

NANDHA ENGINEERING COLLEGE

(An Autonomous Institution affiliated to Anna University Chennai and approved by AICTE, New Delhi)
Erode-638 052, Tamilnadu, India, Phone: 04294 – 225585



Curriculum and Syllabi

for

B.E – Electrical and Electronics Engineering [R22]

[CHOICE BASED CREDIT SYSTEM]

(This Curriculum and Syllabi are applicable to Students admitted from the academic year (2022-23) onwards)

AUGUST 2022

INSTITUTE VISION AND MISSION	
VISION	<ul style="list-style-type: none"> • To be an Institute of excellence providing quality Engineering, Technology and Management education to meet the ever changing needs of the society.
MISSION	<ul style="list-style-type: none"> • To provide quality education to produce ethical and competent professionals with social Responsibility • To excel in the thrust areas of Engineering, Technology and Entrepreneurship by solving real- world problems. • To create a learner centric environment and improve continually to meet the changing global needs.

B.E – ELECTRICAL AND ELECTRONICS ENGINEERING	
VISION	<ul style="list-style-type: none"> • To foster academic excellence imparting knowledge in Electrical, Electronics and allied disciplines to meet the changing needs of the society.
MISSION	<ul style="list-style-type: none"> • To equip the students with leadership qualities for accepting the challenges in various engineering sectors • To excel in the thrust areas of Electrical and Electronics Engineering to solve real world problems • To empower the students to adapt the latest technologies by providing innovative learning environment
PROGRAMME EDUCATIONAL OBJECTIVES (PEO)	<p>The graduates of Electrical and Electronics Engineering will be</p> <p>PEO1: Core Competency: A Successful professionals with domain knowledge in Electrical and Electronics Engineering using emerging techniques.</p> <p>PEO2: Research, Innovation and Entrepreneurship: Able to demonstrate multi-disciplinary skills through innovation and research to meet the societal needs</p> <p>PEO3: Ethics, Human values and Life-long learning: Able to demonstrate ethical practices and managerial skills through continual learning.</p>
PROGRAMME SPECIFIC OUTCOMES (PSO)	<p>The students of Electrical and Electronics Engineering will be able to</p> <ul style="list-style-type: none"> • Analyze, design and validate processes, products by applying knowledge and skills in Power system, Electrical Machines and Power Electronics. • Design and analyze the processes of smart grid and renewable energy systems using appropriate tools and techniques

PROGRAM OUTCOMES:

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

a-l	GRADUATE ATTRIBUTES	PO No.	PROGRAMME OUTCOMES
a	Engineering Knowledge	PO1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b	Problem Analysis	PO2	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c	Design and Development of Solutions	PO3	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
d	Investigation of Complex Problems	PO4	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
e	Modern Tool Usage	PO5	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
f	The Engineer and Society	PO6	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
g	Environment and Sustainability	PO7	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
h	Ethics	PO8	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
i	Individual and Team Work.	PO9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
j	Communication	PO10	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
k	Project Management and Finance	PO11	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
l	Lifelong Learning	PO12	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES WITH PROGRAMME OUTCOMES

A broad relation between the Programme Educational Objectives and the outcomes is given in the following table

PROGRAMME EDUCATIONAL OBJECTIVES	PROGRAMME OUTCOMES											
	A	B	C	D	E	F	G	H	I	J	K	L
1	3	3	3	3	3	2	2	1	2	2	3	2
2	2	3	3	2	3	3	2	2	3	2	3	2
3	3	2	1	1	2	2	2	3	3	3	2	3

MAPPING OF PROGRAM SPECIFIC OUTCOMES WITH PROGRAMME OUTCOMES

A broad relation between the Program Specific Objectives and the outcomes is given in the following table

PROGRAM SPECIFIC OUTCOMES	PROGRAMME OUTCOMES											
	A	B	C	D	E	F	G	H	I	J	K	L
1	3	3	3	3	2	2	2	2	2	2	2	3
2	3	3	2	3	3	2	2	2	2	2	2	3

Contribution

1: Reasonable

2: Significant

3: Strong

SEMESTER: I									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
1	22MAN01	Induction Programme	MC	-	-	-	-	-	-
THEORY									
2	22EYA01	Professional Communication - I	HSMC	-	4	2	0	2	3
3	22MYB01	Calculus and Linear Algebra*	BSC	-	4	3	1	0	4
4	22CYB04	Engineering Chemistry	BSC	-	3	3	0	0	3
5	22CSC01	Problem Solving and C Programming	ESC	-	3	3	0	0	3
6	22MEC01	Engineering Graphics	ESC	-	4	2	0	2	3
7	22GYA01	தமிழர் மரபு / Heritage of Tamils*	HSMC	-	1	1	0	0	1
PRACTICAL									
8	22GEP01	Engineering Practices Laboratory	ESC	-	4	0	0	4	2
9	22CSP01	Problem Solving and C Programming Laboratory	ESC	-	4	0	0	4	2
10	22CYP01	Chemistry Laboratory*	BSC	-	2	0	0	2	1
Mandatory Non Credit Courses									
11	22MAN02	Soft /Analytical Skills - I	MC	-	3	1	0	2	0
12	22MAN03	Yoga - I*	MC	-	1	0	0	1	0
TOTAL					33	15	1	17	22

*Ratified by Eleventh Academic council

SEMESTER: II									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22EYA02	Professional Communication- II	HSMC	22EYA01	4	2	0	2	3
2	22MYB03	Statistics and Numerical methods*	BSC	-	4	3	1	0	4
3	22PYB03	Solid State Physics	BSC	-	3	3	0	0	3
4	22CSC02	Data structures using C*	ESC	22CSC01	3	3	0	0	3
5	22EEC03	Electric Circuit Theory	PCC	-	3	2	1	0	3
6	22GYA02	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology*	HSMC	-	1	1	0	0	1
PRACTICAL									
7	22CSP02	Data Structures Laboratory*	ESC	22CSP01	4	0	0	4	2
8	22PYP01	Physics Laboratory	BSC	-	2	0	0	2	1
9	22EEP01	Electric Circuits Laboratory	PCC	-	4	0	0	4	2
Mandatory Non Credit Courses									
10	22MAN04	Soft /Analytical Skills - II	MC	-	3	1	0	2	0
11	22MAN05	Yoga - II*	MC	-	1	0	0	1	0
TOTAL					32	15	2	15	22

* Ratified by Eleventh Academic Council

SEMESTER: III										
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C	
THEORY										
1	22MYB07	Probability and Complex functions	BSC	-	4	3	1	0	4	
2	22EEC05	Electronic Devices and Circuits	PCC	-	3	3	0	0	3	
3	22EEC06	Electrical Machines-I	PCC	22EEC03	3	3	0	0	3	
4	22EEC07	Electromagnetic Fields	PCC	-	3	3	0	0	3	
5	22ITC06	Java Programming	ESC	-	3	3	0	0	3	
6	22EEC08	Digital Logic Circuits	PCC	-	3	3	0	0	3	
PRACTICAL										
7	22EEP02	Electronic Devices and Circuits Laboratory	PCC	-	4	0	0	4	2	
8	22EEP03	Electrical Machines-I Laboratory	PCC	-	4	0	0	4	2	
9	22ITP04	Java Programming Laboratory	ESC	-	4	0	0	4	2	
Mandatory Non Credit Courses										
10	22MAN07	Soft / Analytical Skills - III	MC		3	1	0	2	0	
11	22MAN09	Indian Constitution	MC		1	1	0	0	0	
TOTAL					35	20	1	14	25	

SEMESTER: IV									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22EEC09	Electrical Machines-II	PCC	22EEC06	3	3	0	0	3
2	22EEC10	Analog Integrated circuits	PCC	22EEC05	3	3	0	0	3
3	22EEC11	Power Generation, Transmission and Distribution	PCC	22EEC03	3	3	0	0	3
4	22EEC12	Measurements and Instrumentation	PCC	-	3	3	0	0	3
5	22EEC13	Microprocessor and Microcontroller	PCC	22EEC08	3	3	0	0	3
6	22CYB06	Environmental Science and Sustainability	BSC	-	3	3	0	0	3
PRACTICAL									
7	22EEP04	Electrical Machines-II Laboratory	PCC	22EEP03	4	0	0	4	2
8	22EEP05	Analog and Digital Integrated Circuits Laboratory	PCC	22EEP02	4	0	0	4	2
9	22EEP06	Microprocessor and Microcontroller Laboratory	PCC	-	4	0	0	4	2
Mandatory Non Credit Courses									
10	22MAN08	Soft/Analytical Skills - IV	MC	-	3	1	0	2	0
11	22GED01	Personality and Character Development	EEC	-	0	0	0	1	0
TOTAL					33	19	0	15	24

SEMESTER: V									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22EECI4	Power System Analysis	PCC	22EECI1	4	3	1	0	4
2	22EECI5	Control Systems	PCC	22EEC06, 22EEC09	4	3	1	0	4
3	22EECI6	Power Electronics	PCC	22EEC05	3	3	0	0	3
4	E1	Elective(PEC)	PEC	-	3	3	0	0	3
5	E2	Elective(PEC)	PEC	-	3	3	0	0	3
6	E3	Elective(PEC)	PEC	-	3	3	0	0	3
PRACTICAL									
7	22EEP07	Control and Instrumentation Laboratory	PCC	22EEP03, 22EEP04	4	0	0	4	2
8	22EEP08	Power Electronics Laboratory	PCC	22EEP02	4	0	0	4	2
Mandatory Non Credit Courses									
9	22MAN10	Soft/Analytical Skills - V	MC	-	3	1	0	2	0
10	22MAN11	Certification Course - I	MC	-	1	0	0	1	0
TOTAL					32	19	2	11	24

SEMESTER: VI									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22EECI7	Power System Protection and switch gear	PCC	22EECI1	3	3	0	0	3
2	22EECI8	Electric drives and Control	PCC	22EECI06, 22EECI09	3	3	0	0	3
3	E4	Elective (PEC)	PEC	22EECI16	3	3	0	0	3
4	E5	Elective(PEC)	PEC	-	3	3	0	0	3
5	E6	Elective(PEC)	PEC	-	3	3	0	0	3
6	E7	Elective(OEC)	OEC	-	3	3	0	0	3
PRACTICAL									
7	22EEP09	Power System Simulation Practices Laboratory	PCC	-	4	0	0	4	2
Mandatory Non Credit Courses									
8	22MANI2	Soft/Analytical Skills - VI	MC	-	3	1	0	2	0
9	22MANI3	Certification Course - II	MC	-	1	0	0	1	0
TOTAL					26	19	0	7	20

SEMESTER: VII									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
THEORY									
1	22GEA01	Universal Human Values	HSMC		2	2	0	0	2
2	E8	Elective(OEC)	OEC		3	3	0	0	3
3	E9	Elective(OEC)	OEC		3	3	0	0	3
4	E10	Elective(OEC)	OEC		3	3	0	0	3
5	EMI	Elective(Management)	HSMC		3	3	0	0	3
PRACTICAL									
6	22GED02	Internship/Industrial training	EEC		0	0	0	0	2
TOTAL					14	14	0	0	16

SEMESTER: VIII									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE REQUISITE	CONTACT PERIODS	L	T	P	C
PRACTICAL									
I	22EED01	Project Work	EEC		20	0	0	20	10
TOTAL					20	0	0	20	10

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HS,BS, ES,PC,EEC and Mandatory Courses

• Humanities and Social Sciences (HS)

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE-REQUISITE	CONTACT PERIODS	L	T	P	C
1.	22EYA01	Professional Communication - I	HSMC	-	4	2	0	2	3
2.	22GYA01	தமிழர் மரபு / Heritage of Tamils	HSMC	-	1	1	0	0	1
3.	22EYA02	Professional Communication- II	HSMC	22EYA01	4	2	0	2	3
4.	22GYA02	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HSMC	-	1	1	0	0	1
5.	22GEA01	Universal Human Values	HSMC		2	2	0	0	2
6.	EMI	Elective(Management)	HSMC	-	3	3	0	0	3

• Basic Sciences (BS)

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE-REQUISITE	CONTACT PERIODS	L	T	P	C
1.	22MYB01	Calculus and Linear Algebra	BSC	-	4	3	1	0	4
2.	22CYB04	Engineering Chemistry	BSC	-	3	3	0	0	3
3.	22CYP01	Chemistry Laboratory	BSC	-	2	0	0	2	1
4.	22MYB03	Statistics and Numerical methods	BSC	-	4	3	1	0	4
5.	22PYB03	Solid State Physics	BSC	-	3	3	0	0	3
6.	22PYP01	Physics Laboratory	BSC	-	2	0	0	2	1
7.	22MYB07	Probability and Complex functions	BSC		4	3	1	0	4
8.	22CYB06	Environmental Science and Sustainability	BSC		3	3	0	0	3

• **Engineering Sciences (ES)**

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE-REQUISITE	CONTACT PERIODS	L	T	P	C
1.	22CSC01	Problem Solving and C Programming	ESC	-	3	3	0	0	3
2.	22MEC01	Engineering Graphics	ESC	-	4	2	0	2	3
3.	22GEP01	Engineering Practices Laboratory	ESC	-	4	0	0	4	2
4.	22CSP01	Problem Solving and C Programming Laboratory	ESC	-	4	0	0	4	2
5.	22CSC02	Data structures using C	ESC	22CSC01	3	3	0	0	3
6.	22CSP02	Data Structures Laboratory	ESC	22CSP01	4	0	0	4	2
7.	22ITC06	Java Programming	ESC	-	3	3	0	0	3
8.	22ITP04	Java Programming Laboratory	ESC	-	4	0	0	4	2

• Programme Core Courses (PC)									
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE-REQUISITE	CONTACT PERIODS	L	T	P	C
1.	22EEC03	Electric Circuit Theory	PCC	-	3	2	1	0	3
2.	22EEP01	Electric Circuits Laboratory	PCC	-	4	0	0	4	2
3.	22EEC05	Electronic Devices and Circuits	PCC	-	3	3	0	0	3
4.	22EEC06	Electrical Machines-I	PCC	22EEC03	3	3	0	0	3
5.	22EEC07	Electromagnetic Fields	PCC	-	3	3	0	0	3
6.	22EEC08	Digital Logic Circuits	PCC	-	3	3	0	0	3
7.	22EEP02	Electronic Devices and Circuits Laboratory	PCC	-	4	0	0	4	2
8.	22EEP03	Electrical Machines-I Laboratory	PCC	-	4	0	0	4	2
9.	22EEC09	Electrical Machines-II	PCC	22EEC06	3	3	0	0	3
10.	22EEC10	Analog Integrated circuits	PCC	22EEC05	3	3	0	0	3
11.	22EEC11	Power Generation, Transmission and Distribution	PCC	22EEC03	3	3	0	0	3
12.	22EEC12	Measurements and Instrumentation	PCC	-	3	3	0	0	3
13.	22EEC13	Microprocessor and Microcontroller	PCC	22EEC08	3	3	0	0	3
14.	22EEP04	Electrical Machines-II Laboratory	PCC	22EEP03	4	0	0	4	2
15.	22EEP05	Analog and Digital Integrated Circuits Laboratory	PCC	22EEP02	4	0	0	4	2
16.	22EEP06	Microprocessor and Microcontroller Laboratory	PCC	-	4	0	0	4	2
17.	22EEC14	Power System Analysis	PCC	22EEC11	4	3	1	0	4
18.	22EEC15	Control Systems	PCC	22EEC06, 22EEC09	4	3	1	0	4
19.	22EEC16	Power Electronics	PCC	22EEC05	3	3	0	0	3
20.	22EEP07	Control and Instrumentation Laboratory	PCC	22EEP03, 22EEP04	4	0	0	4	2

21.	22EEP08	Power Electronics Laboratory	PCC	22EEP02	4	0	0	4	2
22.	22EEC17	Power System Protection and switch gear	PCC	22EEC11	3	3	0	0	3
23.	22EEC18	Electric drives and Control	PCC	22EEC06, 22EEC09	3	3	0	0	3
24.	22EEP09	Power System Simulation Practices Laboratory	PCC	-	4	0	0	4	2

Employability Enhancement Courses (EEC)

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE-REQUISITE	CONTACT PERIODS	L	T	P	C
1.	22GED01	Personality and Character Development	EEC	-	0	0	0	1	0
2.	22GED02	Internship/Industrial training	EEC	-	0	0	0	0	2
3.	22EED01	Project Work	EEC	-	20	0	0	20	10

• **Mandatory Non Credit Courses(MC)**

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PRE-REQUISITE	CONTACT PERIODS	L	T	P	C
1	22MAN01	Induction Programme	MC	-	-	-	-	-	-
2	22MAN02	Soft /Analytical Skills - I	MC	-	3	1	0	2	0
3	22MAN03	Yoga - I	MC	-	1	0	0	1	0
4	22MAN04	Soft /Analytical Skills - II	MC	-	3	1	0	2	0
5	22MAN05	Yoga - II	MC	-	1	0	0	1	0
6	22MAN07	Soft / Analytical Skills - III	MC	-	3	1	0	2	0
7	22MAN09	Indian Constitution	MC	-	1	1	0	0	0
8	22MAN08	Soft/Analytical Skills - IV	MC	-	3	1	0	2	0
9	22MAN10	Soft/Analytical Skills - V	MC	-	3	1	0	2	0
10	22MAN11	Certification Course - I	MC	-	1	0	0	1	0
11	22MAN12	Soft/Analytical Skills - VI	MC	-	3	1	0	2	0
12	22MAN13	Certification Course - II	MC	-	1	0	0	1	0

SUMMARY**B.E- ELECTRICAL AND ELECTRONICS ENGINEERING**

S.No	SUBJECT AREA	CREDITS AS PER SEMESTER								TOTAL CREDITS	Percentage (%)
		I	II	III	IV	V	VI	VII	VIII		
1	HSMC	4	4	0	0	0	0	5	0	13	7.9
2	BSC	8	8	4	3					23	14.1
3	ESC	10	5	5						20	12.2
4	PCC		5	16	21	15	8			65	39.8
5	PEC					9	9			18	11.0
6	OEC						3	9		12	7.3
7	EEC							2	10	12	7.3
	TOTAL CREDITS	22	22	25	24	24	20	16	10	163	100

A.P.L.

22EYA01 - PROFESSIONAL COMMUNICATION - I
(Common to All Branches)

L	T	P	C
2	0	2	3

PREREQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To build essential English skills to address the challenges of communication in today's work environment	1.1	The students will be able to apply knowledge of communication and language processes occur in various work environment
2.0	To comprehend the various dimensions of communication by employing LSRW skills	2.1	The students will be able to involve in diverse discourse forms utilizing LSRW skills
3.0	To deploy students in contextual initiatives by assisting them in developing communication abilities	3.1	The students will be able to participate actively in communication activities that enhance their creative skill
4.0	To facilitate students in comprehending the intent, target audience and environments of various forms of communication	4.1	The students will be able to associate with the target audience and contexts using varied types of communication
5.0	To enhance coherence, cohesion, and proficiency in both verbal and nonverbal communication in the workplace environment	5.1	The students will be able to convey the idea distinctly both in verbal and non verbal communication in work culture

UNIT I –INTRODUCTORY SKILLS	(6+6)
Grammar – Parts of Speech – Verb (Auxiliaries – Primary & Modal, Main Verb) - Listening – Listening to Short Conversations or Monologues - Listening to Experiences – Listening to Descriptions- Speaking – Introducing Oneself – Exchanging Personal information - Talking about food and culture - Reading – Reading for Interrogation – Reading Newspaper, Advertisements and Interpreting - Writing - Seeking Permission for Industrial Visit & In-plant Training	
UNIT II – LANGUAGE ACUMEN	(6+6)
Grammar – Word Formation – Tenses (Present Tense) – Synonyms & Antonyms - Listening – Listening to Announcements – Listening to Interviews - Listening and Note-taking - Speaking – Talking about Holidays & Vacations – Narrating Unforgettable Anecdotes - Reading – Skimming – Scanning (Short Texts and Longer Passages) – Critical Reading - Writing – Instruction – Process Description	
UNIT III – COMMUNICATION ROOTERS	(6+6)
Grammar – Cause and Effect – Tenses (Past Tense) – Discourse Markers - Listening – Listening to Telephonic Conversations – Listening to Podcasts - Speaking – Talking about neoteric Technologies – Eliciting information to fill a form - Reading –Book Reading(Motivational) - Practising Speed Reading (reading newspaper reports & biographies) - Writing – Checklist – Circular, Agenda & Minutes of the Meeting	

UNIT IV – DISCOURSE FORTE	(6+6)
Grammar – Tenses (Future Tense) –Yes/No & WH type questions – Negatives - Listening – Listening to TED/ Ink talks - Speaking – Participating in Short Conversations - Reading – Reading Comprehension (Multiple Choice / Short / Open Ended Questions) - Writing - E-Mail Writing	
UNIT V – LINGUISTIC COMPETENCIES	(6+6)
Grammar – Articles – Homophones & Homonyms – Single line Definition – Phrasal Verb - Listening – Intensive listening to fill in the gapped text - Speaking –Expressing opinions through Situations & Role play- Reading – Cloze Texts - Writing – Paragraph Writing	
LIST OF SKILLS ASSESSED IN THE LABORATORY	
<ol style="list-style-type: none"> 1. Grammar 2. ListeningSkills 3. SpeakingSkills 4. ReadingSkills 5. WritingSkills 	
TOTAL (L:30 , P:30) = 60 PERIODS	
TEXT BOOK:	
1. Shoba, K N, Deepa Mary Francis, “English for Engineers and Technologists”, Volume I, 3rd Edition, Orient BlackSwanPvt.Ltd, Telangana, 2022.	
REFERENCES:	
1. Koneru, Aruna, “English Language Skills”,Tata McGraw Hill Education (India) Private Limited,Chennai, 2006.	
2. HewingsM, “Advanced EnglishGrammar”, Cambridge University Press, Chennai, 2000.	
3. Jack C Richards, Jonathan Hull and SusanProctor, “Interchange”, Cambridge University Press, New Delhi,2015 (Reprint 2021).	

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) / Programme Specific Outcomes (PSOs)

Mapping of COs with POs / PSOs														
Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	-	-	-	-	-	-	-	-	3	3	-	2	1	-
2	-	-	-	-	-	-	-	-	3	3	-	2	1	-
3	-	-	-	-	-	-	-	-	3	3	-	2	1	-
4	-	-	-	-	-	-	-	-	3	3	-	2	1	-
5	-	-	-	-	-	-	-	-	3	3	-	2	1	-
CO (W.A)	-	-	-	-	-	-	-	-	3	3	-	2	1	-

A.P.L.

22MYB01-CALCULUS AND LINEAR ALGEBRA
(Common to All Branches)

L	T	P	C
3	1	0	4

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To develop the use of matrix algebra techniques needed by engineers for practical applications.	1.1	The students will be able to apply the concept of orthogonal reduction to diagonalise a given matrix.
2.0	To use the techniques, skills and engineering tools necessary for engineering practice, with geometric concepts.	2.1	The students will be able to identify the geometric aspects of plane, straight line and sphere.
3.0	To improve the ability of the students in solving geometrical applications of differential calculus problems.	3.1	The students will be able to evaluate the radius of curvature, circle of curvature and centre of curvature for a given curve.
4.0	To learn the important role of mathematical concepts in engineering applications with the functions of several variables.	4.1	The students will be able to calculate the maxima and minima for a given function with several variables by finding the stationary points.
5.0	To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.	5.1	The students will be able to evaluate the area and volume by double and triple integrals.

UNIT I – MATRICES	(9+3)
Characteristic Equation - Eigen values and Eigen vectors of a matrix - Cayley Hamilton Theorem (excluding proof) and its applications - Quadratic form-Reduction of a Quadratic form to canonical form by orthogonal transformation	
UNIT II – ANALYTICAL GEOMETRY OF THREE DIMENSIONS	(9+3)
Equation of plane – Angle between two planes – Equation of straight lines - Coplanar lines –Equation of sphere – Orthogonal spheres.	
UNIT III - GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS	(9+3)
Curvature – Curvature in Cartesian co-ordinates-Centre and Radius of curvature-Circle of curvature-Evolutes and Involutives.	
UNIT IV - FUNCTIONS OF SEVERAL VARIABLES	(9+3)
Partial derivatives - Euler’s theorem on homogeneous function-Jacobian-Maxima and Minima of functions of two variables-Constrained Maxima and Minima by Lagrange’s multiplier method.	
UNIT V -MULTIPLE INTEGRALS	(9+3)
Double integration in Cartesian Co-ordinates-Change of order of integration-Area as double integral- Triple integration in Cartesian Co-ordinates-Volume as triple integrals.	
TOTAL (L:45+T:15) :60 PERIODS	

*Ratified by Eleventh Academic Council

LIST OF PROGRAMS USING MATLAB (Assignment/Online Test):

1. Introduction to MATLAB
2. Matrix operations – Addition, Multiplication, Transpose and Inverse
3. Characteristic equation of a Matrix
4. Eigen values and Eigen vectors of Higher order Matrices.
5. Curve Tracing
6. Determining Maxima and Minima of a function of one variable.
7. Determining Maxima and Minima of a function of two variables.
8. Evaluating double integrals
9. Evaluating triple integrals
10. Finding area between two curves.

TEXT BOOKS:

1. Dr.B.S.Grewal, “Higher Engineering mathematics”, 42nd Edition, Khanna publications, 2012.
2. Erwin Kreyszig , “Advanced Engineering mathematics” , 9th Edition , JOHN Wiley & sons ,2013.
3. Veerarajan.T, “Engineering Mathematics of semester I & II”, 3 rd Edition, Tata McGraw Hill. ,2016.

REFERENCES:

1. N.P.Bali, Manish Goyal, “A Text book of Engineering Mathematics -Sem-II”, 6th Edition, Laxmi Publications, 2014.
2. Kandasamy.P, Thilagavathy.K, Gunavathy .K, “Engineering Mathematics for first year”, 9th Rev.Edition, S.Chand & Co Ltd, 2013.
3. Glyn James, “Advanced Engineering Mathematics” , 7th Edition, Wiley India, 2007

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	2	-	1	-	-	-	1	-	2	2	2	1
2	3	2	2	-	1	1	-	-	1	-	-	2	2	-
3	3	2	2	-	1	-	-	-	-	-	-	2	2	-
4	3	2	2	1	1	-	-	-	1	-	-	2	2	-
5	3	2	2	1	1	-	-	-	1	-	1	2	2	1
CO (w.A)	3	2	2	1	1	1	-	-	1	-	2	2	2	1

G.P

*Approved by Eleventh Academic Council

22CYB04 - ENGINEERING CHEMISTRY
(Common to ECE and EEE Branches)

		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL					
Course Objectives		Course Outcomes			
1.0	To recognize the basic concepts of electrochemistry and understand electrochemical processes.	1.1	The students will be able to evaluate fundamentals of electrochemistry, electrodes, cells and electrode potentials.		
2.0	To facilitate the students to achieve a clear conceptual understanding of technical and commercial aspects of energy sources and storage devices.	2.1	The students will be able to impart knowledge on renewable energy sources like nuclear, solar, wind energy and also on storage devices.		
3.0	To make the students conversant with water treatment, boiler feed water techniques	3.1	The students will be able to identify the various water treatment techniques for domestic and industrial purpose.		
4.0	To elucidate the types of polymers and concepts of surface chemistry.	4.1	The students will be able to use essential descriptions about polymer and surface chemistry.		
5.0	To understand the concept of various analytical techniques	5.1	The students will be able to impart knowledge on general principles and theory of analytical techniques.		

UNIT I – ELECTROCHEMISTRY	(9)
Electrode potential - Nernst equation - derivation and problems - reference electrodes - standard hydrogen electrode - calomel electrode - electrochemical series - significance - Types of cell - electrolytic and electrochemical cells - reversible and irreversible cells - potentiometric titrations (redox) - conductometric titrations (acid-base).	
UNIT II - ENERGY SOURCES AND STORAGE DEVICES	(9)
Nuclear energy - nuclear fission - nuclear fusion - light water nuclear power plants - breeder reactor - solar energy conversion - solar cells - solar water heater - Recent developments in solar cell materials - wind energy - batteries - types of batteries - lead acid storage battery - lithium-ion battery, Electric vehicles - working principles.	
UNIT III - WATER TECHNOLOGY AND NANO MATERIALS	(9)
Municipal water treatment - disinfection methods (UV, ozonation, chlorination) - desalination of brackish water - reverse osmosis - boiler troubles (scale, sludge, priming, foaming and caustic embrittlement) - treatment of boiler feed water - internal treatment (carbonate, phosphate and calgon conditioning) - external treatment - demineralization process. Nanomaterials - synthesis (laser ablation, and chemical vapour deposition method) and applications of nanomaterials.	
UNIT IV - SURFACE CHEMISTRY AND POLYMERS	(9)
Surface chemistry - Adsorption - types - Differentiate between physical and chemical adsorption - Freundlich adsorption isotherm - Langmuir adsorption isotherm. Polymers - classification - addition - condensation - copolymerization – plastics - thermoplastics and thermosetting plastics - preparation, properties and uses of PVC and nylon- polymer processing - compression and injection moulding techniques.	

UNIT V - ANALYTICAL TECHNIQUES	(9)
Colorimetry - principles- estimation of Iron by colorimetry - UV-Visible spectroscopy- principles - instrumentation (block diagram only) - IR spectroscopy - principles - instrumentation (block diagram only) - Flame Photometry - principles - instrumentation (block diagram only) - estimation of sodium by flame photometry - Atomic absorption spectroscopy - principles - instrumentation (block diagram only) - estimation of nickel by atomic absorption spectroscopy.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. Dr.Ravikrishnan, A,"Engineering Chemistry I & Engineering Chemistry II", Sri Krishna Hitech Publishing chem.. Co. Pvt Ltd., 13th Edition, Chennai , 2020. 2. S.S. Dara," A Text book of Engineering Chemistry", S.Chand & Co.Ltd. New Delhi, 2019.
REFERENCES:
<ol style="list-style-type: none"> 1. P.C.Jain and Monica Jain, "Engineering Chemistry", Vol I &II, Dhanpat Rai Pub, Co,New Delhi 15th Edition.,2018. 2. B.Sivasankar, "Engineering Chemistry" , Tata McGraw- Hill Pub.Co.Ltd.,New Delhi,2018

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	-	1	-	-	2	1	-	1	-	-	2	-	-
2	3	1	-	-	-	2		-		-	-	2	1	1
3	3	1	-	-	-		1	-	1	-	-	2	-	-
4	3	2	2	-	-	2	2	-	2	-	-	2	-	-
5	3	2	-	-	-	2	2	-		-	-	2	-	-
CO (w.A)	3	2	2	-	-	2	2	-	1	-	-	2	1	1

G.P.L.

22CSC01 - PROBLEM SOLVING AND C PROGRAMMING (Common to AI&DS, BME, CSE, CSE(CS), CSE(IOT), ECE, EEE and IT Branches)					
		L	T	P	C
		3	0	0	3
PREREQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To understand problem solving, problem solving aspects, programming and to know about various program design tools.	1.1	The student will be able to identify the appropriate problem solving techniques to drive the solution for the given problem.		
2.0	To learn basic structure and Control Statements in C programming.	2.1	The student will be able to implement the appropriate looping and control statements in C for developing applications.		
3.0	To learn the manipulation of arrays and strings	3.1	The student will be able to develop programs on arrays of different dimensions of arrays and strings concepts.		
4.0	To understand the concept of modular programming using user defined functions.	4.1	The student will be able to implement programs using user defined functions.		
5.0	To acquaint with the use and benefits of Memory Allocation and file handling.	5.1	The student will be able to use dynamic memory allocation functions for assigning memory space during execution.		

UNIT I -PROBLEM SOLVING AND C PROGRAMMING BASICS	(9)
General Problem Solving: Algorithms, Flowcharts and Pseudo-codes, implementation of algorithms Basics of C Programming : Introduction to C - Structure of C program - Programming Rules – Compilation – Errors - C Declarations: Tokens - keywords - identifiers - constants - data types - variable declaration and initialization - type conversion - constant and volatile variables - operators and expressions.	
UNIT II - DECISION CONTROL STATEMENTS	(9)
Managing Input and Output operations, Decision Control Statements: Decision control statements, Selection/conditional branching Statements: if, if-else, nested if, if-elif-else statements. Basic loop Structures/Iterative statements: while loop, for loop, selecting appropriate loop. Nested loops break and continue statements.	
UNIT III - ARRAYS AND STRINGS	(9)
Introduction to Array - Definition - Array initialization - Characteristics - One Dimensional Array - Array operations -Two dimensional arrays -Strings and String handling functions.	
UNIT IV - FUNCTIONS	(9)
Functions: Basics - definition - Elements of User defined Functions - return statement, Function types, Parameter Passing Techniques, Function returning more values - Passing Array to Functions - Recursion - Storage classes.	
UNIT V - POINTERS AND FILE MANAGEMENT	(9)
Pointer concepts - Pointers & Arrays, Structure concepts - Defining, Declaring, Accessing Member Variables, Structure within Structure - Union - File Management in C- Dynamic Memory Allocation	
TOTAL (L:45) =45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. Ashok N. Kamthane, "Programming in C", 2nd Edition, Pearson Education, 2013. 2. Sumitabha Das, "Computer Fundamentals and C Programming", 1st Edition, McGraw Hill, 2018.
REFERENCES:
<ol style="list-style-type: none"> 1. R. G. Dromey, "How to Solve it by Computer", Pearson Education India; 1st Edition, ISBN10: 8131705625, ISBN-13: 978-8131705629 2. Maureen Spankle, "Problem Solving and Programming Concepts", Pearson; 9th Edition, India, ISBN-10: 9780132492645, ISBN-13: 978- 0132492645 3. YashavantKanetkar, "Let us C", 16th Edition, BPB Publications, 2018. 4. ReemaThareja., "Programming in C ", 2nd Edition, Oxford University Press, New Delhi, 2018. 5. Balagurusamy E., "Programming in ANSI C", 7th Edition, Mc Graw Hill Education, 2017.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	2	-	-	-	-	-	-	-	-	3	3	3
2	3	2	3	-	-	-	-	-	-	-	-	3	3	3
3	3	2	3	-	-	-	-	-	-	-	3	3	3	3
4	3	2	3	-	-	-	-	-	3	-	3	3	3	3
5	3	2	3	-	-	-	-	-	-	-	3	3	3	3
CO (w.A)	3	2	3	-	-	-	-	-	3	-	3	3	3	3

G.P.L.

22MEC01 - ENGINEERING GRAPHICS
(Common to AGRI, CHEM, CIVIL and EEE Branches)

L	T	P	C
2	0	2	3

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To Construct various plane curves	1.1	The student will be able to construct various plane curves
2.0	To Construct the concept of projection of points, lines and plane	2.1	The student will be able to create the projection of points, lines and planes
3.0	To Develop the projection of solids	3.1	The student will be able to develop projection of solids
4.0	To Solve problems in sectioning of solids and developing the surfaces	4.1	The student will be able to solve problems in sections of solids and development of surfaces
5.0	To Apply the concepts of orthographic and isometric	5.1	The student will be able to apply the concepts of isometric in engineering practice

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications - use of drafting instruments - BIS conventions and specifications - size, layout and folding of drawing sheets - lettering and dimensioning – scales

UNIT I - PLANE CURVES

(6+6)

Basic geometrical constructions, curves used in engineering practices - conics - construction of ellipse, parabola and hyperbola by eccentricity method - construction of cycloid - construction of involutes of square and circle - drawing of tangents and normal to the above curves - theory of projection - principle of multi-view orthographic projection - profile plane and side views - multiple views - representation of three dimensional objects - layout of views

UNIT II - FIRST ANGLE PROJECTION OF POINTS, LINES AND PLANE

(6+6)

Principal planes - first angle projection - projection of points - projection of straight lines (only first angle projections) inclined to both the principal planes - determination of true lengths and true inclinations by rotating line method - projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III - PROJECTION OF SOLIDS

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to anyone of the principal plane and Parallel to another by rotating object method.

(6+6)

UNIT IV - SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES

Sectioning of solids (prism, cube, pyramid, cylinder and cone) in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other - obtaining true shape of section - development of lateral surfaces of simple and sectioned solids - prisms, pyramids cylinder and cone.

(6+6)

UNIT V - ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS

Principles of isometric projection - isometric scale - isometric projections of lines, plane figures, simple solids and truncated solids - prisms, pyramids, cylinders, cones – free hand sketching of orthographic views from isometric views of objects.

(6+6)

TOTAL (L:30 + P:30) = 60 PERIODS

TEXT BOOKS:

1. K.Venugopal and V.Prabhu Raja, “Engineering Graphics”, New Age International (P) Limited, 2022.
2. N.S Parthasarathy and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015.

REFERENCES:

1. N.D.Bhatt and V.M.Panchal, “Engineering Drawing”, Charotar Publishing House, 53rd Edition, 2014.
2. K.R.Gopalakrishna., “Computer Aided Engineering Drawing”, (Vol I and II combined) Subhas Stores, Bangalore, 2017.
3. K. V.Natarajan, “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
4. Luzzader, Warren.J., and Duff, John M, “Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production”, Eastern Economy Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2005.
5. M.B.Shah and B.C.Rana, “Engineering Drawing”, Pearson, 2nd Edition, 2009

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	1	-	-	1	-	-	-	2	-	3	-	1
2	3	2	1	-	-	1	-	-	-	2	-	3	-	1
3	3	2	1	-	-	1	-	-	-	2	-	3	-	1
4	3	2	1	-	-	1	-	-	-	2	-	3	-	1
5	3	3	1	-	-	1	-	-	-	2	-	3	-	1
CO (w.A)	3	2.2	1	-	-	1	-	-	-	2	-	3	-	1

A.P.L.

22GEP01 - ENGINEERING PRACTICES LABORATORY
(Common to AGRI, BME, CHEM, CIVIL, ECE, EEE and MECH Branches)

L	T	P	C
0	0	4	2

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To provide hands on training on various basic engineering practices in Civil Engineering	1.1	The students will be able to make various joints/ connections in civil engineering practices like plumbing and carpentry
2.0	To provide hands on training on welding in Mechanical Engineering	2.1	The students will be able to make various shapes using welding processes.
3.0	To understand the basic working principle of electric components	3.1	The student will be able to do residential house wiring and measure electric quantities-Voltage, Current and Power in R Circuit
4.0	To understand the basic working principle of electronic components	4.1	The students will be able to perform the assembling and testing of the PCB based electronic circuits.
5.0	To develop the skill to make / operate/utilize the simple engineering components	5.1	The students will be able to make / operate / utilize the simple engineering components.

GROUP-A (MECHANICAL AND CIVIL ENGINEERING)

I - CIVIL ENGINEERING PRACTICE	(15)
Buildings:	
a. Study of plumbing and carpentry components of residential and industrial buildings, Safety aspects	
Plumbing:	
a. Study of tools and operations	
b. Hands-on-exercise: External thread cutting and joining of pipes	
Carpentry:	
a. Study of tools and operations	
b. Hands-on-exercise: "L" joint and "T" joint	
II - MECHANICAL ENGINEERING PRACTICE	(15)
Welding:	
a. Study of arc welding, gas welding tools and equipments	
b. Arc welding- Butt joints, Lap joints and Tee joints	
c. Practicing gas welding	
Basic Machining:	
a. Study of lathe and drilling machine	
b. Facing and turning	
c. Drilling and Tapping	

Sheet Metal Work:

- Study of tools and operations
- Rectangular tray
- Cone

GROUP - B (ELECTRICAL AND ELECTRONICS)**I - ELECTRICAL ENGINEERING PRACTICE****(15)**

- Residential house wiring using Switches, fuse, indicator and lamp.
- Fluorescent lamp wiring
- Stair Case Wiring
- Measurement of electrical quantities –Voltage, current, power in R Circuit
- Study of Electrical apparatus-Iron box & water heater
- Study of Electrical Measuring instruments- Megger

II - ELECTRONICS ENGINEERING PRACTICE**(15)**

- Study of Electronic components and various use of multi meter.
- Measurement of AC signal parameter (peak-peak, RMS period, frequency) using CRO.
- Study of logic gates AND, OR, XOR and NOT.
- Study of Clock Signal.
- Soldering practice -Components Devices and Circuits - Using general purpose PCB.
- Study of Half Wave Rectifier (HWR) and Full Wave Rectifier (FWR).
- Study of Telephone, FM Radio and Cell Phone.

TOTAL (P: 60) = 60 PERIODS

COs	Mapping of COs with POs / PSOs													
	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	2	2	-	-	-	-	1	-	3	2	3	1
2	3	3	2	2	-	-	-	-	1	-	3	2	3	1
3	3	2	-	2	-	-	-	-	1	-	3	2	3	1
4	3	2	-	2	-	-	-	-	1	-	3	2	3	1
5	3	2	-	2	-	-	-	-	1	-	3	2	3	1
CO (w.A)	3	2.4	1	2	-	-	-	-	2.5	-	3	2	3	1

A.P.

22CSP01 - PROBLEM SOLVING AND C PROGRAMMING LABORATORY (Common to AI&DS, BME, CSE, CSE(CS), CSE(IOT), ECE, EEE and IT Branches)				
		L	T	P
		0	0	4
PRE REQUISITE : NIL				
Course Objectives		Course Outcomes		
1.0	To study, analyze and understand logical structure of a computer program, and different construct to develop a program in 'C' language.	1.1	The student will be able to identify the appropriate programming construct to develop programs for all types of problems.	
2.0	To study, analyze and implement the concepts of arrays and strings in C programming.	2.1	The student will be able to implement programs on arrays of different dimensions and string concepts.	
3.0	To learn the importance user defined functions and pointers.	3.1	The student will be able to develop programs using user defined functions and pointers.	
4.0	To gain knowledge in user defined data types and file handling functions in C programming.	4.1	The student will be able to design programs using user defined data types and various file handling functions.	
5.0	To acquire skill in dynamic memory allocation.	5.1	The student will be able to use dynamic memory allocation functions for assigning memory space during execution.	

LIST OF EXPERIMENTS - C-Programming:

1. Draw the flowchart for the following using Raptor tool.
 - a) Simple interest calculation
 - b) Greatest among three numbers
 - c) Find the sum of digits of a number
2. Programs for demonstrating the use of different types of operators like arithmetic, logical, relational and ternary operators (Sequential and Selection structures).
3. Programs for demonstrating repetitive control statements like 'for', 'while' and 'do-while' (Iterative structures).
4. Programs for demonstrating one-dimensional and two-dimensional numeric array.
5. Programs to demonstrate modular programming concepts using functions.
6. Programs to implement various character and string operations with and without built-in library functions.
7. Programs to demonstrate the use of pointers.
8. Programs to illustrate the use of user-defined data types.
9. Programs to implement various file management.
10. Program Using Dynamic memory allocation functions.

HARDWARE / SOFTWARE REQUIRED FOR A BATCH OF 30 STUDENTS:	
Hardware:	<ul style="list-style-type: none"> • LAN System with 33 nodes (OR) Standalone PCs – 33 Nos. • Printers – 3 Nos.
Software:	<ul style="list-style-type: none"> • RAPTOR Tool • Compiler – C
TOTAL (P:60) =60 PERIODS	

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	2	-	-	-	-	-	-	-	-	3	3	3
2	3	2	3	-	-	-	-	-	-	-	-	3	3	3
3	3	2	3	-	-	-	-	-	-	-	3	3	3	3
4	3	2	3	-	-	-	-	-	3	-	3	3	3	3
5	3	2	3	-	-	-	-	-	-	-	3	3	3	3
CO (w.A)	3	2	2.8	-	-	-	-	-	3	-	3	3	3	3

G.P.L.

22CYP01 CHEMISTRY LABORATORY
(Common to AGRI, BME, CHEM, CIVIL, ECE, EEE and MECH Branches)

L	T	P	C
0	0	2	1

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To explain the origin of hardness, alkalinity, and chloride and dissolved oxygen in water.	1.1	The students will be able to acquire practical skills in the determination of water quality parameters through volumetric analysis
2.0	To determine the copper in brass in the given solution.	2.1	The students will be able to evaluate the amount of copper in the given analyze by titration method.
3.0	Enable the students to acquire knowledge of conductometric titrations and their calculations.	3.1	The students will be able to gain the knowledge about conductance of ions.
4.0	To perform a potentiometric titration and pH of an acidic solution of known Normality.	4.1	The students will be able to analyze and gain experimental skill about activity of hydrogen ions and measures the voltage
5.0	To know about pH of the solution and how to measure pH using pH meter.	5.1	The students will be able to utilize the fundamental laboratory techniques for analyses such as pH of acidic, basic and neutral solution.

LIST OF EXPERIMENTS

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of alkalinity in water sample.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of DO content of water sample by Winkler's method.
5. Estimation of copper in brass by EDTA.
6. Conductometric titration of strong acid vs strong base.
7. Estimation of iron content of the given solution using potentiometer.
8. Determination of strength of given hydrochloric acid using pH meter.

Total (30 P) = 30 periods

*Ratified by Eleventh Academic Council

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	1	-	1	1	1		-	-	-	1	1	1	-
2	2	1	-	1	-	1	2	-	-	-	1	1	-	-
3	2	-	-	1	-	1	2	-	-	-	1	1	-	-
4	2	-	-	1	2	1	2	-	-	-	1	1	1	-
5	2	2	-	1		1	2	-	-	-	-	1	-	-
CO (w.A)	2	1	-	1	2	1	2	-	-	-	1	1	1	-

G. P. S.

*Ratified by Eleventh Academic Council

22MAN01 INDUCTION PROGRAMME
(For Common To All Branches)

L	T	P	C
-	-	-	-

PRE REQUISITE : NIL

This is a mandatory 2 week programme to be conducted as soon as the students enter the institution. Normal classes start only after the induction program is over.

The induction programme has been introduced by AICTE with the following objective:

“Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his/her study. However, he/she must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he/she would understand and fulfill his/her responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.”

“One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character. “

Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

(i) Physical Activity

This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.

(ii) Creative Arts

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it everyday for the duration of the program. These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later.

(iii) Universal Human Values

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and don't's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It would be effective that the faculty mentor assigned is also the faculty advisor for the student for the full duration of the UG programme.

(iv) Literary Activity

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

(v) Proficiency Modules

This would address some lacunas that students might have, for example, English, computer familiarity etc.

(vi) Lectures by Eminent People

Motivational lectures by eminent people from all walks of life should be arranged to give the students exposure to people who are socially active or in public life.

(vii) Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

(viii) Familiarization to Dept./Branch & Innovations

They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

(ix) Department Specific Activities

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop. For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

Induction Programme is totally an activity based programme and therefore there shall be no tests / assessments during this programme.

REFERENCES:

I. Guide to Induction program from AICTE

G. P. S.

22MAN02 - SOFT/ANALYTICAL SKILLS – I (Common to All Branches)					
		L	T	P	C
		1	0	2	0
PREREQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To understand the basic concepts of grammar and apply them in a structured manner.	1.1	The students will be able to intensify their awareness on correct usage of grammar in writing and speaking		
2.0	To evaluate various real-life situations by resorting to an analysis of key issues and factors.	2.1	The students will be able to solve the real-time problems for performing job functions easily.		
3.0	To solve mathematical problems and thereby reducing the time taken for performing job functions.	3.1	The students will be able to enhance their aptitude round clearing ability in interview process.		

UNIT I – VERBAL ABILITY	(5+10)
Tenses - One word substitution- Articles – Preposition - Conjunction	
UNIT II – BASIC APTITUDE	(5+10)
Percentage – Ratio and Proportion – Blood Relations – Analogy	
UNIT III – LOGICAL REASONING	(5+10)
Probability – Profit and Loss - Syllogism - Statement Assumptions.	
TOTAL(L :15,P:30) = 45 PERIODS	

REFERENCES:
1. Dr. R.S. Aggarwal, “A Modern Approach to Verbal & Non-Verbal Reasoning”, S Chand and Company Limited, New Delhi, 2014.
2. Ashish Aggarwal, “Quick Arithmetic”, S Chand and Company Limited, New Delhi, 2014.
3. Raymond Murphy, “English grammar in use”, 4th Edition, Cambridge University 2012.

Mapping of COs with POs / PSOs														
Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	-	-	-	-	-	-	-	-	3	3	-	2	1	-
2	-	3	2	2	-	-	1	-	2	-	-	3	1	-
3	-	3	2	2	-	-	1	-	2	-	-	3	1	-
CO (w.A)	-	3	2	2	-	-	1	-	2.3	3	-	2.7	1	-

G.P.L.

22MAN03 YOGA - I (For Common To All Branches)				
		L	T	P
		0	0	1
PRE REQUISITE : NIL				
Course Objectives		Course Outcomes		
1.0	To make students in understanding the importance of yoga in shaping mental and physical wellness.	1.1	Student will be able to understand the importance of yoga for physical and mental goodness.	
2.0	To provide awareness about the significance of leading a peaceful life by following yoga exercises and principles.	2.1	Student will be able to perform the yoga exercises for hand, leg, eye and sun salutation etc.	
3.0	To develop mental wellbeing through meditation and breathing exercises.	3.1	Student will be able to learn and practice meditation techniques for keeping good mental health	
4.0	To strengthen the body through physical exercises.	4.1	Student will be able to develop their body by performing yoga exercises.	
5.0	To inculcate the knowledge about different types of Asanas and their benefits	5.1	Students will be able to demonstrate different types of yoga Asanas for improving their personal fitness.	

UNIT I – INTRODUCTION TO YOGA	(3)
Meaning and Importance of Yoga - Elements of Yoga - Introduction - Asanas, Pranayama, Meditation and Yogic Kriyas - Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana and Shashankasana) - Relaxation Techniques for improving concentration - Yog-nidra.	
UNIT II - YOGA AND LIFE STYLE	(3)
Asanas as Preventive measures – Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana – Obesity: Procedure, Benefits and contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana – Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana - Diabetes: Procedure, Benefits and contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana – Asthema: Procedure, Benefits and contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.	
UNIT III – MIND EXERCISES	(3)
Naadi sudhi – Thanduvada sudhi – Breathing meditation – Silent meditation – Relax meditation.	
UNIT IV – PHYSICAL EXERCISES (PART- I)	(3)
Hand Exercises – Leg Exercises – Eye Exercises – Sun Salutation.	
UNIT V – ASANAS (PART-I)	(3)
Asanas –Tadasana – Yegapadhasana – Chakrasana – Udkaddasana – Thirikosana – Thandasana – Paschimottanasana.	
TOTAL (P:15) : 15 PERIODS	

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TEXT BOOKS/REFERENCES:
I. Light On Yoga by B.K.S. Iyengar.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1						2	2	3	2	2		3		
2						2	2	3	2	2		3		
3						2	2	3	2	2		3		
4						2	2	3	2	2		3		
5						2	2	3	2	2		3		
CO (W.A)						2	2	3	2	2		3		

G.P.L.

*Ratified by Eleventh Academic Council

22EYA02 - PROFESSIONAL COMMUNICATION – II (Common to All Branches)						
			L	T	P	C
			2	0	2	3
PREREQUISITE : 22EYA01						
Course Objectives			Course Outcomes			
1.0	To familiarize the students with the basic structures of English and to train them to use these elements correctly in speaking and writing		1.1	The Students will be able to frame sentences both in written and spoken forms with accuracy and fluency.		
2.0	To acquire proficiency in LSRW skills on par with the expectations of the industry.		2.1	The Students will be able to attain and enhance competence in the four modes of literacy: Listening, Speaking, Reading and Writing.		
3.0	To enable students to adopt strategies for enhancing vocabulary, language and fluency and to deliver professional presentations.		3.1	The Students will be able to gain essential competency to express one's thoughts orally and in writing in a meaningful way.		
4.0	To communicate effectively in an academic setting using the language skills as tools.		4.1	The students will be able to use linguistic structures to read and understand well-structured texts encountered in academic or social contexts.		
5.0	To acquire necessary language skills to follow and comprehend discourse such as lectures, conversations, interviews, and discussions.		5.1	The Students will be able to perform various tasks, such as role plays, debates, group discussions apart from the use of correct spelling and punctuation		

UNIT I – LANGUAGE RUDIMENTS	(6+6)
Grammar – Active and Passive Voice – Impersonal Passive Voice – Numerical Expressions - Listening – Listening for Specific Information and Match / Choose / Fill in the texts - Speaking – Describing a Person - Making Plans - Reading – Intensive Reading - Writing – Job Application with Resume	
UNIT II - RHETORIC ENHANCERS	(6+6)
Grammar – Reported Speech – Infinitive and Gerund - Listening – Listening to Iconic Speeches and making notes - Listening news / documentaries - Speaking –Talking over Phone – Narrating Incidents - Reading – Extensive Reading (Motivational Books) - Writing – Recommendation	
UNIT III – TECHNICAL CORRESPONDENCE	(6+6)
Grammar – If Conditionals – Blended Words - Listening – Listening to business conversation on audio and video of Short Films, News, Biographies - Speaking – Synchronous communication and Asynchronous communication – Opportunities and threats in using digital platform- Reading - Finding key information in a given text - Writing –Netiquettes- Inviting Dignitaries - Accepting & Declining Invitation	

UNIT IV - CORPORATE COMMUNICATION	(6+6)
Grammar – Concord – Compound Words - Listening – Listening to Roles and Responsibilities in Corporate - Listening to technical videos - Speaking – Introduction to Technical Presentation - Story Telling - Reading – Reading and Understanding Technical Articles - Writing – Report Writing (Accident, Survey and feasibility)	
UNIT V - LANGUAGE BOOSTERS	(6+6)
Grammar - Idiomatic Expressions – Relative Clauses – Confusable words - Listening – Listening to different kinds of Interviews - Listening to Group Discussion - Speaking – Group Discussion - Reading – Reading and Interpreting Visual Materials - Writing – Analytical Paragraph Writing	
LIST OF SKILLS ASSESSED IN THE LABORATORY	
<ol style="list-style-type: none"> 1. Grammar. 2. Listening Skills. 3. Speaking Skills. 4. Reading Skills 5. Writing Skills 	
TOTAL (L:30 , P:30) = 60 PERIODS	
TEXT BOOKS:	
1. Sudharshana, N.P and Saveetha.C, “English for Technical Communication”, Cambridge University Press, New Delhi, 2016 (Reprint 2017).	
REFERENCES:	
1. Rizvi, M Ashraf, “Effective Technical Communication”, Second Edition, McGraw Hill Education India Pvt Ltd, 2017.	
2. Rodney Huddleston, Geoffrey K. Pullum and Brett Reynolds, “A Student's Introduction to English Grammar”, Second Edition, Cambridge University Press, New Delhi, 2022	
WEB REFERENCE:	
1. http://youtu.be/URtdGiutVew	

Mapping of COs with POs / PSOs														
Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1									3	3		2	1	
2									3	3		2	1	
3									3	3		2	1	
4									3	3		2	1	
5									3	3		2	1	
CO (W.A)									3	3		2	1	

G.P.V.

22MYB03 – STATISTICS AND NUMERICAL METHODS (Common to CSE,IT,AI&DS,IOT,CS(Cyber security),EEEBranches)					
		L	T	P	C
		3	1	0	4
PREREQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To acquaint the knowledge of testing of hypothesis for small and large samples which plays an important role in real life problems.	1.1	The students will be able to select a hypothesis testing method for the given numerical set of data to analyze the significance .		
2.0	To understand the knowledge of design of experiments	2.1	The students will be able to apply analysis of Variance for the data set of selected number factors for analyzing the significance.		
3.0	To introduce the basic concepts of solving algebraic and transcendental equations.	3.1	The students will be able to solve an algebraic or transcendental equation using an appropriate numerical method.		
4.0	To introduce the numerical techniques of interpolation in various intervals and numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.	4.1	The students will be able to appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.		
5.0	To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.	5.1	The students will be able to solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.		

UNIT I - TESTING OF HYPOTHESIS	(9+3)
Sampling Distributions-Tests for single mean, difference of means (Large and Small samples) Using z , t -distribution, F – distribution- Chi-square - Test for independence of attributes and Goodness of fit.	
UNIT II - DESIGN OF EXPERIMENTS	(9+3)
Analysis of variance- Completely randomized design - Randomized block design - Latin square design.	
UNIT III - SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	(9+3)
Solution of algebraic and transcendental equations - Fixed point iteration method - Newton Raphson method- Solution of linear system of equations Gauss elimination method – Iterative methods of Gauss Jacobi and Gauss Seidel Methods – Eigen values of a matrix by Power method .	
UNIT IV - INTERPOLATION AND APPROXIMATION	(9+3)
Lagrange's and Newton's divided difference interpolations - Newton's forward and backward difference interpolation - Numerical single and double integrations using Trapezoidal and Simpson's 1/3 rules - Romberg's Methods.	

UNIT V - NUMERICAL DIFFERENTIATION AND INTEGRATION**(9+3)**

Single step methods: Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge - Kutta method for solving first order differential equations - Multi step methods: Milne's and Adams - Bash forth predictor corrector methods for solving first order differential equations.

TOTAL (L:45+T:15) : 60 PERIODS**TEXT BOOKS:**

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2015.
2. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
3. Gupta S.C. and Kapoor V. K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi, 12th Edition, 2020.

REFERENCES:

1. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
2. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
3. Gerald. C.F. and Wheatley. P.O. "Applied Numerical Analysis" Pearson Education, Asia, New Delhi, 7th Edition, 2007.

WEB REFERENCES:

1. <https://youtu.be/zmyh7nCjmsg>
2. <https://youtu.be/NmgbFJ4UwPs>
3. <https://youtu.be/RgKy7URFxIc>
4. <https://archive.nptel.ac.in/courses/111/107/111107105/>

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	1	1	1				1	1		2		
2	3	3	1	1	1				1	1		2		
3	3	2	1	1	1				1	1		2		
4	3	3	1	1	1				1	1		2		
5	3	2	1	1	1				1	1		2		
CO (W.A)	3	3	1	1	1				1	1		2		



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22PYB03 - SOLID STATE PHYSICS
(Common to ECE, EEE & BME)

L	T	P	C
3	0	0	3

PREREQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To expose the concepts of semiconducting materials.	1.1	The students will be able to predict the importance of conducting materials in the communication field.
2.0	To gain fundamental concepts of dielectric materials in the engineering field.	2.1	The students will be able to acquire knowledge about the fundamentals of dielectric materials
3.0	To acquire the knowledge of magnetic and superconducting materials.	3.1	The students will be able to identify the importance of magnetic and superconducting materials.
4.0	To understand the knowledge of Fabrication process of integrated circuits.	4.1	The students will be able to update the knowledge of Integrated circuits and its fabrication.
5.0	To acquire the knowledge about recent development in advanced materials and nano technology.	5.1	The students will be able to explore the knowledge about recent development in advanced materials and nano materials.

UNIT I – SEMICONDUCTING MATERIALS		(9)
Introduction to semiconducting materials – Elemental and compound semiconductors – Intrinsic semiconductor – carrier concentration derivation – variation of Fermi level with temperature – electrical conductivity – band gap determination – extrinsic semiconductors (qualitative) – Hall effect – determination of Hall coefficient – Applications		
UNIT II – DIELECTRIC MATERIALS		(9)
Electrical susceptibility – dielectric constant – electronic, ionic, orientation and space charge polarization – frequency and temperature dependence of polarization – internal field – Clausius – Mosotti relation (derivation) – dielectric loss – dielectric breakdown – uses of dielectric materials (capacitor and transformer) – ferro electricity and applications.		
UNIT III – MAGNETIC AND SUPERCONDUCTING MATERIALS		(9)
Origin of magnetic moment – Bohr Magneton – Types of magnetic materials – Domain theory – Hysteresis – soft and hard magnetic materials – Ferrites – applications – Superconductivity – properties – types of superconductors – BCS theory of superconductivity (qualitative) – High Tc superconductors – Application of superconductors – Magnetic levitation.		
UNIT IV – FABRICATION PROCESS OF INTERGATED CIRCUITS		(9)
Bulk crystal growth – Epitaxial growth – masking and etching-diffusion of impurities-selective diffusion – Formation of PN junction – resistors – capacitors – inductors – isolation methods – metal semiconductor contact – Introduction to integrated circuit – monolithic and hybrid circuits – Thin film and Thick film technology – Definition of LSI, MSI, VLSI circuits.		

UNIT V – ADVANCED MATERIALS AND NANO TECHNOLOGY	(9)
Metallic glasses: preparation, properties and applications – Shape Memory Alloys (SMA): Characteristics, properties of NiTi alloy, application – Nano materials: Properties, Preparation – Pulsed laser deposition – chemical vapour deposition of nano particles and applications – Carbon nano tubes: fabrication – arc method – structure – properties and application.	
TOTAL (L: 45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. M.N.Avadhanulu and P.G.Kshirsagar, “A text book of Engineering Physics”, S. Chand and Company, New Delhi, 2019. 2. A.Marikani, “Materials Science”, PHI Learning Private Limited, Eastern Economy Edition, 2017. 3. M.A.Wahab, “Solid State Physics”, 3rd edition ,Narosa Publishing House Pvt.Ltd., 2016
REFERENCES
<ol style="list-style-type: none"> 1. B.Rogers , J. Adams and S.Pennathur, “Nanotechnology : Understanding Small System” CRC Press, 2017. 2. Jacob Millman, Charistos C Halkilas, Satyabratajit “Electronic Devices & Circuits”, Tata McGraw Hill ,Education Private Limited, 2016, Third Edition. 3. Subrahmanyam N, Brijlal, “A Text Book Of Optics” S.Chand & Co. Ltd, New Delhi, 2019.
WEB LINKS
<ol style="list-style-type: none"> 1. https://bayanbox.ir/view/7764531208313247331/Kleppner-D.-Kolenkow-R.J.-Introduction-to-Mechanics-2014.pdf. 2. https://physicaeducator.files.wordpress.com/2017/11/electricity_and_magnetism-by-purcell-3ed-ed.pdf. 3. https://rajeshvcet.home.blog/regulation-2021/ph3151-engineering-physics-study-materials/ 4. https://zenodo.org/record/243407#.ZEgPZXZBzIU 5. https://farside.ph.utexas.edu/teaching/qmech/qmech.pdf. 6. https://web.pdx.edu/~pmoeck/phy381/workbook%20nanoscience.pdf.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	-	-	-	-	-	1	1	-	2	-	-
2	3	2	3	-	-	-	-	-	1	1	-	1	-	-
3	3	3	3	-	-	-	-	-	1	1	-	2	-	-
4	3	3	3	-	-	-	-	-	1	1	-	1	-	-
5	3	2	2	-	-	-	-	-	1	1	-	2	-	-
CO (W.A)	3.0	3.0	3.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	2.0	0.0	0.0

G.S.

22CSC02 –DATA STRUCTURES USING C
(Common to 22AIC01, 22CSC02, 22CCC01, 22CIC01 and 22ITC01)

L	T	P	C
3	0	0	3

PREREQUISITE : 22CSC01

Course Objectives		Course Outcomes	
1.0	To learn the concept of pointers and strings	1.1	The student will be able to perform array and string operations using pointers
2.0	To be able to implement the abstract data type list as a linked list using the node and reference pattern.	2.1	The student will be able to manipulate different operations using linked list
3.0	To understand the Stack and Queue ADT	3.1	The student will be able to deploy different operations on stack and queue.
4.0	To gain knowledge on tree data structure.	4.1	The student will be able to determine the structure and operations on trees
5.0	To understand the various operations on graph	5.1	The student will be able to implement the various operations on graph

UNIT I - POINTERS USING ARRAYS AND STRINGS

(9)

Pointers : Introduction – Pointers and arrays– passing an array to a function– returning an array from function – NULL pointers –Array of pointers – Pointer-to-pointer – Dangling Pointer. Function pointers: calling a function using function pointer- Using pointer as a function argument

UNIT II - LIST

(9)

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation – Singly linked lists – Circularly linked lists – Doubly-linked lists – Applications of lists – Polynomial ADT

UNIT III - STACKS AND QUEUES

(9)

Stack ADT – Operations – Applications – Balancing Symbols – Evaluating arithmetic expressions Infix to Postfix conversion – Function Calls – Queue ADT – Operations – Circular Queue – DeQueue – Applications of Queues

UNIT IV - TREE

(9)

Tree ADT – Tree Traversals - Binary Tree ADT – Expression trees – Binary Search Tree ADT – AVL Trees – Priority Queue (Heaps) – Binary Heap.

UNIT V - GRAPHS

(9)

Definitions – Representation of Graphs – Types of Graph – Graph Traversal: Depth-First Search (DFS) – Breadth-First Search (BFS) – Topological Sort – Applications of DFS: Bi-connectivity – Euler Circuits – Finding Strongly Connected Components – Applications of BFS: Bipartite Graph.

TOTAL (L: 45) = 45 PERIODS

*Ratified by Eleventh Academic Council

TEXT BOOKS:

1. Sumitabha Das, "Computer Fundamentals & C Programming", McGraw Hill Education(India) Private Limited, 1st Edition, 2018.
2. Weiss M. A., "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 2016.

REFERENCES

1. Yashavant Kanetkar, "Pointers in C", BPP Publications, 4th Edition, 2017.
2. PradipDey, Manas Ghosh, "Programming in C", Oxford Higher Education, 2nd Edition, 2016.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	2	2	2	1	-	-	2	-	2	3	3	3
2	3	3	2	2	2	2	-	-	1	-	2	3	3	3
3	2	3	2	2	2	2	-	-	2	-	2	3	3	3
4	3	3	2	2	2	1	-	-	1	-	2	3	3	3
5	3	3	2	2	2	1	-	-	2	-	2	3	3	3
CO (W.A)	2.8	3	2	2	2	1.4	-	-	1.6	-	2	3	3	3

G.P.L.

*Ratified by Eleventh Academic Council

22EEEC03-ELECTRIC CIRCUIT THEORY (For EEE Branch only)					
		L	T	P	C
		2	1	0	3
PRE REQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To impart basic knowledge about electric circuits and networks to the students	1.1	The student will be able to name the various circuit elements, explain the behavior of circuit elements and circuits and analyze the circuits using KVL, KCL, Mesh analysis and Nodal analysis techniques.		
2.0	To develop in students the ability to analyze various types of DC circuits using network theorems.	2.1	The student will be able to state the various network theorems, explain it and use it for solving the problems of electric circuits and networks		
3.0	To make the students to understand circuit laws, waveform and network theorems in AC circuits	3.1	The student will be able to describe fundamental concepts used in single phase AC circuits, explain these concepts and solve problems pertaining to these circuits.		
4.0	To get an insight into analysis of resonance and coupled circuits	4.1	The student will be able to design resonance and coupled circuits		
5.0	To gain the knowledge about the three phase circuits and power measurement	5.1	The student will be able to examine the 3-phase circuits for impedance, voltage, current, power, phase shift and power factor.		

UNIT I - BASIC CIRCUITS ANALYSIS	(6+3)
Introduction-Circuit Elements –Current and Voltage sources- Circuit variables -Ohm’s and Kirchhoff’s laws – Resistive circuits- Series and parallel reduction –Current division rule and Voltage division rule - Mesh and Nodal analysis for D.C circuits	
UNIT II -NETWORK REDUCTION AND NETWORK THEOREMS FOR DC CIRCUITS	(6+3)
Network reduction: Source transformation, Star delta transformation. Network theorems: Superposition theorem, Thevenin’s theorem, Norton’s theorem, Maximum power transfer theorem and Reciprocity theorem	
UNIT III - AC CIRCUITS	(6+3)
Introduction to alternating quantities - Average and RMS values, Peak and Form Factors – Power, Power factor and energy – AC signals and RLC circuits-Network theorems: Thevenin’s, Norton’s theorem	
UNIT IV - RESONANCE AND COUPLED CIRCUITS	(6+3)
Resonance in Electric circuits-Series and parallel resonance- Variation of impedance with frequency- Bandwidth of RLC circuit- Quality factor - Impedance of RLC circuit near resonance-Selectivity- Coupled Circuits: Self and mutual inductance, Co-efficient of coupling.	

UNIT V -THREE PHASE CIRCUITS AND POWER MEASUREMENTS	(6+3)
Three phase voltages and currents-Phase sequence-Line and phase quantities- Phasor diagrams-Balanced and unbalanced loads- Analysis of three phase 3-wire, 4-wire circuits with star and delta connected loads– Power and power factor measurements using single and two wattmeter methods.	
TOTAL (L:30+T:15) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. Jr., William H. Hayt, Kemmerly, Jack E. Phillips, Jamie D. Durbin, Steven M. “Engineering Circuits Analysis” ,9th edition., Tata McGraw Hill publishers, New Delhi, 2020 2. Sudhakar A and Shyam Mohan S Pall, “Circuits and Network Analysis and Synthesis”, McGraw Hill Education India pvt.ltd New Delhi, 2015
REFERENCES:
<ol style="list-style-type: none"> 1. Van Valkenburg M.E., “Network Analysis”, Pearson Education India, Revised 3 rd Edition, 2019 2. S.R. Paranjothi, "Electric Circuits Analysis", New Age International Ltd., New Delhi, 4th Edition, 2014 3. Charles K. Alexander and Mathew N.O. Sadiku, “Fundamentals of Electric Circuits”, 2nd Edition Tata McGraw Hill publishers, 2013.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	2	3	2	1	2	1	1	2	3	2
2	3	3	3	3	2	2	3	1	2	-	1	2	3	2
3	3	3	2	3	1	3	2	1	2	-	-	2	3	2
4	3	3	3	3	1	2	1	1	2	-	-	2	3	2
5	3	3	3	3	2	3	2	1	2	1	2	2	3	2
CO (W.A)	3	3	2.8	3	1.6	2.6	2	1	2	1	1	2	3	2

G.P.L.

22CSP02 –DATA STRUCTURES LABORATORY (Common to 22CSP02, 22AIP01, 22CCP01, 22CIP01 and 22ITP01)					
		L	T	P	C
		0	0	4	2
PRE REQUISITE : 22CSP01					
Course Objectives		Course Outcomes			
1.0	To learn the concept of pointers	1.1	The students will be able to perform array operations using pointers		
2.0	To learn the implementation of all types linked list with its different operations.	2.1	The students will be able to explore various operations on linked list.		
3.0	To impart the basic stack and queue concepts and its applications.	3.1	The students will be able to work with stack and queue concepts.		
4.0	To Explore the concepts of tree data structures	4.1	The students will be able to construct and manipulate various tree operations.		
5.0	To understand the various operations on graph	5.1	The students will be able to deploy different operations on graphs.		

LIST OF EXPERIMENTS	
<ol style="list-style-type: none"> 1. Pointer using 1D, 2D array 2. Implementation of singly linked list and its operations 3. Implementation of doubly linked list and its operations 4. Implementation of circular linked list and its operations 5. Implementation of Infix to postfix conversion using stack ADT 6. Implement the application for evaluating postfix expressions using array of stack ADT 7. Implementation of reversing a queue using stack 8. Binary Search Tree 9. AVL Tree 10. Priority Queues (Heaps) 11. Implementation of Graph Traversals(BFS, DFS) 	

*Ratified by Eleventh Academic Council

HARDWARE / SOFTWARE REQUIRED

HARDWARE:

I. LAN System with 33 nodes (OR) Standalone PCs – 33 Nos.

SOFTWARE:

I. Compiler – C

TOTAL (P:60) =60 PERIODS

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	2	2	2	1	-	-	2	-	2	3	3	3
2	3	3	3	3	1	2	1	2	1	1	1	2	3	2
3	2	3	2	2	1	-	3	-	2	-	3	1	3	2
4	3	3	3	1	1	2	-	1	1	-	1	-	3	2
5	3	2	3	3	2	1	-	1	-	1	2	2	3	2
CO (W.A)	2.8	2.8	2.6	2.2	1.4	1.5	2	1.3	1.5	1	1.8	2	3	2.2

G.P.L.

*Ratified by Eleventh Academic Council

**22PYP01 - PHYSICS LABORATORY
(Common to All Branches)**

L	T	P	C
0	0	2	1

PREREQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To provide the basic practical exposure to all the engineering and technological streams in the field of physics.	1.1	The student will be able to apply the concept of stress, strain and elastic limit for a given sample to find their properties
2.0	To infer the practical knowledge by applying the experimental methods to correlate with the Physics theory.	2.1	The student will be able to gain the basic knowledge about handling the laser light and Identify the basic parameters of an optical fibre
3.0	To enable the students to correlate the theoretical principles with application oriented studies.	3.1	The student will be able to analyze the properties of matter with sound waves
4.0	To introduce different experiments to test basic understanding of physics concepts applied in optics and electronics	4.1	The student will be able to recall the knowledge of properties of light through spectrometer grating and fiber optic cable
5.0	To analyze the behavior and characteristics of solar cells and LED	5.1	The student will be able to acquire the knowledge in semiconducting devices such as solar cells and LED

LIST OF EXPERIMENTS

1. Determination of Young's modulus by non-uniform bending method
2. Determination of (a) wavelength and (b) particle size using Laser.
3. Determination of thermal conductivity of a bad conductor – Lee's Disc method
4. Determination of wavelength of mercury spectrum – spectrometer grating
5. Determination of band gap of a semiconductor
6. Determination of thickness of a thin wire – Air wedge method.
7. Determination of V-I characteristics of solar cell.

Total (P:30) = 30 PERIODS

*Ratified by Eleventh Academic Council

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	-	-	-	-	-	-	1	-	2	1	-
2	3	3	2	-	-	-	-	-	-	-	-	1	1	-
3	3	3	2	-	-	-	-	-	1	-	-	1	-	-
4	3	2	3	-	-	-	-	-	-	-	-	2	-	-
5	3	2	2	-	-	-	-	-	-	1	-	1	-	-
CO (W.A)	3.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0	0.0

G.P.L.

*Ratified by Eleventh Academic Council

22EEP01- ELECTRIC CIRCUITS LABORATORY (For EEE Branch only)					
		L	T	P	C
		0	0	4	2
PRE REQUISITE : NIL					
Course Objectives		Course Outcomes			
1.0	To provide fundamentals concepts of electric circuits.	1.1	The students will be able to analyze the electrical circuits using various circuit laws		
2.0	To understand and analyze the basic theorems of Circuit theory.	2.1	The students will be able to examine the network theorems and operation of typical electrical circuits.		
3.0	To understand the concept of network theorems using digital simulation.	3.1	The students will be able to simulate the resonance and network theorems using digital simulation software.		
4.0	To understand the concept of resonance in series circuit.	4.1	The students will be able to design electric circuits under resonance to meet desired needs within realistic constraints.		
5.0	To get an insight into solution of three phase power measurements.	5.1	The students will be able to find power and power factor in three phase circuits using two wattmeter method.		

List of Experiments	
<ol style="list-style-type: none"> 1. Experimental verification of Ohm's law 2. Experimental verification of Kirchhoff's voltage and current laws 3. Experimental verification of Superposition theorem 4. Experimental verification of Thevenin's theorem 5. Experimental verification of Norton's theorem 6. Experimental verification of Reciprocity theorem 7. Verification of KVL and KCL by using digital simulation 8. Verification of Superposition theorem & Thevenin's theorem by using digital simulation 9. Verification of Reciprocity theorem & Maximum power transfer theorem by using digital simulation 10. RLC series resonance circuits by using digital simulation <p>ADDITIONAL EXPERIMENTS:</p> <ol style="list-style-type: none"> 11. Study of DSO and measurement of sinusoidal voltage, frequency and power factor 12. Experimental determination of power in three phase circuits by two-watt meter method 	
TOTAL (P:60) = 60 PERIODS	

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	-	3	-	1	3	1	2	2	2	3
2	3	3	3	3	-	2	2	1	2	1	2	2	2	3
3	3	3	2	-	3	2	2	1	2	1	2	3	2	3
4	3	3	3	-	3	2	1	1	2	1	2	3	2	3
5	3	2	3	2	-	2	2	1	2	1	2	2	2	3
CO (w.A)	3	2.8	2.8	2.6	3	2.2	1.7	1	2.2	1	2	2.4	3	3

A.P.L.

22MAN04- SOFT/ANALYTICAL SKILLS – II					
(Common to All Branches)					
		L	T	P	C
Prerequisite : NIL		1	0	2	0
Course Objectives		Course Outcomes			
1.0	To acquire satisfactory competency in use of Verbal Reasoning	1.1	The students will be able to enhance their vocabulary which in turn will be helpful in developing their speaking skills.		
2.0	To develop skill to meet the competitive examinations for better job opportunity.	2.1	The students will be able to solve the problems easily by using Short-cut method with time management.		
3.0	To enrich their knowledge and to develop their logical reasoning thinking ability.	3.1	The students will be able to analyze the problems logically and approach the problems in a different manner.		

UNIT I – VERBAL COMPETENCY	(5+10)
Voice - Modal Verbs – Synonyms & Antonyms - Confusable Words	
UNIT II – NUMERICAL REPRESENTATION	(5+10)
Average – Data Interpretation – Simple Interest and Compound Interest – Venn Diagram.	
UNIT III - RESOLUTION TENDENCY	(5+10)
Time and Work – Pipes and Cistern – Number Series and Odd man Out – Cube Problems.	
TOTAL(L :15,P:30) : 45 PERIODS	

REFERENCES:
1. Ashish Aggarwal, “Quick Arithmetic”, S Chand and Company Limited, New Delhi, 2014.
2. Dr. R.S. Aggarwal, “A Modern Approach to Verbal & Non-Verbal Reasoning”, S Chand and Company Limited, New Delhi, 2014.
3. Raymond Murphy, “English grammar in use”, Fourth Edition, Cambridge University 2012.

Mapping of COs with POs / PSOs														
Cos	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1									3	3		2		1
2		3	2	2			1		2			3	2	
3		3	2	2			1		2			3	2	
CO (w.A)		2	1.3	1.3			0.6		2.3	1		2.6	1.3	0.3

G. S. S.

22MAN05 YOGA – II
(For Common To All Branches)

		L	T	P	C
		0	0	1	0
PRE REQUISITE : NIL					
Course Objectives		Course Outcomes			
1.0	To strengthen the body through physical exercises.	1.1	Student will be able to perform physical exercises like spine exercises, massage and acupressure.		
2.0	To understand the importance of value system and ethics.	2.1	Student will be able to learn the human values, ethics, time management and the importance of introspection.		
3.0	To know the life philosophy of yogis and maharishis.	3.1	Student will be able to analyze various life philosophies of yogi's and rishi's.		
4.0	To understand the nature laws, cause and effect theory.	4.1	Student will be able to understand life lessons and nature laws.		
5.0	To inculcate knowledge about different types of Asanas and their benefits.	5.1	Students will be able to demonstrate different types of yoga Asanas and improve their personal fitness.		

UNIT I – PHYSICAL EXERCISES (PART-II)	(3)
Breathing Exercises – Kapalapathi – Maharasanam (Spine Exercises) – Massage and Acupressure.	
UNIT II – HUMAN VALUE	(3)
Divine power – Life force (Bio magnetism) – Importance of Introspection – Time management – Punctuality – self confidence – mind control.	
UNIT III – PHILOSOPHY OF LIFE	(3)
Basic needs for life – Hunger and thirst – climatic/weather changes – Body wastes – pressure of excretory organs – safety measures – protection from natural disaster – protection from enmity – protection from accidents – ethics – morality – duty – charity – Wisdom of perfection stages – faith – understanding – realization.	
UNIT IV – NATURE'S LAW OF CAUSE AND EFFECT	(3)
Food transformation into seven minerals – Natural actions – pattern – precision – regularity – Required skills – planned work – awareness – introspection.	
UNIT V – ASANAS (PART-II)	(3)
Ustrasana – Vakrasana –Komugasana – Padmasana – Vajrasana – Sukhasana – Yogamudra – mahamudra.	
TOTAL (P:15) : 15 PERIODS	

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TEXT BOOKS/REFERENCES:

I.Light On Yoga by B.K.S. Iyengar.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1						1	2	3	3	2	1	3		
2						1	2	3	3	2	1	3		
3						1	2	3	3	2	1	3		
4						1	2	3	3	2	1	3		
5						1	2	3	3	2	1	3		
CO (W.A)						1	2	3	3	2	1	3		

G.P.L.

22MYB07- PROBABILITY AND COMPLEX FUNCTIONS

(For EEE Branch only)

	L	T	P	C
	3	1	0	4

PRE REQUISITE :NIL

Course Objectives		Course Outcomes	
1.0	To apply the statistical tools in Engineering problems. To introduce the basic concepts of probability and random variables	1.1	Students will be able to Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
2.0	To introduce the basic concepts of two dimensional random variables.	2.1	Students will be able to Understand the basic concepts of one and two dimensional random variables and apply in Engineering applications.
3.0	To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property	3.1	Students will be able to Develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property
4.0	To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.	4.1	Students will be able to Familiarize the complex integration techniques and contour integration techniques which can be used in real integrals.
5.0	To acquaint the students with Differential Equations which are significantly used in engineering problems	5.1	Students will be able to Acquaint the Differential Equations which are significantly used in Engineering problems.

UNIT I - PROBABILITY AND RANDOM VARIABLES	(9+3)
Axioms of probability – Conditional probability – Baye’s theorem - Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Uniform, and Normal distributions.	
UNIT II - TWO-DIMENSIONAL RANDOM VARIABLES	(9+3)
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (Excluding proof).	
UNIT III- ANALYTIC FUNCTIONS	(9+3)
Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates - Properties – Harmonic conjugates – Construction of analytic function – Conformal mapping – Mapping by functions $w = z + c, cz, \frac{c}{z}$ - Bilinear transformation.	
UNIT IV COMPLEX INTEGRATION	(9+3)
Line integral - Cauchy’s integral theorem – Cauchy’s integral formula – Taylor’s and Laurent’s series– Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals- Evaluation of contour integration over unit circle and semi circle	

UNIT V ORDINARY DIFFERENTIAL EQUATIONS	(9+3)
Higher order linear differential equations with constant coefficients - Method of variation of parameters– Homogenous equation of Euler’s and Legendre’s type – System of simultaneous linear first order differential equations with constant coefficients.	
TOTAL (L:45+ T:15) : 60 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007. 2. Johnson. R.A., Miller. I and Freund. J., "Miller and Freund’s Probability and Statistics for Engineers", Pearson Education, Asia, 9th Edition, 2016. 3. Grewal.B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition,2018.
REFERENCES:
<ol style="list-style-type: none"> 1. Papoulis. A. and Unnikrishnapillai . S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India, 4th Edition, New Delhi, 2010. 2. Ross . S.M., "Introduction to Probability and Statistics for Engineers and Scientists", 5th Edition, Elsevier, 2014. 3. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons,10th Edition, New Delhi, 2016.
WEBLINK:
<ol style="list-style-type: none"> 1. https://www.youtube.com/watch?v=4hdNdgjnnqI 2. https://www.youtube.com/watch?v=7Mj3b_I_ZCE 3. https://www.youtube.com/watch?v=2WS3JReOCrU

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	1							1					
2	3	1							1					
3	3	1	1	1					1			1		
4	3	2	1	1					1			2		
5	3	3	1	2					2			2		
CO (W.A)	3	2	1	1					2			2		

G.P.L.

22EEEC05 - ELECTRONIC DEVICES AND CIRCUITS (For EEE Branch only)					
		L	T	P	C
		3	0	0	3
PRE REQUISITE :NIL					
Course Objectives			Course Outcomes		
1.0	To motivate the students to learn about unipolar and bipolar devices	1.1	The students will be able to learn about the various types of diodes		
2.0	To educate about current and voltage controlled devices	2.1	The students will be able to acquire knowledge about current and voltage controlled device		
3.0	To learn about various BJT amplifiers	3.1	The students will be able to analyze various configurations of BJT Amplifiers		
4.0	To learn about various FET amplifiers	4.1	The students will be able to analyze various configurations of FET Amplifiers		
5.0	Develop a strong basis of oscillator	5.1	The students will be able to recognize about the Oscillator and its types		

UNIT I - DIODE CIRCUITS	(9)
Diodes - Rectifier circuits - Zener diode circuits - Clipper and Clamper circuits –Schottky diode ,PIN diode,tunnel diode ,LED and Photodiode.	
UNIT II - JUNCTION TRANSISTOR	(9)
Operation of NPN and PNP Transistor, Characteristics of BJT in CB, CE and CC configurations- Bipolar transistor biasing-Construction, Operation, Characteristics of JFET and MOSFET-Applications of Junction Transistor	
UNIT III - BJT AMPLIFIERS	(9)
Analog signals and linear amplifiers - Basic transistor amplifier configurations-CE amplifiers - CC (Emitter Follower) amplifier - CB amplifier - Comparison of the three basic amplifiers.	
UNIT IV - FET AMPLIFIERS	(9)
Introduction to FET amplifier - Calculation of voltage Gain, Input Impedance and Output Impedance- Common source amplifier - Source follower amplifier - Common gate configuration - comparison of the three basic amplifiers.	
UNIT V - OSCILLATORS	(9)
Condition for oscillations- Hartley, Colpitts and Clapp Oscillators- Phase shift and Wien bridge Oscillator - Crystal oscillators	
TOTAL = 45 PERIODS	

TEXT BOOKS:
1. Donald A Neamen , Dhruves Biswas “Semiconductor Physics and Devices” McGraw Hill Education; 4th edition 2017.
2. Albert Malvino , David J. Bates “Electronic Principles” McGraw Hill Education; 7th edition 2017

REFERENCES:

1. M.S. Tyagi, Introduction to Semiconductor materials and devices, John Wiley and sons, 2008
2. S.M. Sze & K. Ng, Kwok, Physics of semiconductor devices, John Wiley and sons, Third edition 2008

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	2	1	2	2	1	1	2	1	2	2	3	1
2	3	2	2	1	2	2	1	1	2	2	2	2	3	1
3	3	2	2	2	2	1	2	1	3	2	2	1	3	1
4	3	2	2	2	2	1	2	1	3	1	2	1	3	1
5	3	2	2	2	2	2	1	1	3	1	2	2	3	1
CO	3	2	2	2	2	1	1	1	1	1	2	1	3	1

G.P.L.

22EEEC06 -ELECTRICAL MACHINES-I
(For EEE Branch only)

	L	T	P	C
	3	0	0	3

PRE REQUISITE : 22EEEC03

Course Objectives		Course Outcomes	
1.0	To Understand the concepts of field energy, co energy, mechanical force and production of torque and EMF	1.1	The students will be able to understand the generation of EMF and Torque in rotating Machines
2.0	To know the construction, operation and characteristics of various types of DC Generators	2.1	The students will be able to illustrate the construction and principle of operation and characteristics of DC machines
3.0	To learn starting, starters and methods of speed control of DC motors.	3.1	The students will be able to select appropriate DC motor as well as to choose an appropriate method of Speed control for any industrial application
4.0	To understand different types of Transformer construction, working principle and their performance	4.1	The students will be able to identify the transformer parameters from the equivalent circuit
5.0	To analyze the various losses and efficiency taking place in DC Machines and transformers	5.1	The students will be able to evaluate the performance of DC machines and transformers

UNIT I - BASIC CONCEPTS OF ROTATING MACHINES	(9)
Basics of magnetic circuit parameters -Principles of electro mechanical energy conversion- Single and multiple excited systems- Concepts of co-energy- Generated voltage- Torque in DC Machines.	
UNIT II - DC GENERATORS	(9)
Principle of operation-Constructional details- Emf equation- Methods of excitation- Self and separately excited generators- Characteristics of series, shunt and compound generators- Armature reaction and commutation- Parallel operation of DC shunt and compound generators – Applications.	
UNIT III - DC MOTORS	(9)
Principle of operation- Back emf and torque equation- Characteristics of series, shunt and compound motor- Starter- Starting methods- Speed control of DC shunt motors – Applications.	
UNIT IV -TRANSFORMERS	(9)
Constructional details of core and shell type transformers- Types of windings- Principle of operation- Emf equation- Transformer on no load- Parameters referred to HV/LV windings- Equivalent circuit- Transformer on load- Regulation- Parallel operation of single phase transformers-Construction and working of Auto transformer- Construction of three phase transformer.	
UNIT V -TESTING OF DC MACHINES AND TRANSFORMERS	(9)
Losses and efficiency in DC machines and transformers- Condition for maximum efficiency- Testing of DC machines- Brake test, Swinburne's test, Hopkinson's test- Testing of transformers- Polarity test, Load test, open circuit and short circuit tests- All day efficiency.	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. P. S. Bimbhra, "Electric Machinery", Khanna Publishers, 2nd Edition, 2021. 2. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 6th Edition 2017.
REFERENCES:
<ol style="list-style-type: none"> 1. I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 5th Edition, 2017. 2. H. Cotton, "Advanced Electrical Technology", CBS Publishers and distributors, 1967.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	3	3	3	2	2	2	1	1	2	-	2	3	1
2	2	3	3	3	3	3	2	1	1	2	1	2	3	1
3	2	3	3	3	3	3	2	1	1	2	1	2	3	1
4	3	3	3	3	3	3	3	1	1	2	1	3	3	1
5	2	3	3	3	3	3	3	1	1	2	1	3	3	1
CO (w.A)	2.2	3	3	3	2.8	2.8	2.4	1	1	2	0.8	2.4	3	1

G. P. V.

22EEEC07 –ELECTROMAGNETIC FIELDS
(For EEE Branch only)

	L	T	P	C
	3	0	0	3

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To understand basics of vector algebra and its applications.	1.1	The students will be able to Locate the position of a point in a given or its transformed coordinate system.
2.0	To analyze fields a potential due to static charges.	2.1	The students will be able to Determine the electric field at a point due to a charge that is continuously distributed using Coulomb's law and Gauss's Law.
3.0	To evaluate static magnetic fields.	3.1	The students will be able to Calculate energy associated with a magnetic field using the concepts of Biot-savart's law, Ampere's Circuit law and Magnetic flux density.
4.0	To understand the relation between the fields under time varying situations.	4.1	The students will be able to emphasize the ideas about faradays laws, induced emf and their applications.
5.0	To understand principles of propagation of uniform plane waves	5.1	The students will be able to Calculate the power associated with an Electromagnetic wave using the Poynting theorem and also summarize the sources of EMI and the control techniques to reduce EMI

UNIT I -INTRODUCTION TO ELECTROMAGNETIC FIELDS	(9)
Sources and effects of electromagnetic fields – Introduction to vector algebra – Co-ordinate systems – Vector calculus: Gradient, divergence and curl – Divergence theorem – Stoke's theorem.	
UNIT II - ELECTROSTATICS	(9)
Coulombs law – Electric field intensity –Charge distribution – Electric Field due to straight conductor and circular disc – Electric flux density – Gauss's law and its applications –Electric Potential – Electric dipole – Boundary conditions at the interface of conductor and dielectric – Poisson's and laplace's equation – Capacitors.	
UNIT III - MAGNETOSTATICS	(9)
Biot-Savart's law – Ampere's circuital law –Magnetic flux and magnetic flux density – Scalar and vector magnetic potentials –Magnetic materials – Magnetic boundary conditions – Self and mutual inductance – Inductance of solenoid and toroid.	
UNIT IV - ELECTROMAGNETIC FIELDS	(9)
Time varying fields: Time Varying Fields – Transformer and Rotational EMF. Maxwell's equation: Maxwell's Equation in Point Form and Integral Form – Comparison of Circuit Theory with Field Theory. Electromagnetic Waves: Electromagnetic wave equation – Wave equation for free space – Poynting theorem – Standing wave ratio – Antenna and its types – Antenna measurements.	

UNIT V -ELECTROMAGNETIC INTERFERENCE & COMPATIBILITY (Qualitative analysis only)	(9)
Introduction to Electromagnetic Interference and Electromagnetic Compatibility (EMI & EMC) – Sources and Characteristics of EMI –Control Techniques of EMI – Grounding – Shielding – Filtering.	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. Sadiku Matthew N.O., “Principles of Electromagnetics”, 6th Edition, Oxford University Press, New Delhi, 2015. 2. Hayt Jr W.H., Buck J.A., Jaleel Akhtar M., “ Engineering Electromagnetics ” 9th Edition McGraw Hill Education, India, 2020.
REFERENCES:
<ol style="list-style-type: none"> 1. Gottapu Sasibhushana Rao., “Electromagnetic Field Theory and Transmission Lines”, 1st Edition, John Wiley and Sons, India, 2013 2. David J Griffith, “Introduction to Electrodynamics”, Pearson Education, 4th ed., 2012. 3. Ashutosh Pramanik, “Electromagnetism – Theory and Applications”, Prentice-Hall of India Private Limited, New Delhi, 2006. 4. Fawwaz. T.Ulaby, “Electromagnetics for Engineers”, Pearson Education, 2005.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	2	3	2	1	2	1	1	2	3	2
2	3	3	3	3	2	2	3	1	2	-	1	2	3	2
3	3	3	2	3	1	3	2	1	2	-	-	2	3	2
4	3	3	3	3	1	2	1	1	2	-	-	2	3	2
5	3	3	3	3	2	3	2	1	2	1	2	2	3	2
CO (w.A)	3	3	2.8	3	1.6	2.6	2	1	2	1	1	2	3	2

G.P.L.

22ITC06 - JAVA PROGRAMMING
(Common to 22AIC04 ,22CSC07, 22CCC06 and 22CIC06)

L	T	P	C
3	0	0	3

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To understand Object oriented programming concepts and characteristics of Java	1.1	The students will be able to develop Java programs using OOP principles
2.0	To know the principles of Inheritance, abstraction and interfaces	2.1	The students will be able to develop Java programs with the concepts of inheritance
3.0	To define exceptions and use I/O streams	3.1	The students will be able to construct applications with exception handling.
4.0	To understand threads concepts	4.1	The students will be able to develop Java applications using threads
5.0	To design and build simple GUI programs using AWT and Swings.	5.1	The students will be able to develop interactive Java applications using GUI components.

UNIT I - INTRODUCTION TO OOP AND JAVA FUNDAMENTALS	(9)
Object Oriented Programming - Abstraction – objects and classes - Encapsulation- Inheritance - Polymorphism- OOP in Java – Characteristics of Java – The Java Environment - Java Source File - Structure – Compilation. Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods -access specifiers - static members -Comments, Data Types, Variables, Operators, Control Flow, Arrays , Strings, Packages - JavaDoc comments.	
UNIT II - INHERITANCE AND INTERFACES	(9)
Inheritance – Super classes- sub classes –Protected members – constructors in sub classes- the Object class – abstract classes and methods-Keywords: Static-final-this- final methods and classes – Method overloading-Method overriding-Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces	
UNIT – III EXCEPTION HANDLING AND I/O	(9)
Exceptions - exception hierarchy - throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing File	
UNIT – IV –THREADS	(9)
Java Thread Model – Main Thread – Creating a Thread – Creating Multiple Threads — Thread Priorities – Synchronization – Inter thread Communication – Suspending, Resuming, and Stopping Threads – Using Multithreading.	

UNIT – V EVENT DRIVEN PROGRAMMING	(9)
Graphics programming - Frame – Components Basics of event handling - event handlers - adapter classes - actions - mouse events - AWT event hierarchy - Introduction to Swing – layout management - Swing Components – Text Fields , Text Areas – Buttons- Check Boxes – Radio Buttons – Lists- choices- Scrollbars – Windows –Menus – Dialog Boxes.	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> Herbert Schildt, “Java: The Complete Reference”, 11th Edition, McGraw Hill Education, New Delhi, 2019 for Units I, II, III, IV. Herbert Schildt, “Introducing JavaFX 8 Programming”, 1st Edition, McGraw Hill Education, New Delhi, 2015 for Unit V.
REFERENCES:
<ol style="list-style-type: none"> Cay. S. Horstmann, Gary Cornell, “Core Java-JAVA Fundamentals”, Prentice Hall, 10th ed., 2016. Paul Deitel, Harvey Deitel, “Java SE 8 for programmers”, 3rd Edition, Pearson, 2015.3. SCJP Sun Certified Programmer for Java 6 Study Guide. 6th edition, McGrawHill.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	1	-	1	-	-	-	1	-	-	1	3	3
2	3	1	1		1				1			1	3	3
3	3	1	1		1				2			1	3	3
4	3	2	1		1				2			2	3	3
5	3	2	2	2	1				3	1	3		3	3
CO (w.A)	3	1.6	1.2	2	1				1.8	1	3	1	3	3

G.P.L.

22EEC08 –DIGITAL LOGIC CIRCUITS (For EEE Branch only)					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To educate about the fundamentals of Boolean functions	1.1	The students will be able to study number systems and to simplify the mathematical expressions using Boolean functions		
2.0	To motivate the students to design combinational logic circuits	2.1	The students will be able to design combinational logic circuits		
3.0	To make the student to understand about the concepts of synchronous circuits	3.1	The students will be able to analyze and design various synchronous circuits		
4.0	To encourage the students to implement asynchronous circuits	4.1	The students will be able to implement the asynchronous circuits		
5.0	To motivate the students to know about logic families	5.1	The students will be able to expose the concept of memory devices and logic families		

UNIT I - BOOLEAN ALGEBRA AND LOGIC CIRCUITS	(9)
Number systems-Binary arithmetic– Logic gates- Binary codes–Boolean algebra and theorems-Boolean functions– Canonical and standard forms -Simplifications of boolean functions using Karnaugh map and Quine Mc-Clusky methods.	
UNIT II - COMBINATIONAL LOGIC CIRCUITS AND ITS APPLICATIONS	(9)
Introduction- Adder and subtractor circuits – Code converters(Binary to Gray, Gray to Binary, Binary to BCD,BCD to Binary and BCD to Excess 3) - Decoders and encoders -Multiplexers and demultiplexers.	
UNIT III - SEQUENTIAL LOGIC CIRCUITS	(9)
Synchronous sequential circuits – Flip flops – Shift registers – Counters - Analysis and design Procedures - State reduction and state assignment.	
UNIT IV - ASYNCHRONOUS SEQUENTIAL LOGIC CIRCUITS	(9)
Introduction to asynchronous sequential circuits-Classification of Asynchronous Sequential circuit-Analysis and Design procedure-Reduction of state flow table-Hazards and Fault Detection -Race free statement.	
UNIT V -PROGRAMMABLE LOGIC DEVICES AND MEMORIES	(9)
Programmable logic devices: PLA, PAL, CPLD and FPGA –Memories: RAM organization, ROM organization, PROM, EPROM, EEPROM- Logic families: RTL, DTL and TTL logic.	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOKS:

1. Morris Mano M., "Digital Design with an Introduction to Verilog HDL, VHDL, and System Verilog", 6th Edition, Pearson, New Delhi, 2018.

REFERENCES:

1. Charles H. Roth Jr , Larry L. Kinney, "Fundamentals of Logic Design" ,7th ed., Thomson Learning, 2014.
2. Charles H. Roth, Jr., Lizy Kurian John, "Digital System Design using VHDL", CL Engineering/Cengage Learning India ,2012.
3. Nripendra N Biswas, "Logic Design Theory", PHI Learning, 2010.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	3	3	2	3					1	2	1	3
2	3	2	3	3	2	2					1	2	1	3
3	2	3	2	3	1	3						2	2	3
4	3	3	3	3	1	2						2	1	2
5	3	3	3	3	2	3					2	2	1	3
CO (w.A)	2.8	2.6	2.8	3	1.6	2.6	-	-	-	-	0.8	2	1.2	2.8

G. P. S.

22EEP02 - ELECTRONIC DEVICES AND CIRCUITS LABORATORY (For EEE Branch only)					
		L	T	P	C
		0	0	4	2
PRE REQUISITE : NIL					
Course Objectives		Course Outcomes			
1.0	To provide fundamentals concepts of unipolar and bipolar devices.	1.1	The students will be able to build different characteristics of unipolar and bipolar devices		
2.0	To understand and analyze the basic concepts of diode.	2.1	The students will be able to know the applications of Diode		
3.0	To understand the concept of bipolar devices.	3.1	The students will be able to acquire knowledge about the various configuration of BJT		
4.0	To get an insight into solution of single phase rectifiers.	4.1	The students will be able to build different types of rectifiers and filter circuits.		
5.0	To understand the concept of unipolar devices and use of regulator.	5.1	The students will be able to attain information about regulators.		

List of Experiments	
<ol style="list-style-type: none"> 1. Characteristics of PN Junction Diode. 2. Characteristics of Zener Diode. 3. Verification of Clipper and Clamper Circuits With its Characteristics. 4. Verify a Single Phase Half Wave & Full Wave Rectifiers With and Without Filters. 5. Verify a Shunt Voltage Regulator. 6. Characteristics of Common Emitter Configuration of transistor. 7. Characteristics of Common Base Configuration of transistor. 8. Characteristics of Common Collector Configuration of transistor. 9. Characteristics of JFET. 10. Characteristics of MOSFET. <p>ADDITIONAL EXPERIMENTS</p> <ol style="list-style-type: none"> 1. Characteristics of PN Junction Diode using VLABS. 2. Wien bridge oscillator using VLABS. 	
TOTAL (P:60) = 60 PERIODS	

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	2	1	1	1	1	1	1	1	2	1	3	1
2	3	2	2	1	1	1	1	1	1	1	2	1	3	1
3	3	2	2	2	1	1	1	1	1	1	2	1	3	1
4	3	2	2	2	1	1	1	1	1	1	2	1	3	1
5	3	2	2	2	1	1	1	1	1	1	2	1	3	1
CO (w.A)	3	2	2	2	1	1	1	1	1	1	2	1	3	1

G. P. S.

22EEP03 -ELECTRICAL MACHINES-I LABORATORY (For EEE Branch only)						
			L	T	P	C
			0	0	4	2
PRE REQUISITE : NIL						
Course Objectives			Course Outcomes			
1.0	To get a basic practical knowledge on DC generators and DC motors	1.1	The students will be able to acquire knowledge on load characteristics of DC Generators and DC motors			
2.0	To understand and analyze the uniqueness of each kind of DC machine	2.1	The students will be able to know the characteristics of the DC machines independently			
3.0	To understand the concept of loads and speed control techniques	3.1	The students will be able to familiar to control and test the speed of DC motor under various loads			
4.0	To get an insight into working and operation of a transformer under load condition	4.1	The students will be able to analyze the performance of single phase transformer under load condition			
5.0	To understand the concept of withstanding capacity and rating of transformer using tests	5.1	The students will be able to understand the various tests performed on transformer to acquire its efficiency			

LIST OF EXPERIMENTS	
<ol style="list-style-type: none"> 1. Open circuit characteristics of DC separately excited generator. 2. Load characteristics of DC compound generators with cumulative and differential connections. 3. Load characteristics of DC shunt motors. 4. Load characteristics of DC series motors. 5. Speed control of DC shunt motors. 6. Swinburne's test. 7. Load test on single phase transformer. 8. Open circuit and short circuit test on single phase transformer. 9. Parallel operation of single phase transformer. 10. Study of Scott connection of transformer. 	
ADDITIONAL EXPERIMENTS <ol style="list-style-type: none"> 1. Polarity test on single phase transformer. 2. Separation of no load losses in a single phase transformer. 	
TOTAL (P:60) = 60 PERIODS	

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	3	2	2	3	2	1	2	1	-	3	3	-
2	2	3	3	3	2	3	2	1	2	1	-	2	3	-
3	2	3	3	3	2	3	2	1	2	1	-	2	3	-
4	2	3	3	3	2	3	2	1	2	2	-	2	3	-
5	3	3	2	3	2	2	2	2	2	1	-	3	3	-
CO (w.A)	2.4	2.8	2.8	2.8	2	2.8	2	1.2	2	1.2	-	2.4	3	-

G. P. S.

22ITP04 JAVA PROGRAMMING LABORATORY (Common to 22AIC04 ,22CSC07, 22CCC06 and 22CIC06)					
		L	T	P	C
		0	0	4	2
PRE REQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To impart fundamental concepts of OOP using java	1.1	The students will be able to create simple Java programs using basic programming elements in Java.		
2.0	To gain exposure about inheritance, packages and Interfaces	2.1	The students will be able to develop applications using inheritance, packages and interfaces.		
3.0	To explore about the exception handling mechanism	3.1	The students will be able to construct applications with exception handling.		
4.0	To understand threads concepts	4.1	The students will be able to build applications using threads and collection framework		
5.0	To know about Event handling using swing components.	5.1	The students will be able to create GUIs and event driven programming applications for real world problems		

LIST OF EXPERIMENTS	
<ol style="list-style-type: none"> 1. Write simple Java programs using operators, arrays and control statement 2. Programs using Static, final and this keywords. 3. Demonstrate the concepts of inheritance 4. Programs illustrating overloading and overriding methods in Java 5. Programs to use packages and Interfaces in Java. 6. Implement exception handling and creation of user defined exception. 7. Implement program to demonstrate multithreading and inter thread communication. 8. Write a program to perform file operations. 9. Develop applications using swing layouts 	
HARDWARE OR SOFTWARE REQUIREMENT:	
HARDWARE:	
<ol style="list-style-type: none"> 1. LAN System with 33 nodes (OR) Standalone PCs – 33 Nos. 2. Printers – 3 Nos. 	
SOFTWARE:	
<ol style="list-style-type: none"> 1. Java / Equivalent Compiler 	
TOTAL (P:60) = 60 PERIODS	

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3			2		3	2	2	2	3	3	1	3
2	2	2	3	3	3	1	3	3	2	2	3	3	1	3
3	2	2	3	3	3	1	3	3	2	2	3	3	1	3
4	2	2	3	3	3	1	3	3	2	2	3	3	1	3
5	2	2	3	3	3	2	3	3	2	2	3	3	1	3
CO (w.A)	2.2	2.2	2.4	2.4	2.8	1.2	3	2.8	2	2	3	3	1	3

G.P.L.

22MAN07– SOFT / ANALYTICAL SKILLS – III (Common to All Branches)					
		L	T	P	C
		1	0	2	0
PRE REQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	Improving overall language proficiency for personal or professional reasons	1.1	The students will be able to enhance their writing skills		
2.0	To develop problem solving skills across all levels	2.1	The students will be able to develop problem solving skills across all levels		
3.0	To develop students to workout solutions for problems that involving general reasoning.	3.1	The students will be able to solve reasoning problems with ease.		

UNIT I – Verbal Competency	(5+10)
Sentence Selection-Paragraph Formation- Sentence Correction- Spellings	
UNIT II - Aptitude	(5+10)
Clocks, Calendar, Age Problems-Problem on Trains- Problems on Numbers - Partnerships.	
UNIT III – Logical & Reasoning	(5+10)
Coding and Decoding - Logical Equivalent- Venn Diagram Problem.	
TOTAL (L:15, P:30) : 45 PERIODS	

REFERENCES:
1. Dr. R.S. Aggarwal, “A Modern Approach to Verbal & Non-Verbal Reasoning”, S Chand and Company Limited, New Delhi, 2014.
2. Ashish Aggarwal, “Quick Arithmetic”, S Chand and Company Limited, New Delhi, 2014.
3. Raymond Murphy, “English grammar in use”, Fourth Edition, Cambridge University, 2012.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	-	-	-	-	-	-	-	-	3	3	-	2	-	1
2	-	3	2	2	-	-	1	-	2	-	-	3	2	-
3	-	3	2	2	-	-	1	-	2	-	-	3	2	-
CO (w.A)	-	2	1.3	1.3	-	-	0.6	-	2.3	1	-	2.6	1.3	0.3

G.P.L.

22MAN09 INDIAN CONSTITUTION (Common to All Branches)				
		L	T	P
		1	0	0
PRE REQUISITE : NIL				
Course Objectives		Course Outcomes		
1.0	To educate students to learn about the Constitutional Law of India.	1.1	The students will be able to Gain Knowledge about the Constitutional Law of India.	
2.0	To motivate students to Understand the role of Union Government.	2.1	The students will be able to know the Union Government and role of President and Prime Minister.	
3.0	To make students to understand about State Government.	3.1	The students will be able to acquire knowledge about State Government and role of Governor, Chief Minister.	
4.0	To understand about District Administration, Municipal Corporation and Zila Panchayat.	4.1	The students will be able to understand the District Administration, Municipal Corporation and Zila Panchayat.	
5.0	To encourage students to Understand about the election commission.	5.1	The students will be able to understand the role and function of election commission.	

UNIT I - The Constitution - Introduction	(9)
The History of the Making of the Indian Constitution - Preamble and the Basic Structure, and its interpretation - Fundamental Rights and Duties and their interpretation - State Policy Principles.	
UNIT II – Union Government	(9)
Structure of the Indian Union - President – Role and Power - Prime Minister and Council of Ministers - Lok Sabha and Rajya Sabha	
UNIT III – State Government	(9)
Governor – Role and Power - Chief Minister and Council of Ministers - State Secretariat	
UNIT IV – Local Administration	(9)
District Administration - Municipal Corporation - Zila Panchayat	
UNIT V – Election Commission	(9)
Role and Functioning - Chief Election Commissioner - State Election Commission	
TOTAL (L:45) = 45 PERIODS	

TEXT BOOK:
<ol style="list-style-type: none"> 1. Rajeev Bhargava, Ethics and Politics of the Indian Constitution, Oxford University Press, New Delhi, 2008. 2. B.L. Fadia, The Constitution of India, Sahitya Bhawan; New edition (2017). 3. DD Basu, Introduction to the Constitution of India, Lexis Nexis; Twenty-Third 2018 edition.
REFERENCES:
<ol style="list-style-type: none"> 1. Steve Blank and Bob Dorf, The Startup Owner’s Manual: The Step-by-Step Guide for Building a Great Company”, K & S Ranch ISBN – 978-0984999392 2. Eric Ries, The Lean Startup: How Today’s Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses” , Penguin UK ISBN – 978-0670921607 3. Adrian J. Slywotzky with Karl Weber, Demand: Creating What People Love Before They Know They Want It, Headline Book Publishing ISBN – 978-0755388974 4. Clayton M. Christensen, The Innovator’s Dilemma: The Revolutionary Book That Will Change the Way You Do Business, Harvard business ISBN: 978-142219602.
REFERENCES: Web link
<ol style="list-style-type: none"> 1. https://www.fundable.com/learn/resources/guides/startup 2. https://corporatefinanceinstitute.com/resources/knowledge/finance/corporate-structure/ 3. https://www.finder.com/small-business-finance-tips 4. https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1						3		3		2		3		
2						3		3		2		3		
3						3		3		2		3		
4						3		3		2		3		
5						3		3		2		3		
CO (w.A)						3		3		2		3		

G.P.L.

22EEEC09 -ELECTRICAL MACHINES-II (For EEE Branch only)					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 22EEEC06					
Course Objectives		Course Outcomes			
1.0	To impart knowledge on construction and performance of salient and non – salient type synchronous generators.	1.1	The students will be able to understand the construction and working principle of Synchronous generator.		
2.0	To impart knowledge on Principle of operation and performance of synchronous motor.	2.1	The students will be able to understand the construction and working principle of Synchronous Motor.		
3.0	To impart knowledge on construction, principle of operation and performance of induction machines	3.1	The students will be able to understand the construction and working principle of Three Phase Induction Motor.		
4.0	To impart knowledge on Starting and speed control of three-phase induction motors.	4.1	The students will be able to acquire knowledge about the starting and speed control of induction motors.		
5.0	To impart knowledge on Construction, principle of operation and performance of single phase induction motors and special machines	5.1	The students will be able to gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines.		

UNIT I – SYNCHRONOUS GENERATOR	(9)
Constructional details – Types of rotors – EMF equation – Synchronous reactance – Armature reaction – Voltage regulation – EMF, MMF and ZPF methods – Synchronizing and parallel operation – Synchronizing torque - Capability curves– Salient pole Machine: Two reaction theory – Determination of direct and quadrature axis synchronous reactance using slip test.	
UNIT II – SYNCHRONOUS MOTOR	(9)
Principle of operation – Procedure for starting - Starting methods – Different torques - Synchronization torque - Effect of change in torque - Effect of change in excitation - V and inverted V curves – Power input and power developed equations – Hunting – Applications.	
UNIT III – THREE PHASE INDUCTION MOTOR	(9)
Constructional details – Types of rotors -- Principle of operation – Slip – Equivalent circuit – Torque-Slip characteristics - Condition for maximum torque – Losses and efficiency – Load test - No load and blocked rotor tests - Circle diagram – Separation of losses – Applications.	
UNIT IV – STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR	(9)
Need for starting – Types of starters – DOL, Star delta, Autotransformer and Rotor resistance starters – Speed control – Voltage control, Frequency control and pole changing – Cascaded Connection-V/f control – Slip power recovery Scheme.	

UNIT V – SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES	(9)
Single Phase Induction Motor: Constructional details– Double field revolving theory and operation – Equivalent circuit – Starting methods - Capacitor start and capacitor start and run induction motor, Shaded pole induction motor. Special Machines- Repulsion motor - Servo motor – Switched Reluctance motor – Universal Motor – BLDC motor.	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. A.E. Fitzgerald, Charles Kingsley, Stephen. D. Umans, 'Electric Machinery', Mc Graw Hill publishing Company Ltd, 6th Edition 2017. 2. D.P. Kothari and I.J. Nagrath, 'Electric Machines', McGraw Hill Publishing Company Ltd, 5th Edition 2017.
REFERENCES:
<ol style="list-style-type: none"> 1. B.R.Gupta, 'Fundamental of Electric Machines' New age International Publishers, 3rd Edition, Reprint 2015. 2. Murugesh Kumar, 'Electric Machines', Vikas Publishing House Pvt. Ltd, First edition 2010.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	1	1	1							1	3	2
2	3	3	1	1	1							1	3	2
3	3	3	1	1	1							1	3	2
4	3	3	1	1	1							1	3	1
5	3	3	1	1	1							1	3	-
CO (w.A)	3	3	1	1	1							1	3	1

G.P.L.

22EEEC10 –ANALOG INTEGRATED CIRCUITS (For EEE Branch only)					
		L	T	P	C
		3	0	0	3
PRE REQUISITE : 22EEEC05					
Course Objectives			Course Outcomes		
1.0	To provide in-depth instructions on the characteristics of operational amplifiers	1.1	The students will be able to impart knowledge on characteristics of OP-AMP		
2.0	To educate about basic operation using OP-AMP	2.1	The students will be able to acquire knowledge about basic operation using OP-AMP		
3.0	To learn about the application of OP-AMP	3.1	The students will be able to known about application OP-AMP		
4.0	To make the student to understand about unique IC	4.1	The students will be able to analyze and construct various application circuits using 555 timer.		
5.0	To learn about applications ICs	5.1	The students will be able to acquire knowledge about application ICs		

UNIT I – AMPLIFIER CHARACTERISTICS	(9)
Introduction-Advantages of negative feedback Amplifier – Voltage / current, series, Shunt feedback –Ideal OP -AMP characteristics -DC Performance - Bias currents, Offset currents, Offset voltage,AC characteristics - Frequency response, Slew rate.	
UNIT II – BASIC OPERATIONS USING OP-AMP	(9)
Differential amplifier–Inverting and Non-inverting Amplifiers - Voltage to current converter, current to voltage converter, differentiator and integrator, Summing, subtracting, averaging amplifier, Peak detector, Sample and hold circuit.	
UNIT III - APPLICATIONS OF OP-AMP	(9)
Instrumentation amplifier -Comparators – Multivibrators - Clippers – Clampers - D/A converter (R-2R ladder and weighted resistor types) - A/D converters using op amps.	
UNIT IV - SPECIAL ICS	(9)
Functional block, characteristics of Astable and Monostable multivibrators using 555 timers and its PWM application - IC566 voltage controlled oscillator- IC 565 phase locked loop IC.	
UNIT V - APPLICATION ICS	(9)
AD623 Instrumentation Amplifier and its application (load cell weight measurement)- IC voltage regulators – 78XX, 79XX, 317 Adjustable voltage regulators, 723 Precision voltage regulators.	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. D. Roy Choudhury, Shail B. Jain, "Linear Integrated Circuits", Fifth Edition New Age International, 2018. 2. Ramakant A. Gayakward, "Op-amps and Linear Integrated Circuits", IV edition, Pearson Education, PHI 2021.
REFERENCES:
<ol style="list-style-type: none"> 1. David A. Bell, 'Op-amp & Linear ICs', Oxford, Third Edition, 2011 2. Jacob Millman, Christos C. Halkias, 'Integrated Electronics - Analog and Digital circuits system', McGraw Hill, 2nd Edition, 2017.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	2	1	1	1	1	1	1	2	2	3	1
2	3	3	3	1	1	1	1	1	1	1	2	2	3	1
3	3	2	3	1	1	1	1	1	1	1	2	2	3	1
4	3	3	3	2	1	1	1	1	1	1	2	2	3	1
5	3	3	3	2	1	1	1	1	1	1	2	2	3	1
CO (w.A)	3	3	3	2	1	1	1	1	1	1	2	2	3	1

G.P.L.

22EECI I - POWER GENERATION, TRANSMISSION AND DISTRIBUTION (For EEE Branch only)				
		L	T	P
		3	0	0
PRE REQUISITE : 22EEC03				
Course Objectives		Course Outcomes		
1.0	To know the structure of electric power system and classifications of power generation.	1.1	The students will be able to understand the concepts of various conventional power generation systems.	
2.0	To impart knowledge on computation of transmission line parameters	2.1	The students will be able to estimate the line parameters for transmission line	
3.0	To obtain the equivalent circuits for the transmission lines based on distance and to determine voltage regulation and efficiency.	3.1	The students will be able to design electrical equivalent models and analyze the performance of transmission systems.	
4.0	To study the types, construction of cables and methods to improve the efficiency	4.1	The students will be able to calculate the sag of transmission line and predict voltage distribution in insulators	
5.0	To study about distribution systems, types of substations, methods of grounding.	5.1	The students will be able to explain about the importance of distribution of the electric power in power system.	

UNIT I – CLASSIFICATIONS OF POWER GENERATION	(9)
Structure of power system- Classification of power generation systems- Thermal, hydel, nuclear, wind and solar.	
UNIT II - TRANSMISSION LINE PARAMETERS	(9)
Parameters of single and three phase transmission lines with single circuits -Resistance, inductance and capacitance of solid, stranded and bundled conductors, Symmetrical and unsymmetrical spacing and transposition - Application of self and mutual GMD- Skin and proximity effects -Typical configurations, conductor types and electrical parameters of EHV lines	
UNIT III – MODELLING AND PERFORMANCE OF TRANSMISSION LINES	(9)
Performance of Transmission lines - Short line, medium line and long line - Equivalent circuits, phasor diagram, attenuation constant, phase constant, surge impedance - Transmission efficiency and voltage regulation, real and reactive power flow in lines – Ferranti effect - Formation of Corona	
UNIT IV – DESIGN OF OVERHEAD TRANSMISSION LINES	(9)
Design of OH lines – Line Supports –Types of towers – Stress and Sag Calculation – Effects of Wind and Ice loading. Insulators- Types, voltage distribution in insulator string, improvement of string efficiency. Comparison between overhead line and underground cables, types of underground cables and its construction.	

UNIT V - DISTRIBUTION SYSTEMS AND SUBSTATIONS	(9)
Distribution Systems: General Aspects – Kelvin’s Law – DC 2-wire distributor – Radial and ring main distribution.	
Substations: Types of Substations - Key diagram of 11 kV/415 V substation, Methods of Grounding.	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. D. P. Kothari, I. J. Nagrath, Power System Engineering, 2019, 3rd edition, McGraw Hill Education 2. CL Wadhwa, Electrical Power Systems, 2017,7th Edition, New Age publication 3. S.N. Singh, ‘Electric Power Generation, Transmission and Distribution’, Prentice Hall of India Pvt. Ltd, New Delhi, Second Edition, 2011.
REFERENCES:
<ol style="list-style-type: none"> 1. Arun Ingole, "power transmission and distribution" Pearson Education, 2017. 2. G.Ramamurthy, “Handbook of Electrical power Distribution,” Universities Press, 2013. 3. V.K.Mehta, Rohit Mehta, ‘Principles of power system’, S.Chand & Company Ltd, New Delhi, 2013.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	3	2	3	2	1	2	2	1	3	3	2
2	3	3	3	3	2	3	2	1	2	1	1	3	3	2
3	3	3	3	3	2	3	2	1	2	1	1	3	3	2
4	3	3	3	3	2	3	2	1	2	1	1	3	3	2
5	3	3	3	3	2	3	2	3	2	2	2	3	3	2
CO (w.A)	3.0	3.0	3.0	3.0	2.0	3.0	2	1.4	2	1.4	1.2	3.0	3.0	2.0

G.P.L.

22EECI2 – MEASUREMENTS AND INSTRUMENTATION
(For EEE Branch only)

L	T	P	C
3	0	0	3

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To educate the fundamental concepts and characteristics of measurement and errors	1.1	The students will be able to understand the fundamental art of measurement in engineering
2.0	To assimilate the operating principle of various measuring instruments	2.1	The students will be able to apply their knowledge to measure electrical quantities using analog instruments
3.0	To impart the importance of various bridge circuits used with measuring instruments.	3.1	The students will be able to measure resistance, inductance and capacitance using various bridge circuits.
4.0	To perceive knowledge on the fundamental working of transducers and display devices	4.1	The students will be able to analyze and apply various transducers for measurement process
5.0	To emphasize the need of digital instrumentation principles	5.1	The students will be able to understand the concept of digital instrumentation

UNIT I – CHARACTERISTICS AND CONCEPTS OF MEASUREMENT	(9)
Instruments- Classification-applications -Elements of a generalized measurement system - Static and dynamic characteristics - Errors in measurement -Statistical evaluation of measurement data- Standards and calibration.	
UNIT II - MEASURING INSTRUMENTS	(9)
Classification of measuring instruments-Essential requirements of an instrument-Construction, working principle of PMMC, MI type instruments -Electro-dynamometer type Wattmeter-Energy Meter-Determination of B–H curve and measurement of iron loss- Instrument transformers (CT & PT).	
UNIT III – DC AND AC BRIDGES	(9)
DC Bridges: Wheatstone bridge, Kelvin bridge, Kelvin double bridge and their merits and demerits. AC Bridges: Maxwell bridge, Anderson bridge, Schering Bridge and their Merits and Demerits.	
UNIT IV – TRANSDUCERS AND DISPLAY DEVICES	(9)
Classification of transducers- Selection of transducers- Resistive (Thermistor & Thermocouple) , capacitive and Linear Variable Differential Transducer, Piezoelectric and Hall effect Transducer-Working principle of Analog CRO, LED and LCD.	
UNIT V – DIGITAL INSTRUMENTS & INTRODUCTION TO VIRTUAL INSTRUMENTATION	(9)
Comparison of analog and digital techniques-Digital voltmeter- Multimeters- Smart meters- Measurement of frequency and phase- A/D converters: types and characteristics – D/A converters: types and characteristics- DSO- Introduction to Virtual Instrumentation	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:
<ol style="list-style-type: none"> 1. A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, New Delhi, 29th Edition 2021. 2. H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010
REFERENCES:
<ol style="list-style-type: none"> 1. David A. Bell, Electronic Instrumentation and Measurements, 2013, Oxford University Press 2. Jennings, Richard, and Fabiola De La Cueva. LabVIEW graphical programming, 2020, McGraw-Hill Education 3. E. O. Doebelin and D. N. Manik, "Measurement Systems – Application and Design", Tata McGraw-Hill, New Delhi, 6th Edition 2017.

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	2	2	1	3	1						3	3	2
2	3	2	3	2	2	1			2			2	3	2
3	3	2	3	2	3							2	3	3
4	3	3	3	2	2							1	3	2
5	3	3	3	2	3				2			3	3	3
CO (w.A)	3	2	3	2	3				1			2	3	2

G.P.L.

22EEEC13-MICROPROCESSOR & MICROCONTROLLER
(For EEE Branch only)

		L	T	P	C
		3	0	0	3
PRE REQUISITE : 22EEEC08					
Course Objectives		Course Outcomes			
1.0	To impart knowledge on functional blocks and programming of 8085 Microprocessor	1.1	The students will be able to explain the architecture of 8085 Microprocessor		
2.0	To understand the concepts of 8051 architecture & instruction set of 8051.	2.1	The students will be able to develop skills in writing assembly language program		
3.0	To gain knowledge on microcontroller associated peripheral interface devices	3.1	The students will be able to recognize the knowledge on interfacing the external devices to the processor according to the user requirements		
4.0	To make the students understand ARM architecture	4.1	The students will be able to gain knowledge about architectures of RISC and ARM processor		
5.0	To convey the skills to know about PIC microcontroller	5.1	The students will be able to develop systems using PIC microcontroller		

UNIT I -8085 ARCHITECTURE INSTRUCTION SET AND PROGRAMMING	(9)
Functional block diagram-Interrupt Structure-Instruction format and addressing modes-Assembly language format-Data transfer, data manipulation and control instructions-Simple programming with 8085.	
UNIT II-8051 INSTRUCTION SET & PROGRAMMING	(9)
Functional block diagram-Instruction format and addressing modes-Interrupt structure-Timer-I/O Port-Serial Communication-Simple programming.	
UNIT III -APPLICATIONS OF 8051 MICROCONTROLLER	(9)
Interfacing LCD- Stepper motor control-Interfacing A/D converter- D/A Converter-DC Motor interfacing, sensor interfacing.	
UNIT IV-INTRODUCTION TO PIC MICROCONTROLLER	(9)
Introduction to PIC microcontrollers-Overview and features-PIC 16FXX architecture- Memory organization - Register File Structure-Timer module-CCP module – Addressing Modes-Classification of instructions.	
UNIT V - ARM ARCHITECTURE AND PROGRAMMING	(9)
Introduction to RISC processors-Comparison between CISC and RISC-Overview of 16XX ARM v7-Features- Pin Configuration-Architecture-Register configuration and instruction set.	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOKS:	
1.	Muhammad Ali Mazidi & Janice Gilli Mazidi, R.D.Kinely 'The 8051 Micro Controller and Embedded Systems', PHI Pearson Education, 5th Indian reprint, 2003.
2.	R. S. Gaonkar, "Microprocessor Architecture: Programming and Applications with the 8085", Penram International Publishing, 1996
3.	Peatman, J.B., Design with PIC Micro Controllers Pearson Education, 3rd Edition, 2004
4.	Jonathan W Valvano Introduction to Am(r) Cortex-M Microcontrollers Createspace Independent Publisher 2012
REFERENCES:	
1.	Krishna Kant, "Microprocessor and Microcontrollers", Eastern Company Edition, Prentice Hall of India, New Delhi, 2007.
2.	Subrata Ghoshal, "8051 Microcontrollers, 2/e: Internals, Instructions, Programming & Interfacing", 2nd Edition, Pearson Education, 2014

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	1	2	3	1					1	1	3	3	2
2	2	1	2	3	2					1	1	2	3	2
3	2	1	2	3	2					2	2	2	3	3
4	2	2	2	3	1					1	1	1	3	2
5	2	1	2	3	2					1	1	3	3	3
CO (w.A)	2	1	2	3	2					1	1	2	3	2

G.P.L.

22CYB06- ENVIRONMENTAL SCIENCE AND SUSTAINABILITY
(Common to CHEM^{2nd}, BME^{3rd}, ECE^{3rd} & EEE^{4th})

L	T	P	C
3	0	0	3

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To recognize the basic concepts of environment, ecosystems and biodiversity.	1.1	The students will be able to know the importance of environment and functions ecosystems and biodiversity
2.0	To impart knowledge on the causes, effects and control measures of environmental pollution.	2.1	The students will be able to identify the causes, effects of environmental pollution and contribute the preventive measures to the society.
3.0	To make the students conversant with the global and Indian scenario of renewable resources, causes of their degradation and measures to preserve them.	3.1	The students will be able to identify and understand the renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.
4.0	To familiarize the concept of sustainable development goals, recognize and analyze climate changes, concept of carbon credit and the challenges of environmental management.	4.1	The students will be able to recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.
5.0	To inculcate and embrace sustainability practices and develop a broader understanding on green materials, energy cycles and analyzes the role of sustainable urbanization.	5.1	The students will be able to demonstrate the sustainability practices and identify green materials, energycycles.

UNIT I - ENVIRONMENT AND BIODIVERSITY	(9)
Environment - scope and importance - Eco-system- Structure and function of an ecosystem - types of biodiversity- genetic - species and ecosystem diversity- Values of biodiversity - India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity - habitat loss - poaching of wildlife - man-wildlife conflicts – endangered and endemic species of India – Conservation of biodiversity - In-situ and ex-situ.	
UNIT II - ENVIRONMENTAL POLLUTION	(9)
Pollution – Causes - Effects and Preventive measures of Water – Soil - Air - Noise Pollution - Solid waste management - methods of disposal of solid waste – various steps of Hazardous waste management - E-Waste management - Environmental protection – Air acts – water acts.	
UNIT III - RENEWABLE SOURCES OF ENERGY	(9)
Energy management and conservation -New Energy Sources - Different types new energy sources – Hydrogen energy – Geothermal energy - Solar energy – wind energy – biomass energy - Applications of Hydrogen energy - Ocean energy resources -Tidal energy conversion.	

UNIT IV – SUSTAINABILITY AND MANAGEMENT	(9)
Development – Factors affecting development – advantages – disadvantages – GDP - Sustainability- needs – concept - from unsustainability to sustainability - millennium development goal - Sustainable Development goals - Climate change – Concept of carbon credit – carbon footprint - Environmental management.	
UNIT V – SUSTAINABILITY PRACTICES	(9)
Zero waste and R concept - ISO 14000 Series - Environmental Impact Assessment - Sustainable habitat - Green buildings - Green materials- Sustainable energy - Non-conventional Sources - Energy Cycles- carbon cycle and carbon emission - Green Engineering - Sustainable urbanization	
TOTAL(L:45) = 45 PERIODS	

TEXT BOOK:
<ol style="list-style-type: none"> 1. Dr. A.Ravikrishan, Environmental Science and Engineering., Sri Krishna Hitech Publishing co. Pvt.Ltd., Chennai, 15thEdition, 2023. 2. Anubha Kaushik and C. P. Kaushik’s “Perspectives in Environmental Studies”, 6th Edition, New Age International Publishers , 2018.
REFERENCES:
<ol style="list-style-type: none"> 1. Rajagopalan, R, ‘Environmental Studies-From Crisis to Cure’, Oxford University Press, Third Edition, 2015. 2. Erach Bharucha “Textbook of Environmental Studies for Undergraduate Courses” Orient Blackswan Pvt. Ltd. 2013.
WEB LINK:
<ol style="list-style-type: none"> 1. http://www.jnkvv.org/PDF/08042020215128Amit1.pdf 2. https://www.conserve-energy-future.com/types-of-renewable-sources-of-energy.php 3. https://ugreen.io/sustainability-engineering-addressing-environmental-social-and-economic-issues/

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	2	2			3	3	2	1			2		
2	2	2	2			3	3	2	1			2		
3	2	2	2			3	3	2	1			2		
4	2	2	2			3	3	2	1			2		
5	2	2	2			3	3	2	1			2		
CO (w.A)	2	2	2			3	3	2	1			2		

G.P.L.

22EEP04 -ELECTRICAL MACHINES-II LABORATORY
(For EEE Branch only)

L	T	P	C
0	0	4	2

PRE REQUISITE : 22EEP03

Course Objectives		Course Outcomes	
1.0	To expose the students to the operation of synchronous generator non-salient pole type and give them experimental skill.	1.1	Students will be able to understand and analyze EMF and MMF methods.
2.0	To expose the students to the operation of synchronous generator salient pole type and give them experimental skill.	2.1	Students will be able to acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines.
3.0	To expose the students to the operation of synchronous motor and give them experimental skill.	3.1	Students will be able to analyze the characteristics of V and Inverted V curves
4.0	To expose the students to the operation of three phase induction motors and gives them experimental skill.	4.1	Students will be able to acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors
5.0	To expose the students to the operation of single phase induction motors and gives them experimental skill.	5.1	Students will be able to acquire knowledge on separation of losses

LIST OF EXPERIMENTS

1. Regulation of Alternator by EMF and MMF Methods.
2. Regulation of Alternator by ZPF Method.
3. Regulation of Salient Pole Alternator.
4. Load Test on three phase alternator.
5. V and inverted V curve of three phase synchronous motor.
6. Load Test on three phase induction motor.
7. Performance evaluation of three phase induction motor from circle diagram.
8. Separation of no load losses of three phase induction motor.
9. Load Test on single phase induction motors.
10. No load and blocked rotor test on single-phase induction motor.

ADDITIONAL EXPERIMENTS

1. Synchronization of alternators by using dark and bright lamp method.
2. Study of Induction Motor Starters.

TOTAL (P:60) = 60 PERIODS

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	1	1					1			3	3	2
2	3	3	1	1					1			3	3	2
3	3	3	1	1					1			3	3	2
4	3	3	1	1					1			3	3	2
5	3	3	1	1					1			3	3	2
CO (w.A)	3	3	1	1					1			3	3	2

G.P.L.

22EEP05- ANALOG AND DIGITAL INTEGRATED CIRCUITS LABORATORY (For EEE Branch only)						
			L	T	P	C
			0	0	4	2
PRE REQUISITE : 22EEP02						
Course Objectives			Course Outcomes			
1.0	To implement the basic circuits using OP-AMP.	1.1	The students will be able to analyze about the characteristics of OP-AMP			
2.0	To implement the timer IC application.	2.1	The students will be able to know the applications of OP-AMP and 555 IC			
3.0	To verify the expressions using Boolean functions	3.1	The students will be able to acquire knowledge about the various types of logic gates			
4.0	To verify the Combinational circuits	4.1	The students will be able to understand about the code converters			
5.0	To understand the concept of conversions in various applications.	5.1	The students will be able to acquire knowledge about checker and generator			

LIST OF EXPERIMENTS	
<ol style="list-style-type: none"> 1. Implementation of Inverting and Non-Inverting amplifier using OP-AMP. 2. Implementation of Differentiator and integrator using OP-AMP. 3. Implementation of Monostable multivibrator using 555 IC. 4. Implementation of Astable multivibrator using 555 IC. 5. Verification of logic gates. 6. Verification of Half subtractor and Half adder. 7. Verification of binary to gray code and gray to binary code converter. 8. Verification of Multiplexer and Demultiplexer. 9. Verification of encoder and decoder. 10. Verification of Parity checker and Parity generator. 	
<p>ADDITIONAL EXPERIMENTS</p> <ol style="list-style-type: none"> 1. Design and implementation of precision rectifier using op-amp 2. Design and implementation of triangular wave generator using op-amp 	
TOTAL (P:60) = 60 PERIODS	

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	3	2	-	1	1	1	1	-	2	2	2	1
2	3	3	3	1	-	1	1	1	1	-	2	2	2	1
3	3	2	3	1	-	1	1	1	1	-	2	2	2	1
4	3	3	3	2	-	1	1	1	1	-	2	2	2	1
5	3	3	3	2	-	1	1	1	1	-	2	2	2	1
CO	3	3	3	2	-	1	1	1	1	-	2	2	2	1

G.P.L.

22EEP06- MICROPROCESSORS AND MICROCONTROLLERS LABORATORY
(For EEE Branch only)

L	T	P	C
0	0	4	2

PRE REQUISITE : NIL

Course Objectives		Course Outcomes	
1.0	To understand the basic programming of Microprocessor and microcontroller.	1.1	The students will be able to apply fundamental of assembly language programming for microprocessor and microcontroller
2.0	To inscribe the interfacing of assembly language programs	2.1	The students will be able to apply computing platform for various engineering applications
3.0	To provide solid foundation on interfacing the external devices to the processor according to the user requirements	3.1	The students will be able to work with standard microcontroller real time interfaces including stepper motor, LED
4.0	To familiarize and develop programs for ARM and PIC	4.1	The students will be able to design circuits for various applications using microcontroller and microprocessor
5.0	To develop the quality of analyzing and assessing obtained data	5.1	The students will be able to demonstrate the basic instructions with processor and controller based on its architecture and instruction set

LIST OF EXPERIMENTS

1. Simple arithmetic operations: multiplication, division using 8085.
2. Traffic Light Controller using 8085.
3. Displaying a moving/rolling message in the trainer kit's output using 8085.
4. Simple arithmetic operations: multiplication, division using 8051.
5. Interfacing of Stepper Motor using 8051.
6. Flashing of LED using ARM.
7. Simple arithmetic operations: Addition/Subtraction using PIC and ARM
8. Analog to Digital conversion using PIC Microcontroller.

ADDITIONAL EXPERIMENTS

1. Interfacing of keypad and LCD using PIC 16FXX for Security System.
2. Implementing zigbee protocol using ARM.

TOTAL (P:60) = 60 PERIODS

Mapping of COs with POs / PSOs														
COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	2	1	2	3								3	3	2
2	2	1	2	3								2	3	2
3	2	1	2	3								2	3	3
4	2	2	2	3								1	3	2
CO (w.A)	2	1	2	3	0	0	0	0	0	0	0	2	3	2

G.P.L.

22MAN08– SOFT / ANALYTICAL SKILLS – IV (Common to All Branches)					
		L	T	P	C
		1	0	2	0
PRE REQUISITE : NIL					
Course Objectives			Course Outcomes		
1.0	To recollect the functional understanding of basic grammar and its structure	1.1	The students will be able to apply the knowledge of basic grammar to construct the sentences.		
2.0	To develop students to workout solution for problems that involves mathematics aptitude.	2.1	The students will be able to solve aptitude problems with ease		
3.0	To enrich their knowledge and to develop their logical reasoning ability	3.1	The students will be able to solve reasoning problems with ease.		

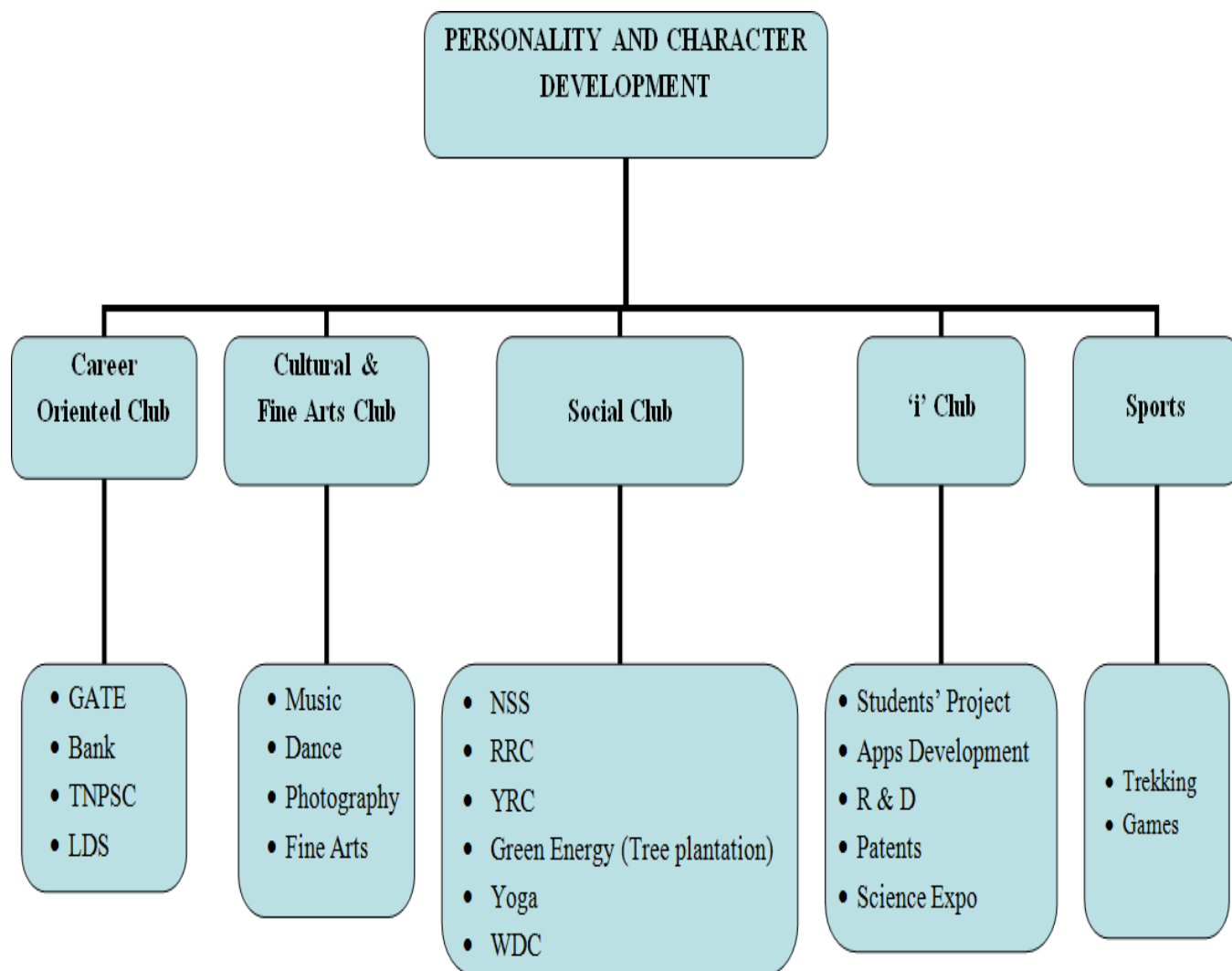
UNIT I - Verbal	(5+10)
Articles -Fill in the blanks - Grammatical Error - Sentence improvement	
UNIT II – Aptitude	(5+10)
Speed and Distance -Time and Work-Mixture And Alligations-Permutation and Combinations	
UNIT III - Logical and Reasoning	(5+10)
Seating Arrangement- Directions and Distance- Non verbal Reasoning	
TOTAL (L:15, P:30) : 45 PERIODS	

REFERENCES:
1. Dr. R.S. Aggarwal, “A Modern Approach to Verbal & Non-Verbal Reasoning”, S Chand and Company Limited, New Delhi, 2014.
2. Ashish Aggarwal, “Quick Arithmetic”, S Chand and Company Limited, New Delhi, 2014.
3. Raymond Murphy, “English grammar in use”, Fourth Edition, Cambridge University, 2012.

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	-	-	-	-	-	-	-	-	3	3	-	2	-	1
2	-	3	2	2	-	-	1	-	2	-	-	3	2	-
3	-	3	2	2	-	-	1	-	2	-	-	3	2	-
CO (W.A)	-	2	1.3	1.3	-	-	0.6	-	2.3	1	-	2.6	1.3	0.3

G. P. S.

22GED01-PERSONALITY AND CHARACTER DEVELOPMENT (Common to All Branches)				
	L	T	P	C
	0	0	1	0
PRE REQUISITE : NIL				



*LDS - Leadership Development Skills

OBJECTIVES :

Career Oriented Club	Cultural & Fine Arts Club	Social Club	'I' club	Sports
<ul style="list-style-type: none"> • To provide support for identifying specific careerfield of interests and career path • To provide support for preparing for competitive exams 	<ul style="list-style-type: none"> •To bring out the hidden talent of students in music, dance and other finearts. •To promotephotography skillamong the students •To develop and enhance the performance of students by participating in various events •To inculcatemanagerial capabilities such as event managementand stage organization 	<ul style="list-style-type: none"> •To create social awareness and develop a sense of social and civic responsibility •To inculcate socially and environmentally sound practices and be aware of the benefits •To encourage the students to work along with the people in rural areas, thereby developing their character, social consciousness, commitment, discipline and being helpful towards the community. 	<ul style="list-style-type: none"> •To inculcate the basic concepts of innovation •To foster the networking between students, build teams, exchange ideas, do projects and discuss entrepreneurial opportunities •To enrich the academic experience, build competencies and relationships beyond the classroom 	<ul style="list-style-type: none"> • To provide the opportunities to excel at sports • To promote an understanding of physical and mental well-being through an appreciation of stress, rest and relaxation. • To develop an ability to observe, analyze and judge the performance of self and peers in sporting activities. • To develop the leadership skills and nurture the team building qualities. Trekking: • To provide the opportunities to explore nature and educating about the purityof nature •To improve physical and mental health.

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

<ul style="list-style-type: none"> • Find a better career of their interest. • Make use of their knowledge during competitive exams and interviews 	<ul style="list-style-type: none"> • Take part in various events • Develop team spirit, leadership and managerial qualities 	<ul style="list-style-type: none"> • Develop socially responsive qualities by applying acquired knowledge • Build character, social consciousness, commitment and discipline 	<ul style="list-style-type: none"> • Apply the acquired knowledge in creating better solutions that Meet new requirements and market needs • Develop skills on transforming new knowledge or new Technology into viable products and services on commercial markets as a team 	<ul style="list-style-type: none"> • Demonstrate positive leadership skills that contribute to the organizational effectiveness • Take part an active role in their personal wellness (emotional, physical, and spiritual) that supports a healthy lifestyle • Create inclination towards outdoor activity like Nature study and Adventure.
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G. P. S.

22GYA01 HERITAGE OF TAMILS
(For Common To All Branches)

	L	T	P	C
	1	0	0	1
PRE REQUISITE : NIL				

UNIT I - LANGUAGE AND LITERATURE	(3)
Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.	
UNIT II - HERITAGE - ROCK ART PAINTINGS TO MODERN ART - SCULPTURE	(3)
Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.	
UNIT III - FOLK AND MARTIAL ARTS	(3)
Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.	
UNIT IV - THINAI CONCEPT OF TAMILS	(3)
Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.	
UNIT V - CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE	(3)
Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.	
TOTAL (L:15) : 15 PERIODS	

TEXT-CUM-REFERENCE BOOKS	
1.	தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2.	கணினித் தமிழ் – முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3.	கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4.	பொருளுத – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

22GYA01 தமிழர் மரபு
(அனைத்து பாடப்பிரிவினருக்கும்)

L	T	P	C
I	0	0	I

முன் தேவை: இல்லை

அலகு 1 மொழி மற்றும் இலக்கியம் **(3)**

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு 2 மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக்கலை: **(3)**

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஜம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுருமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு 3 நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்: **(3)**

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டாம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு 4 தமிழர்களின் திணைக் கோட்பாடுகள்: **(3)**

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளின் சோழர்களின் வெற்றி.

அலகு 5 இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு: **(3)**

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு, கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ் புத்தகங்களின் அச்ச வரலாறு.

TOTAL (L:15) : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

22GYA02 TAMILS AND TECHNOLOGY
(For Common To All Branches)

L	T	P	C
1	0	0	1

PRE REQUISITE : NIL

UNIT I - WEAVING AND CERAMIC TECHNOLOGY

(3)

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II - DESIGN AND CONSTRUCTION TECHNOLOGY

(3)

Designing and Structural construction House & Designs n household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III - MANUFACTURING TECHNOLOGY

(3)

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel - Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beads - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV - AGRICULTURE AND IRRIGATION TECHNOLOGY

(3)

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoempu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.

UNIT V - SCIENTIFIC TAMIL & TAMIL COMPUTING

(3)

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project.

TOTAL (L:15) : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே.கே.பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல.சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருளை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
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10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

**22GYA02 தமிழ்நாடும் தொழில்நுட்பமும்
(அனைத்து பாடப்பிரிவினருக்கும்)**

L	T	P	C
I	0	0	I

முன் தேவை: இல்லை

அலகு 1 நெசவு மற்றும் பாணைத் தொழில்நுட்பம்:

(3)

சங்ககாலத்தில் நெசவுத்தொழில் - பாணைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு 2 வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:

(3)

சங்ககாலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் மற்றும் சங்ககாலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்ககாலத்தில் கட்டுமான பொருட்களும் நடுக்கல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரம் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சாரோசெனிக் கட்டிடக் கலை.

அலகு 3 உற்பத்தி தொழில் நுட்பம்:

(3)

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எக்கு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுருமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு 4 வேளாண்மை மற்றும் நீர்பாசனத் தொழில் நுட்பம்:

(3)

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுவித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

அலகு 5 அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:

(3)

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின் பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

TOTAL (L:15) : 15 PERIODS

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