter-standard bounded metric-norm Uniform metric topology- Metrizable-The sequence lemma- Uniform limit theorem-Weierstrass M-test based on problems-Connectedness: Connected Spaces –proof of the theorems- Connected Subspaces of the Real line- Components and Local Connectedness.

Unit- III: Compactness:

Compactness introduction- Compact Spaces- open cover-theorems and examples –The Tube Lemma-finite intersection property with theorem-Compact subspaces of the Real Line-Extreme value theorem-the lebesgue number lemma-Uniform continuity theorem-Limit Point Compactness- sequentially compact-Local Compactness-one point compactification with proof of the theorems.

Unit - IV: Countability and Separation Axioms:

Countability and Separation Axioms introduction - The Separation Axioms- first and second countability axioms and theorems - Lindelof space - Sorgenfrey plane example-Normal Spaces and theorems- The Urysohn Lemma- The Urysohn Metrization Theorem - immbedding theorem

Unit -V: Extension Theorem:

Introduction about Extension Theorem- The Tietze Extension Theorem- The Tychonoff Theorems - The Stone-Cech Compactification- Metrization Theorems: Local finiteness-refinement-The Nagata-Smirov Metrization Theorem- Its relevant Exercise problems.

Text Book:

1. **James. R. Munkres,** "Topology: A first course", 2nd Edition, Prentice Hall of India Pvt Ltd, New Delhi. 2013

Unit I: Chapter 2- Section: 12- Section 19

Unit II: Chapter 2- Section: 20, 21 and Chapter 3-Section: 23- Section: 25

Unit III: Chapter 3- Section: 26- Section 29

Unit IV: Chapter 4- Section: 30- Section 34

Unit V: Chapter 5- Section: 37, 38- Chapter 6: Section 39, 40, 9.1 to9.3

Reference Books:

1. **G.F. Simmons** "Introduction to Topology and modern Analysis", Tata McGraw Hill edition.
   B. Mendelson, "Introduction to Topology", CBS Publishers, Delhi, 1985.
2. **Size- Tsen Hu,** "Introduction to General Topology", Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1966.
3. **S. Lipschutz**, "General Topology", Schaum's Series, McGraw-Hill New Delhi, 1965.
4. **K. D. Joshi,** "Introduction to General Topology", New Age International Pvt. Ltd, 1983.
5. **J. L. Kelly**, "General Topology", Springer-Verlag, New York, 1975

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO1: know how the topology on a space is determined by the collection of open sets, by the collection of closed sets, or by a basis of neighbourhoods at each point.–K2.

CO2: know the definition and basic properties of connected spaces, path connected spaces, compact paces, and locally compact spaces – K3

CO3: know what it means for a metric space to be complete, and you can characterize compact metric spaces – K4

CO4: familiar with the Urysohn lemma and the Tietze extension theorem, and you can characterize metrizable spaces – K5

CO5**:** familiar with the construction of the fundamental group of a topological space and applications to covering spaces and homology theory – K5.

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	S	S	S	S
CO2	S	S	S	S	S	M	S	S	M	S
CO3	S	S	M	S	M	S	S	S	S	S
CO4	S	M	S	S	S	S	S	M	S	S
CO5	S	S	M	S	S	S	S	S	S	S

S- Strong = 3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT25	OPTIMIZATION TECHNIQUES	L	T	P	C
CORE- X			5	-	-	4

Objectives:

- Ability to understand and analyze managerial problems in industry so that they are able to use resources (capitals, materials, staffing, and machines) more effectively;
- Provides a quantitative technique or a scientific approach for making better decisions for operations under the control.
- Use integer programming problem to solve system of linear equations.
- To provide the depth knowledge about inventory control theory and make students to solve the inventory problems.

Unit-I: Integer Programming:

Integer Programming introduction – Gomory's all Integer Programming Problem method - Construction of Gomory's Constraints - Fractional Cut Method - All integer- Fractional Cut Method - Mixed integer-Branch and Bound Method-Applications of Integer programming.

Unit-II: Dynamic Programming:

Dynamic Programming introduction – The Recursive equation approach-Characteristics of Dynamic Programming - Dynamic Programming Algorithm- Solutions of Discrete D.P.P-Some Applications- Solutions of L.P.P by Dynamic Programming.

Unit- III: Queueing Theory:

Queueing Theory introduction – Queueing System –Elements of Queueing System-Operating Characteristics of Queueing System – Probability distribution in Queueing System Classification of Queueing models –Definition of Transient and Steady States-Poisson Queueing System

Unit-IV: Non Linear Programming:

Non Linear Programming introduction - Formulation of Non - Linear Programming Problem(NLPP)- General Non Linear Programming problem- Constraints optimization with equality Constraints- Constraints optimization with inequality Constraints-Saddle point problems-Saddle points and NLPP.

Unit - V: Non Linear Programming Methods:

Non Linear Programming Methods introduction – Graphical Solution- Kuhn-Tucker Conditions with Non-Negative Constraints – Quadratic Programming –Wolfe's Modified Simples Methods-Beal's Method- Separable Convex Programming –Separable Programming Algorithm.

Text Book:

1. **Kanti Swarup, P.K. Gupta, Man Mohan,** "Operations Research", Sultan Chand & Sons, Educational Publishers, New Delhi.2013
   Unit – I: Chapter 7 Section 7.1-7.7
   Unit – II: Chapter 13- Sections 13.1-13.7
   Unit – III: Chapter 20- Sections 20.1-20.8
   Unit – IV: Chapter 24- Sections 24.1-24.7
   Unit – V: Chapter 25- Sections 25.1-25.8

Reference Books:

1. **Panneerselvam.R**, "Operations Research", 2nd Edition, PHI Learning Private Limited, Delhi, 2015
2. **Prem Kumar Gupta.Er, Hira.D.S**. "Operations Research", 7th Edition,S.Chand & Company Pvt.Ltd.2014
3. **Hiller.F.S & Lieberman.J** "Introduction to Operation Research ", 7th Edition, Tata–MCGraw Hill Publishing Company, NewDelhi, 2001.
4. **G. Srinivasan,** "Operations Research principles and applications", Second Edition, PHI Learning Private Limited, New Delhi-110001, 2012.

Course Outcomes:

Upon the successful completion of the course, students will be able to
CO1: analyze the real-life systems with limited constraints – K2.
CO2: identify the mathematical nature of a given optimization problem – K3
CO3: analyze a range of classes of optimization problems – K4
CO4: identify solution methods for the optimization problems studied – K5
CO5: depict the systems in a mathematical model form – K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	S	S	S	S	M	S	S	S	S	S

S- Strong=3, M-Medium=2, L-Low = 1

SEMESTER -III

COURSE CODE	P21MTT31	COMPLEX ANALYSIS	L	T	P	C
CORE- XI			5	-	-	4

Objectives:

- To impart various concepts about the sequence and series, analytic functions in the complex plane.
- Provide deep knowledge about mapping and transformation and the learner will gain knowledge of power series of analytic function
- Learner will be proficient in applications of Cauchy's theorem
- To present students the elements and importance of the Complex analysis.
- To define and recognize the basic properties of the complex numbers.

Unit -I: Functions, Limit, and Continuity:

Functions, Limit, and Continuity introduction- Sequence and series –Concepts of limits and continuity- continuous and discontinuous function- Examples- Stereographic projection – Rieamann's Sphere- limit at infinity-– sequence and series of function- uniform convergence of sequence and series of functions with examples- Weiestrass's M- test Theorem.

Unit -II: Analytic Functions and Power Series:

Analytic Functions and Power Series introduction- Differentiability and Cauchy-Riemann equations – complex differentiable- analytic or holomorphic -Harmonic functions – Finding harmonic conjugates - power series as an Analytic functions –root test and ratio test – Exponential and Trigonometric functions – Periodic function

Unit -III: Complex Integration:

Complex Integration introduction -Plane – properties of complex line integrals – Weak form of Cauchy's Theorem – Cauchy - Goursat Theorem – Cauchy's Theorem for a Disk- Cauchy's integral Theorem and Examples – Consequence of simply connectivity – simply connected – Winding number –Homotopy version of Cauchy's theorem

Unit -IV: Mapping and Transformation:

Mapping And Transformation introduction -Cauchy integral formula and theorems - Gauss Mean value Theorem –Cauchy's inequality and examples - Morera's theorem. Existence of Harmonic Conjugate –Taylor's Theorem and Examples –Zeros of Analytic functions - Identity theorem- Laurent serious –Laurent Theorem –Principle of conformal mapping.

Unit -V: Maximum Principle:

Maximum Principle and Schwarz' Lemma – Liouville's Theorem: Maximum Modulus principle – Hadamard's Three circles/lines theorem – Schwarz' Lemma and its consequence- Liouville's Theorem- Meromorphic Functions - Infinite sums and Meromorphic functions-Infinite products of Complex numbers.

Text Book:

1. **S.Ponnusamy, "**Foundations of Complex Analysis", 2rd Edition, Narosa Publishing House Ltd, Chennai, 2005.
   Unit I - Chapter 1: 1.6 and Chapter 2: 2.2 – 2.4
   Unit II – Chapter 3: 3.1 – 3.4
   Unit III - Chapter 4: 4.1 – 4.6
   Unit IV- Chapter 4: 4.7 –4.12 and Chapter 5: 5.1
   Unit V – Chapter 6: 6.1 – 6.4 and Chapter 11: 11.1-11.2

Reference Books:

1. **John B. Conway —**"Function of one Complex Variable" 2nd Edition, Springers International Students Edition. 2012
2. **Karunakaran,** "Complex Analysis", Narosa Publishing House, New Delhi, 2002.
3. **R.V. Churchill & J. W. Brown,** "Complex Variables & Applications", Mc.Graw Hill,1990.
4. **John. B. Conway,** "Functions of One Complex Variable", Narosa Pub. House, 2002.
5. **Lars V. Ahlfors,** "Complex Analysis", Third Ed. McGraw-Hill Book Company, Tokyo, 1979.

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO1: explain and apply Cauchy's integral formula and some of its consequences – K2

CO2: explain the convergence of power series and develop analytical capabilities in Taylor or Laurent series in a given domain – K3

CO3: define the fundamental concepts of complex numbers and its properties, Exponential, logarithmic, trigonometric and hyperbolic complex functions – K4.

CO4: describe Holomorphic and harmonic complex functions and list different examples – K5

CO5: state Complex integral on a path – Cauchy theorem and Cauchy integral formula name zeros and singularities of a Complex function and the residue theorem – K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	S	S	M	S
CO2	S	S	S	S	S	M	S	S	S	S
CO3	S	S	M	S	M	S	S	M	S	S
CO4	S	M	S	S	S	S	M	S	S	S
CO5	S	S	M	S	S	M	S	S	S	S

S- Strong = 3, M-Medium=2, L-Low = 1

COURSE CODE	P21MTT32	MEASURE THEORY	L	T	P	C
CORE- XII			5	-	-	4

Objectives:

- Understand the concepts of outer measures and integrals
- Provide the relationship between Riemann and Lebesgue integral
- Learner will be derive integration and derivates by using Radon-Nikodym Theorem and Fubini's Theorem
  - Gain understanding of the abstract measure theory and definition and main properties of the integral.
- To construct Lebesgue's measure on the real line and in n-dimensional Euclidean space.
- To explain the basic advanced directions of the theory.

Unit- I: Lebesgue Measure:

Lebesgue Measureintroduction- Lebesgue Outer Measure – Measurable Sets Regularity Measurable Functions – every interval is measurable- Borel set- outer measure of interval equals it's length- regular measure- Borel and Lebesgue Measurability

Unit-II: Borel and Lebesgue Measure:

Borel And Lebesgue Measure introduction– Hausdorff measures on the Real Line – Hausdorff Dimension - Integration of non-negative Functions -Fatou's Lemma-Lebesgue's Monotone Convergence Theorem – General Integral – Lebesgue's Dominated Convergence Theorem - Integration of series – Riemann and Lebesgue Integral

Unit-III: R-S Integral:

R-S Integral introduction- Abstract Measures space – Measures and Outer Measures- Extension of a Measure – Uniqueness of Extension - Completion of a Measure – Measure Spaces – Integration with respect to a Measure – L^p Spaces – Convex Functions –Jensen's Inequality – Completeness.

Unit-IV: Signed Measure:

Signed Measure introduction - Signed Measure and the Hahn Decomposition - Definition of Positive Set, Negative Set, Null Set– the Jordan Decomposition –Definition of Mutually singular– Radon-Nikodym Theorem – Some Application of The Radon-Nikodym Theorem – Randon-Nikodym derivation –Lebesgue Decomposition Theorem

Unit- V: Measurability in a Product Space:

Measurability in a Product Space introduction – Definition of Measurable Rectangle and Elementary Sets- Fubini's Theorem– The Product Measure and Fubini's Theorem -Definition of Monotone Class- Fubini's Theorem – Theorem on Fubini's Theorem

Text Book:

1. **G.De Barra,** "Measure Theory and Integration", 1st edt, New age international (p) Limited, 2003
   Unit – I: Chapter II: Sections 2.1 to 2.5
   Unit – II: Chapter III: Sections 3.1 to 3.4
   Unit – III: Chapter V: Sections 5.1 to 5.6
   Unit – IV: Chapter VII: Sections 7.1 and 7.2, Chapter VIII: Sections 8.1 and 8.2
   Unit – V: Chapter X: Sections 10.1 and 10.2

Reference Books:

1. **P.R. Halmos,** "Measure Theory", D.VanNostrand Company, Inc. Princeton, N.J., 1950
2. **H.L.Royden** "Real Analysis", Prentice Hall of India 2001 edition.
3. **I.K. Rana,** "An Introduction to Measure and Integration", Narosa Publishing House, NewDelhi, 1999
4. **D.L. Cohn,** "Measure Theory", Birkhauser, Switzerland, 1980

Course Outcomes:

CO	CO Statement	Knowledge Level
CO1	Understanding the basic concepts of the definition of general Lebesque integral.	K2
CO2	Derives the concepts of Borel sets, measurable functions, differentiation of monotone functions	K3
CO3	Demonstrate statement of main results in fundamental integral theorems, monotone convergence theorem, and its related proves and results.	K4
CO4	Demonstrate the proof in integration in product spaces and signed measures.	K5
CO5	Apply the theory of this course to solve real problems in difficult situations.	K6

K1- Remember: K2- Understand: K3-Apply, K4 - Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	S	S	S
CO4	S	S	S	S	S	M	S	S	S	S
CO5	S	S	S	S	S	S	M	S	S	M

S- Strong = 3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT33	DIFFERENTIAL GEOMETRY	L	T	P	C
CORE- XIII			4	-	-	4

Objectives:

- To introduce space curves, surfaces and its properties.
- The learner will acquire knowledge in problem solving in curves and surfaces in geometrical approach.
- To make the students to solve the problems in planes, surface in curves, geodesic equations and geodesic curvatures.

Unit - I: Representation and Theory of Space Curves:

Representation and theory of Space Curves introduction-Representation of space curves-Unique parametric representation of a space curve- Arc length - tangent and osculating plane - principal normal and binormal - curvature and torsion - contact between curves and surfaces - osculating circle and osculating sphere - locus of centres of spherical curvature.

Unit- II: Evolutes of a Plane and Space Curve:

Evolutes of a Plane and Space Curveintroduction- Tangent surfaces - Involutes and evolutes Betrand curves - Spherical indicatrix - Intrinsic equations of space curves – Fundamental existence theorem for space curves - Helices.

Unit-III: The First Fundamental Form and Local Intrinsic Properties of a Surface:

The First Fundamental Form and Local Intrinsic Properties of a Surface introduction-Definition of a surface - Nature of points on a surface - Representation of a surface - Curves on surfaces - Tangent plane and surface normal - The general surfaces of revolution – Helicoids - Metric on a surface - The first fundamental form - Direction coefficients on a surface.

Unit- IV: Families of curves:

Families of curves introduction-- Orthogonal trajectories - Double family of curves – Isometric correspondence - Intrinsic properties - Geodesics on a surface: Geodesics and their differential equations - Canonical geodesic equations - Geodesics on surface of revolution - Normal property of geodesics - Differential equations of geodesics using normal property.

Unit-V: Existence Theorems:

Existence theorems proof- Geodesic parallels - Geodesic polar coordinates – Geodesic curvature - Gauss-bonnet theorem-Meusnieu's theorem-Gaussian curvature Euler's theorem-Duplin's indicarix-Surface of revolution conjugate system-Asymptric lines-isometric lines.

Text Book:

1. **D. Somasundaram,** "Differential Geometry: A first course", Narosa Publishing House, New - Delhi, India, 2005.

Unit I: Sections 1.2-1.7, 1.10-1.12
Unit II: Sections 1.13-1.18
Unit III: Sections 2.2-2.10
Unit IV: Sections 2.11-2.15, 3.2-3.6
Unit V: Sections 3.7-3.12

Reference Books:

1. **T.J. Willmore**, "An Introduction to Differential Geometry", Oxford University Press,New Delhi, 2006.
2. **J. N. Sharma & A. R. Vasistha**, "Differential Geormetry", KedarNath Ram Nath, Meerut, 1998.
3. **Dirk J. Struik:** "Lectures on Classical Differential Geometry" (second edition), Addison Wesley Publishing Company.

Course Outcomes:

CO	CO Statement	Knowledge Level
CO1	Understand planes, spaces curves, arc, nature of points, geodesic concepts	K2
CO2	Prove theorems planes, surfaces, Identification of important types of curves in surfaces, including principal curves, asymptotic curves and geodesics using fundamental existence theorem for space curves	K3
CO3	Enumerate some standard examples in geometry, such as surfaces of constant Gaussian curvature, compact and non - compact surfaces, and surfaces of revolution	K4
CO4	Evaluate Gaussian and mean curvatures using variety of methods including patch computations .Differential equations of geodesics using normal property	K5
CO5	Apply/Create real time situation.	K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	M	M	S	L	S	S	M	S	S	S

S- Strong = 3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT34	CLASSICAL DYNAMICS	L	T	P	C
CORE- XIV			4	-	-	4

Objectives:

- ❖ To develop familiarity with the physical concepts and facility with the mathematical methods of classical dynamics
- ❖ To represent the equations of motion for complicated mechanical systems using the Lagrangian and Hamiltonian formulation of classical dynamics

Unit-I: Introductory Concepts:

Introductory Concepts introduction- The mechanical system-Equations of motion-Units - Generalised Coordinates -Degrees of freedom -Generalized Coordinates-Configuration space-Examples- constraints -holonomic constraints - non-holonomic constraints -Unilateral constraints-virtual work-virtual displacement-Principle of virtual work- D'Alembert's principle- Generalized forces-Examples - Energy and momentum-Potential energy-Work and kinetic energy-Conservation of energy-Equilibrium and stability-Kinetic energy of a system-Angular momentum-Generalized momentum-Examples.

Unit-II: Lagrange's Equation:

Lagrange's Equation introduction- Derivation and examples -Kinetic energy-Lagrange's equation-From of the equations of motion-Nonholonomic systems- Integrals of the Motion-Ignorable coordinates-the Kepler problem -Routhian function-Conservative system -Natural systems-Liouville's system-Examples.

Unit-III: Hamilton's Equations:

Hamilton's Equations introduction-Hamilton's principle-Stationary values of a function - Constrained stationary values-Stationary value of a definite integral-The brachistochrone problem-Examples-Geodesic path - Hamilton's equations -Derivation of Hamilton's equation-The form of the Hamiltonian function-Legendre transformation-Examples- Other variational principles -Modified Hamilton's principle-Principle of least action- phase space-Trajectories - Extended phase space -Liouville'theorem.

Unit-IV: Hamilton - Jacobi Theory:

Hamilton - Jacobi Theory introduction- Hamilton's Principal Function-The canonical integral - Pfaffian forms – The Hamilton - Jacobi equation-Jacobi's theorem-Conservative systems and ignorable coordinates-Examples– Separability- Liouville's system-Stackle's theorem - Examples.

Unit-V: Canonical Transformations:

Canonical Transformations introduction -Differential forms and Generating functions-Canonical transformations-Principal forms of generating function-Further comments on the Hamilton-Jacobi method -Examples – Special Transformations -Some simple transformation -Homogeneous canonical transformation-Point transformations-Momentum transformations -Examples– Lagrange and Poisson Brackets-Lagrange brackets-Poisson brackets-The bilinear covariant -Examples.

Text Book:

1. **Donald T. Greenwood**, "Classical Dynamics", PHI Pvt. Ltd., New Delhi, 1985.
   Unit I - Chapter: 1.1-1.5
   Unit II - Chapter: 2.1-2.4
   Unit III - Chapter: 3.1, 3.2 and 3.4 (3.3 Omitted)
   Unit IV - Chapter: 4.1-4.4
   Unit V - Chapter: 5.1-5.3

Reference Books:

1. **H. Goldstein,** "Classical Mechanics", (2^{nd} Edition), Narosa Publishing House, New Delhi, 1998.
2. **John L Synge and Byron A Griffith**, "Priniciples of Mechanics", McGraw-Hill, New York, 1959.
3. **Narayan Chandra Rana &Promod Sharad Chandra Joag,** "Classical Mechanics", Tata McGraw Hill, 1991.

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO1: solve the Lagrange's equations for simple configurations using various Methods – K2

CO2: understand the concept of Hamilton Jacobi Theory – K3

CO3: understand the concept canonical Transformations – K4

CO4: develop skills in formulating and solving physics problems – K5

CO5: get idea of dynamical systems are of relatively recent origin, the concept of motion in phase- space and its geometrical depiction is simple – K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	M	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	M	S	S	S	M	M	S	S
CO4	S	M	S	S	S	S	S	S	S	S
CO5	S	S	S	S	M	M	S	M	S	S

S- Strong =3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT35	CALCULUS OF VARIATIONS AND INTEGRAL EQUATIONS	L	T	P	C
CORE- XV			5	-	-	4

Objectives:

- To introduce the concept of maxima, and minima functions al for family of curves of unknown functions.
- To give a knowledge about separable equations, fundamental lemmas of calculations variation, Fredholm integrals, Volterra integral equation and make students to solve the problems.
- To study linear/non integral problems and methods of successive approximations.
- To solve problems in the field of extremals, Jacobi conditions, Legendre condition, transforming equations, conditional/unconditional integral equations.

Unit-I: The Method of Variations in Problems with Fixed Boundaries:
The method of variations in problems with fixed boundaries introduction -Variation and its properties - Euler's equation - Functional of the form $\int F(x,y_1,y_2,\ldots y_n, y_1',y_2',\ldots y_n')\,dx$. Functional dependent on higher order derivatives - Functionals dependent on the functions of several independent variables - Variational problems in parametric form - Some applications.

Unit-II: Conditions for an Extremum:
Sufficient conditions for an Extremum: Field of extremals - The function E(x,y,p,y') - Transforming the Euler equations to the canonical form- Extremals with Corners .- One-Sided Variations - Problems - An elementary Problem with Moving Boundaries.

Unit-III: Direct Methods in Variational Problems:
Direct Methods in Variational Problems introduction-Direct methods - Euler's finite difference method - The Ritz method - Kantorovich's method.

Unit -IV: Integral Equations:
Linear Integral Equations: Definition, Regularity conditions – special kind of kernels – Eigen values and Eigen functions – convolution Integral – the inner and scalar product of two functions – Notation – reduction to a system of Algebraic equations – examples – Fredholm alternative - examples – an approximate method

Unit -V: Successive Approximations:
Method of Successive Approximations: Iterative scheme – examples – Volterra Integral equation – examples – some results about the resolvent kernel. Classica l Fredholm Theory: the method of solution of Fredholm – Fredholm's first theorem – Fredholm's second theorem – Fredholm's third theorem.

Text Books:

1. L.**Elsgolts,** "Differential equations and the calculus of variations", MIR publishers, Moscow 1970.

   Unit – I Chapter 6
   Unit – II Chapter 8
   Unit – III Chapter 10

2. **Ram.P.Kanwal**, "Linear Integral Equations Theory and Practice", Academic Press 1971.

   [1] Unit – IV Chapters 1 and 2
   Unit – V Chapters 3 and 4

Reference Books:

1. **S.J. Mikhlin,"** Linear Integral Equations" (translated from Russian), Hindustan Book Agency, 1960.
2. **I.N. Snedden,** "Mixed Boundary Value Problems in Potential Theory", North Holland, 1966.

Course Outcomes:

CO	CO Statement	Knowledge Level
CO1	Demonstrate to understand competence with the basic ideas of The Method of Variations in Problems with fixed Boundaries, and unknown functions are in integral equations	K2
CO2	Develop and solve problems in integral equations , special kind of equation for several independent variables	K3, K4
CO3	Analyse Parametric forms with moving boundaries and other problems and kernel for integral equations	K4
CO4	Apply Euler's finite difference method ,The Ritz method and Kantorovich's method in Vibrational Problems, and in the field of extremely	K6
CO5	Evaluate the extremals of functionals , solving applied problems , Solve differential and integral equations Compose clear and accurate proofs using the concepts of reduction to a system of Algebraic equations	K4,K5, K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	S	S	S	S	S	S	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	M

S- Strong =3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTT36	FUNCTIONAL ANALYSIS	L	T	P	C
CORE- XVI			5	-	-	4

Objectives:

- To introduce three structure theorems of Function as Hahn – Banach theorem, open mapping theorem and uniform boundedness principle from Hilbert space.
- To study the finite dimensional spectrum theory.

Unit-I: Banach Spaces

Banach Spaces introduction - The definitions and some examples-Continuous linear transformations-The Hahn-Banach Theorem- The Natural imbedding of N in N^{**}- The Open mapping theorem and closed graph theorem-The conjugate of an operator-properties of conjugate of an operator.

Unit-II: Hilbert Spaces:

Hilbert Spaces introduction- The definitions and some simple properties-orthonormal bases-orthogonal Complements-orthonormal sets-The Conjugate Space H^* - The Adjoint of an operator-Self-adjoint operators-Normal and Unitary operators.

Unit-III: Spectral Theory:

Finite-Dimensional Spectral Theory: Matrices -Basic operations of matrices-determinants and the spectrum of an operator -The spectral theorem for operators on a finite dimensional Hilbert space- - A survey of the situation

Unit -IV: Banach Algebras:

General preliminaries on Banach Algebras: The definition and some examples-Regular and singular elements in Banach algebra-Topological divisors of zero-The Spectrum of an element in a Banach algebra-The formula for the spectrum radius-The radical and semi-simplicity.

Unit-V: The Structure of Commutative Banach Algebras:

The Structure of Commutative Banach Algebras introduction- The Gelfand mapping – Applications of the formula r(x) = lim || xn ||1/n - Involutions in Banach Algebras – The Gelfand-Neumark theorem.

Text Book:

1. **G.F.Simmons** "Introduction to Topology and Modern Analysis" ,Tata McGraw Hill Edn, 2004.

   Unit I: Chapter 9
   Unit II: Chapter 10
   Unit III: Chapter 11
   Unit IV: Chapter 12
   Unit V: Chapter 13

Reference Books:

1. B. V. Limaye, Functional Analysis, Revised Third Edition, New Age International, 2017.
2. M. Thamban Nair, Functional Analysis - A First Course, Prentice Hall of India, 2010.
3. S. Ponnusamy, Foundations of Functional Analysis, Narosa Publishing House, 2002.
4. S. Kesavan, Functional Analysis, TRIM series, Hindustan Book Agency, New Delhi, 2009.
5. Rajendra Bhatia, Lectures on Functional Analysis, TRIM series, Hindustan Book Agency, New Delhi, 2009.

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO	CO Statement	Knowledge Level
CO1	Describe properties of normed linear spaces and construct examples of such spaces	K2
CO2	Apply basic theoretical techniques to analyze linear functionals and operators on Banach and Hilbert spaces.	K3
CO3	Apply Finite-Dimensional Spectral Theory survey of the situation	K4
CO4	Apply theorems to do problems	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	M	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	M	S	S	S

S- Strong=3, M-Medium=2, L-Low = 1

SEMESTER –IV

COURSE CODE	P21MTE411	CHOICE -I	L	T	P	C
ELECTIVE -I		NUMBER THEORY	4	-	-	4

Objectives:

- To expose the students to the charm, niceties and nuances in the world of numbers.
- To highlight some of the Applications of the Theory of Numbers.
- The Learner will gain deep knowledge to solve the problems on algebraic number theory.
- The Learner will be know the various type of equations

Unit- I: Arithmetical Functions and Dirichlet Multiplication:

Arithmetical Functions and Dirichlet Multiplication introduction- The Möbius function - Euler totient function - a relation connecting ϕ and μ - a product formula for $\phi(n)$ - the Dirichlet product of arithmetic functions - Dirichlet inverses and the Mobius inversion formula - the Mangoldt function - Multiplicative function - multiplicative functions and Dirichlet Multiplication - The inverse of a completely multiplicative function - Liouville's function - The divisor functions – Generalised convolutions - Formal Power series - The Bell series of an arithmetical function - Bell Series and Dirichlet multiplication - derivatives of arithmetical functions - The Selberg identity.

Unit -II: Averages of Arithmetical Functions:

Averages of Arithmetical Functions introduction- The big oh notation - asymptotic equality of functions - Euler's summation formula-Some elementary asymptotic formulas - average order of d(n) - average order of the divisor functions $\sigma_\alpha(n)$ - average order of $\phi(n)$ - an application to the distribution of lattice points visible from the origin - average order of $\mu(n)$ and of $\Delta(n)$ - the partial sums of a Dirichlet product - applications to $\mu(n)$ and $\Lambda(n)$ - another identity for the partial sums of a Dirichlet product

Unit- III: Congruences:

Introduction about Congruences- Definition and basic properties of Congruences - Residue classes and complete residue system - Linear congruences - reduced residue systems and the Euler - Fermat theorem - polynomial congruences modulo p - Langrange's theorem - applications of Lagrange's theorem - Simultaneous Linear Congruences: The Chinese remainder theorem - applications of the Chinese remainder theorem - Polynomial congruences with prime power moduli - the principle of cross classification - a decomposition property of reduced residue systems.

Unit- IV: Quadratic Residues and Quadratic Reciprocity Law:

Quadratic Residues and Quadratic Reciprocity Law introduction**:** Quadratic residues - Legendre's symbol and its properties - evaluation of (-1/p) and (2/p) - Gauss' Lemma - the quadratic reciprocity Law - applications of the reciprocity law - the Jacobi symbol - Applications to Diophantine equations.

Unit- V: Partition Function:

Partition Function introduction Partitions – Definition- Example -Graphs - Formal power series- Definition- Example - Euler's identity - Definition- Example -Euler's formula- Definition- Example -Jacobi's formula - Definition- Example- a divisibility property- Definition- Example-Exercise problems.

Text Books:

1. **Tom M. Apostol**, "Introduction to Analytic Number Theory", Springer International Student Edition, 1998.
2. **Niven Herbert S. Zuckerman,** "Introduction to the Theory of Numbers", Wiley Eastern University Edition, 1984

Unit I	:	Chapter 2 Section 2.2 - 2.19 (Book 1)
Unit II	:	Chapter 3 Section 3.2 - 3.12 (Book 1)
Unit III:		Chapter 5 Section 5.1 - 5.11 (Book 1)
Unit IV:		Chapter 9 Section 9.1- 9. 8 (Book 1)
Unit V:		Chapter 10 Section 10.1-10.6 (Book 2)

Reference Books:

1. "Elementary Number Theory", **David M Burton,** Seventh edition. https://www.pdfdrive.com/elementary-number-theory-7th-ed-by-david-m-burton-e58704232.html
2. "Basic Number Theory"**, S. B. Malik**, First edition, 1998. https://www.madrasshoppe.com/basic-number-theory-sb-malik-9780706987492-9834.html

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO	CO Statement	Knowledge Level
CO1	Demonstrate factual knowledge including the mathematical notation and terminology of number theory	K2
CO2	Construct mathematical proofs of statements and find counterexamples to false statements in Number Theory.	K3
CO3	Apply theoretical knowledge to problems of computer security	K4
CO4	Analyze the logic and methods behind the major proofs in number theory.	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	**PO4**	**PO5**	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	M	S	S

S- Strong =3, M-Medium=2, L-Low = 1

COURSE CODE	P21MTE412	CHOICE -II	L	T	P	C
ELECTIVE -I		AUTOMATA THEORY	4	-	-	4

Objectives:

- To make the students to understand the nuances of Automata and Grammar.
- To explain various types of automata and grammar.
- Introduce the fundamental concepts of formal languages, grammars and automata theory.
- Identify different formal language classes and their relationships
- To make them to understand the applications of these techniques in computer science.

Unit-I: Finite Automata and Regular Expressions:

Finite Automata and Regular Expressions introduction- Definitions and examples - Additional forms of Proof – Inductive Proofs- Deterministic and Non deterministic finite Automata - Finite Automata with – moves- Finite Automata with Epsilon Transitions.

Unit-II: Context Free Grammar:

Context Free Grammar introduction- Regular expressions and their relationship with automation - Proving Languages not to be regular – Closure Properties of Regular Languages – Equivalence and Minimization of Automata- Grammar - Ambiguous and unambiguous grammars - Derivation trees – Chomsky Normal form

Unit-III: Pushdown Automaton:

Pushdown Automaton introduction- Parse Trees – Ambiguity in Grammars and Language- Pushdown Automaton - Definition and examples - Relation with Context free languages- Equivalence of Pushdown Automata and CFG, Deterministic Pushdown Automata.

Unit- IV: Finite Automata and Lexical Analysis:

Finite Automata and Lexical Analysis introduction**:** Role of a lexical analyzer - Minimizing the number of states of a DFA - Implementation of a lexical analyzer.

Unit -V: Basic Parsing Techniques:

Basic Parsing Techniques: Parsers introduction - Bottom up Parsers - Shift reduces - operator precedence - Top down Parsers - Recursive descent - Predictive parsers.

Text Books:

1. **John E. Hopcroft and Jeffrey D. Ullman**, "Introduction to Automata theory, Languages and Computations", Narosa Publishing House, Chennai, 2000.
   Unit I: Chapter 2: Sections2.1-2.4,
   Unit II: Chapter 2, Section 2.5, Chapter 4, Sections 4.1-4.3, 4.5, 4.6 and
   Unit III: Chapter 5: Section 5.2, 5.3
2. **A.V. Aho and Jeffrey D. Ullman,** "Principles of Compiler Design", Narosa Publishing House, Chennai, 2002.
   Unit IV: Chapter 3: Section 3.1-3.8 and
   Unit V: Chapter 5: Section 5.1-5.5

Reference Books:

1. **John . E. Hopcraft, Rajeev Motwani and Jeffrey D. Ullman**, "Introduction to Automata Theory, Languages and Computationc", Pearson Education, 2013
2. **Kenneth H. Rosen**, "Discrete Mathematics and it's Applications", 7th Edition/ McGraw Hill Education, New York, 2012
3. **B.S.Vatssa**, "Discrete Mathematics",WISHWA PRAKASHAN,1993.
4. **V.Sundaresan,K.S.Ganapathy Subramanian, K.Ganesan**, "Discrete Mathematics", A.Rd.Publications, 1998.
5. **T.Veerarajan**, "Discrete Mathematics", McGraw Hill Education (India)Pvt.Ltd,New Delhi, 2014.
6. **Harry R. Lewis and Christos H. Papadimitriou**, "Elements of the Theory of Computation", Second Edition, Prentice Hall, 1997.
7. **A.V. Aho, Monica S. Lam, R. Sethi, J.D. Ullman,** "Compilers: Principles, Techniques and Tools", Second Edition, Addison-Wesley, 2007.

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO1: acquire a fundamental understanding of the core concepts in automata theory and formal languages – K2

CO2: design grammars and automata (recognizers) for different language classes – K3

CO3: identify formal language classes and prove language membership properties – K4

CO4: prove and disprove theorems establishing key properties of formal languages and automata – K5

CO5: solve the sums based on automata and grammar – K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	M
CO2	S	S	S	M	S	S	M	S	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	M	S	S	S	S	S	S	S
CO5	S	S	S	S	M	S	M	S	S	S

S- Strong =3, M-Medium = 2, L-Low = 1

COURSE CODE	P21MTE413	CHOICE -III	L	T	P	C
ELECTIVE -I		PROBABILITY THEORY AND STATISTICS	4	-	-	4

Objective:

- To learn the advanced theory of possibility and distributions and Estimations.
- To understand the concepts of probability and its properties.
- The learner identifying situations where one-way ANOVA and Latin square

Unit- I: Theory of Probability:

Theory of Probability introduction- Axiomatic approach to axioms of Probability, Conditional probability –Multiplicative law of Probability-Total probability and Baye's theorem – Independent events. Discrete random variable - continuous random variables – Properties of distribution function-Function of random variable- Two-dimension random variable - Marginal Probability Distributions –Conditional Probability Distributions- independent random variables.

Unit-II: Moment Generating Function:

Mathematical Expectations introduction- Expectation, functions of a random variable, properties of expected values – Moment Generating Function: Moments -Moment Generating Function and properties - Characteristic Functions: Probability Generating Function- Correlation: properties of correlation coefficient – Regression: properties of regression co-efficient –Multiple and Partial Correlation: relation between Multiple and partial Correlation Coefficients.

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Unit-III: Distributions:

Introduction about Distributions: Geometric Distribution - Memoryless property of geometric distribution -The Normal Distribution - Uniform Distribution – Exponential Distribution – Gamma Distributions - Beta Distributions- Sampling distribution - Chi Square, t, F Distribution – Students t Distribution – F-Distribution

Unit-IV: Estimation:

Estimation introduction- Concepts of Point and Interval Estimator –Efficiency - Consistent Estimator –Sufficient Estimator – Properties of Estimator –invariance property of consistent estimator – method of Maximum Likelihood Estimators-Minimum chi square Estimator.

Unit-V: Classifications and types:

Classifications: One way and two way classification -ANOVA- design of Experiments: Experimental Units –basic principles in the design of Experiments- Completely block designs - Completely Randomized Design -Randomized Block design – Latin square designs- analysis of Latin square designs- merits and demerits of Completely Randomized Design - merits and demerits of Random Block design and Latin square design –Factorial Experiments.

Text Book:

1. **P.R.Vital ,** "Mathematical Statistics", Margham publications, Edition 2012.
   Unit I - Chapter 1: 1.4 – 1.48 and Chapter 2 : 2.1 – 2.33
   Unit II- Chapter 3: 3.1 – 3.18, Chapter 5, Chapter 6, Chapter 8, Chapter 9 and Chapter 11
   Unit III- Chapter 15, Chapter 16, Chapter 17, Chapter 18, Chapter 19,Chapter 20, and Chapter 2
   Unit IV- Chapter 23 Unit V -Chapter 26 and Chapter 28.

Reference Books:

1. **Robert V. Hogg & Allen T. Craig,** "Introduction to Mathematical Statistics", 5th Edition, Pearson Education, Singapore, 2002.
2. **Irwin Miller &Marylees Miller, John E. Freund's** "Mathematical Statistics", 6th Edition, Pearson Education, New Delhi, 2002.
3. **John E. Freund**, "Mathematical Statistics", 5 th edition, Prentice Hall India, 1994.
4. **S.M. Ross,** "Introduction to Probability Models", Academic Press, India, 2000.

Course Outcomes:

CO	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of statistics, probability and random variables	K2
CO2	Apply the concepts in finding the moments of the distributions.	K3
CO3	Identify the type of the distribution and estimation	K4
CO4	Understand the basics of sampling distribution theory	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping With Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	M	S	S	S	S

S- Strong =3, M-Medium=2, L-Low = 1

COURSE CODE	P21MTE414	CHOICE -IV	L	T	P	C
ELECTIVE -I		ASTRONOMY	4	-	-	4

Objectives:

To acquire the knowledge about the celestial objects and planets.

- ❖ Develop skills to design observing projects with research telescopes and projects drawing
- ❖ upon data in the literature and in archives.
- ❖ To be familiar with the appearance of a range of common astronomical objects, such as asteroids, comets, satellites, planets, stars, and galaxies.

Unit I: Spherical trigonometry:

Spherical trigonometry (only the four formulae) Celestial sphere – Four systems of coordinates Conversion of Coordinates- Diurnal Motion -Sidereal time – West Hour angle of a body expressed in time units and Azimuth at rising – Latitude of a Place –Morning and Evening Stars- Circumpolar star

Unit II: The Earth

The Earth – Zones of the earth – Perpetual Day and Perpetual Night – Terrestrial latitude and Longitude – Date Line – Shape of Earth – Dip of Horizon - Effects of Dip Twilight-, Duration of Twilight, Twilight throughout night, Shortest Twilight, Civil, nautical and astronomical twilights

Unit III: Refraction:

Refraction – Tangent Formula, Constant of Refraction , Refraction on Horizontal and Vertical Arcs – Refraction of any Arc, Cassini's Formula, Horizontal Refraction, Geocentric parallax –Horizontal Parallax - Effect of Geocentric Parallax on Right Ascension and Declination – Angular Diameter – Geocentric Parallax and Refraction

Unit IV : Kepler's Laws of planetary Motion:

Kepler's Laws – Kepler's Laws of planetary Motion – Longitude of Perigee – Forward motion of the apse line – Eccentricity of Earth orbit – Newton's Law of Gravitation – Newton's deductions from Kepler's Law –Mean Anomaly –Geocentric and Heliocentric latitudes and longitudes

Unit V: Eclipses

Eclipses introduction – Umbra and Penumbra -Lunar Eclipse – Solar eclipse – Condition for a Lunar Eclipse – Synodic period of nodes Ecliptic Limits – Maximum and minimum number of eclipses near a node in a year – Saros of Chaldeans – Eclipses Seasons – duration of Lunar and solar eclipses- Importance of total solar eclipses

Text Book:

1. **S,Kumaravelu. & Susheela Kumaravelu** "Astronomy for Degree classes", Rainbow Printers, Nagercoil, 2000.

Reference Books:

1. **V.B.Bhatia** , "Text book for Astronomy and Astrophysics with elements of Cosmology", 2 nd Edition, Narosa Publishing House, New Delhi, 2001.
2. **Subramanian, K., Subramanian, L, V,.Venkatraman,.& Brothers** "A text book of Astronomy," (1st Edition). Educational Publishers (1965)
3. **Daniel Fleish ., Julia Kregenow "**Mathematics of Astronomy ",(1st Edition). Cambridge University Press, New York -.(2013)
4. **Jean Meeus** "More Mathematical Astronomy morsels ",(1st Edition).Willmann Bell Publishing,(2002).

Course Outcomes (CO):

CO	CO Statement	Knowledge Level
CO1	Defining about the observed properties of physical systems that comprise the known universe	K1
CO2	Demonstrate their ability to read, understand, and critically analyze the astronomical/physical concepts.	K2
CO3	Applying their physics and mathematical skills to problems in the areas of planetary science.	K3
CO4	Analyze to draw valid scientific conclusions and communicate those conclusions in a clear and articulate manner	K4

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping With Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	M	S	S	S	S

S- Strong =3, M-Medium=2, L-Low = 1

COURSE CODE	P21MTE421	CHOICE -I	L	T	P	C
ELECTIVE -II		FUZZY SETS AND THEIR APPLICATIONS	4	-	-	4

Objectives:

- To introduce the concept of fuzzy theory and study its application in real problems
- To study the uncertainty environment through the fuzzy sets that incorporates
- Imprecision and subjectivity into the model formulation and solution process.
- To understand the fuzzy relations and fuzzy arithmetic.
- To explain the concept of operations on fuzzy sets**.**

Unit-I: From Classical Sets To Fuzzy Sets

From Classical Sets To Fuzzy Sets: A Grand paradigm shift, Introduction - Fuzzy Sets Verses Crisp Sets : An Overview - Fuzzy Sets : Basic types – Fuzzy sets : Basic Concepts – Characteristics and Significance of the paradigm shift – Additional Properties of α – cuts – Representations of Fuzzy sets First Dcomposition theorem – Second Decomposition theorem– Third Decomposition theorem- Extension Principle for fuzzy sets**.**

Unit-II: Operations on Fuzzy Sets

Operations on Fuzzy Sets:Types of operations – Fuzzy complements – First Characterization Theorem of Fuzzy Complements - Second Characterization Theorem of Fuzzy Complements - Fuzzy Intersections: t-Norms – Some classes of Fuzzy Intersections (t–Norms) - Fuzzy Unions: t-Conorms - Some classes of Fuzzy Unions (t– Conorms) - Combinations of Operations – Aggregation Operations**.**

Unit-III: Fuzzy Arithmetic:

Fuzzy Arithmetic introduction -Fuzzy Numbers – Membership functions of Fuzzy numbers theorem - Linguistic variables -Arithmetic operations on intervals –Arithmetic operations on Fuzzy numbers – Lattice of Fuzzy numbers – Fuzzy Equations – Equation A + X = B and Equation A * X = B.

Unit-IV: Fuzzy Relations:

Fuzzy Relations introduction Crisp and Fuzzy Relations – Projections and Cylindric Extensions – Binary Fuzzy Relations – Binary Relations on a Single Set – Fuzzy Equivalence Relations – Fuzzy Compatibility Relations –Fuzzy Ordering Relations – Fuzzy Morphisms – SUP-i Compositions of Fuzzy Relations – INF-omega Compositions of Fuzzy Relations.

Unit-V: Fuzzy Decision Making

Fuzzy Decision Making introduction -General Discussion - Individual decision making – Multiperson Making – Multicriteria Decision Making – Multistage Decision Making – Fuzzy Ranking methods – Fuzzy Linear programming. ltiperson Decision Making-Ranking methods – Fuzzy Linear programming.

Text Book:

1. **George J. Klir and Bo Yuan**, "Fuzzy sets and Fuzzy Logic Theory and Applications", Prentice Hall of India, (2005).

UnitI- Chapter 1 Sections 1.3, 1.4, Chapter :2 Sections 2.1 and 2.3
Unit II Chapter 3 Sections 3.1, 3.2, 3.3, 3.4, 3.5-
Unit III Chapter 4 Sections 4.1, 4.2, 4.3, 4.4.-
Unit IV- Chapter 5 Sections 5.3, 5.4, 5.5, 5.6, 5.7, 5.8
Unit V- Chapter 15 Sections 15.2,15.3, 15.6, 15.7

Reference Books

1. **H.J. Zimmermann**, "Fuzzy Set Theory and its Applications", Allied Publishers Limited (1991).
2. **M. Ganesh,** "Introduction to Fuzzy sets and Fuzzy logic", Prentice Hall of India, New Delhi (2006).

Course Outcomes:

CO	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of fuzzy sets and membership functions , Know various AI search algorithms	K2
CO2	Ability to find examples for crisp equivalence relation.	K3
CO3	Applying the concept in Fuzzy Morphisms.	K4
CO4	Understand the basics of sampling distribution theory	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping With Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	M	S	M	S	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	S	S	S

S- Strong = 3, M-Medium=2, L-Low=1

COURSE CODE	P21MTE422	CHOICE -II	L	T	P	C
ELECTIVE -II		STOCHASTIC PROCESSES	4	-	-	4

Objectives:

- To give a depth knowledge about Markov chain and Process.
- To understanding the stochastic models for much real life probabilistic situations and expected results.
- To learn the well known models like birth – death and queueing to reorient the knowledge of stochastic analysis.
- The learner understands in depth knowledge about ergording, renewal theory and its application in discrete and continuous process.

Unit-I: Stochastic Processes:
Basic Definitions: Stochastic Processes: An Introduction - Markov Chains : Definition and Examples Higher Transition Probabilities - Generalization of Independent Beronoulli Trials: Sequence of Chain – Dependent Trails - Classification of States and Chains – Determination of Higher Transition Probabilities - Stability of A Markov System – Graph Theoretic Approach.

Unit-II: Sequence of Chains:
Sequence of Chains introduction – definition of Sequence of Chains Poisson Process -Poisson Process and Related Distributions – Generalizations of Poisson Process - Birth and Death Process Introduction – Definition of Birth and Death Process

Unit –III: Classification of States:
Classification of States: Introduction -Brownian Motion – Wiener Process – Differential Equations for AWiener Process -Kolmogorov Equation – First Passage Time Distribution for wiener Process – Ornstein- Uhlenbeck Process.

Unit- IV: Birth and Death Distribution Process:
Introduction about Birth and Death Distribution Process: Renewal Process - Renewal Processes in Continuous Time – Renewal Equation - Stopping Time- Wald's Equation Introduction - Wald's Equation Renewal Theorems

Unit- V: Renewal Theorems:
Introduction of Renewal Theorems- Renewal Theorems -Delayed and Equilibrium Renewal Process introduction – Delayed and Equilibrium Renewal Process- Introduction about Residual and Excess Lifetimes-.Applications of Residual and Excess Lifetimes.

Text Books:

1.J.Medhi "Stochastic process", Second edition- New Age International Publishers.(2008)

Unit I: Chapter 1: 1.5; Chapter 2: 2.1 to 2.7
Unit II: Chapter 3: 3.1 to 3.4
Unit III: Chapter 4: 4.1 to 4.6
Unit IV: Chapter 6: 6.1 to 6.5

Unit V: Chapter 6: 6.6 to 6.11

Reference Books:

1.V.G. Kulkarni, Introduction to Modelling and Analysis of Stochastic Systems, Second Edition, Springer (2011)

2. **Samuel Karlin and Howard M. Taylor,** "A First Course in stochastic process", second edition, Academic Press. 1975

3.**Samuel Karlin and Howard M. Taylor**, "A Second course in stochastic process", Academic Press, 1981.

4.**Narayan Bhat, U,** "Elements of Applied Stochastic Processes", Second Edition John Wiley & Sons,New York.

5.**Feller,** "An Tntroduction to Probability theory and its applications", Volume 1. Third edition, John Wiley & Sons, New York.

Course Outcomes:

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of Stochastic process, Markov chains	K2
CO2	Apply the concepts in Birth and Death Distribution Process	K K3
CO3	Identify the type of the Differential Equations for A Wiener Process -Kolmogorov Equation	4 K4
CO4	Understand the basics of sampling distribution theory	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	M	M	S	M

S- Strong =3, M-Medium = 2, L-Low=1

COURSE CODE	P21MTE423	CHOICE -III	L	T	P	C
ELECTIVE -II		FLUID DYNAMICS	4	-	-	4

Objectives:

- ❖ It is a subject of almost all fields of engineering, astrophysics, biomedicine, and metrology. Basic concepts of fluid dynamics aredelt with in this paper.
- ❖ To understand the concepts of irrotational motion, two dimensional motion and real fluids.
- ❖ To provide clear knowledge about fluid dynamics and apply this concepts on real time problems.
- ❖ To study the concepts of the laminar boundary layer.

Unit I: Fluid

Introductory Notions – Velocity – Stream Lines and path lines – Stream tubes and Filaments – Fluid Body – Density –pressure**.** Differentiation following the fluid – Equation of continuity – Boundary conditions (Kinematical and physical) - Rate of change of linear momentum – Equation of motion of an inviscid fluid.

Unit II: Euler's momentum theorem

Euler's momentum theorem proof - conservative forces - Bernoulli's theorem in steady motion – Energy equation for inviscid fluid – circulation – Kelvin's theorem – vortex motion – Helmholtz equation.

Unit III: Two-dimensional motion

Two-dimensional motion introduction – two-dimensional functions – complex potential -Basic singularities – source, vortex and doublet. Circle theorem - Flow past a circular cylinder with circulation – conformal transformation – Blasius's theorem – lift force.

Unit IV: Viscous flow

Viscous flow Definition-– Navier Stokes Equations – vorticity and circulation in a viscous fluid – steady flow through an arbitrary cylinder under pressure – steady couette flow between cylinders in relative motion – steady flow between parallel planes.

Unit V: Incompressible flow:

The Laminar boundary layer in incompressible flow - Boundary layer concept – Boundary layer equations. Displacement thickness – momentum thickness – kinetic energy thickness – integral equation of boundary layer – flow parallel to semi-infinite flat plate – Blasius's equation and its solution in series.

Text Books

1. L.M.Milne Thomson, Theoretical Hydro dynamics, Macmillan Company, Vedition, 1968.

(For Units I and II)

Unit I	Chapter 1	Sections1.0 – 1.3
	Chapter 3	Sections 3.10 – 3.40 (omit sections 3.32)
Unit II	Chapter 3	Sections 3.41 to 3.53 (omit sections 3.44)

2. N.Curle and H.J.Davies, Modern Fluid Dynamics – Vol. I, D.Van nostrand Company Ltd, London, 1968. (For Units III, IV and V)

Unit III	Chapter 3	Sections 3.1 – 3.7 (omit 3.4 & 3.5.3)
Unit IV	Chapter 5	Sections 5.1 to 5.3 (omit 5.3.4 and 5.3.5)
Unit V	Chapter 6	Sections 6.1 – 6.3 (omit 6.2.2 and 6.3.2 to 6.3.5)

Reference Books

1. F.Chorlton, Text book of Fluid Dynamics , CBS Publishers and distributors, New Delhi-32, 1998.
2. M.D.Raisinghawia, Fluid Dynamics, S.Chand and Company Ltd, New Delhi - 55

Course Outcomes:

CO	CO Statement	Knowledge Level
CO1	Understand the fundamental knowledge of fluids and its properties	K2
CO2	Describe the concepts and equations of fluid dynamics.	K3
CO3	Apply thermodynamic control volume concepts in fluid dynamics for applications that include momentum, mass and energy balances	K4
CO4	Analyze the approximate solutions of the Navier-Stokes equation	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	M	S	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	M	S	M	S	S	S	M	S

S- Strong =3, M-Medium =2, L-Low=1

COURSE CODE	P21MTE424	CHOICE -IV	L	T	P	C
ELECTIVE -II		TENSOR ANALYSIS AND SPECIAL THEORY OF RELATIVITY	4	-	-	4

Objectives:

- To introduce the notion of Tensor and study its properties.
- To study the theory of relativity.
- To understand the concepts of invariance, metric tensor and Einstein tensor.
- To study specific theory of relativity and relativistic dynamics.

Unit- I: Invariance:

Invariance - Transformations of coordinates and its properties - Transformation by invariance - Transformation by covariance and contra variance - Covariance and contra variance - Tensor and Tensor character of their laws - Algebras of tensors - Quotient tensors - Symmetric and skew symmetric tensors – Relative tensors.

Unit-II: Metric Tensor:

Metric Tensor - The fundamental and associated tensors - Christoffel's symbols - Transformations of Chrisffel's symbols- Covariant Differentiation of Tensors - Formulas for covariant Differentiation- Ricci Theorem - Riemann -Christoffel Tensor and their properties.

Unit -III: Einstein Tensor:

Einstein Tenso rintroduction - Riemannian and Euclidean Spaces (Existence Theorem)- Introduction about The e-systems and the generalized Kronecker deltas - The e-systems and the generalized Kronecker deltas Application of the e-systems.

Unit-IV: Special Theory of Relativity:

Special Theory of Relativity: Galilean Transformation - Maxwell's equations - The ether Theory – The Principle of Relativity Relativistic Kinamatics : Lorentz Transformation equations - Events and simultaneity - Example Einstein Train - Time dilation - Longitudinal Contraction -Invariant Interval - Proper time and Proper distance – World line - Example - twin paradox - addition of velocities - Relativistic Doppler effect.

Unit-V: Relativistic Dynamics :

Relativistic Dynamics : Momentum – energy – Momentum-energy four vector – Force – Conservation of Energy – Mass and energy – Example – inelastic collision – Principle of equivalence – Lagrangian and Hamiltonian formulations . Accelerated Systems: Rocket with constant acceleration – example – Rocket with constant thrust

Text Books:

1. **I.S. Sokolnikoff,** "Tensor Analysis", John Wiley and Sons, New York, 1964
2. **D. Greenwood**, "Classical Dynamics", Prentice Hall of India, New Delhi, 1985

Unit I Chapter 2: Sections 18 to 28 of [1]
Unit II Chapter 2: Sections 29 to 37 of [1]

Unit III Chapter 2: Section 38 to 41 of [1]
Unit IV Chapter 7: Sections 7.1 and 7.2 of [2]
Unit V Chapter 7: Sections 7.3 and 7.4 of [2]

Reference Books:

1. **J.L. Synge and A.Schildt,** "Tensor Calculus", Toronto, 1949.
2. **A.S. Eddington,** "The Mathematical Theory of Relativity", Cambridge University Press, 1930.
3. **P.G. Bergman, "**An Introduction to Theory of Relativity", New york, 1942.
4. **C.E. Weatherburn,** "Riemannian Geometry and Tensor Calculus", Cambridge, 1938.

Course Outcomes:

CO Number	CO Statement	Knowledge Level
CO1	Understand concept of tensor variables and difference from scalar or vector variables.	K2
CO2	Derive base vectors, metric tensors and strain tensors in an arbitrary coordinate system..	K3
CO3	Investigate the Christoffel symbols which provide a concrete representation of the connection of (pseudo-)Riemannian geometry in terms of coordinates on the manifold	K4
CO4	Apply Riemannan-Christoffel tensor to problems of differential geometry, electrodynamics and relativity	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	M	S	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	M	S	S	S	S	S	S	M

S- Strong= 3, M-Medium = 2, L-Low=1

COURSE CODE	P21MTR41	PROJECT	L	T	P	C
PROJECT			-	-	22	8

Rules And Regulation Of The Project:

1. The Project Area/title must be any one of the following
   (i)Pure Mathematics
   (ii)Applied Mathematics
   (iii)Mathematical Application in Real Time Activities.
2. Student allotment Method will be decided by the Department Faculties
   (In October 2nd week)
3. They are Four Project Common Meet(In Front of All Faculty) Power point presentation
   (i). First Meet – November last week. Work done - Topic and Area will be decided (5 marks)
   (ii). Second Meet – January 1st week. Work done-25% work (5 marks)
   (iii). Third Meet –February 1st week, Work done -50% work (5 marks)
   (iv). Fourth Meet – March 1st week, work done -90% work (5 marks)
4. Project Record Submission – Third week of March

NON MAJOR ELECTIVE – MATHEMATICS DEPARTMENT OFFERING COURCES TO OTHER DEPARTMENT

COURSE CODE	P21MTN211	NUMERICAL METHODS	L	T	P	C
SEMESTER -II			4	-	-	4

Objectives:

- To develop efficient algorithms for solving problems in Science, Engineering and Technology.
- The leaner will analyze the different aspects of numerical solution of algebraic and transcendental equations.
- Students will be able to identify the basic concept of numerical differentiation and integration, principle of least squares.
- The learner will become knowledgeable in solving solution to simultaneous linear equations.

Unit- I: Algebraic and Transcendental Equations:

Solution of Algebraic and Transcendental Equations- Bisection Method – Problems in Bisection Method – Iteration Method –Condition for Convergence – Regular Falsi Method-Newton's Method. Problems in Regular Falsi Method and Newton's Method

Unit - II: simultaneous Linear Algebraic Equations:

Solutions of simultaneous Linear Algebraic Equation - Gauss Elimination Method –Gauss Jordan Method –Method of Factorization-Gauss Jacobi – Gauss Siedel Method . Problems in Gauss Elimination, Gauss Jordan , Factorization-Gauss Jacobi and Gauss Siedel Method

Unit - III: Finite Differences:

Finite Differences introduction- First and Higher Order Differences –Forward and Backward Differences – Properties of Operator - Differences of a Polynomial - Factorial Polynomials- Relation between the Operators Δ ,E and D- Summation of the series.

Unit - IV: Interpolation:

Interpolation- Gregory Newton Forward and Backward Formula – Gauss Forward and Backward Formula- Stirling's Formula-Interpolation with Unequal Intervals: Divided differences-Newton's Interpolation Formula-Lagrange's Interpolation Inverse Interpolation.

Unit - V: Numerical Differentiation and Integration:

Numerical Differentiation and Integration introduction - Newton's Forward and Backward Difference Formula – Problems solving using Newton's Forward and Backward Difference Formula- Stirling's Formula to Compute Derivatives-Trapezoidal rule- Simpsons $1/3^{rd}$ and $3/8^{th}$ rule Problems using Trapezoidal rule- Simpsons $1/3^{rd}$ and $3/8^{th}$ rule.

Text Book:

1. **P.Kandasamy , K.Thilagavathi and K. Gunavathi**, "Numerical Methods", S.Chand and Company Ltd New Delhi 2013.

   Unit I – Chapter 3 -3.1 to 3.4
   Unit II – Chapter 4 -4.1 ,4.2,4.4,4.7 to 4.9
   Unit III – Chapter 5- 5.1 to5.4,5.7
   Unit IV –Chapter 6, 7 -7.1 to 7.5 & 8
   Unit V – Chapter 9

Reference Books:

1. **Arumuga, Issac, Somasundaram**,"Numerical Analysis", New Gamma Publishing House, Palayam Kottai 2003.
2. **G. Balaji**, "Numerical Methods", G.Balaji Publishers, Chennai 2007

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Understand the equations using different methods under differ conditions and numerical solutions of system algebraic equation	K1
CO2	Apply various interpolation methods and finite different concepts	K3
CO3	Analyse differentiation and integration whenever and where ever routine methods are not applicable	K4
CO4	Evaluate the ordinary differential equations using different methods through the theory of finite differences.	K5
CO5	Evaluate the partial differential equations using different methods through the theory of finite differences.	K5

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

COURSE CODE	P21MTN212	OPERATION RESEARCH	L	T	P	C
SEMESTER -II			4	-	-	4

Objectives

- To impart the basic concepts and applications of linear programming.
- The leaner will formulate a linear programming problem and solve them graphically and simplex method
- The leaner will be able to understand the concepts of duality programming
- The leaner will analyze the different aspects of transportation problems and also assignment problems
- Students will be able to identify the basic analysis of various inventory models.
- The leaner will develop, organize, evaluate short, long term processes and solve problems

Unit - I: Linear Programming problem:

Introductions- Linear Programming: Mathematical formulation of linear programming problem- Basic Solution - Solving Linear Programming problem using Graphical solution- Unbounded and Infeasible solution in graphical methods -Simplex method - Use of Artificial Variables: – Big M Method – Two Phase Method – Problems using this methods

Unit -II: Transportation Problem:

Transportation Problem introduction- Mathematical formulation of the problem - Finding Initial Basic Feasible Solution using North - West Corner Rule - Row minima methods- Column minima method - Matrix Minima Method - Vogel's Approximation Method - Optimum solution – MODI method .

Unit- III: Assignment Problem:

Assignment Problem: Introduction – Definition of Assignment Problem -Mathematical formulation of Assignment Problem - Assignment Algorithm – Problem solving using Assignment Algorithm- Application of Assignment Problem: Minimization case routing problem

Unit- IV: Replacement Problem:

Replacement Problem: Introduction about Replace problem –Definition Replace problem -and System Reliability – Replacement of Equipment that Deteriorates Gradually- Exercise Problems - Replacement of Equipment the Fails Suddenly-problems in replacement of Equipment the Fails Suddenly

Unit - V: Network Scheduling by Pregame Evaluation and Review Techniques PERT/ Critical Path Method -CPM:

Network Scheduling by PERT/CPM : Introduction network and Basic Components- Rules of Construction –Problems in Network Scheduling using CPM -Critical Path Analysis – Probability Considerations in PERT – Problems in Network Scheduling using PERT Distinction between PERT and CPM.

Text Book:

1. Kanti Swarup, P.K. Gupta, Man Mohan, "Operations Research", Sultan Chand & Sons, Educational Publishers, New Delhi.2013

Reference Books:

1. **Panneerselvam.R**, "Operations Research", 2nd Edition, PHI Learning Private Limited, Delhi, 2015
2. **Prem Kumar Gupta.Er, Hira.D.S**. "Operations Research",7th Edition,S.Chand & Company Pvt.Ltd.2014
3. **Hiller.F.S & Lieberman.J** "Introduction to Operation Research ",7th Edition, Tata–MCGraw Hill Publishing Company, NewDelhi, 2001.
4. **G. Srinivasan,** "Operations Research principles and applications", Second Edition, PHI Learning Private Limited, New Delhi-110001, 2012.
5. **Taha H.A., "**Operations Research An introduction" Prennce Hall of India Private Ltd 1st Edition New Delhi (2008) .

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	understand the application of OR and frame a LP Problem with solution – graphic and through solver add in excel	K1
CO2	analyze and interpret results of transportation and problem using appropriate method Solutions of assignment and problem using appropriate method	K2
CO3	evaluate simple model of L.P.P.	K3
CO4	understand and evaluate of CPM and PERT define basic components of Network and find critical path	K3
CO5	find the replacement period of equipment that failssuddenly/gradually	K4, K5

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

COURSE CODE	P21MTN213	DISCRETE MATHEMATICS	L	T	P	C
SEMESTER -II			4	-	-	4

Objectives:

- To study of and, or and not logics by truth tables.
- To study of normal forms.
- Analysis Free and Bound variable formulas.
- Understand Types of Grammar, function of Pushdown automata

Unit- I: Mathematical Logic:

Mathematical Logic Statement and Notation – Connection – Negation Conjunction – Disjunction – Statement Formulas and Truth Tables – Logical Capabilities of Programming Languages – Conditional and Bi Conditional – Well Formed Formula – Tautologies –Equivalence of Formula – Duality Law Tautological Implication.

Unit - II: Normal Forms:

Normal Forms introduction- Disjunctive Normal Forms – Theorem based on Disjunctive Normal Forms - Conversion of given statements into Disjunctive Normal Forms- based on Conjunctive Normal Forms – Theorem based on Conjunctive Normal Forms - Conversion of given statements into Conjunctive Normal Forms -Principal Disjunctive Normal Forms – Principal Conjunctive Norms-Conversion of Disjunctive Normal Forms to Principal Disjunctive Normal Forms-Conversion of Conjunctive Norms to Principal Conjunctive Norms

Unit- III: Theory of Inference:

Theory of inference introduction – Truth Table Technique – Rules of Inference - Inconsistent Premises – Indirect Method of Proof – Predicate calculus- Free and Bound Variables – Valid Formulas and Equivalences – Inference Theory of Predicate Calculus.

Unit - IV: Grammar :

Grammar introduction - alphabet - basic characters- string – Length of string – concatenation of sting -Definition –Types of Grammar – Phrase Structure Grammar – Context Sensitive Grammar – Context Free Grammar – Regular Grammar – Languages Generated by these Grammars. Conversion of one type grammar into other type .

Unit - V: NDFSA to DFSA and Pushdown Automata:

Automata -Definition – Deterministic finite state Automata (DFSA) – Examples for Deterministic finite state Automata - Non-Deterministic finite state Automata NDFSA) – Examples for Non Deterministic finite state Automata Conversion of NDFSA to DFSA- Problem solving in the Conversion of NDFSA to DFSA Pushdown automata- Simple Theorem.

Text Books:

1. **J.P.Tremblay**, **R. Manohar –** "Discrete Mathematical Structures with Applications to Computer Science", Tata McGraw – Hill Edition 1997
   Unit I- Chapter :1- 1-1,1-2:1-2.1 to 1-2.11.
   Unit II-Chapter :1-3.1 to 1-3.4
   Unit III- Chapter: 1-4.1to 1- 4.3 .1-5 to1-5.4,1-6:1-6.1 -1-6.4

2. **Dr.Rani Siromoney, "**Formal Languages and Automata, The Chiristian Literature Society"**, Revised Edition 1979.**
   Unit IV-Chapter2 : 2.1 to 2.6
   Unit V-Chapter 5: 5.1 and Chapter 6

Reference Books:

1. **John . E. Hopcraft, Rajeev Motwani and Jeffrey D. Ullman**, "Introduction to Automata Theory, Languages and Computationc", Pearson Education, 2013
2. **Kenneth H. Rosen**, "Discrete Mathematics and it's Applications", 7th Edition/ McGraw Hill Education, New York, 2012
3. **B.S.Vatssa**, "Discrete Mathematics",WISHWA PRAKASHAN,1993.
4. **V.Sundaresan,K.S.Ganapathy Subramanian, K.Ganesan**, "Discrete Mathematics", A.Rd.Publications, 1998.
5. **T.Veerarajan**, "Discrete Mathematics", McGraw Hill Education (India)Pvt.Ltd,New Delhi, 2014.

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	Understanding of some Logic truth tables	K2
CO2	Prove / define basic normal forms	K3
CO3	To analyses the concepts of free and bound variable formulas	K4
CO4	Understanding the concepts of Grammars	K4
CO5	Basic concepts of Languages and basic definitions of Automata	K6

K1- Remember: K2- Understand : K3-Apply, K4- Analyse, K5- Evaluate; K6- create

COURSE CODE	P21MTN214	DIFFERENTIAL EQUATIONS	L	T	P	C
SEMESTER -II			4	-	-	4

Objectives:

- To introduce the basic concepts of differential equations and Laplace Transforms.
- Understand the basic concepts of first order differential equation and it applications.
- Determine solutions to second order linear homogeneous, non-homogeneous differential equations with constant coefficients.
- Understand the elementary theory of partial differential equations, and solve it using various techniques.

Unit- I: **Differential Equations of the first order and first degree:**

Differential Equations of the first order and first degree introduction- Definition – Examples for differential Equations of the first order and first degree - Variable separable method – Homogeneous Linear equation and non – Homogeneous Linear equation- Bernoulli's equations- exact differential equations.

Unit-II: Equation of the first order and higher degree:

Equation of the first order and higher degree introduction- Definition – Examples of Equation of the first order and higher degree- Equations Solvable for dy/dx — Examples in Equations Solvable for dy/dx- Equations solvable for y – Examples in Equations solvable for y-Equations solvable for x – Examples in Equations solvable for x- Clairaut's form.

Unit- III: Linear equations with constant Co- efficient:

Linear equations with constant Co- efficient introduction- Definition – complementary function of a Linear equation with constant Co – efficient – particular Integral – General method of finding P.I – special methods for finding P.I of the functions of the type e^{ax} , cos ax or sin ax , e^{ax} V where V is any function of x , x^m – Linear equations with Variable Co – efficient, Equations reducible to the linear equations.

Unit - IV: Simultaneous Differential Equations:

Simultaneous Differential Equations introduction- Simultaneous equations of the first order and first degree – Simultaneous linear differential equations: Linear equations of the second order: Complete solution given a known integral – Reduction to the normal form – Change of Independent Variables – Variation of Parameters – Methods of operations factors.

Unit - V: Partial Differential Equations(PDE):

Formation of Partial Differential Equations (PDE) – Lagrange method of solving linear Partial Differential Equations – Solution of Partial Differential Equations of type F(p,q)=0- Solution of Partial Differential Equations of type F(z,p,q)=0- Solution of Partial Differential Equations of type F(x,p) = G(y,q) - Clairaut's form and Charpit's method- Solution of Partial Differential Equations using Charpit's method.

Text Book:

1. **S.Narayanan and T.K. Manickavachagam pillai**, "Differential equations and its applications" S. Viswanathan Printers and Publishers Pvt. Ltd., Madras 2014.

Reference Books:

1. Arumugam and Isaac - "Differential equations and applications", - New gamma publishing house – 1999.

2. P.Kandasamy and K. Thilagavathi "Mathematics for Branch I: Volume III" S. Chand and Company Ltd., New Delhi - 2004.

Course Outcome:

On the successful course completion, students will be able to:		Cognitive Level
CO1	solve linear equations with variable coefficients.	K2
CO2	understand the fundamental properties of the PDE	K1&K2
CO3	apply the Differentation Of Higher Order Methods to solve Practical life problems	K3
CO4	solve partial differential equations using Lagrange's method and Charpit's method	K3&K4
CO5	create real life problems into ordinary differential equations.	K4 &K5

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

COURSE CODE	P21MTN215	FOURIER AND LAPLACE TRANSFORMATIONS	L	T	P	C
SEMESTER - II			4	-	-	4

Objectives:

- To enhances basic skills in the areas of Fourier series.
- To acquaint the student with the Fourier transform techniques used in wide variety of situations.
- To study about Fourier series and their applications.
- To introduce the basic concepts of Laplace Transforms.
- First solutions by applying Laplace transform methods.

Unit – I: Fourier series:

Fourier series introduction- Definition –Examples for Fourier series - Dirchlet's conditions Definition -Fourier series of periodicity 2π and 2l –Examples for Fourier series of periodicity 2π and 2l Odd and Even functions – Root mean square value of a function - Problems in this method Parseval's Theorem.

Unit – II: Half range series:

Half range series definition - Half range sine series – Definition -Examples in Half range sine series Half range cosine series – Definition -Examples in Half range cosine series- Harmonic analysis – Definition -Examples of Harmonic analysis -Complex form of Fourier series- problem in Complex form of Fourier series

Unit – III: Fourier Transform:

Fourier Transform introduction – Definition –Examples in Fourier Transform -Properties – Fourier integral theorem – Fourier Sine transforms - Definition –Examples in Sine transforms- Fourier Cosine transforms – Definition –Examples in Fourier Cosine transforms- Convolution Theorem – Parseval's identity**.**

Unit – IV: Laplace Transforms:

Laplace Transforms introduction - Definition – Types of Laplace transform – Examples in each type - Laplace transform of periodic functions – Definition-Examples in Laplace transform of periodic functions- Some general Theorems

.

Unit – V: Inverse Laplace Transforms:

Inverse Laplace Transforms: Definition of Inverse Laplace Transforms – Linearity of Inverse Laplace Transforms- Properties of of Inverse Laplace Transforms-, first shifting Theorem – second shifting Theorem – change of scale- property and examples.

Text Books:

1. **P.Kandasamy and K.Thilagavathy** , "Mathematics, Vol. IV", S.Chand and company Ltd., - 2004. UNIT I: Chapter I UNIT II: Chapter I and UNIT III: Chapter IV

2. **S.Narayanan and T.K Manickavachagam Pillai,** " Differential equations and its applications" S.Viswanathan Printers and Publishers Pvt. Ltd.,Madras 2014.

   UNIT IV and UNIT V: Chapter 9 – Sec. 1 to 7

Reference Books:

1. Laplace Transforms" by **A.R. Vasistha and Dr.R.K. Gupta** Published by Krishna Prakashan Media Pvt, Ltd., Meerut.2012
2. Laplace transform and Fourier transform" by **Dr.J.K Goyal and K.P.Gupta**, Published by Pragathi Prakashan Media Pvt, Ltd., Meerut.2013

Course Outcomes:

CO Number	CO statement	Knowledge level
CO1	Integral equations of Fourier Transforms	K4
CO2	Demonstrate the Fourier Transforms	K3
CO3	Understand the fundamental properties of the Laplace transforms	K1&K2
CO4	Apply the Laplace inverse transforms to solve simultaneous equations	K3

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

COURSE CODE	P21MTN216	Statistics	L	T	P	C
SEMESTER - II			4	-	-	4

Objectives:

- To enhances basic skills in the areas of data collection.
- To acquaint the student with the average calculation in various situation.
- To study about deviation of data from the central values.
- To know the testing tools and methods .

Unit – I: Primary and Secondary data:

Collection of Data –Primary data-Secondary data-choice of methods-Direct personal Observation-Indirect oral Interview-Information Through Agencies-Mailed questionnaire Schedules send through Enumerators, Sources of secondary data- Data precautions in the in the use of secondary data- Sample questionnaire

Unit – II: Central Tendency and Variation:

Measure of Central Tendency- Meaning- Definition – Arithmetic Mean - Median- Definition Mode - Definition -Geometric mean- Definition- Harmonic mean – Definition- Individual data- Discrete series and continuous series – Problem in all the three types.

Measure of Variation: Measure of dispersion- range- Quartail deviation- Mean Deviation Standard deviation - Individual data- Discrete series and continuous series – Problem in all the three types.

Unit – III: Correlation and Regression:

Correlation and Regression introduction -Types of correlation graphical representation of Correlation - Karl Pearson's coefficient of correlation – Rank correlation- Coefficient of rank correlation.

Regression: Significance of regression-difference between correlation and regression-RegressionLines - Regression equations

Unit – IV: Theoretical distributions:

Theoretical distributions introduction - Binomial distribution –properties of binomial distribution-simple problems in binomial distribution - Poisson distribution- simple problems in Poisson distribution -Normal distributions – properties of Normal distributions - practical problems in Normal distributions.

Unit – V: Sampling Theory and Testing of Significance:

Sampling Theory and Testing of Significance introduction - Estimation-Hypothesis-Test of significance- Small sample test - Student 't' test –Large sample test for significance of average-Student F-test- Chi –Square test for Goodness of fit-Simple practical problems using - Chi –Square test

Text Books:

1, R.S.N. Pillai and V.Bagavathi,, "Statistics", Sultan Chand, New Delhi, 2008.
2. Gupta S.P, "Statistical Methods", Sultan Chand, New Delhi, 33rd Edition, 2005

Reference Book:

1. **S.C.Gupta and V.K.Kapoor**, "Fundamentals of Mathematical Statisitics", Sultan Chand and Sons, New Delhi -2, 2011

Course Outcomes:

CO Number	CO statement	Knowledge level
CO1	Analyse –Primary data-Secondary data	K4
CO2	Measure of Central Tendency and Measure of Variation	K3
CO3	Understand and apply Correlation and Regression	K1&K2
CO4	Understand Theoretical distributions	K2
CO5	Sampling Theory and Testing of Significance: Estimation-Evaluate	K5

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

COURSE CODE	P21MTN217	MATHEMATICAL APTITUDE	L	T	P	C
Elective - NME			4	-	-	4

Objectives:

- To impart skills in numerical and quantitative techniques.
- Able to critically evaluate various real life situations by resorting to Analysis of key issues and factors.
- Able to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

Unit I :

Numbers – HCF – LCM – Square Roots & Cube Roots- Problems on numbers. (Chapters 1, 2,5, 7)

Unit II :

Decimal Fractions, Simplification, Time & Distance. (Chapter 3,4,17)

Unit III :

Surds and Indices – Percentage – Profit and Loss- Simple Interest. (Chapters 9, 10,11, 21)

Unit IV:

Ratio and Proportion – Partnership – Allegation or Mixture- Probability. (Chapters 12, 13, 20, 31)

Unit V :

Average – Problems on Age- Calender. (Chapters 6,8,27)

Text Book:

Dr.R.S.Aggarwal, "Quantitative Aptitude for Competitive Examinations" , S.Chand & Company Ltd., Ram Nagar, New Delhi -2007.

Link: https://books.shunyafoundation.com/book-quantitative-aptitude-by-r-s-aggarwal-published-by-s-chand-english/dp/ODTRGH2E

Relationship Matrix for Course Outcomes, Programme Outcomes and Programme Specific Outcomes

	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	S	S	M	M
CO2	S	M	S	M	M	M	M	S	S	M
CO3	S	S	S	S	S	S	M	S	S	S
CO4	M	M	S	M	S	S	S	M	S	S
CO5	M	S	S	S	S	M	S	S	S	M

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

COURSE CODE	P21MTS22	MATLAB	L	T	P	C
SUPPORTIVE COURSE -II			-	2	-	2

Objectives:

- To impart the programming concepts of Matlab
- Specific outcome of learning the learner will be able to use Matlab for interactive computations Able to draw 2D and 3D graphs.
- Understand richness of Matlab rather than using algebraic Number theory M.S. Word for documentation
- Able to applying programming techniques to solve the programs at advanced level.

Unit -I: MATLAB: Brief Introduction:

MATLAB: Importing and Visualizing Images- Importing and displaying images -Converting between image types -Exporting images- Interactive Exploration of Images- Obtaining pixel intensity values- Extracting a region of interest- Computing pixel statistics –

Introduction To MATLAB**:** Brief Introduction - Installation of MATLAB – History - Use of MATLAB - Key features.

MATLAB Software: Introduction to MATLAB Software – MATLAB window - Command window – Workspace - Command history - Setting directory - working with the MATLAB user interface - Basic commands - Assigning variables - Operations with variables

Unit -II: Data Files and Data Types:

Data Files and Data Types **i**ntroduction **-** Character and string - Arrays and vectors – Column vectors - Row vectors.

Basic Mathematics:

BODMAS Rules - Arithmetic operations - Operators and special characters -Mathematical and logical operators - solving arithmetic equations

Unit -III: Operations on Matrix:

Operations on Matrix introduction -Creating rows and columns Matrix - Matrix operations - Finding transpose, determinant and inverse -Solving matrix

Other Operations**:** Trigonometric functions -Complex numbers- fractions -Real numbers- Complex numbers

Unit-IV: Image processing:

Image processing with Measuring object sizes-Creating a custom interactive tool- Pre-processing Images - Adjusting image contrast -Reducing noise in an image -Using sliding neighbourhood operations -Using block processing operations

Unit -V: Symbolic Math:

Symbolic Math in MATLAB**:** Calculus: Numerical Integration- Linear Algebra- Roots of Polynomials- Algebraic equations Differential Equations (1st & 2nd order) -Transforms (Fourier, Laplace, etc)- Ordinary Differential equations -Examples of few ODEs

Text Books:

1. **Y. Kirani Singh & B. B. Chaudhuri, "**MATLAB Programming", Prentice-Hall of India Pvt. Ltd, New Delhi, 2008.

2. **Desmond. J.Higham &Nicholas J.Hiham**, "MATLAB Guide", 2nd edition SIAM , 2005.

Course Outcomes:

Upon the successful completion of the course, students will be able to

CO1: use MATLAB for interactive computations.
CO2: familiar with memory and file management in MATLAB.
CO3: generate plots and export this for use in reports and presentations.
CO4: cooperating and working with others using subversion
CO5: debugging and optimising their programs

CO	CO Statement	Knowledge Level
CO1	Demonstrate the basic concepts of types of mat lab mathematical operators, Relational, binary and logical operators	K2
CO2	Apply the concepts in expanding and reducing size- reshaping, shifting and sorting matrices.	K3
CO3	Identify different types of Matlab and Matlab file	K4
CO4	Understand the basics of document layout and organization	K5
CO5	Emphasis on estimating a document class and fine tuning text .	K6

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	S	S	S	S	M	S	S	S	M	S

S- Strong = 3, M-Medium= 2, L-Low = 1

VALUE ADDED PROGRAM

COURSE CODE	P21MTV11	PYTHON LANGUAGE	L	T	P	C
SEMESTER - I			-	-	-	2

Objectives:

- To understand the fundamentals of Python Programming.
- To get knowledge about the Functions in Python.
- To understand the concepts of List and String methods.
- To gain idea about exception handling and classes.

Unit- I: Introduction to Python:

Introduction to Python: Introduction – Python Overview – Getting Started with Python –Comments – Python Identifiers – Reserved Keywords – Variables – Standard Data types.

Unit- II: Operators:

Types of Operators - Statement and Expressions – String Operations – Boolean Expressions – Control Statements – Iteration While Statement – Input from Keyboard.

Unit- III: Functions:

Functions introduction – Built-in Functions – Composition of Functions – User defined Functions Parameters and Arguments –Function Calls- The return statement – Python Recursive Functions The Anonymous function – Writing Python Scripts.

Unit –IV: Strings and Lists:

Introduction about Strings and Lists: Strings - Lists. Tuples and Dictionaries: Tuples – Dictionaries.

Unit –V: Files and Exceptions:

Files and Exceptions introduction - Text Files – Directories – Exceptions – Exceptions with Arguments- User defined Exceptions- Classes and Objects.

Text Book:

1. **E. Balagurusamy,** "Problem Solving and Python Programming by ", McGraw-Hill first edition (2017)m

Reference Books:

1. **Ashok Namdev Kamthane, , Amit Ashok Kamthane**, "Programming and Problem Solving with Python". (2017),
2. **John B. Schneider Shira Lynn Broschat Jess Dahmen),** "Algorithmic Problem Solving with Python".(2019

Course Outcomes (CO)

CO1	To implement basic concepts of operators and functions.	K1
CO2	To Review various string, list, tuple and dictionaries.	K2
CO3	To evaluate the functionality of an exception handling.	K3
CO4	To analyze the concept of classes and objects.	K4

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	M	S	S
CO5	S	S	S	S	M	S	S	S	M	S

S- Strong = 3, M-Medium= 2, L-Low = 1

COURSE CODE	P21MTV11	PYTHON LAB	L	T	P	C
Value Added Program- I			-	-	-	2

Objectives:

- To gain knowledge about the fundamentals of python programming.
- To understand the concepts of string, list, tuple.
- To implement the concept of exception handling, classes and objects

List of Practical Programmes:

1. Write a python program to print the prime numbers in given range.
2. Write a python program m to calculate the area of a triangle.
3. Write a python program to find HCF of the given numbers.
4. Write a python program to create a simple calculator.
5. Write a python program to display Fibonacci series sequence using recursion.
6. Write a python program to demonstrate the string methods.
7. Write a python program to demonstrate the built-in list methods.
8. Write a python program to define a function that prints a tuple whose values are the
9. Cube of numbers between 1 1nd 10.
10. Write a python program to demonstrate exception handling.
11. Write a python program to demonstrate classes and their attributes.

Course Outcomes (CO)

CO1	To implement basic operators and function concepts.	K3
CO2	To Review various string and list methods.	K4
CO3	To execute exception handling.	K5

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S

S- Strong = 3, M-Medium= 2, L-Low = 1

COURSE CODE	P21MTV42	Mathematical Modelling	L	T	P	C
SEMESTER - IV			-	-	-	2

Objectives :

- ❖ To enrich mathematical application thinking
- ❖ Solve practical problems
- ❖ Develop mathematical Models

Unit- I: Introduction about Simulation and Mathematical Modeling:

Introduction about Simulation and Mathematical Modeling : Basic definitions of Trigonometry - develop mathematical models for trigonometry application

Unit- II: Introduction about the applications of Operation Research:
Introduction about the applications of Operation Research – Develop mathematical models for Cost minimization –Minimum Resource utilization-Time minimization-Queuing model**.**

Unit -III: Introduction to Graph Theory:
Introduction to Graph Theory –Application-Develop Mathematical Modeling for real time application

Unit- IV: Numerical Methods:
Numerical Methods- Introduction –Application – Mathematical models using Numerical Methods for real time problems

Unit- V: Introduction to Ordinary and Partial Differential Equations:
Introduction to Ordinary and Partial Differential Equations- Mathematical Models to solve real time problems**.**

Text Book:

1. **Robert.E.Moyer "** Schaum's outline of Trigonometry" fifth edition . The Mcgraw-Hill Companies New Delhi 2015
2. **S. Narayanan and T.K. Manickavachagam pillai**, "Differential equations and its applications" S. Viswanathan Printers and Publishers Pvt. Ltd., Madras 2014
3. **Kanti Swarup, P.K .Gupta,Man Mohan**"Operations Research", Sultanchand and sons , Edition – 2017.
4. **P.Kandasamy , K.Thilagavathi and K. Gunavathi**, "Numerical Methods", S.Chand and Company Ltd , New Delhi 2013.
5. **S.A.Choudum**, "A first Course in Graph Theory", Macmillan india limited, 1999.

COURSE OUTCOME:

CO1	Develop Mathematical Models For Trigonometry Application	K3
CO2	To Review minimum Resource utilization.	K4
CO3	Develop Mathematical Modeling for real time	K5
CO4	To analyze Mathematical Models to solve real time problems.	K5

K1- Remember: K2- Understand: K3-Apply, K4- Analyse, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	S	S	S	S	S	S	S
CO2	S	S	S	M	S	S	S	S	M	S
CO3	S	S	S	S	S	S	M	S	S	S
CO4	S	S	M	S	S	S	S	M	S	S

S- Strong = 3, M-Medium= 2, L-Low = 1

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MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL – 624 102

M.Sc. COMPUTER SCIENCE

Syllabus
(With Effect from 2021)

DEPARTMENT OF COMPUTER SCIENCE

MOTHER TERESA WOMEN'S UNIVERSITY
KODAIKANAL

DEPARTMENT OF COMPUTER SCIENCE

CHOICE BASED CREDIT SYSTEM (CBCS)

(2021-2022 ONWARDS)

M.Sc. COMPUTER SCIENCE

1. About the Programme

M.Sc. in Computer Science is a two-year post-graduate programme with the objective to develop human resources with core competence in various thrust areas of Computer Science. The programme includes Software Engineering, System Development, Natural Computation, Mathematical Foundation, Data Analytics and Artificial Intelligence.

Other modules include programming, data analytics, software development, applied communications, network architecture, and database design. The coursework of the programme focuses on preparing students for innovation within major tech companies or entrepreneurship within startup ventures.

Students are provided with opportunities to develop and have core competency in the field of Computer Science and encourage them to make a mark in the much sought after IT industry. Guest lectures, case studies and presentations are organized from time to time to give an insight into the latest development and happenings in the industry

2. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1	To provide technology-oriented students with the knowledge and ability to develop creative solutions.
PEO2	To develop skills to learn new technology.
PEO3	To apply computer science theory and software development concepts to construct computing-based solutions.
PEO4	To design and develop computer programs/computer-based systems in the areas related to algorithms, networking, web design, cloud computing, Artificial Intelligence, Mobile applications.

3. Eligibility: B.Sc. CS / B.C.A. / B.Sc. IT

4. General Guidelines for PG Programme

i. **Duration:** The programme shall extend through a period of 4 consecutive semesters and the duration of a semester shall normally be 90 days or 450 hours. Examinations shall be conducted at the end of each semester for the respective subjects.

ii. **Medium of Instruction:** English

iii. **Evaluation:** Evaluation of the candidates shall be through Internal Assessment and External Examination.

- **Evaluation Pattern**

Evaluation Pattern	Theory		Practical	
	Min	Max	Min	Max
Internal	13	25	13	25
External	38	75	38	75

- **Internal (Theory): Test (15) + Assignment (5) + Seminar/Quiz(5) = 25**
- **External Theory: 75**

- **Question Paper Pattern for External examination for all course papers.**

Max. Marks: 75 **Time: 3 Hrs.**

S.No.	Part	Type	Marks
1	**A**	**10*1 Marks=10** Multiple Choice Questions (MCQs): 2 questions from each Unit	**10**
2	**B**	**5*4=20** Two questions from each Unit with Internal Choice (either / or)	**20**
3	**C**	**3*15=45** Open Choice: Any three questions out of 5 : one question from each unit	**45**
Total Marks			**75**

*** Minimum credits required to pass: 90**

- **Project Report**

A student should select a topic for the Project Work at the end of the third semester itself and submit the Project Report at the end of the fourth semester. The Project Report shall not exceed 75 typed pages in Times New Roman font with 1.5 line space.

- **Project Evaluation**

There is a Viva Voce Examination for Project Work. The Guide and an External Examiner shall evaluate and conduct the Viva Voce Examination. The Project Work carries 100 marks (Internal: 25 Marks; External (Viva): 75 Marks).

5. Conversion of Marks to Grade Points and Letter Grade

(Performance in a Course/Paper)

Range of Marks	Grade Points	Letter Grade	Description
90 – 100	9.0 – 10.0	O	Outstanding
80-89	8.0 – 8.9	D+	Excellent
75-79	7.5 – 7.9	D	Distinction
70-74	7.0 – 7.4	A+	Very Good
60-69	6.0 – 6.9	A	Good
50-59	5.0 – 5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

6. Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students with 71% to 74% of attendance must apply for condonation in the Prescribed Form with prescribed fee. Students with 65% to 70% of attendance must apply for condonation in the Prescribed Form with the prescribed fee along with the Medical Certificate. Students with attendance less than 65% are not eligible to appear for the examination and they shall re-do the course with the prior permission of the Head of the Department, Principal and the Registrar of the University.

7. Maternity Leave

The student who avails maternity leave may be considered to appear for the examination with the approval of Staff i/c, Head of the Department, Controller of Examination and the Registrar.

8. Any Other Information

In addition to the above mentioned regulations, any other common regulations pertaining to the PG Programmes are also applicable for this Programme.

PROGRAMME OUTCOMES

After completing M.Sc. Computer Science Program, the students will be able to:

PO1	To provide advanced and in-depth knowledge of computer science and its applications
PO2	To prepare Post Graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, design and implementation skills.
PO3	To enable students pursue a professional career in Information and Communication
PO4	Technology in related industry, business and research.
PO5	To impart professional knowledge and practical skills to the students.
PO6	Apply computer science theory and software development concepts to construct computing-based solutions.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

After completing M.Sc. Computer Science Program, the students will be able to:

PSO1	Have the knowledge in the areas like Artificial Intelligence, Web Services, Cloud Computing, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies Advanced Operating System, Mobile Technologies, Software Project Management and core computing subjects. Choose to study any one subject among recent trends in IT provided in the optional subjects.
PSO2	Understand all dimensions of the concepts of software application and projects.
PSO3	Understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT.
PSO4	Develop in-house applications in terms of projects.

M.SC COMPUTER SCIENCE CURRICULUM

S.No.	Course Code	Course Title	Credits	Hours		Int	Ext	Total
				L	P			
SEMESTER- I								
1.	P21CST11	**Core-1**: Advanced JAVA Programming	4	5	-	25	75	100
2.	P21CST12	**Core-2**: Data Structures and Algorithms	4	5	-	25	75	100
3.	P21CST13	**Core-3**: Discrete Mathematical Structure	4	5	-	25	75	100
4.	P21CST14	**Core-4:** Compiler Design	4	5	-	25	75	100
5.	P21CSP11	**Core–5**: **Computing-Lab1** (Advanced JAVA and Data Structures & Algorithms)	4	-	6	25	75	100
6.	P21CSS11	**Supportive Course I**: Computer Skills for Web Designing and Video Editing	2	-	4	25	75	100
	Sub Total		**22**	**30**				**600**
SEMESTER – II								
7	P21CST21	**Core-6**: Python Programming	4	4	-	25	75	100
8	P21CST22	**Core-7**: Cryptography and Network Security	4	4	-	25	75	100
9	P21CST23	**Core-8**: Distributed Operating System	4	4	-	25	75	100
10	P21CST24	**Coure-9**: NoSQL Databases	4	4	-	25	75	100
11	P21CSP22	**Core-10**: **Computing-Lab2** (Python Programming & Operating System)	4	-	6	25	75	100
12		**Non Major Elective**	4	-	6	25	75	100
13	P21CSS22	**Supportive Course – 2**: Web Programming	2	-	2	25	75	100
	Sub Total		**26**	**30**				**700**
SEMESTER – III								
14	P21CST31	**Core-11**: Digital Image Processing	4	4	-	25	75	100
15	P21CST32	**Core-12**: Cloud Computing	4	4	-	25	75	100
16	P21CST33	**Core-13**: Artificial Intelligence and Machine Learning Algorithms	4	4	-	25	75	100
17	P21CST34	**Core-14**: Internet of things	4	4	-	25	75	100
18	P21CSP33	**Core-15**: **Computing-Lab3** (Image Processing)	4	-	6	25	75	100
19	P21CSP34	**Core-16**: **Computing-Lab4** (R Programming)	4	-	6	25	75	100
20	P21WSS33	**Supportive Course – 3**: Women Empowerment	2	2	-	25	75	100
	Sub Total		**26**	**30**				**700**
SEMESTER – IV								
21	P21CSE411/	**Elective – I***	4	4	-	25	75	100

	P21CSE412/ P21CSE413	1. Object Oriented Analysis and Design 2. Computational Linguistics 3. Client Server Computing 4. Any MOOC Course[$]						
22	P21CSE421/ P21CSE422/ P21CSE423/	**Elective – II*** 1. Big Data Analytics 2. Soft Computing 3. Wireless Sensor Networks 4. Any MOOC Course[$]	4	4	-	25	75	100
23	P21CSR41	**Core-17**: Project	8	-	22	25	75	100
	Sub Total		**16**	**30**				**300**
	Total		**90**	**120**				**2300**

Non Major Elective

The candidates who have joined the PG Programme, can also undergo Non Major Elective offered by other Departments.

List of Non-Major Electives:

S.No.	Course code	Non Major Elective Course Name
1	P21CSN211	C Programming
2	P21CSN212	Photo Designing
3	P21CSN213	Big Data Analytics
4	P21CSN214	Digital Image Processing
5	P21CSN215	Mobile Computing
6	P21CSN216	Data Communication and Networking
7	P21CSN217	Cloud Computing

ADDITIONAL CREDIT COURSES

P21CSV11	Big Data Analytics Lab	I Semester – 2 Credits
P21CSI21	Internship	II Semester – 2 Credits
P21CSO31	MOOC	III Semester – 2 Credits
P21CSV42	Soft Computing Lab	IV Semester – 2 credits

*Those who have CGPA 9 and want to do the project in Industry / Institution during 4th semester, these two elective papers in IV semester can be opted in third semester itself.

[$]For Elective – I / Elective- II, the students can also take either one 4-credit course or two 2-credit courses in MOOC, with the approval of Departmental Committee.

SEMESTER -I

COURSE CODE	P21CST11	ADVANCED JAVA PROGRAMMING	L	T	P	C
CORE - I			5	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Course Objectives	• To Understand the Basic Programming Concepts of Java. • To know how to import user defined package, to create thread program and string methods • To learn about the Input/output and Networking package classes and methods • To learn about the Abstract Windowing Toolkit and Applet package classes and methods

UNITI: Applets

Applet Fundamental – Applet Class – Applet Life Cycle – Developing An Applet Program-Passing Values Through Parameters - Graphics In An Applet – Event Handling.

UNIT II :**GUI Applications**

Graphical User Interface-Creating Windows-Dialog Boxes-Layout Managers- AWT Component Classes- Swing Component Classes-Event Handling-AWT graphics classes.

UNIT III: Networking

Basics Of Networking - Networking In Java - Socket Programming Using TCP/IP – Socket Programming Using UDP – URL And INET Address Classes. **Java Database Connectivity:** Types Of Drivers- JDBC Architecture- JDBC Classes And Interfaces-Basic Steps In Developing JDBC Applications-Creating a New Database And Table With JDBC.

UNITIV: Servlets

Basics – Advantages Over Applets – Servlet Alternatives – Servlet Strengths - Servlet Architecture - Servlet Life Cycle - Generic Servlet- HTTP Servlet-Passing Parameters To Servlet – Server-Side Include – Cookies – Filters-Security Issues.

UNITV: Java Server Pages

Overview – JSP and HTTP – JSP Engines – Working Of JSP – Anatomy of A JSP Page- JSP Syntax-Creating A Simple JSP Page-Components Of Java Server Pages – Implicit Objects – Client Side Validation Using JavaScript – Handling Request And Response.

TEXTBOOK(S):

1. Herbert Schildt, Java The Complete Reference, McGraw Hill Education, 10th Edition,New York, 2017

REFERENCEBOOKS:

2. UttamK.Roy, Advanced Java Programming, Oxford University Press,2017.
3. Black Book, Core and Advanced Java, Dreamtech Press, 2017

COURSE OUCOMES

CO1: Define the Applet fundamentals, GUI applications and AWT components. K1
CO2: Discuss about Networking in java and Java database connectivity. K2
CO3: Understand the concept of Servlets. K2
CO4: Understand the concepts JSP and HTTP. K3
CO5: Discuss about the Web programming on client side and server side. K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3	PSO 4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	M	M	M	M	M	S	M	S
CO4	M	S	M	S	M	S	M	S	S	S
CO5	S	M	S	S	S	S	M	M	S	S

S – Strongly Correlating - 3 Marks **M- Moderately Correlating - 2 Marks**
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST12	DATA STRUCTURES AND ALGORITHM	L	T	P	C
CORE – II			5	-	-	4

Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse
Objectives	• To introduce algorithm analysis framework for recursive and non-recursive algorithms • To acquire knowledge on ADTs such as List, Stack and Queue • To explore the binary trees and the priority queues with their applications • To learn the various hashing techniques and Set ADT

UNITI: Trees

Heaps – Binary Search Trees – Selection Trees – Forests – representation of Disjoint Sets – Counting Binary Trees.

Graphs: The Graph Abstract Data type – Elementary Graph Operations – Minimum Cost Spanning Trees – Shortest Paths and Transitive Closure – Activity Networks.

UNITII: Hashing:

Introduction – Static hashing – Dynamic hashing – Bloom filters.

Priority Queues:

Single and Double ended priority queues – Left Trees – Binomial Heaps
Fibonacci Heaps – Pairing Heaps – Symmetric Min – Max Heaps – Interval Heaps.

UNIT III : Efficient Binary Search trees:

Optimal Binary Search Trees – AVL Trees – Red – Black Trees – Splay Trees.

Multiway Search Trees: m-way Search Trees – B –Trees – B^+-Trees.

UNIT IV : Dynamic Programming:

The General Method – Multistage graphs – All-pairs shortest paths – Single-source shortest paths – Optimal binary search trees – string editing – 0/1 knapsack–reliability design–The Travelling Sales person problem – flow shop scheduling.

Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Biconnected Components and DFS.

UNITV: Backtracking:

The General Method – The 8-Queens Problem – Sum of subsets –Graph coloring – Hamiltonian cycles–Knapsack problem.

Branch and Bound: The Method – 0/1 Knapsack problem – Traveling Sales person (*) –Efficiency considerations.

TEXTBOOK(S):

1. Ellis Horowitz, SartajSahni, Dinesh Mehta, Fundamentals of Data Structures in C++, University Press (India) Private Limited, Second Edition, Reprinted , 2017.

2. Alfred V.Aho, John E. Hopcraft and Jeffrey D.Ullman, Data Structures and Algorithms, Pearson Education, Fourteenth Impression, 2013.

REFERENCEBOOK(S):

1. Timothy A.Budd, Classic Data Structures in C++,– Addison Wesley Publishing Co., First Edition., 1994.
2. Timothy A.Budd, Data Structure and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, Addison Wesley Publishing Company, 1997.
3. Sara Baase and Allen Van Gelder, Computer Algorithms – Introduction to Design & Analysis, Third Edition, Pearson Education, New Delhi, 2000.
4. P.T.Rajan, Data Structures, A. Chitra, Vijay Nicol Imprints Pvt Ltd, McGraw Hill Education of India Pvt. Ltd., 2006.
5. S.Sridhar, Design and Analysis of Algorithms, Oxford University Press,2015
6. Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, Fundamentals of Computer Algorithms – University Press (India) Private Limited, Second Edition, Reprinted, 2017.

COURSE OUTCOMES

CO1: Describe the dynamicstructures–treesandgraphsanddiscusstheapplicationofthesestructures in finding simplified solutions K1

CO2: Describe hash and priority queues and its application K2

CO3: Implement binary search tree, balanced tree and multi–way indexed tree K2

CO4: Solve problems using dynamic programming and apply traversal techniques of trees and graphs K3

CO5: Analyze and solve problems using backtracking and branch-and-bound technique. K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	M	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	M	S	S	S	S	M	M	S	S

S – Strongly Correlating - 3 Marks **M- Moderately Correlating - 2 Marks**

W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST13	DISCRETE MATHEMATICAL STRUCTURES	L	T	P	C
CORE - III			5	-	-	4

Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse
Objectives	• To study features of mathematical logic and inference. • To understand the relations and functions • To learn the automata theory. • To gain knowledge on probability and graph.

UNIT–I: MATHEMATICAL LOGIC AND INFERENCE

Statements and Notations – Connectives – Negation – Conjunction – Disjunction – Statement Formulas and Truth Tables – Conditional and Bi-conditional – Well Formed Formulas Tautology – Equivalence of formulas – Duality of Law – Tautological Implications. The theory of inference for statement calculus – Validity using truth table – rules of inference– consistency of premises and indirect method of proof.

UNIT – II: RELATIONS AND FUNCTIONS

Cartesian product of Two Sets –Relations– Representation of Relation– Operations on relation– Equivalence Relation, Function and Operator – One to one, onto functions – Special Type ofFunctions.

UNIT – III: AUTOMATA THEORY

Introduction – Alphabet, Words, Free semi group, Languages – Regular Expressions, Regular Languages – Finite State Automata – Grammars – Finite state Machine – Turing machine.

UNIT–IV: PROBABILITY THEORY

Introduction – Sample space and Event – Finite Probability Space– Conditional Probability – Independent Events.

UNIT–V: GRAPH THEORY

Introduction – Data structures – Graph and multi graph Sub graph, Isomorphic and homeomorphism graphs – Path, connectivity – Bridges of Konigsberg, Traceable multigraph.

TEXTBOOKS:

1. J.P.Trembly, R.Manohar, Discrete Mathematical structures with applications to computer science, Tata McGraw Hill Publications, 1997.
2. Dr.M.K.Venkatraman, Dr.N.Sridhran, N.Chandrasekaran, Discrete Mathematics, The National Publishing Company, 2012.
3. Seymour Lipschutz, Mark Lipson, Discrete mathematics, Schaum's outlines, 2nd Edition., Tata McGraw Hill Edition, 7threprint, 2007.

REFERENCEBOOKS:

1. John EHopcroft, Jeffery D.Ullman, Introduction to Automata Theory, languages and computation, Narosa Publishing House, 2006.
2. NarsinghDeo, Graph Theory with Applications to Engineering and Computer Science, Prentice Hall of India, 2005.
3. Frank Harary, Graphtheory, Narosa Publishing House.

COURSE OUTCOMES

CO1:Impart knowledge on mathematical logic and theory of inference K1
CO2:Understand the concept of sets, relations, functions and mapping. K2
CO3: Understand the concepts of Automata Theory, Regular expressions, NFA and Turing Machine K3
CO4: Understand the concept of Probability theory. K3
CO5: Understand the graph theory concepts and applications in computer science. K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO2	PSO 3	PSO 4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	S	S	S	S	S	M	M	S	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST14	COMPILER DESIGN	L	T	P	C
CORE - IV			5	-	-	4

Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse
Objectives	• To study features of Compilers and Translators. • To understand the lexical analyzer • To learn the LR AND SLR. • To gain knowledge on. Symbol and optimization

UNIT I: Introduction to Compilers:
Compilers and Translators-Why Do We Need Translators?-The Structure of A Compiler – Lexical Analysis – Syntax Analysis - Intermediate Code Generation – Optimization – Code Generation – Book Keeping – Error Handling – Compiler – Writing Tools – Getting started.

UNIT II: Lexical Analysis:
The role of the lexical analyzer-Simple approach to design of a lexical analyzer – Regular Expressions – Finite Automata –From regular expression to finite automata – Minimizing the number of states of a DFA-A language for specifying lexical analyzer - Implementing a lexical analyzer.

UNIT III: Semantic Analysis:
The Syntactic Specification of Programming Languages- Context free grammars -Derivation and Parse Trees – Parsers – Shift-reduce Parsing – Operator-precedence parsing – Top – down parsing – Predictive Parsers.

UNIT IV: Syntax Analysis:
LR parsers-The canonical collection of LR(0) items-constructing SLR parsing tables – constructing canonical LR parsing tables – constructing SLR parsing tables – constructing LALR parsing tables.
Syntax directed translation schemes – Implementation of syntax directed schemes – Intermediate Code - Parse Tree and Syntax Trees -Three Address code, quadruples, and triples – Translation of assignment statements.

UNIT V: Code Optimization Code Generation:
The contents of a symbol tables-Data structure for a symbol table-Representing Scope information. Code Optimization-The principal sources of optimization – Loop optimization – The DAG representation of basic blocks –Peep hole Optimization.

TEXTBOOK(S):

1. Principles of Compiler Design, Alfred V.Aho and Jeffrey D.Ullman, 25th Reprint, 2002.

REFERENCEBOOK(S):

1. C.Allen Compiler Designing, I. Holub Prentice Hall of India, 2003.
2. C.N.Fischer and R. J.LeBlanc, Crafting a compiler with C , Benjamin Cummings, 2003.
3. J.P.Bennet, Introduction to Compiler Techniques, Second Edition, Tata Mc. GrawHill,2003.

COURSE OUTCOMES

CO1**:** Describe the basics of Compiler Structure K3

CO2: Analyze the functioning of Lexical Analyzer and implementation using Finite Automata. K2

CO3**:** Understand the role of Context Free Grammar and Parsing Techniques K1

CO4**:** Analyze the working methodology of LR Parsers and Representation of Intermediate Code Generation Phase K4

CO5**:** Discuss about the Data Structures used by Compiler, various Code Optimization Sources and apply the techniques K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	S	S	S	S	S	M	M	S	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSP11	COMPUTING-LAB1 (ADVANCED JAVA PROGRAMMING& DATA STRUCTURES AND ALORITHMS)	L	T	P	C
CORE - V			-	-	6	4

Java List

1. Program to display life cycle of an applet
2. Program to display digital clock using applet
3. Program to display different graphical shapes in applet
4. Program to display graphical bar chart by passing parameters in applet
5. Write an Applet which will play two sound notes in a sequence continuously use theplay() methods available in the applet class and the methods in the Audio clip interface.
6. Program to find factorial value of N using AWT high level event handling
7. Program to illustrate window closing using AWT low level event handling.
8. Program to illustrate TCP based network communication.
9. Program to illustrate UDP based network communication.
10. Program to find sum of digits using RMI
11. Program to find length of the given string using RMI
12. Program using HTML/Java script to find length of the given string.
13. Use JDBC connectivity and create Table, insert and update data.
14. Write a program in Java to create a Cookie and set the expiry time of the same.
15. Write a program in Java to create Servlet to count the number of visitors to awebpage.

Data Structures and Algorithms List

1. Implementation of Stack using Array
2. Implementation of Queue using Linked List
3. Implementation of Heap Tree.
4. Implementation of Tree Traversal.
5. Implementation of BFS.
6. Implementation of DFS.
7. Implementation of Merge Sort using Divide and Conquer.
8. Implementation of Warshall's Algorithm using Dynamic Programming.
9. Implementation of Prim's Algorithm using Greedy Technique.
10. Implementation of n-queens Problem using Backtracking.

SEMESTER - II

COURSE CODE	P21CST21	PYTHON PROGRAMMING	L	T	P	C
CORE - VI			4	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Objectives	• To understand why Python is a useful scripting language for developers. • To learn how to design and program Python applications. • To learn how to use lists, tuples, and dictionaries in Python programs. • To learn how to identify Python object types.

UNIT I : Python Programming: An Introduction

IDLE an Interpreter for Python, Python Strings, Relational Operators, Logical Operators, Bitwise Operators, Variables and Assignment Statements, Keywords, Script Mode. **Functions -** Built-in Functions ,Function Definition and Call, Importing User-defined Module**,** Assert Statement, Command Line Arguments. **Control Structures -** if Conditional Statement, Iteration (for and while Statements).

UNITII: **Scope**

Objects and Object IDs, Scope of Objects and Names. **Strings:** Strings, String Processing Examples, Pattern Matching. **Mutable and Immutable Objects –** Lists, Sets, Tuples, Dictionary.

UNIT III :**Recursion**

Recursive Solutions for Problems on Numeric Data, Recursive Solutions for Problems on Strings, Recursive Solutions for Problems on Lists, Problem of Tower of Hanoi. **Files and Exceptions:** File Handling, Writing Structures to a File, Errors and Exceptions, Handling Exceptions Using try…except, File Processing Example.

UNITIV: **Classes I**

Classes and Objects, Person: An Example of Class, Class as Abstract Data Type, Date Class. **Classes II -** Polymorphism, Encapsulation, Data Hiding, and Data Abstraction, Modifier and Accessor Methods, Static Method, Adding Methods Dynamically, Composition, Inheritance, Built-in Functions for Classes.

UNIT V: **Graphics**

2D Graphics, Animation – Bouncing Ball.

Applications of Python

- Collecting Information from Twitter, Sharing Data Using Sockets, Managing Databases using Structured Query Language (SQL), Developing Mobile Application for Android, Integrating Java with Python.

TEXTBOOK(S):

1. SheetalTaneja, Naveen Kumar, Python Programming, a Modular Approach with Graphics, Database, Mobile, and Web Applications, Pearson Publication, 2018.

REFERENCEBOOK(S):

1. ReemaThareja, Python Programming, Oxford UniversityPress,2017
2. Lambert, Fundamentals of Python Programming, C engage Publications, 2017
3. E.Balagurusamy, Problem Solving using Python, McGraw Hill Education Ltd., 2017 CRC Press.
4. Dieter Uckelmann; Mark Harrison; Architecting the Internet of Things Florian Michahelles, (Eds.) Springer, 2011.
5. Oliver Hersent, David Boswarthick, Omar Elloumi, The Internet of Things, Key Applications and Protocols, Wiley , 2017

COURSE OUTCOMES

CO1:Describe the basic concepts of python programming, Functions and control structures. K2
CO2:Understand Strings, Mutable and immutable objects. K3
CO3:Understand Recursion and Files and exception. K2
CO4:Discuss classes, objects, polymorphism, encapsulation and inheritance. K3
CO5:Apply python for collecting information from twitter, sharing data using sockets, managing database, and mobile application for android. K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	S	S	S	S	S	M	M	S	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST22	CRYPTOGRAPHY AND NETWORK SECURITY	L	T	P	C
CORE - VII			4	-	-	4

Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse
Objectives	• To learn about the Number Theory • To Understand the basics of Cryptography • To Understand Hash Functions and Cryptography • To Know about Security Procedure and System Security .

UNIT – I: Introduction& Number Theory

Services, Mechanisms and attacks – the OSI security architecture - Network security model - Classical Encryption techniques (Symmetric cipher model, substitution techniques, transposition techniques, steganography). FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic-Euclid's algorithm-Finite fields - Polynomial Arithmetic – Prime numbers-Fermat's and Euler's theorem-Testing for primality - The Chinese remainder theorem- Discrete logarithms.

UNIT – II: Block Ciphers & Public Key Cryptography

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES) - Triple DES – Blowfish - RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange - Elliptic curve arithmetic - Elliptic curve cryptography.

UNIT – III: Hash Functions and Digital Signatures

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – EI Gamal – Schnorr.

UNIT – IV: Security Practice & System Security

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V: E-Mail, IP & Web Security

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. IPSecurity: Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys- client authentication-PKI as deployed by SSL Attacks fixed in v3- Exportability-Encoding-Secure Electronic Transaction (SET).

Text Book(s):

1. William Stallings, Cryptography and Network Security, 6 th Edition, Pearson Education, March, 2013.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.

Reference Book(s):

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata McGraw Hill, 2007.
2. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
3. Charles P Fleeger, "Security in Computing", 4th Edition, Prentice Hall of India, 2006.
4. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.
5. Charlie Kaufman and Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication in Public World", PHI, 2002.
6. Bruce Schneier and Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.
7. Douglas R Simson "Cryptography – Theory and practice", First Edition, CRC Press, 1995.

COURSEOUTCOMES

CO1: Understand the Number Theory K1
CO2: Understand the basics of Cryptography K2
CO3: Understand Hash Functions and Cryptography K3
CO4: Understand Security Procedure and System Security K3
CO5: Understand the various Security Services K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	S	S	M	M	M	S	M	M
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	S	S

S – Strongly Correlating - 3 Marks **M- Moderately Correlating - 2 Marks**
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST23	DISTRIBUTED OPERATING SYSTEM	L	T	P	C
CORE - VIII			4	-	-	4

Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:** Analyze
Objectives	• To study features of Distributed operating system. • To understand the communication of different hardware and software in distributed environment. • To learn the distributed resource management components. • To gain knowledge on modern operating system working principles.

UNIT - I: Introduction

Introduction – Operating System Definition – Functions of Operating System – Types of Advanced Operating System – Design Approaches – Synchronization Mechanisms – concepts of a Process – Critical Section Problem – Process Deadlock – Models of Deadlock – Conditions for Deadlock – System with single-unit requests, Consumable Resources , Reusable Resources.

UNIT - II: Distributed Operating Systems

Distributed Operating Systems: Introduction- Issues – Communication Primitives – Inherent Limitations –Lamport‟s Logical Clock, Vector Clock, Global State , Cuts – Termination Detection – Distributed Mutual Exclusion – Non Token Based Algorithms – Lamport'sAlgorithm - Token Based Algorithms –Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms – Agreement protocols.

UNIT - III Distributed Resource Management

Distributed Resource Management – Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed shared Memory – Architecture – Algorithm – Protocols – Design Issues – Distributed Scheduling – Issues – Components – Algorithms.

UNIT - IV Failure Recovery and Fault Tolerance

Failure Recovery and Fault Tolerance – Concepts – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems – Synchronous and Asynchronous Check pointing and Recovery –Check pointing in Distributed Database Systems – Fault Tolerance Issues – Two-Phase and Non-blocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.

UNIT - V: Multiprocessor and Database OS

Multiprocessor and Database Operating Systems –Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory management – Reliability/Fault Tolerance – Database Operating Systems – concepts – Features of Android OS, Ubuntu, Google Chrome OS and Linux operating systems.

Text Book(s):

1. MukeshSinghalN.G.Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 2000.

2. Andrew S.Tanenbaum, Distributed Operating System, PHI, 1994.

Reference Book(s):

1. Abraham Silberschatz, Peter B.Galvin, G.Gagne, "Operating Concepts", 6th Edition Addison Wesley publications, 2003.

2. Andrew S.Tanenbaum, "Modern Operating Systems", 2nd Edition Addison Wesley, 2001

COURSE OUTCOMES

CO1**:** Understand the Operating System Structure and its Services K1

CO2**:** Understand the efficient Scheduling of Multiple Process Execution. K2

CO3**:**Understand the efficient allocation of available memory among multiple processes K3

CO4**:** Understand the Device Management System K3

CO5**:** Compare and Contrast the features of Windows and LINUX operating Systems in terms of their services. K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3	PSO 4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	S	S
CO5	S	S	S	S	S	S	M	M	S	S

S – Strongly Correlating - 3 Marks **M- Moderately Correlating - 2 Marks**

W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST24	NoSQL DATABASES	L	T	P	C
CORE – IX			4	-	-	4

Cognitive Level	**K1:** Recall	**K2:** Understand	**K3:** Apply	**K4:** Analyze
Objectives	• Distinguish the different types of NoSQL databases • To learn the Database Terminology • To understand Document Database • To learn Column Family Database.			

UNIT I: Introduction

Database System Applications - View of Data - Database Languages - Relational Databases - Database Design - Data Storage and Querying - Transaction Management - Database Architecture - Data Mining and Information Retrieval - Specialty Databases - Database Users and Administrators - History of Database Systems.

Relational Databases: **Introduction to the Relational Model**: Structure of Relational Databases - Database Schema - Keys - Schema Diagrams - Relational Query Languages –Relational Operations.

UNIT II: Variety of NoSQL Databases :

Data Management with Distributed Databases - ACID and BASE - Four Types of NoSQL Databases. **Key-Value Databases:** From Arrays to Key-Value Databases - Essential Features of Key-Value Databases - Keys: More Than Meaningless Identifiers.

Key-Value Database Terminology: Key-Value Database Modeling Terms - Key-Value Architecture Terms - Key-Value Implementation Terms.

UNIT III: Document Databases:

What is a Document - Avoid Explicit Schema Definitions - Basic Operations on Document Databases. **Document Database Terminology:** Document and Collection Terms - Types of Partitions - Data Modeling and Query Processing.

Designing for Document Databases: Normalization, Denormalization, and the Search for Proper Balance - Planning for Mutable Documents - The Goldilocks Zone of Indexes - Modeling Common Relations.

UNIT IV: Family Databases

Column Family Databases: In the Beginning, There was Google Big Table - Differences and Similarities to Key-Value and Document - Architectures Used in Column Family Databases - When to Use Column Family Databases.

Column Family Database Terminology: Basic Components of Column Family Databases - Structures and Processes: Implementing Column Family -Processes and Protocols.

Designing for Column Family Databases: Guidelines for DesigningTables-GuidelinesforIndexing-ToolsforWorkingwithBigData

UNIT V:Graph Database

Graph Databases: What is a Graph - Graphs and Network Modeling - Advantages of Graph Databases.

Graph Database Terminology: Elements of Graphs - Operations on Graphs - Properties of Graphs and Nodes - Types of Graphs.

Designing for Graph Databases: Getting Started with Graph Design - Querying a Graph - Tips and Traps of Graph Database Design.

BOOKS FOR STUDY:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "**Database System Concepts",** Sixth Edition, McGrawHill,2016.
   UNITI : Chapters: 1, 2
2. Dan Sullivan, Addison-Wesley, **"NoSQL for Mere Mortals",** Pearson India Education Services Pvt. Ltd.,2016.

BOOKS FOR REFERENCE:

1. SAMS, Brad Dayley, **"NoSQL with MongoDB in 24 Hours"**, Pearson Education, First Edition,2015.
2. Kyle Banker, Peter Bakkum, Shaun Verch, Douglas Garrett, Tim Hawkins, **"MongoDB in Action",** Dreamtech Press, Second Edition,2017.

COURSE OUTCOMES

CO1: Acquire a deep knowledge on relational Database, Structured Query Language and Data Modeling K1
CO2**:** Acquire the Knowledge on MongoDB query language K2
CO3: Comprehend the principles of NoSQL K2
CO4: Differentiate NoSQL key value database and Document database K2
CO5: Know the concept of Column database and Understand the data modeling techniques K2

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	M	S	S	S	M	S	M	M	S
CO3	S	S	S	S	S	M	M	S	S	M
CO4	S	S	M	M	S	S	M	S	S	S
CO5	S	M	S	M	M	S	M	M	S	M

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSP22	COMPUTING-LAB2 (PYTHON PROGRAMMING & OPERATING SYSTEM LAB)	L	T	P	C
CORE – X			-	-	6	4

PYTHON PROGRAM LIST

Exercise1-Basics

a) Running instructions in Interactive interpreter and a Python Script
b) Write a program to purpose fully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
b) Write a program add.py that takes 2 numbers as command line arguments and prints it's sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) Usingaforloop,writeaprogramthatprintsoutthedecimalequivalentsof1/2,1/3,1/4,...,1/10

c) Write a program using a for loop that loops over a sequence. What is sequence?

d) Write a program using a while loop that asks the user for a number, and prints a count down from that number to zero.

e) Find the sum of all the primes below two million.
Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

f) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Exercise - 4 - DS

a) Write a program to count the numbers of characters in the string and store them in a dictionary data structure

b) Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.

c) Write a program combine_lists that combines these lists into a dictionary.

d) Write a program to count frequency of characters in a given file. Can you use character frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise - 5 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 6 Functions

a) Write a function ball collides that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding. Hint: Represent a ball on a plane as a tupelo of(x,y,r), r being the radius
If(distance between two balls centers) <= (sum of the irradii) then(they are colliding)

b) Find mean, median, mode for the given set of numbers in a list.
c) Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
d) Write a function dups to find all duplicates in the list.
e) Write a function unique to find all the unique elements of a list.

Exercise - 7 - Functions - Problem Solving

a) Write a function cumulative product to compute cumulative product of a list of numbers.
b) Write a function reverse to reverse a list without, using the reverse function.
c) Write function to compute GCD, LCM of two numbers. Each function shouldn't exceed one line.

Exercise - 8 - Multi-D Lists

a) Write a program that defines a matrix and prints
b) Write a program to perform addition of two square matrices
c) Write a program to perform multiplication of two square matrices

Exercise - 9 - Modules

a) Install packages requests, flask and explore them using(pip)
b) Write a script that imports requests and fetch content from the page. Eg.(Wiki)
c) Write a simple script that serves a simple HTTP Response and a simple HTML Page

Exercise – 10 OOP

a) Class variables and instance variable and illustration of these lf variable
i) Robot
ii) ATM Machine

Exercise - 11 - Testing

a) Write a test-case to check the function even_numbers which return True on passing a list of all even numbers
b) Write a test- case to check the function reverse_string which returns the reversed string

Exercise - 12 - Advanced

a) Build any one classical data structure.
b) Write a program to solve Knapsack problem.

OPERATING SYSTEM LIST

1: Simulate the following CPU scheduling algorithms.

a) FCFS b) SJF c) Round Robin d) Priority.

2: Write a C program to simulate producer-consumer problem using Semaphores

3: Write a C program to simulate the concept of Dining-philosophers problem.

4: Simulate MVT and MFT.

5: Write a C program to simulate the following contiguous memory allocation Techniques

a) Worst fit b) Best fit c) First fit.

6: Simulate all page replacement algorithms a)FIFO b) LRU c) OPTIMAL

7: Simulate all File Organization Techniques a) Single level directory b) Two level directory

8: Simulate all file allocation strategies a) Sequential b) Indexed c) Linked.

9: Simulate Bankers Algorithm for Dead Lock Avoidance.

10: Simulate Bankers Algorithm for Dead Lock Prevention.

11: Write a C program to simulate disk scheduling algorithms. a) FCFS b) SCAN c) C-SCAN

COURSE CODE	P21CSS22	WEB PROGRAMMING LAB	L	T	P	C
SUPPORTIVE COURSE II			2	-	-	2

1. Develop and demonstrate a XHTML file that includes Java Script for the following problems:

   a) Input: A number n obtained using prompt Output: The first n Fibonacci numbers

   b) Input: A number n obtained using prompt Output: A table of numbers from 1 to n and their squares using alert

2. a) Develop and demonstrate, using Java script, a XHTML document that collects the USN (the valid format is: A digit from 1 to 4 followed by two upper-case characters followed by two digits followed by two upper-case characters followed by three digits; no embedded spaces allowed) of the user. Event handler must be included for the form element that collects this information to validate the input. Messages in the alert windows must be produced when errors are detected.

   b) Modify the above program to get the current semester also (restricted to be a number from 1 to 8)

3. a) Develop and demonstrate, using Java script, a XHTML document that contains three short paragraphs of text, stacked on top of each other, with only enough of each showing so that the mouse cursor can be placed over some part of them. When the cursor is placed over the exposed part of any paragraph, it should rise to the top to become completely visible.

   b) Modify the above document so that when a paragraph is moved from the top stacking position, it returns to its original position rather than to the bottom.

4. a) Design an XML document to store information about a student in an engineering college affiliated to VTU. The information must include USN, Name, Name of the College, Brach, Year of Joining, and e-mail id. Make up sample data for 3 students. Create a CSS style sheet and use it to display the document.

b) Create an XSLT style sheet for one student element of the above document and use it to create a display of that element.

5. a) Write a Perl program to display various Server Information like Server Name, Server Software, Server protocol, CGI Revision etc.

   b) Write a Perl program to accept UNIX command from a HTML form and to display the output of the command executed.

6. a) Write a Perl program to accept the User Name and display a greeting message randomly chosen from a list of 4 greeting messages.

b) Write a Perl program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.

7. Write a Perl program to display a digital clock which displays the current time of the server.

8. Write a Perl program to insert name and age information entered by the user into a table created using MySQL and to display the current contents of this table.

9. Write a PHP program to store current date-time in a COOKIE and display the 'Last visited on' date-time on the web page upon reopening of the same page.

10. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.

11. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.

12. Build a Rails application to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings

SEMESTER – III

COURSE CODE	P21CST31	DIGITAL IMAGE PROCESSING	L	T	P	C
CORE – XI			4	-	-	4

Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse
Objectives	• To learn about the basic concepts of digital image processing and various image transforms. • To familiarize the student with the image enhancement techniques • To expose the student to a broad range of image processing techniques and their applications. • To appreciate the use of current technologies those are specific to image processing systems.

UNITI: Introduction to Image Processing

Overview of Image Processing - Nature of Image Processing - Digital Image Representation-Types of Images-Based on Nature - Based on Attributes - Based on Colour - Based on Dimensions – Based on Data Types – Domain Specific Images – Digital Image Processing Operations – Fundamental Steps In Image Processing – Image Enhancement – Image Restoration - Image Compression - Image Analysis – Image Synthesis.

Digital Imaging Systems: Overview of Digital Imaging Systems –Image Sensors – Image Storage – Image processors – Output Devices –Networking Components – Image Processing Software – Physical Aspects of Image Acquisition-Nature of Light - Simple Image Model - Colour Fundamentals - Lighting System Design-Simple Image Formation Process - Biological Aspects of Image Acquisition – Human Visual System – Properties of Human Visual System – Monochrome and Colour Image – Review of Digital Cameras – Sampling and Quantization – Sampling – Resampling - Image Quantization - Image Display Devices and Device Resolution – Digital Halftone Process - Random Dithering - Ordered Dithering - Non - periodic Dithering – Image Storage and File Formats - Need for File Formats -Types of File Formats - Structures of File Formats.

UNITII: Digital Image Processing Operations

Basic Relationships and Distance Metrics - Image Coordinate System - Image Topology - Connectivity-Relations-DistanceMeasures-ImportantImageCharacteristics-Classificationof Image Processing Operations - Arithmetic Operations. Logical Operations – Geometrical Operations - Image Interpolation Techniques - Set Operations.

Digital Image Transforms: Need for Image Transforms – Spatial Frequencies in Image Processing - Introduction to Fourier Transform – Discrete Fourier Transform – Fast Fourier Transform – Discrete Cosine Transform.

UNITIII: Image Enhancement

Image Quality and Need for Image Enhancement - Image Quality Factors - Image Quality Assessment Toll – Image Quality Metrics – Image Enhancement operations – Image Enhancement in Spatial Domain – Linear Point Transformations – Non – Linear Transformations – Square Function – Square root – Logarithmic Function – Exponential Function - Power Function - Gamma Correction - Histogram - Based techniques – Histogram Stretching – Histogram Sliding – Histogram Equalization – Histogram Specification – Local and Adaptive Contrast Enhancement – Spatial Filtering Concepts – Image Smoothing Spatial Filters- Box Filters - Gaussian Filters - Image Sharpening Spatial Filters

- Gradient and Laplacian Filters-High – boost Filters – Unsharp Masking.

Image Restoration: Introduction to Degradation - Types of Image Degradations - Image Degradation Model - Noise Modeling -Noise Categories Based on Distribution - Noise Categories Based on Correlation – Noise Categories Based on Nature – Noise Categories Based on Source- estimation by Observation Estimation by Experimentation - Estimation by Modeling - Image Restoration Techniques –Unconstrained Method – Inverse Filters – Wiener Filters.

UNITIV: Image Compression

Image Compression Model - Compression-Measures – Compression Algorithm and its Types – Entropy Coding - Predictive Coding - Transform Coding - Layered Coding - Types of Redundancy - Coding Redundancy - Inter pixel Redundancy - Psycho visual Redundancy -Chromatic Redundancy - Lossless Compression Algorithms - Run - length Coding – Huffman Coding - Bit plane Coding - Arithmetic Coding - Dictionary - based Coding – Lossless Predictive Coding - Lossy Predictive Coding - Vector Quantization – Codebook design –Generalized Lloyd algorithm.

UNITV: Image Segmentation:

Introduction – Formal Definition of Image Segmentation – Classification of Image Segmentation Algorithms - Detection of Discontinuities –Point Detection-Line Detection - Edge Detection - StagesinEdgeDetection-TypesofEdgedetectors-FirstorderEdgeDetection-Edgeoperatorperformance - Edge linking Algorithms - Principle of Thresholding - Principle of Region –growing.

Colour Image Processing - Introduction - Colour Image Storage and Processing -Colour Models - RGB Colour Model - HIS Colour Model - HSV Colour Model - HLS Colour Model - Printing Colour Models - Colour Quantization - Popularity or Populosity Algorithm – Median cut Algorithm – Octree based Algorithm – Pseudo colour Image Processing – Full colour Processing- Colour Transformations – Image Filters for Colour Image – Colour image Segmentation.

TEXTBOOK(S):

1. S.Sridhar, Digital Image Processing, Second Edition, OXFORD University Press, 2016.

REFERENCEBOOK(S):

1. Rafael C.Gonzalez, Richard E.Woods, Digital Image Processing using MATLAB, 2nd Edition, Prentice Hall of India, 2002.
2. A.Jain, Fundamentals of Digital Image Processing, Prentice Hall of India, 2010.
3. William K Pratt, Digital Image Processing, JohnWilley, 2002.

COURSE OUTCOMES

CO1: To impart the knowledge about image processing techniques and understand the concept of image analysis, storage formats of image K1

CO2: To analyze the attitude of image processing arithmetic operations and image transformation techniques. K2

CO3: Discuss about the image need for image enhancement and use of image restoration. K3

CO4: To understand the concept to fit image compression models, measures and algorithms. K3

CO5: Understand the role of image segmentation, various color models and color image transformation K4

MAPPING OF COs WITH POs AND PSOs

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	S	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	M	M	S	M	S	S	S
CO5	S	S	M	S	S	M	M	M	S	S

S – Strongly Correlating - 3 Marks **M- Moderately Correlating - 2 Marks**
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST32	CLOUD COMPUTING	L	T	P	C
CORE - XII			4	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Objectives	• To learn the concepts of cloud computing, cloud services and platforms • To understand real – world cloud applications • To develop Cloud applications • Identify and define technical challenges for cloud applications and assess their importance.

UNIT I: Cloud Architecture and Model:
Technologies for Network-Based System – System Models for Distributed and Cloud Computing NIST Cloud Computing Reference Architecture. Cloud Models:- Characteristics – Cloud Services– Cloud models(IaaS, PaaS, SaaS) – Public vs. Private Cloud – Cloud Solutions – Cloud ecosystem– Service management – Computing on demand.

UNIT II: Virtualization:
Basics of Virtualization - Types of Virtualization – Implementation Levels of Virtualization- Virtualization Structures – Tools and Mechanisms – Virtualization of CPU, Memory, I/O Devices - Virtual Clusters and Resource management – Virtualization for Data-Center Automation.

UNIT III: Cloud Infrastructure:
Architectural Design of Compute and Storage Clouds –Layered Cloud Architecture Development – Design Challenges – Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources.

UNITIV:ProgrammingModel:
ParallelandDistributedProgrammingParadigms–MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications - Programming Support - Google App Engine, Amazon AWS - Cloud Software Environments - Eucalyptus, Open Nebula, Open Stack, Aneka, Cloud - Sim.

UNITV: Security in the Cloud:
Security Overview – Cloud Security Challenges and Risks – Software-as-a-Service Security – Security Governance – Risk Management – Security Monitoring – Security Architecture Design – Data Security – Application Security – Virtual Machine Security - Identity Management and Access Control – Autonomic Security.

TEXTBOOK(S):

1. Distributed and Cloud Computing, From Parallel Processing to the Internet of Things Kai Hwang, Geoffrey C Fox, Jack G Dongarra, Morgan Kaufmann Publishers,2012.

REFERENCEBOOK(S):

1. John W.Ritting house and James F.Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2010.
2. Anthony Velte, Robert Elsenpeter, Cloud Computing, A Practical Approach, To by Velte, TMH, 2009.

3. Kumar Saurabh, Cloud Computing – Insights into New – Era Infrastructure, Wiley India, 2011.
4. James E.Smith, Ravi Nair, Virtual Machines: Versatile Platforms for Systems and Processes, Elsevier/Morgan Kaufmann, 2005.

COURSE OUTCOMES

CO1: Describe the Cloud Architecture and Model. K1

CO2: Analyze the basics and applications of Virtualization. K3

CO3: Understand the different Cloud Infrastructure. K2

CO4: Understand different programming model. K4

CO5: Discuss the Cloud Security Challenges and Risks. K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	M	M	M	M	S	S	M
CO2	S	S	M	M	S	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	M	S	M	S	M	S
CO5	S	S	S	S	S	S	M	M	S	S

S – Strongly Correlating - 3 Marks **M- Moderately Correlating - 2 Marks**
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CST33	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING ALGORITHMS	L	T	P	C
CORE - XIII			4	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Objectives	• To have an appreciation for and understanding of both the achievements of AI and the theory underlying those achievements. To have an appreciation for the engineering issues underlying the design of AI systems. • To have a basic proficiency in a traditional AI language including an ability to write simple to intermediate programs and an ability to understand code written in that language. • To have an understanding of the basic issues of knowledge representation and blind and heuristic search, as well as an understanding of other topics such as minimax, resolution, etc. that play an important role in AI programs. • To understand and apply scaling up machine learning techniques and associated computing techniques andtechnologies.

UNITI: Introduction:
Introduction to Artificial Intelligence, Intelligence Problems and AI techniques, Solving problems by searching, Problem Formulation. Intelligent Agents: Structure of Intelligent agents, Types of Agents, Agent Environments PEAS representation for an Agent. Uninformed Search Techniques: DFS, BFS, Uniform cost search,

UNIT II: Depth Limited Search, Iterative Deepening, Bidirectional search, Comparing Different Techniques. Informed Search Methods:
Heuristic functions, Hill Climbing, Simulated Annealing, Best First Search, A*, IDA*, SMA*, Crypto Arithmetic Problem, Backtracking for CSP, Performance Evaluation. 6 Adversarial Search: Game Playing, Min-Max Search, Alpha Beta Pruning.

UNIT III: **Introduction to Machine Learning**: Introduction to Analytics and Machine Learning – Framework for developing Machine Learning Models – Probability Theory – Random Variables – Binomial Distribution – Poisson Distribution – Exponential Distribution – Normal Distribution – Central Limit Theorem – Hypothesis Test – Analysis of Variance (ANOVA).

UNIT IV: **Introduction to Linear Regression:**
Linear Regression – Steps in Building a Regression Model – Building Simple regression Model –Model Diagnostics – Multiple Linear Regression - Binary Logistic Regression – Credit Classification – Gain Chart and Lift Chart – Classification Tree.

UNIT V:**Gradient Descent Algorithm:**
Gradient Descent Algorithm –Advanced Machine Learning Algorithms: Dealing with Imbalanced Datasets – Advanced Regression Model – K-Nearest Neighbor Algorithm – Ensemble Methods – Random Forest.

Text Books:

1. Elaine Rich, Kevin Knight, ShivshankarBNair, Artificial Intelligence, McGraw Hill, 2008.

2. ManaranjanPradhan& U Dinesh Kumar, Machine Learning using Python, Wiley, 1st Edition, 2019.

Reference Book (S):

1. GeorgeLugar, AI-Structures and Strategies for Complex Problem Solving., 4/e, Pearson Education, 2002.
2. Nils J. Nilsson, Principles of Artificial Intelligence, Narosa Publication, 1980.
3. Patrick H.Winston, Artificial Intelligence, 3rd Edition, Pearson Education, 1992.
4. Deepak Khemani, A First Course in Artificial Intelligence, McGraw Hill Publication, 2018.
5. Dr.Dheeraj Mehrotra, Basics of Artificial Intelligence & Machine Learning, Notion Press, 1st Edition, 2019.

COURSE OUTCOMES

CO1: Understand the problem domain, problem formulation and introducing intelligent agents K1
CO2: Analyze the functioning of various searching methodologies in AI K2
CO3: Introduction to Machine Learning K3
CO4: Understand Regression Models K3
CO5: Understand Advanced Machine Learning Algorithms K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	S	M	M	M	M	S	M	M
CO4	S	S	M	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	S	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks W- Weakly Correlating - 1 Mark

COURSE CODE	P21CST34	INTERNET OF THINGS	L	T	P	C
CORE - XIV			4	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Objectives	• To get familiar with the evolution of IOT with its design principles • To outline the functionalities and protocols of internet communication • To analyze the hardware and software components needed to construct IOT applications • To identify the appropriate protocol for API construction and writing embedded code

UNITI: Introduction to Internet of Things:

Introduction – Physical Design of IoT – Logical Design of IoT – IoT Enabling Technologies – IoT& Deployment Templates.**Domain Specific IoTs:** Introduction–Home Automation–Cities – Environment – Energy – Retail – Logistics Agriculture – Industry – Health & Lifestyle.

UNIT II: IoT and M2M :

Introduction : M2M – Difference between IoT and M2M – SDN and NFV for IoT. **IoT System Management with NETCONF-YANG :**Need for IoT Systems Management –Simple Network Management Protocol (SNMP) – Network Operator Requirements – NETCONF- YANG – IoT Systems Management with NETCONF_YANG.

UNIT III: IoT Platforms Design Methodology:

Introduction – IoT Design Methodology –Case Study on IoT System for Weather Monitoring– Motivation for using Python.
IoT Systems –Logical Design using Python: Introduction – Installing Python – Python Data types & Data Structures – Control Flow – Functions – Modules – Packages – File Handling –Date/Time Operations– Classes– Python packages of Interest for IoT.

UNITIV:IoT Physical Devices & Endpoints:

What is an IoT Device – Exemplary Device: Raspberry Pi – About the Board – Linux on Raspberry Pi – Raspberry Pi Interfaces –Programming Raspberry Pi with Python– Other IoTdevices.
IoT Physical Servers & Cloud Offerings: Introduction to Cloud Storage Models & Communication APIs – WAMP – Auto Bahn for IoT – Xively Cloud for IoT – Python Web application Framework – Django – Designing a RESTful Web API – Amazon Web Services for IoT – SkynetIoT messaging platform.

UNIT V: Case Studies Illustrating IoT Design:

Introduction – Home Automation – Cities –Environment– Agriculture– Productivity applications

Data Analytics for IoT : Introduction – Apache Hadoop – Using Hadoop MapReduce for Batch Data Analysis – Apache Oozier – Apache Spark – Apache Storm – Using Apache Storm for Real-time Data Analysis.

TEXTBOOK(S):

1. Arshdeep Bahga, Vijay Madisetti, Internet of Things, Universities Press (INDIA) Private Ltd., 2015.

REFERENCEBOOK(S):

1. Cuno P Fister, Getting Started with the Internet of Things, O'Relly, 2011.
2. Adrian Mcewen, HakinCassimally, Designing the Internet of Things, Willey, 2015.
3. Honbo Zhou, The Internet of Things in the Cloud: A Middleware Perspective, CRCPress, 2012.
4. Dieter Uckelmann; Architecting the Internet of Things, Mark Harrison; Florian Michahelles, (Eds.) Springer, 2011.
5. Oliver Hersent, David Boswarthick, Omar Elloumi, The Internet of Things, Key Applications and Protocols, Wiley , 2017

COURSE OUTCOMES

CO1: Understand the definition and significance of the **Internet of Things**. K1
CO2 : Discuss the architecture, operation, and business benefits of an **IoT** solution. K2
CO3: Examine the potential business opportunities that **IoT** can uncover. K3
CO4**:** Explore the relationship between **IoT**, cloud computing, and big data. K3
CO5**:** Identify how IoT differs from traditional data collection systems K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	**S**	**S**	**M**	**S**	**M**	**M**	**M**	**S**	**S**	**M**
CO2	**S**	**S**	**M**	**S**	**M**	**S**	**M**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**M**	**M**	**M**	**M**	**S**	**M**	**M**
CO4	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**	**M**	**S**
CO5	**S**	**S**	**M**	**S**	**S**	**S**	**M**	**S**	**S**	**S**

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSP33	COMPUTING-LAB3 (IMAGE PROCESSING)	L	T	P	C
CORE - XV			-	-	6	4

1. Implement the spatial image enhancement functions on a bitmap image – mirroring(Inversion)
2. Implement the spatial image enhancement functions on a bitmap image – notation(Clockwise)
3. Implement the spatial image enhancement functions on a bitmap image –Enlargement (Double Size)
4. Implement (a) Low Pass Filter (b) High Pass Filter
5. Implement (a) Arithmetic Mean Filter (b) Geometric Mean Filter
6. Implement Smoothing and Sharpening of an eight bit color image
7. Implement (a) Boundary Extraction Algorithm (b) Graham & #39; Scan Algorithm
8. Implement (a) Edge Detection (b) Line Detection
9. Display an image and its histogram
10. Write a Program to Perform Shrinking, Zooming and Cropping of an image
11. Write a Program to perform the experiment for histogram equalization.
12. Write a Program to Perform blurring and de-blurring on an image.
13. Write a Program to Remove salt and pepper noise in an image.
14. Write a Program to Perform Edge detection using Operators.
15. Write a Program to Perform2-D DFT and DCT.
16. Write a Program to Perform DWT of images.
17. Implement a function for image segmentation.
18. Implement a function for image morphology that analyze the form and shape detail of image structures.
19. Implement a function for Image Restoration.
20. Models for representing the color and methods of processing the color plane

COURSE CODE	P21CSP34	COMPUTING-LAB4 (R PROGRAMMING)	L	T	P	C
CORE - XVI			-	-	6	4

1. Find Sum, Mean and Product of Vector in R
2. R Program to sample from a Population
3. R Program to Sort a Vector.
4. To combine the matrix using ***rbind*** and ***cbind*** methods.
5. Use seq() to create sequence.
6. Write a program to convert the table data into data frame.
7. Calculate student marklist and output it in dataframe.
8. R Program to Check Prime Number
9. R Program to Check for Leap Year.
10. R Program to Check if a Number is Odd or Even in R
11. R Program to Find the Sum of Natural Numbers
12. Convert Decimal into Binary using Recursion in R
13. R program to Find the Factorial of a Number Using Recursion
14. R Program to Make a Simple Calculator
15. Write a R Program to import CSV data into R.
16. Write a R Program to move the result data from R to CSV.
17. Draw the Line Graph for Student Data.
18. Draw the Pie-Chart for Employee Data.
19. Create a Table from the existing data set in Rand draw the chart.
20. Apply K-Means Algorithm for IRIS dataset and output it in graph
21. Get some input from mtcar dataset and perform analysis.

SEMESTER – IV

COURSE CODE	P21CSE411	CHOICE - I	L	T	P	C
ELECTIVE - I		OBJECT ORIENTED ANALYSIS AND DESIGN	4	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Objectives	● To learn the basic principles of objects and Object Oriented System Development Life Cycle. ● Learn to apply the Unified Modeling Language(UML) to elementary object – oriented analysis and design concepts. ● UML presents the concepts and techniques necessary to effectively use system requirements to drive the development of a robust design model. ● Showing how implementation details of a system can be modeled.

UNIT - I: **Introductionto Object Oriented System Development:**
Introduction – Two Orthogonal views – object oriented Systems development Methodology – Object orientation – unified approach – Object Basics – object oriented philosophy – objects – classes – attributes – behavior and methods – Message passing -Encapsulation and information hiding – hierarchy – polymorphism – object relationship and associations– aggregation– a case study– advanced topics.

UNIT–II: Object Oriented System And Methodology Development:
Object oriented system development life cycle(SDLC) – development process – building high quality software – use-case driven approach – reusability –Object oriented methodologies – introduction – Booch methodology – Jacobson methodologies – patterns –frameworks – unified approach.

UNIT – III: Unified **Process and Use Case Diagrams**
Unified modeling language – introduction – static and dynamic models –modeling – unified modeling language -UML diagrams – UML class diagrams – Use-case diagram – UML dynamic modeling-model management –OOA process – introduction –difficulty in analysis – business object analysis – use-case driven object oriented analysis –business processing modeling – use-case model – developing effective documentation.

UNIT – IV: Object Classification
Object analysis – classification – common class patterns approach – use-case driven approach – CRC – naming classes – object relationships – associations – Super-Subclassrelationships–aggregation– classresponsibility–objectresponsibility-Objectorienteddesign process and design axioms – introduction – design process – design axioms- design patterns.

UNIT – V: Design Classes:
Designing classes – introduction - object oriented design philosophy – UML object constraint – designing classes – class visibility – defining attributes – designingmethodsandprotocols– Packagesandmanagingclasses–Accesslayer–Objectstorageandobject interoperability – introduction – object store and persistence – Database management systems– database organization and access control– distributed databases.

TEXTBOOK(S):

1. Ali Bahrami, Object Oriented Systems Development, IrwinMcGraw Hill Publications, 1999.

REFERENCEBOOK(S):

1. Grady Booch, Object Oriented Analysis and Design, Pearson, 2009.

COURSE OUTCOMES

CO1: Describe the basics of Object Oriented concepts K1

CO2: Analyze the function in g methodologies provided by Boochand Jacobson; Introduction on unified approach. K2

CO3: IllustrationofUMLdiagramsapplicabletovariousphasesofsoftwaredevelopment. K3

CO4: Study on Relationship between various objects in the application and various ways of their reorientations

K3

CO5: Import knowledge on packaging classes, distributing them among layers & introducing the object-oriented databases.

K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	M	S	S	M
CO2	S	S	M	S	M	S	M	S	S	S
CO3	S	S	S	S	M	M	M	S	M	M
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	S	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSE412	CHOICE - II	L	T	P	C
ELECTIVE - I		COMPUTATIONAL LINGUISTICS	4	-	-	4

Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze
Objectives:	• To understand the computing Human Languages • To know the various models for computing human languages • To have competence of linguistic names which are indispensable for computing natural languages • To instruct linguistics nuances for computing human languages

Unit 1: Introduction to Tamil Linguistics

Tamil Computing Tools Development: Tamil Text Preprocessing tools: Sentence Splitter, Tokenizer, Word boundary identifier. Hands on these tools.

Unit 2: Shallow Parser

What is Shallow Parsing and How to develop a Shallow Parser (Rule based System development) Shallow parsing is an analysis of a sentence which first identifies constituent parts of sentences (nouns, verbs, adjectives, etc.) and then links them to higher order units that have discrete grammatical meanings (noun groups or phrases, verb groups, etc.). It is suitable for complex NLP applications; Morphological Analyser, Part of Speech Tagger, NP/VP Chunker, Clause Boundary Identifier.

Unit 3: Deep Parsing

Deep Parsing: Deep parsing is the search strategy which will give a complete syntactic structure to a sentence. It is the task of parsing a limited part of the syntactic information from the given task. Dependency Parser for Tamil; How to develop a dependency parser

Unit 4: Machine Translation

Application: Machine Translation

Unit 5: Applications of CL

Corpus Development in Tamil: Content Development using various methods such as Wikipedia and Blocks. Annotated Corpus of various Grammatical categories in Tamil using , Annotation tool (PALINKA for Tamil)

Text Books

1. kaNippoRiyil Tamil/கணிப்பொறியில்தமிழ்; T.Prakash/த.பிரகாஷ்Perikam/பெரிகாம் ,(நூல்வெளியீடுமற்றும்விற்பனை), 36, அசீஸ்முல்க்இரண்டாம்தெரு, ஆயிரம்விளக்கு, சென்னை-6. Tamil; 2005
2. IyarkaiMozhiyaaivuThamizh; Prof. subbaiyapillai/ கு. சுப்பையாபிள்ளை உலகத்தமிழ்ஆராய்ச்சிநிறுவனம்; 2012.
3. GATE.ac.uk - releases/gate-2.0alpha3-build516/doc/userguide.html
4. NLTK Website : 1. Language Processing and Python (nltk.org)
5. AU-KBC Tools: http://78.46.86.133:8080/aukbc-nlp/

6. Search Engine AU-KBC: Searchko: www.searchko.co.in
7. Corpus Linguistics: An Introduction Kindle Edition; Author: NiladriSekhar Dash; :Pearson; 1st edition (1 October 2007);
8. An Introduction to Corpus Linguistics; Author: Graeme Kennedy; Routledge:1998
9. PALinkA: A high-end tool for syntactic and semantic annotation for Tamil Text: Customized by AU-KBC for Tamil . To download: http://78.46.86.133/PALinkA.tar.gz
10. Natural Language Processing with Python: Analyzing Text with the Natural Language Toolkit 1st Edition; Steven Bird , Ewan Klein , Edward Loper
11. Machine Translation ; Pushpak Bhattacharyya ; Chapman and Hall/CRC; 2015

Course Outcomes:

After successful completion of the course, Student shall be able to:

CO1: Develop Tamil Computing Tools.	K2, K5
CO2: Analyse sentences using Shallow Parser.	K5
CO3: Extract Syntactic information using Deep Parser.	K4
CO4: Apply Machine Translation.	K3
CO5: Develop Tamil Corpus.	K4,K5

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	M	S	M	M	S	M	M	M	S
CO2	M	S	S	M	M	M	M	S	M	M
CO3	M	M	S	S	S	M	S	M	M	S
CO4	S	M	S	M	M	S	M	M	M	S
CO5	M	M	S	S	S	M	S	M	M	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks **W-Weakly Correlating - 1 Mark**

COURSE CODE	P21CSE413	CHOICE - III	L	T	P	C
ELECTIVE - I		CLIENT SERVER COMPUTING	4	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Objectives	• To Learn about Client/Server Computing: An Introduction, features objective evaluations and details of Client/Server development tools, used operating system, • To know about database management system and its mechanism in respect of Client/Server computing • To Study about network components used in order to build effective Client/Server applications. • To provide the basic concepts of client server computing and the new technologies involved

UNIT I –INTRODUCTION

Introduction-Classification of Client/Server System: Two-tier Client/Server Model-Three-tier Client/Server Model-Client/Server Advantages and Disadvantages. Driving Forces behind Client/Server Computing: Driving Forces-Development of Client/Server Systems- Client/Server Standards- Client/Server Security-Improving Performance of Client/Server Applications-Downsizing and Rightsizing-Client/Server Methodology.

UNIT II: ARCHITECTURE OF CLIENT/SERVER SYSTEMS

Components - Principles behind Client/Server Systems - Client Components-Server Components - Communications Middleware Components - Architecture for Business Information System - Existing Client/Server Architecture.

CLIENT/SERVER AND DATABASES

Client/Server in Respect of Databases-Client/Server Database Architecture-Database Middleware Component-Access to Databases-Distributed Client/Server Database Systems-Distributed DBMS

UNIT III: CLIENT/SERVER APPLICATION COMPONENTS

Technologies for Client/Server Application-Service of a Client/Server Application-Categories of Client/Server Applications-Client Services-Server Services-Client/Server Application: Connectivity-Client/Server Application: Layered Architecture.

UNIT IV: SYSTEM DEVELOPMENT

Hardware Requirements-Software Requirements-Communication Interface Technology: Network Interface Card, LAN Cabling, WAN, ATM, Ethernet, Token Ring, FDDI, TCP/IP, SNMP, NFS, SMTP

UNIT V: CLIENT/SERVER TECHNOLOGY AND WEBSERVICES

Web Services History - Web Server Technology - Web Server - Web Server Communication - Role of JAVA for Client/Server on Web - Server Technology - Client/Server Technology and Web Applications - Server's Changing Role.

FUTURE OF CLIENT/SERVER COMPUTING: Technology of Next Generation - Enabling Technology - Client/Server Computing and the Intranet – Transformational System.

TEXT BOOK

1. Subhash Chandra Yadav, Sanjay Kumar Singh: An Introduction to Client/Server Computing, New Age International Publishers, 2009.

REFERENCES

1. Alex Berson, Client Server Architecture, McGraw Hill, 1992.
2. Patrick Smith, Steve Guengerich: Client Server Computing, Second Edition, Prentice Hall of India Pvt Ltd., 2011.
3. Robert Orfali, Dan Harkey and Jerri Edwards: Essential Client/Server Survival Guide, John Wiley &Sons Inc, 1996

COURSE OUTCOMES

CO1: Comprehend the basic concepts of the client-server model. K1
CO2**:** Understand how Client-Server systems work K2
CO3: Differentiate between two-tier and three-tier architectures. K3
CO4: Improve the performance and reliability of Client Server based systems. K3
CO5: Identify security and ethical issues in Client Server Computing K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	S	S	M	S	S	S
CO2	M	S	M	S	S	M	M	S	S	S
CO3	S	M	M	M	M	M	S	S	M	S
CO4	M	M	S	S	S	M	M	M	S	S
CO5	S	M	S	S	S	S	M	M	M	M

S – Strongly Correlating - 3 Marks **M- Moderately Correlating - 2 Marks**
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSE421	CHOICE -I	L	T	P	C
ELECTIVE -II		BIG DATA ANALYTICS	4	-	-	4
Cognitive Level	K1: Recall	K2: Understand K3: Apply K4: Analyze				
OBJECTIVES	• To understand and the basic concepts of Big Data • To understand about analytics and the purpose of it • To understand the Big Data Technologies. • To develop the critical thinking and analytical approach by using Hadoop.					

UNIT I: Introduction to Big Data

Introduction- Types of Digital Data: Classification of Digital Data, Introduction to Big Data: Characteristics of data - Evolution of Big data - Challenges of Big data - Other Characteristics of Data Which are not Definitional Traits of Big Data-Why Big Data? – Are we Just an Information Consumer or Do we also produce Information?-Traditional Business Intelligence (BI) versus Big Data – A Typical Data Warehouse Environment – A Typical Hadoop Environment – What is New Today? – What is changing in the Realms of Big Data?

UNIT – II :Analytics Basics:

Big Data Analytics: Where do we Begin? – What is Big Data Analytics? – What Big Data Analytics Isn't? – Why this Sudden Hype Around Big Data Analytics? Classification of Analytics – Greatest Challenges that Prevent Business from capitalizing on Big Data – Top Challenges Facing Big Data – why is Big Data Analytics Important? – What kind of Technologies are we looking Toward to Help Meet the Challenges Posed by Big Data? – Data Science – Data Scientist…Your New Best Friend – Terminologies Used in Big Data Environments – Basically available Soft State Eventual Consistency (BASE) – Few Top Analytics Tools

UNIT – III: Big Data Technologies:

The Big Data Technology Landscape: NoSQL (Not Only SQL) -Hadoop, Introduction to Hadoop: Introducing Hadoop – Why Hadoop? – Why not RDBMS? –RDBMS versus Hadoop – Distributed Computing Challenges – History of Hadoop – Hadoop Overview–Use Case of Hadoop – Hadoop Distributors – HDFS (Hadoop Distributed File System) Processing Data with Hadoop – Managing Resources and Applications with Hadoop YARN (Yet another Resource Negotiator) – Interacting with Hadoop Ecosystem.

UNIT – IV: Introduction to MAPREDUCE Programming

Introduction – Mapper – Reducer –Combiner – Partitioner – Searching – Sorting – Compression, Introduction to Hive: What is Hive? – Hive Architecture – Hive Data Types – Hive File Format – Hive Query Language (HQL) –RC File Implementation – SerDe – User – Defined Function (UDF).

UNIT – V: Analytical Algorithms

Analytical Algorithms: Introduction to Machine Learning – Machine Learning Algorithms.

TEXT BOOKS:

1. SeemeAcharya, and SubhashiniChellappan, "Big Data and Analytics", Wiley India Pvt. Ltd., First Edition-2015.

REFERENCE BOOKS:

1. Nathan Marz, and James Warren, "Big Data – Principles and best practices of scalable real–time data systems", Manning Publication cp., USA-2015.
2. Bart Baesens, "Analytics in a Big Data World: The Essential Guide to Data Science and its Applications", Wiley Indi a Pvt. Ltd - 2015.
3. Jared Deamn,"Big Data, Data Mining and Machine Learning" ,Willey India Pvt. Ltd, 2015.

COURSE OUTCOMES

CO1**:** Describe the basics of Big Data, Types of Data and Data Warehouse Environment K1
CO2**:** Understand the Data Analytics, Evolution, Importance, Tools, Technology and Data Science K3
CO3**:** Analyze the technologies and comparison of No SQL, RDMS, Hadoop, and YARN K2
CO4**:** Analyze the working methodology of Map Reduce and Hive Query Language K4
CO5**:** Implement the Machine Learning Algorithms K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO1	PSO2	PSO 3	PSO 4
CO1	S	S	M	S	M	M	M	S	S	M
CO2	S	S	M	S	M	M	M	S	S	S
CO3	S	S	S	S	M	M	M	S	M	S
CO4	S	S	S	S	M	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	M	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSE422	CHOICE - II	L	T	P	C
ELECTIVE - II		SOFT COMPUTING	4	-	-	4

Cognitive Level	**K1:** Recall **K2:** Understand **K3:** Apply **K4:**Analyse
Objectives	• To give students knowledge of soft computing theories fundamentals, • To learn the fundamentals of non-traditional technologies and approaches for solving hard real-world problems. • To learn and apply artificial neural networks, fuzzy sets and fuzzy logic, and genetic algorithms in problem solving and use of heuristics based on human experience • To introduce the ideas of fuzzy sets, fuzzy logic to become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems

UNIT I: Introduction to Soft Computing

Introduction, Artificial Intelligence, Artificial Neural Networks, Fuzzy Systems, Genetic Algorithm and Evolutionary Programming, Swarm Intelligent Systems, Expert Systems.

UNITII:Introduction Neural network:

Artificial Neural Networks – First Generation - Introduction to Neural Networks, Biological Inspiration, Biological Neural Networks to Artificial Neural Networks, Classification of ANNs, First-generation Neural Networks.

UNITIII:Introduction fuzzy logic:

Fuzzy Logic – Introduction to Fuzzy Logic, Human Learning Ability, Imprecision, and Uncertainty, Undecidability, Probability Theory vs. Possibility Theory, Classical Sets and Fuzzy Sets, Fuzzy Set Operations, Fuzzy Relations, Fuzzy Composition**.**

UNITIV:Introduction Genetic Algorithms:

Genetic Algorithms and Evolutionary Programming – Introduction to Genetic Algorithms, Genetic Algorithms, Procedures of GAs, Genetic Representations, Selection, Genetic Operators, Mutation, Natural Inheritance Operators.

UNITV:Introduction to Swarm Intelligence:

Introduction to Swarm Intelligence – Background of Swarm Intelligent Systems, Ant Colony System, Ant Colony Optimization.

TEXTBOOK(S):

1. N.P.Padhy, S.P.Simon, 'Soft computing with MATLAB programming' Oxford University Press, First Edition, 2015

REFERENCEBOOK(S):

1. S.N.Sivanandam and S.N.Deepa, Principles of Soft computing, Wiley India Edition, 2nd Edition, 2013.
2. Simon Haykin, Neural Networks, Pearson Education, 2003.
3. John Yen & Reza Langari, Fuzzy Logic – Intelligence Control & Information , Pearson Education, New Delhi, 2003

4. N.P.Padhy, Artificial Intelligence and Intelligent Systems Oxford University Press,2013.

COURSE OUTCOMES

CO1**:** Introduce the basic concepts and techniques of Soft Computing K2
CO2: Differentiate Biological and Artificial Neural Network and Explain the types of Neural Networks K3
CO3: Analyze various fuzzy models in developing fuzzy inference systems to be appropriate with specific real time problems K4
CO4: Use genetic algorithms to combinatorial optimization problems K1
CO5: Discuss the Optimization techniques Swam Intelligence and Antcolony optimization K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	S	M	M	S	S	M
CO2	S	S	M	S	M	M	M	S	S	S
CO3	S	S	S	S	M	M	M	S	S	S
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	M	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks W- Weakly Correlating - 1 Mark

COURSE CODE	P21CSE423	CHOICE - III	L	T	P	C
ELECTIVE - II		WIRELESS SENSOR NETWORKS	4	-	-	4

Cognitive Level	**K1:** Recall**K2:** Understand**K3:** Apply**K4:**Analyse
Objectives	● To study the concepts of sensor networks. ● To study the research issues in different layers of sensor networks ● To program sensor motes using data centric Programming. ● To design and Develop wireless sensor node

UNIT I: Introduction:
The vision, Networked wireless sensor devices, Applications, Key design challenges. Network deployment: Structured versus randomized deployment, Network topology, Connectivity, Connectivity using power control, Coverage metrics, Mobile deployment.

UNITII: Localization:
Issues & approaches, Coarse – grained & Fine – grained node localization, Network - wide localization, Theoretical analysis of localization techniques. Synchronization: Issues & Traditional approaches, Fine – grained clock synchronization, and Coarse – grained data synchronization.

UNITIII: Wireless characteristics:
Basics, Wireless link quality, Radio energy considerations, SINR capture model for interference. Medium - access and sleep scheduling: Traditional MAC protocols, Energy efficiency in MAC protocols, Asynchronous sleep techniques, Sleep – scheduled techniques, and Contention – free protocols.

UNITIV: Sleep – based topology control:
Constructing topologies for connectivity, constructing topologies for coverage, SetK – cover algorithms. Routing: Metric – based approaches, Routing with diversity, Multi-path routing, Lifetime-maximizing energy – aware routing techniques, Geographic routing, Routing to mobile sinks.

UNIT V: Data-centric networking:
Data-centric routing, Data-gathering with compression, Querying, Data-centric storage and retrieval, the database perspective on sensor networks. Reliability and congestion control: Basic mechanisms and tunable parameters, Reliability guarantees, Congestion Control, Real-time scheduling.

TEXTBOOK(S):
1. Daniel Minoli, TaiebZnati, Wireless Sensor Networks: Technology, KazemSohraby, Protocols, and Applications, Wiley Inter Science, 2007.

COURSE OUTCOMES

CO1: Discuss about Networked wireless sensor devices, design challenges and topology K1
CO2: Analyze the Localization, synchronization issues and approaches K2
CO3: Understand the wireless characteristics, MAC protocols and contention free protocols K2

CO4: Construct topology for connectivity, coverage and routing techniques. K3
CO5: Discuss about the data centric routing and Reliability and congestion control K4

MAPPING OF COs WITH POs AND PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	S	M	M	S	S	M
CO2	S	S	M	S	M	M	M	S	S	S
CO3	S	S	S	S	M	M	M	S	S	S
CO4	S	S	S	S	S	S	M	S	M	S
CO5	S	S	M	S	S	S	M	S	M	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

NON MAJOR ELECTIVE
OFFERED FOR OTHER DEPARTMENT STUDENTS

COURSE CODE	P21CSN211	CHOICE – I	L	T	P	C
SEMESTER - II		C PROGRAMMING	4	-	-	4

Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze
Objectives	• To introduce students to the basic knowledge of programming fundamentals of C language. • To impart writing skill of C programming to the students and solving problems. • To impart the concepts like looping, array. • To impart the knowledge on functions and pointers.

Lab Exercise:

Simple Programs:

1. Finding the largest, smallest among three numbers
2. Generate the Fibonacci sequence

Control Structures:

1. Find whether a number is prime or not
2. Find whether a given number is a perfect or not
3. Find the factorial of a number

Arrays:

1. Program for Sorting
2. Program to search an element
3. Find whether given string is a palindrome or not
4. Perform the addition of two matrices
5. Perform subtraction of two matrices
6. Perform multiplication of two matrices

Functions:

1. Program to apply Recursion
2. Program for Call by Value

Pointers:

1. Program to perform addition
2. Program for swapping two numbers

Structures:

1. Program to print student information using structures
2. Program for Array of structures

File:

1. Program for applying File operations
2. Program to get n numbers and find odd and even numbers using file.

COURSE CODE	P21CSN212	CHOICE – II	L	T	P	C
SEMESTER - II		PHOTO DESIGNING	4	-	-	4

Cognitive Level	K1: Recall K2: Understand K3: Apply K4: Analyze
Objectives	• Demonstrate knowledge of image resolution, image size, and image file format for web, video, and print. • Demonstrate knowledge of design principles, elements, and image composition. • Demonstrate knowledge of typography • Apply principles of composition to produce professional images

Unit I: Introduction

Getting into Photoshop: Introduction - Best in Photoshop 7.0 - Photoshop Interface-Saving the File-Importing Existing File.

Unit II : Editing and Retouching

Editing and Retouching: Working with Selections-Getting started with the Selection tool-Selection with Rectangle Marquee Tool-Selection with Elliptical Marquee Tool-Moving a Selection-Moving with Keyboard Shortcut-Selection with the Magic Wand-Selection with Lasso Tool-Adding and Subtraction Selection-Selection with the Magnetic Lasso-Transforming a Selection-Combining Selection Tools-Cropping the Completed Image-Quick Mask tool to make Selection-Enabling the Quick Mask Mode-Adjusting Quick Mask Setting-Patch Tool-Paint Tools-Image Color Adjustments.

Unit III: Photoshop

Making Artistic use of Photoshop: Painting Tools-Working with Brushes-Drawing-Eraser Tool-Brushes Palette-Pen Tool-Selecting an Image with Pen Tool-Editing and Cleaning Tools-Clone Stamp Tool-Healing Brush-Image Resizing.

Unit IV: Tools of Photoshop

Building Original Art work: Layers-Creating A Layer -Layer Mask-Transform-Custom shapes -Create Your own Custom shapes.

Unit V: Applications of Photoshop

Transforming Images with Filters: Filters-Text Tool-Text Wrap-Try it.

Text Book:

J. Jenitha, A. Diana, “Adobe Photoshop 7.0 - A Novice Guide” ACCA Publication, 2012.

Reference Book:

1. Deke McClelland, Laurie Ulrich Fuller Robert C. Fuller, "Photoshop CS2 Bible", Photoshop® CS2 Bible, Professional Edition, 2005.
2. “Photoshop CS6 in Simple Steps”, Kogent Learning Solutions Inc, Dreamtech Press, 2013.

COURSE OUTCOMES (CO):

CO1: Understand the different dimensions of digital data. K1
CO2: Apply the concept of data classification on different types of data K2
CO3: Analyze the characteristics of different patterns of data K3
CO4: Implement the concept of bigdata in different scenarios K4
CO5: Utilize relevant applications of tools and technology in the creation, reproduction, and distribution of visual messages. K4

Mapping of COs with POs and PSOs :

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	M	S	M	S	M	M	S	S	M	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	S	S	M	S	M	S	S	S	M	M
CO4	M	S	M	M	S	M	M	S	S	S
CO5	S	M	M	S	M	M	S	M	M	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSN213	CHOICE – III	L	T	P	C
SEMESTER - II		BIG DATA ANALYTICS	4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze				

Objectives	• To study the basic technologies that forms the foundations of Big Data • To understand and apply scaling up machine learning techniques and associated computing techniques andtechnologies. • To identify the characteristics of datasets and compare the trivial data and big data for various applications. • To recognize and implement various ways of selecting suitable model parameters for different machine learningtechniques.

Unit-I: Data Evolution

Data Development Time Line – ICT Advancement-a Perspective – Data Growth-a Perspective – IT Components-Business Process – Landscape-Data to Data Science – Understanding data: Introduction – Type of Data: Numeric – Categorical – Graphical – High Dimensional Data — Data Classification – Hot Data – Cold Data – Warm Data – Thick Data – Thin Data - Classification of digital Data: Structured, Semi-Structured and Un-Structured.

Unit-II: Sources Of Data

TimeSeries–TransactionalData–BiologicalData–SpatialData–SocialNetworkDataData Evolution – Data Sources
Data Science: Data Science-A Discipline – Data Science vs Statistics – Mathematics - Programming Language - Database, - Machine Learning. Data Analytics Relation: Data Science, Analytics, Big Data Analytics.

Unit-III: Data Science Components

Data Engineering, Data Analytics-Methods and Algorithm, Data Visualization Big Data: Introduction To Big Data: - Evolution What is Big Data – Sources of Big Data. Characteristics of Big Data 6Vs – Big data- Challenges of Conventional Systems.

Unit-IV: Data Processing Models
Data Processing Models – Limitation of Conventional Data Processing Approaches – Big Data Myths - Data Discovery-Traditional Approach, Big Data Technology: Big Data Exploration - Data Augmentation – Operational Analysis – 360 View of Customers – Security and Intelligence

Unit-V: Use Cases

Big Data Use cases –Big Data Technology Potentials – Limitations of Big Data and Challenges- Big Data Roles Data Scientist , Data Architect, Data Analyst – Skills – Case Study : Big Data – Customer Insights – Behavioral Analysis – Big Data Applications - Marketing – Retails – Insurance – Risk and Security – Healthcare.

Text Book:

- V. Bhuvaneswari, T. Devi, "Big Data Analytics: A Practitioner‟s Approach" Sci-Tech Publishers Chennai 2016.

Reference Books:

1. Han Hu, Yonggang Wen, Tat-Seng, Chua, XuelongLi,"Toward Scalable Systems forBig data Analytic" (2016)
2. SeemaAcharya, SubhashniChellappan, "Big Data Analytics", Wiley, (2015).

Course Outcomes:

After completing this course, students will be able to:

CO1: Understand the key issues in big data management and its associated applications in intelligent business and scientific computing. K1

CO2: Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NO SQL in big data analytics. K2

CO3: Interpret business models and scientific computing paradigms, and apply software tools for big data analytics. K2

CO4: Ability to identify the characteristics of datasets and compare the trivial data and big data for various applications. K3

CO5: Achieve adequate perspectives of big data analytics in various applications like recommender systems, social media applications etc. K4

Mapping of COs with POs and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	M	S	S	S	M
CO2	S	M	S	M	S	S	M	S	M	M
CO3	S	M	M	M	S	M	S	M	S	S
CO4	M	S	M	S	M	S	S	S	M	M
CO5	M	S	M	S	M	S	M	S	M	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSN214	CHOICE - IV	L	T	P	C
SEMESTER - II		DIGITAL IMAGE PROCESSING	4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze				

Objectives	• To understand the basic fundamental concept of an image • To know the concepts of Image techniques, Sharpe and filtering ideas • To gain the knowledge about image patterns, structures and image compressions • To appreciate the use of current technologies those are specific to image processing systems.

Unit-I: Digital Image Fundamentals

Image formation, Image transforms – Fourier transforms, Walsh, Hadamard, Discrete cosine, Hostelling transforms.

Unit-II: Image Enhancement and Restoration

Histogram modification techniques - Image smoothening – Image sharpening - Image restoration - Degradation model – Noise models- Spatial filtering – Frequency domain filtering

Unit-III: Image compression and segmentation:

Compression Models - Elements of information theory - Error free compression - Image segmentation – Detection of discontinuities - Edge linking and boundary detection – Thresholding – Region based segmentation –Morphology

Unit- IV: Representation and description:

Representation schemes – Boundary descriptors – Regional descriptors –Relational descriptors

Unit- V: Object Recognition and Interpretation

Patterns and pattern classes - Decision - Theoretic methods -Structural methods.

Text Book:

1.Gonzalez, R.C., Woods, R.E., “Digital Image Processing”, 2nd Edition, Pearson Education,2002.

Reference Books:

1.Anil Jain, K., “Fundamentals of Digital image Processing” , Prentice all ofIndia,1989.

2.SidAhmed, “Image Processing”, McGraw Hill, New York,1995.

Course Outcomes:

After completing this course, students will be able to:

CO1: To remember the basic image concepts. K1
CO2: To know the image sharpens enhancement and compression models. K2
CO3: To apply various image techniques like edge linking and boundary detection. K3
CO4: To analyze basic requirements of image processing like structure, compression and resolution. K4
CO5: Understand the role of image segmentation, various color models and color image transformation K4

Mapping of COs with POs and PSOs :

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	S	S	S	S	S	S
CO2	M	M	S	M	S	S	M	S	M	S
CO3	S	M	S	M	M	S	S	M	S	S
CO4	S	S	M	S	S	M	S	S	M	M
CO5	S	M	M	M	S	S	M	M	S	M

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSN215	CHOICE - V	L	T	P	C
SEMESTER - II		MOBILE COMPUTING	4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze				

Objectives	• To learn the basic concepts of Mobile Computing and its Applications. • To provide various emerging technologies in Mobile computing services. • To gain knowledge about GSM, GPRS, CDMA and 3G. • To study the specifications and functionalities of various protocols/standards of mobile networks.

Unit I:Introduction

Mobility of bits and bytes, wireless- The beginning, mobile computing – Networks – Middleware and Gateways – Application and Services – Developing Mobile computing Applications – Security in Mobile Computing.

Unit II **Mobile Computing Architecture**

History of Computers – History of Internet – Internet – The ubiquitous network – Architecture for Mobile Computing– Three Tire Architecture - Design consideration for Mobile Computing- Mobile Computing through Internet – Making existing Applications Mobile –Enabled

Unit - III **Mobile Communication**

Global System For Mobile Communication (GSM): Global system for Mobile Communication- GSM Architecture – GSM entities – Call routing in GSM, PLMN Interface – GSM Address Identifiers – Network aspects in GSM- GSM frequency allocation – Authentication and Security. Short Message Service (SMS) : Mobile Computing over SMS - Short Message Service- Value added services through SMS – Accessing the SMS bearer.

Unit – IV: **General Packet Radio Service (GPRS)**

General Packet Radio Service (GPRS) : Introduction – GPRS and packet data network – GPRS network architecture – GPRS network operations – Data services in GPRS – Applications for GPRS- limitations of GPRS – Billing and Charging in GPRS. Wireless Application Protocol (WAP): Introduction – WAP – MMS- GPRS application

Unit V **CDMA AND 3G**

CDMA AND 3G : Introduction – Spread spectrum technology – IS 95- CDMA versus GSM – Wireless data–Third generation network – Application on 3G. WIRELESS LAN : Introduction – Wireless LAN advantages – IEEE 802.11 standards – Wireless LAN architectures – Mobility in Wireless LAN – Deploying Wireless LAN – Mobile Ad-hoc network and sensor network – Wireless LAN Security – WiFi versus 3G.

Text Book:

1.AshokTalukder,RoopaRYavagal,"MobileComputing",TataMcGrawHillPublishingCompanyLtd, 2005.

Reference Books:

1. Jochen Schiller, (2004), "Mobile Communications", Second Edition, Addision Wesely Publications.
2. UWE Hansmann, Lother Merk, Martin.S, (2006), "Principles of Mobile Computing", Second Edition, Springer publications.
3 Jeyasri Arokiamary,(2005), "Mobile Communications", First Edition, Anuradha Agencies.

Course Outcomes :

After completing this course, students will be able to:

CO1: To member the concept of Wireless LANs, PAN, Mobile Networks K1
CO2: To understand positioning techniques of location-based services and applications K2
CO3: To apply all techniques used in the GSM and GPRS K3
CO4: To analyze CDMA and wireless LANS. K4
CO5: To design a system, component or process as per needs and specifications K3

Mapping of COs with POs and PSOs :

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	S	S	M	S	M
CO2	M	S	S	M	S	S	M	S	S	S
CO3	S	S	M	S	S	M	S	M	S	S
CO4	M	S	M	S	S	S	S	S	S	M
CO5	S	M	M	M	S	S	M	S	M	M

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSN216	CHOICE - VI	L	T	P	C
SEMESTER - II		DATA COMMUNICATION AND NETWORKING	4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze				

Objectives:

- To educate the concepts of terminology and concepts of the OSI reference model and the TCP/IP reference model and protocols such as TCP, UDP and IP.
- To be familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide areanetworks.
- Introduce the student to a network routing for IP networks and how a collision occurs and how to solve it and how a frame is created and character count of each frame.
- An overview of security issues related to data communication in networks

Unit -I: Introduction

Introduction To Data Communications And Networking: Introduction-Fundamental Concepts - Data Communication – Protocols – Standards – Signal Propagation – Analog and Digital Signals. Information Encoding: Representing Different Symbols – Minimizing Errors - Analog and Digital Transmission Methods – Modes of Data Transmission and Multiplexing. Transmission Errors: Detection and Correction.

Unit-II: Transmission Media

Transmission Media: Guided Media - Unguided Media. Network Topologies: Mesh, Star, Tree, Ring, Bus – Switching: Circuit switching, Message switching, Packet switching. Routing Algorithms: Routers and Routing – Factors affecting Routing Algorithms – Routing Algorithms – Approaches to Routing – Network Protocols and OSI Model

Unit-III: LAN

Local Area Networks (LAN), Metropolitan Area Networks (MAN) and Wide Area Networks (WAN):LAN– Ethernet – MAN – Switched Multimegabit Data Services (SMDS) - WAN – WAN Architecture - WAN Transmission Mechanism - WAN Addressing – Packet Forwarding – Aloha - Integrated Services Digital Network (ISDN) – X.25 Protocol – Frame Relay.

Unit-IV: ATM

ynchronous Transfer Mode (ATM) - Internetworking Concepts, Devices, Internet Basics, History and Architecture – An Introduction to TCP / IP, IP, ARP, RARP, ICMP.

Unit-V: Transmission Control Protocol

Features of TCP, Relationship between TCP and IP *, Ports and Sockets, TCP connections, What makes TCP Reliable, TCP Packet Format – User Datagram Protocol (UDP): UDP Packet, Difference between UDP and TCP – Domain Name System (DNS) – Electronic Mail (Email) – File Transfer Protocol (FTP).

Text Book:

1. Achyut S. Godbole, (2007), “Data Communications and Networks”, Ninth reprint, Tata McGraw- Hill Publishing Company Limited.

Reference Books:

1. Behrouz A. Forouzan, (2007), “Data Communications and Networking”, Second Edition Update, Nineteenth reprint, Tata McGraw-Hill Publishing Company Limited.
2. Andrew S. Tanenbaum, (2001), “Computer Networks”, Third Edition, Prentice Hall

Course Outcomes :

After completing this course, students will be able to:

CO1: Understand the basics of data communication, networking, internet and their importance. K1
CO2: Understand Internet structure and can see how standard problems are solved and the use of cryptography and network security K2
CO3: Apply knowledge of different techniques of error detection and correction to detect and solve error bit during data transmission. K3
CO4: Identify the basic security threats of a network K4
CO5: Analyze TCP/IP and their protocols. K4

Mapping of COs with POs and PSOs :

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	S	S	M	S	M	S	S	S
CO2	S	S	S	M	S	S	S	M	S	S
CO3	M	S	M	M	S	S	S	S	M	M
CO4	S	S	M	S	S	M	M	S	S	S
CO5	M	S	M	M	S	M	S	M	S	M

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks
W-Weakly Correlating - 1 Mark

COURSE CODE	P21CSN217	CHOICE – VII	L	T	P	C
SEMESTER - II		CLOUD COMPUTING	4	-	-	4
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze				

Objectives	• To understand the basic knowledge about the cloud computing techniques and architecture. • To gain knowledge of cloud services and cloudsecurity. • To be able to understand Cloud Segment, Cloud Deployment Models and key cloud companies. • Identify and define technical challenges for cloud applications and assess their importance.

Unit –I: Introduction

Introduction - cloud computing at a glance – Historical development – Building cloud computing environment.

Unit-II: Parallel and Distributed Computing

Principles of parallel and distributed computing – Eras of computing – parallel Vs distributed computing – Elements of parallel computing – Elements of distributed computing – Technologies for distributed computing.

Unit-III: Architecture of Cloud Computing

Cloud Computing Architecture: Introduction – Cloud reference model – Types of clouds – Organizational aspects.

Unit-IV: Applications of Cloud Computing

Cloud Applications: Scientific Applications: Healthcare –Business and Consumer Applications: CRM and ERP – Media Applications – Multiplayer Online gaming

Unit-V:Cloud Security

Cloud Security – Cloud Computing Concept – Cloud Risk – Cloud Security Tools and Techniques – Data Production in Cloud – Cloud Storage – Data Loss Prevention – Cloud Application Security – Security Assertion Markup Language.

Text Books:

1.RajkumarBuyya, Christian vecchiola , Thamaraiselvi, (2013), "Mastering Cloud computing", Mc Gram Hill Publication. (UNIT – I to UNIT–IV)

2.CharlesP.Pfleeger, Shari Lawrence Pfleeger, DevenN.Shan, (2007), "Security in Computing", Fourth Edition, Prentice Hall Publication. (UNIT–V)

Reference Book:

1. Judith Hurwitz, Robin Bloon, (2009), "Cloud Computing for Dummies"

Course Outcomes:

After completing this course, students will be able to:

CO1: Identify the architecture and infrastructure of cloud computing including SaaS, PaaS, IaaS, public cloud, private cloud, and hybrid cloud. K1

CO2: Understand the core issues of cloud computing, security, privacy, and inter operability.K2

CO3: Apply the appropriate technologies and approaches for the related issues in Cloud Computing. K3

CO4: Analyze the suitable cloud computing solutions and recommendations according to the applications used. K4

CO5: Learn the Concept of Cloud Infrastructure Model. K1

Mapping of COs with POs and PSOs :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4
CO1	S	S	M	S	M	S	M	S	M	S
CO2	S	S	M	S	S	M	M	S	S	S
CO3	S	M	M	M	S	M	M	S	M	S
CO4	M	M	S	S	M	S	M	M	S	S
CO5	S	S	M	M	M	S	M	S	M	S

S – Strongly Correlating - 3 Marks M- Moderately Correlating - 2 Marks

W-Weakly Correlating - 1 Mark

VALUE ADDED PROGRAMME

COURSE CODE	P21CSV11	BIG DATA ANALYTICS LAB	L	T	P	C
SEMESTER - I			-	-	-	2
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze				

Objectives:	• Conceptualization and Summarization of big data • Trivial data versus big data • Big data computing technologies • Machine learning techniques and Scaling up machine learning approaches

1. Installation of Hadoop:

   Three modes of Installation

   Stand Alone Mode:

   Pseudo Distributed Mode:

   Fully Distributed Mode

2. *Weather Report POC-Map Reduce Program to analyse time – temperature statistics and generate report with max/min temperature.*

   Problem Statement:

   1.The system receives temperatures of various cities (Austin, Boston, etc) of USA captured at regular intervals of time on each day in an input file.

   2.System will process the input data file and generates a report with Maximum and Minimum temperatures of each day along with time.

   3.Generateaseparateoutputreportforeachcity.Ex:Austin-r-00000 Boston-r-00000 Newjersy-r-00000 Baltimore-r-00000 California-r-00000 Newyork-r-00000

3. Implementing Matrix Multiplication with HadoopMapReduce

4. Pig Latin Scripts to sort, group, join, project, and filter our data.

5. Hive Databases, Tables, Views, Functions and Indexes

6. Hive Functions:
   a. Built-in Functions
      1. Collection Functions
      2. Date Functions
      3. Mathematical Functions
      4. Conditional Functions
      5. String Functions
      6. Miscellaneous Functions

   b. UDFs (User Defined Function)

COURSE CODE	P21CSV42	SOFTCOMPUTING LAB	L	T	P	C
SEMESTER - IV			-	-	-	2
Cognitive Level		K1: Recall K2: Understand K3: Apply K4: Analyze				

Objectives:	• Introduce Neural Networks, architecture, functions and various algorithms involved • Introduce Fuzzy Logic, Various fuzzy systems and their functions. • Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory. • Introduce students to artificial neural networks and fuzzy theory from an engineering perspective

Section-A(FuzzyLogic)

1. a) Write a program (m.file) to calculate union, intersection, complement and difference of two fuzzy sets.
   b)Write a program (m.file) to calculate the Demorgan's Law.
2. Find whether the given matrix is (a) reflexive (b) tolerance and (c) transitivity matrix or not.
3. Find whether the given matrix is symmetry or not.
4. Find the fuzzy relation between two vectors *R* and *S*

R=
0.7 0.5
0.8 0.4
S =
0.9 0.6 0.2
0.1 0.7 0.5
Using max–product and max-min method

5. a) Use command line commands to display the Gaussian membership function. Given x =0–10 with increment of 0.1 and Gaussian function is defined between 0.5 and −5. b) Use command line commands to display the triangular membership function. Given x = 0–10withincrement of0.2triangularmembership function is defined between [3 4 5].
6. Illustrate different types of generalized bell membership functions using a program
7. Using program, find the crisp lambda cutset relations for λ=0.2,the fuzzy matrix is given by

R=
0.2 0.7 0.8 1
1 0.9 0.5 0.1
0 0.8 1 0.6
0. 0.4 1 0.3

8. Temperature control of the reactor where the error and change in error is given to the controller. Here the temperature of the reactor is controlled by the temperature bath around the reactor thus the temperature is controlled by controlling the flow of the coolant into the reactor. Form the membership function and the rule base using FIS editor.
9. Consider the water tank with following rules
   a) IF (level is okay) THEN (valve is no_change)(1)

b) IF (level is low) THEN (valve is open_fast)(1)
c) IF (level is high) THEN (valve is close_fast)(1)

Using Mamdani method and max–min method for fuzzification and method of centroid for de-fuzzification method construct a FIS. Before editing that rules, membership functions must be defined with membership function editor.

10. a)Formal fuzzy system, which approximates function *f*, when *x*[−10,10].Repeat the same by adding random, normally distributed noise with zero mean and Unit variance.

    b)Simulate the output when the input is sin(*t*). Observe what happens to the signal shape at the output.

11. Use Fuzzy Logic Toolbox to model the tip given after a dinner for two, where the food can be disgusting, not good, bland, satisfying, good, or delightful, and the service can be poor, average, or good. To get started, you type fuzzy in a window. Then use the fuzzy inference system and membership function editors to define and tune your rules.

Section-B (Neural Network)

12. Design networks of McCulloch –Pitts neurons that implement logical NOT, AND and OR gates. Draw each network and label all the weight and threshold values.

13. Derive expressions for the weights and thresholds of a McCulloch – Pitts neuron that can compute the following input-output mappings:
    *in1 in2 out.*Write code for the above ANN.

14. Investigate the use of back-propagation learning using asigmoidal non-linearity to achieve one-to-one mapping, as described here:

1.f(x) =1/x	1	≤x≤100
2.f(x) =log10x,	1	≤ x ≤ 10
3.f(x)=exp(-x),	1	≤ x ≤ 10
4.f(x) =sinx,	0	≤ x ≤ π/2

For each mapping, do the following:

(a) Set up two sets of data, one for network training, and the other for testing.
(b) Use the training data set compute the synaptic weights of the network, assumed to have a single hidden layer.
(c) Evaluate the computation accuracy of the network by using the test data. Use a single layer but with a variable number of hidden neurons. Investigate how the net work performance is affected by varying the size of the hidden layer.

15. The data presented in the Table P4.17 show the weights of eye lenses of wild Australian rabbits as a function of age. No simple analytical function can exactly interpolate these data, because we do not have a single valued function. Instead, we have a nonlinear least squares model of this dataset, using a negative exponential, as described by Y =2.33.846(1– exp(-0.006042x))

16. Using the back - propagation algorithm, design a multiplayer perceptron that provides a non linear least - squares approximation to this data set. Compare your result against the least – sequence model described.

TableP4.17Weights of Eye Lenses of Wild Australian Rabbits

Ages	Weights	Ages	Weights	Ages	Weights	Ages	Weights

(days)	(mg)	(days)	(mg)	(days)	(mg)	(days)	(mg)
15	21.66	75	94.6	218	174.18	338	203.23
15	22.75	82	92.5	218	173.03	347	188.38
15	22.3	85	105	219	173.54	354	189.7
18	31.25	91	101.7	224	178.86	357	195.31
28	44.79	91	102.9	225	177.68	375	202.63
29	40.55	97	110	227	173.73	394	224.82
37	50.25	98	104.3	232	159.98	513	203.3
37	46.88	25	134.9	232	161.29	535	209.7
44	52.03	142	130.68	237	187.07	554	233.9
50	63.47	142	140.58	26	176.13	591	234.7
50	61.13	147	155.3	258	183.4	648	244.3
60	81	147	152.2	276	186.26	660	231
61	73.09	150	144.5	285	189.66	705	242.4
64	79.09	159	142.15	300	186.09	723	230.77
65	79.51	165	139.81	301	186.7	756	242.57
65	65.31	183	153.22	305	186.8	768	232.12
72	71.9	192	145.72	312	195.1	860	246.7
75	86.1	195	161.1	317	216.41		

Section –C (Genetic Algorithm)

17. Write a program to implement Roulette wheel and ranking selection method.
    a) Write a program to maximize a function f(x,y) = xsin(4 x) + ysin(20x) subject to -3.0

Reference Books:

1.N.P.Padhy, S.P.Simon, Soft computing with P programming, Oxford University Press, First Edition, 2015.

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