



THAMIRABHARANI ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION)

REGULATIONS 2024
B. E. ELECTRICAL AND ELECTRONICS ENGINEERING
CHOICE BASED CREDIT SYSTEM
CURRICULUM AND SYLLABI FOR SEMESTERS I TO VIII

SEMESTER I

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24IP0101	Induction Programme	-	-	-	-	-	0
THEORY								
2	24HS0101	Professional English I	HSMC	3	0	0	3	3
3	24MA0101	Matrices and Calculus	BSC	3	1	0	4	4
4	24PH0101	Engineering Physics I	BSC	3	0	0	3	3
5	24CY0101	Engineering Chemistry	BSC	3	0	0	3	3
6	24GE0101	Problem Solving and Python Programming	ESC	3	0	0	3	3
7	24GE0102	தமிழர் மரபு / Heritage of Tamils	HSMC	1	0	0	1	1
PRACTICALS								
8	24GE0103	Problem Solving and Python Programming Laboratory	ESC	0	0	4	4	2
9	24BS0101	Physics and Chemistry Laboratory	BSC	0	0	4	4	2
10	24GE0102	English Laboratory I	EEC	0	0	2	2	1
TOTAL				16	1	10	27	22

SEMESTER II

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	24HS0203	Professional English II	HSMC	2	0	0	2	2
2	24MA0202	Ordinary Differential Equations and Transform Techniques	BSC	3	1	0	4	4
3	24PH0202	Engineering Physics II	BSC	3	0	0	3	3
4	24GE0204	Environmental Science and Engineering	BSC	2	0	0	2	2
5	24GE0205	Engineering Graphics	ESC	2	0	4	6	4
6	24GE0206	Basic Electrical and Electronics Engineering	ESC	3	0	0	3	3
7	24GE0207	தமிழரும் தொழில் நுட்பமும்/ Tamils and Technology	HSMC	1	0	0	1	1
PRACTICALS								
8	24GE0208	Basic Electrical and Electronics Engineering Laboratory	ESC	0	0	4	4	2
9	24GE0209	Engineering Practices Laboratory	ESC	0	0	4	4	2
10	24HS0204	English Laboratory II	EEC	0	0	2	2	1
TOTAL				16	1	14	31	24

SEMESTER III

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	24MA0303	Numerical Methods	BSC	3	1	0	4	4
2	24EE3301	Electric and Magnetic Fields	PCC	3	1	0	4	4
3	24EE3302	Electric Circuit Analysis	PCC	3	0	0	3	3
4	24EE3303	Electronic Devices and Circuits	PCC	3	0	0	3	3
5	24EE3304	DC Machines and Transformers	PCC	3	0	0	3	3
6	24CS5307	C and Data Structures	PCC	3	0	0	3	3
PRACTICALS								
7	24EE3305	Electronic Devices and Circuits Laboratory	PCC	0	0	3	3	1.5
8	24EE3306	DC Machines and Transformers Laboratory	PCC	0	0	3	3	1.5
9	24CS5308	C and Data Structures Laboratory	PCC	0	0	3	3	1.5
10	24GE0310	Professional Development	EEC	0	0	2	2	1
TOTAL				18	2	11	31	25.5

SEMESTER IV

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	24EE3401	Generation, Transmission and Distribution	PCC	3	0	0	3	3
2	24EE3402	Linear Integrated Circuits and Applications	PCC	3	0	0	3	3
3	24EE3403	Measurements and Instrumentation	PCC	3	0	0	3	3
4	24EE3404	Microprocessor and Microcontroller	PCC	3	0	0	3	3
5	24EE3405	AC Machines	PCC	3	0	0	3	3
6	24EE3406	Digital Electronics	PCC	3	0	0	3	3
PRACTICALS								
7	24EE3407	AC Machines Laboratory	PCC	0	0	3	3	1.5
8	24EE3408	Linear and Digital Circuits Laboratory	PCC	0	0	3	3	1.5
9	24EE3409	Microprocessor and Microcontroller laboratory	PCC	0	0	3	3	1.5
10	24GE0411	Soft Skills I	EEC	0	0	4	4	2
TOTAL				18	0	13	31	24.5

SEMESTER V

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	24EE3501	Power System Analysis	PCC	3	0	0	3	3
2	24EE3502	Power Electronics	PCC	3	0	0	3	3
3	24EE3503	Control Systems Engineering	PCC	3	0	0	3	3
4	24EE3504	Utilization and Conservation of Electrical Energy	PCC	3	0	0	3	3
5	24HS0505	English for Competitive Examinations	HSMC	3	0	0	3	3
6	24OE35XX	Professional Elective I	PEC	3	0	0	3	3
PRACTICALS								
7	24EE3505	Power Electronics Laboratory	PCC	0	0	3	3	1.5
8	24EE3506	Control Systems Laboratory	PCC	0	0	3	3	1.5
TOTAL				18	0	6	24	21

SEMESTER VI

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	24EE3601	Protection and Switchgear	PCC	3	0	0	3	3
2	24EE3602	Power System Operation and Control	PCC	3	0	0	3	3
3	24MGC601	Principles of Management	HSMC	3	0	0	3	3
4	24EE36XX	Professional Elective II	PEC	3	0	0	3	3
5	24EE36XX	Professional Elective III	PEC	3	0	0	3	3
6	24OXX6XX	Open Elective I	OEC	3	0	0	3	3
PRACTICALS								
7	24EE3603	Power System Laboratory	PCC	0	0	3	3	1.5
8	24GE0613	Soft Skills II	EEC	0	0	4	4	2
TOTAL				18	0	7	25	21.5

SEMESTER VII

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	24EE3701	High Voltage Engineering	PCC	3	0	0	3	3
2	24EE3702	Renewable Energy Technologies	PCC	3	0	0	3	3
3	24GE0714	Professional Ethics	HSMC	3	0	0	3	3
4	24EE37XX	Professional Elective IV	PEC	3	0	0	3	3
5	24EE37XX	Professional Elective V	PEC	3	0	0	3	3
6	24OXX7XX	Open Elective II	OEC	3	0	0	3	3
PRACTICALS								
7	24EE3703	Renewable Energy Laboratory	PCC	0	0	3	3	1.5
8	24EE3704	Internship	EEC	0	0	0	0	2
TOTAL				18	0	3	21	21.5

SEMESTER VIII

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1	24EE3801	Project Work	EEC	0	0	20	20	10

TOTAL CREDITS: 170

PROFESSIONAL ELECTIVE I

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24EE3507	Substation Engineering and Automation	PEC	3	0	0	3	3
2	24EE3508	HVDC and FACTS	PEC	3	0	0	3	3
3	24EE3509	Energy Management and Auditing	PEC	3	0	0	3	3
4	24EE3510	Power Quality	PEC	3	0	0	3	3

PROFESSIONAL ELECTIVE II

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24EE3604	Special Electrical Machines	PEC	3	0	0	3	3
2	24EE3605	Analysis of Electrical Machines	PEC	3	0	0	3	3
3	24EE3606	Electrical Drives	PEC	3	0	0	3	3
4	24EE3607	SMPS and UPS	PEC	3	0	0	3	3
5	24EE3608	Power Electronics for Renewable Energy Systems	PEC	3	0	0	3	3

PROFESSIONAL ELECTIVE III

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24EE3609	Embedded System Design	PEC	3	0	0	3	3
2	24EE3610	Embedded C Programming	PEC	3	0	0	3	3
3	24EE3611	Smart System Automation	PEC	3	0	0	3	3
4	24EE3612	Embedded System for Automotive Applications	PEC	3	0	0	3	3
5	24EE3613	VLSI Design	PEC	3	0	0	3	3

PROFESSIONAL ELECTIVE IV

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24EE3705	Electric Vehicle Architecture	PEC	3	0	0	3	3
2	24EE3706	Electric Vehicle Design, Mechanics and Control	PEC	3	0	0	3	3
3	24EE3707	Design of Electric Vehicle Charging System	PEC	3	0	0	3	3
4	24EE3708	Testing of Electric Vehicles	PEC	3	0	0	3	3
5	24EE3709	Grid Integration of Electric Vehicles	PEC	3	0	0	3	3

PROFESSIONAL ELECTIVE V

S. NO.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24EE3710	Energy Storage Systems	PEC	3	0	0	3	3
2	24EE3711	Hybrid Energy Technology	PEC	3	0	0	3	3
3	24EE3712	Sustainable and Environmental Friendly HV Insulation System	PEC	3	0	0	3	3
4	24EE3713	Power System Transients	PEC	3	0	0	3	3

OPEN ELECTIVE I

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24OCS601	Software Engineering Fundamentals	OEC	3	0	0	3	3
2	24OCS602	C Programming	OEC	3	0	0	3	3
3	24OAD601	Foundations of Artificial Intelligence	OEC	3	0	0	3	3
4	24OAD602	Programming for Data Science	OEC	3	0	0	3	3
5	24OEC601	Electronics Engineering	OEC	3	0	0	3	3
6	24OEC602	Wireless Technologies	OEC	3	0	0	3	3

OPEN ELECTIVE II

S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1	24OCS701	IoT Concepts and Applications	OEC	3	0	0	3	3
2	24OCS702	Introduction to Cloud Computing	OEC	3	0	0	3	3
3	24OCS703	Data Structures and Algorithm	OEC	3	0	0	3	3
4	24OAD701	Machine Learning using Python	OEC	3	0	0	3	3
5	24OAD702	Deep Learning and Neural Networks	OEC	3	0	0	3	3
6	24OAD703	Large Language Models	OEC	3	0	0	3	3
7	24OEC701	Consumer Electronics	OEC	3	0	0	3	3
8	24OEC702	Principles of Modern Communication System	OEC	3	0	0	3	3

SUMMARY

Name of the Programme: B. E. Electrical and Electronics Engineering											
S. No.	Subject Area	Credits per Semester								% of Subject Area	Total Credits
		I	II	III	IV	V	VI	VII	VIII		
1	HSMC	4	3	-	-	3	3	3	-	9	16
2	BSC	12	9	4	-	-	-	-	-	15	25
3	ESC	5	11	-	-	-	-	-	-	9	16
4	PCC	-	-	20.5	22.5	15	7.5	7.5	-	43	73
5	PEC	-	-	-	-	3	6	6	-	9	15
6	OEC	-	-	-	-	-	3	3	-	4	6
7	EEC	1	1	1	2	-	2	2	10	11	19
8	Non-Credit/ Mandatory	-	-	-	-	-	-	-	-	0	-
Total		22	24	25.5	24.5	21	21.5	21.5	10	100	170

Legends

HSMC	Humanities, Social Sciences and Management Courses
BSC	Basic Sciences Courses
ESC	Engineering Sciences Courses
PCC	Professional Core Courses
PEC	Professional Elective Courses
OEC	Open Elective Courses
EEC	Employability Enhancement Courses

SEMESTER I

24IP0101	INDUCTION PROGRAMME	L	T	P	C
		-	-	-	0
<p>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.</p> <p>The induction programme has been introduced by AICTE with the following objective:</p> <p>“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.”</p> <p>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.</p> <p>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.</p> <p>(i) Physical Activity</p> <p>This would involve a daily routine of physical activity with games and sports, yoga, gardening, etc.</p> <p>(ii) Creative Arts</p> <p>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 every day 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.</p> <p>(iii) Universal Human Values</p> <p>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,</p>					

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:

Guide to Induction program from AICTE

24HS0101	PROFESSIONAL ENGLISH I	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To improve the communicative competence of learners. To learn to use basic grammatic structures in suitable contexts. To acquire lexical competence and use them appropriately in a sentence and understand their meaning in a text. To help learners use language effectively in professional contexts. To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals. 					
UNIT I	INTRODUCTION TO EFFECTIVE COMMUNICATION	9			
<p>What is effective communication? (Explain using activities) Why is communication critical for excellence during study, research and work? What are the seven C's of effective communication? What are key language skills? What is effective listening? What does it involve? What is effective speaking? What does it mean to be an excellent reader? What should you be able to do? What is effective writing? How does one develop language and communication skills? What does the course focus on? How are communication and language skills going to be enhanced during this course? What do you as a learner need to do to enhance your English language and communication skills to get the best out of this course?</p> <p>INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION</p> <p>Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. Writing - Writing emails / letters introducing oneself. Grammar - Present Tense (simple and progressive); Question types: Wh/ Yes or No/ and Tags. Vocabulary - Synonyms; One-word substitution; Abbreviations & Acronyms (as used in technical contexts).</p>					
UNIT II	NARRATION AND SUMMATION	9			
<p>Reading - Reading biographies, travelogues, newspaper reports, Excerpts from literature, and travel & technical blogs. Writing - Guided writing-- Paragraph writing Short Report on an event (field trip etc.) Grammar –Past tense (simple); Subject-Verb Agreement; and Prepositions. Vocabulary - Word forms (prefixes& suffixes); Synonyms and Antonyms. Phrasal verbs.</p>					
UNIT III	DESCRIPTION OF A PROCESS / PRODUCT	9			
<p>Reading – Reading advertisements, gadget reviews; user manuals. Writing - Writing definitions; instructions; and Product /Process description. Grammar - Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses. Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words).</p>					
UNIT IV	CLASSIFICATION AND RECOMMENDATIONS	9			
<p>Reading – Newspaper articles; Journal reports and Non Verbal Communication (tables, pie charts) - Writing – Note-making / Note-taking (*Study skills to be taught, not tested); Writing</p>					

recommendations; Transferring information from non-verbal (chart, graph etc, to verbal mode) Grammar – Articles; Pronouns - Possessive & Relative pronouns. Vocabulary - Collocations; Fixed / Semi fixed expressions.		
UNIT V	EXPRESSION	9
Reading – Reading editorials; and Opinion Blogs; Writing – Essay Writing (Descriptive or narrative). Grammar – Future Tenses, Punctuation; Negation (Statements & Questions); and Simple, Compound & Complex Sentences. Vocabulary - Cause & Effect Expressions – Content vs Function words.		
TOTAL: 45 PERIODS		
COURSE OUTCOMES:		
At the end of the course, the students will be able to		
CO1: Use appropriate words in a professional context.		
CO2: Gain understanding of basic grammatical structures and use them in right context.		
CO3: Read and infer the denotative and connotative meanings of technical texts.		
CO4: Read and interpret information presented in tables, charts and other graphic forms.		
CO5: Write definitions, descriptions, narrations and essays on various topics.		
TEXT BOOKS:		
1. “English for Engineers & Technologists”, Orient Blackswan Private Ltd. Department of English, Anna University, (2020 edition).		
2. Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Jovani, “English for Science & Technology”, Cambridge University Press, Authored by, Department of English, Anna University, 2021.		
REFERENCE BOOKS:		
1. Meenakshi Raman and Sangeeta Sharma, “Technical Communication – Principles and Practices”, Oxford Univ. Press, 2016, New Delhi.		
2. Lakshminarayanan, “A Course Book on Technical English”, Scitech Publications (India) Pvt. Ltd.		
3. Aysha Viswamohan, “English for Technical Communication” (With CD), Mcgraw Hill Education, ISBN: 0070264244.		
4. Kulbhusan Kumar and RS Salaria, “Effective Communication Skill”, Khanna Publishing House.		
5. Dr. V. Chellammal, “Learning to Communicate”, Allied Publishing House, New Delhi, 2003.		
ASSESSMENT PATTERN		
Two internal assessments and an end semester examination to test students’ reading and writing skills along with their grammatical and lexical competence.		

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
2	1	1	1	1	1	3	3	3	1	3	-	3	-	-	-
3	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
4	2	3	2	3	2	3	3	3	2	3	3	3	-	-	-
5	2	3	3	3	-	3	3	3	2	3	-	3	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24MA0101	MATRICES AND CALCULUS	L	T	P	C
		3	1	0	4
OBJECTIVES:					
<ul style="list-style-type: none"> To develop the use of matrix algebra techniques that is needed by engineers for practical applications. To familiarize the students with differential calculus. To familiarize the student with functions of several variables. This is needed in many branches of engineering. To make the students understand various techniques of integration. To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications. 					
UNIT I	MATRICES				9+3
Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigenvalues and Eigenvectors – Cayley - Hamilton theorem – Diagonalization of matrices by orthogonal transformation – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms – Applications: Stretching of an elastic membrane.					
UNIT II	DIFFERENTIAL CALCULUS				9+3
Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Implicit differentiation - Logarithmic differentiation - Applications: Maxima and Minima of functions of one variable.					
UNIT III	FUNCTIONS OF SEVERAL VARIABLES				9+3
Partial differentiation – Homogeneous functions and Euler’s theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor’s series for functions of two variables – Applications: Maxima and minima of functions of two variables and Lagrange’s method of undetermined multipliers					
UNIT IV	INTEGRAL CALCULUS				9+3
Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass.					
UNIT V	MULTIPLE INTEGRALS				9+3
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals – Applications: Moments and centres of mass, moment of inertia.					
TOTAL: 60 PERIODS					

COURSE OUTCOMES:

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

- CO1: Use the matrix algebra methods for solving practical problems.
- CO2: Apply differential calculus tools in solving various application problems.
- CO3: Able to use differential calculus ideas on several variable functions.
- CO4: Apply different methods of integration in solving practical problems.
- CO5: Apply multiple integral ideas in solving areas, volumes and other practical problems.

TEXT BOOKS:

1. Kreyszig.E, “Advanced Engineering Mathematics”, John Wiley and Sons, 10th Edition, New Delhi, 2016.
2. Grewal.B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 44th Edition, 2018.
3. James Stewart, “Calculus: Early Transcendentals”, Cengage Learning, 8th Edition, New Delhi, 2015. [For Units II & IV - Sections 1.1, 2.2, 2.3, 2.5, 2.7 (Tangents problems only), 2.8, 3.1 to 3.6, 3.11, 4.1, 4.3, 5.1 (Area problems only), 5.2, 5.3, 5.4 (excluding net change theorem), 5.5, 7.1 - 7.4 and 7.8].

REFERENCE BOOKS:

1. Anton. H, Bivens. I and Davis. S, "Calculus", Wiley, 10th Edition, 2016.
2. Bali. N., Goyal. M. and Watkins. C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.), New Delhi, 7th Edition, 2009.
3. Jain. R.K. and Iyengar. S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 5th Edition, 2016.
4. Narayanan. S. and Manicavachagom Pillai. T. K. “Calculus”, Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.
5. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
6. Srimantha Pal and Bhunia. S.C, "Engineering Mathematics", Oxford University Press, 2015.
7. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2018.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
2	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
3	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
4	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-
5	3	3	1	1	-	-	-	-	2	-	2	3	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24PH0101	ENGINEERING PHYSICS I	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To make the students effectively to achieve an understanding of mechanics. To enable the students to gain knowledge of electromagnetic waves and its applications. To introduce the basics of oscillations, optics and lasers. To equip the students to be successfully understand the importance of quantum physics. To motivate the students towards the applications of quantum mechanics. 					
UNIT I	MECHANICS	9			
<p>Multiparticle dynamics: Center of mass (CM) – CM of continuous bodies – motion of the CM – kinetic energy of system of particles. Rotation of rigid bodies: Rotational kinematics – rotational kinetic energy and moment of inertia - theorems of M.I –moment of inertia of continuous bodies – M.I of a diatomic molecule - torque – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic molecule - gyroscope - torsional pendulum – double pendulum –Introduction to nonlinear oscillations.</p>					
UNIT II	ELECTROMAGNETIC WAVES	9			
<p>The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, Conditions on the wave field - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - polarization - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, waves from localized sources, momentum and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium-vacuum interface for normal incidence.</p>					
UNIT III	OSCILLATIONS, OPTICS AND LASERS	9			
<p>Simple harmonic motion - resonance –analogy between electrical and mechanical oscillating systems - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect. Reflection and refraction of light waves - total internal reflection – interference – Michelson interferometer – Theory of air wedge and experiment. Theory of laser – characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, CO2 laser, semiconductor laser –Basic applications of lasers in industry.</p>					
UNIT IV	BASIC QUANTUM MECHANICS	9			
<p>Photons and light waves - Electrons and matter waves –Compton effect - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization –Free particle - particle in a infinite potential well: 1D,2D and 3D Boxes- Normalization, probabilities and the correspondence principle.</p>					
UNIT V	APPLIED QUANTUM MECHANICS	9			
<p>The harmonic oscillator(qualitative)- Barrier penetration and quantum tunneling(qualitative)- Tunneling microscope - Resonant diode - Finite potential wells (qualitative)- Bloch's theorem for particles in a periodic potential –Basics of Kronig-Penney model and origin of energy bands.</p>					

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- CO1: Understand the importance of mechanics.
- CO2: Express their knowledge in electromagnetic waves.
- CO3: Demonstrate a strong foundational knowledge in oscillations, optics and lasers.
- CO4: Understand the importance of quantum physics.
- CO5: Comprehend and apply quantum mechanical principles towards the formation of energy bands.

TEXT BOOKS:

1. D.Kleppner and R.Kolenkow. “An Introduction to Mechanics”, McGraw Hill Education (Indian Edition), 2017.
2. E.M.Purcell and D.J.Morin, “Electricity and Magnetism”, Cambridge Univ.Press, 2013.
3. Arthur Beiser, Shobhit Mahajan, S. Rai Choudhury, “Concepts of Modern Physics”, McGraw- Hill (Indian Edition), 2017.

REFERENCE BOOKS:

1. R. Wolfson. “Essential University Physics”, Volume 1 & 2. Pearson Education (Indian Edition), 2009.
2. Paul A. Tipler, “Physics” – Volume 1 & 2, CBS, (Indian Edition), 2004.
3. K. Thyagarajan and A. Ghatak. “Lasers: Fundamentals and Applications”, Laxmi Publications, (Indian Edition), 2019.
4. D. Halliday, R. Resnick and J. Walker. “Principles of Physics”, Wiley (Indian Edition), 2015.
5. N. Garcia, A. Damask and S. Schwarz. “Physics for Computer Science Students”, Springer-Verlag, 2012.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	1	1	1	-	-	-	-	-	-	-	-	-
2	3	3	2	1	2	1	-	-	-	-	-	-	-	-	-
3	3	3	2	2	2	1	-	-	-	-	-	1	-	-	-
4	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-
5	3	3	1	1	2	1	-	-	-	-	-	-	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24CY0101	ENGINEERING CHEMISTRY	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To inculcate sound understanding of water quality parameters and water treatment techniques. To impart knowledge on the basic principles and preparatory methods of nanomaterials. To introduce the basic concepts and applications of phase rule and composites. To facilitate the understanding of different types of fuels, their preparation, properties and combustion characteristics. To familiarize the students with the operating principles, working processes and applications of energy conversion and storage devices. 					
UNIT I	WATER AND ITS TREATMENT	9			
<p>Water: Sources and impurities, Water quality parameters: Definition and significance of-colour, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, flouride and arsenic. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, break-point chlorination). Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process.</p>					
UNIT II	NANOCHEMISTRY	9			
<p>Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials: Definition, properties and uses of – nanoparticle, nanocluster, Nano rod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.</p>					
UNIT III	PHASE RULE AND COMPOSITES	9			
<p>Phase rule: Introduction, definition of terms with examples. One component system - water system; Reduced phase rule; Construction of a simple eutectic phase diagram - Thermal analysis; Two component system: lead-silver system - Pattinson process. Composites: Introduction: Definition & Need for composites; Constitution: Matrix materials (Polymer matrix, metal matrix and ceramic matrix) and Reinforcement (fiber, particulates, flakes and whiskers). Properties and applications of: Metal matrix composites (MMC), Ceramic matrix composites and Polymer matrix composites. Hybrid composites - definition and examples.</p>					
UNIT IV	FUELS AND COMBUSTION	9			
<p>Fuels: Introduction: Classification of fuels; Coal and coke: Analysis of coal (proximate and ultimate), Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method). Petroleum and Diesel: Manufacture of synthetic petrol (Bergius process), Knocking - octane number, diesel oil</p>					

- cetane number; Power alcohol and biodiesel. Combustion of fuels: Introduction: Calorific value - higher and lower calorific values, Theoretical calculation of calorific value; Ignition temperature: spontaneous ignition temperature, Explosive range; Flue gas analysis - ORSAT Method. CO ₂ emission and carbon foot print.		
UNIT V	ENERGY SOURCES AND STORAGE DEVICES	9
Stability of nucleus: mass defect (problems), binding energy; Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Wind energy; Geothermal energy; Batteries: Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion-battery; Electric vehicles-working principles; Fuel cells: H ₂ -O ₂ fuel cell, microbial fuel cell; Supercapacitors: Storage principle, types and examples.		
TOTAL: 45 PERIODS		
COURSE OUTCOMES:		
At the end of the course, the students will be able to		
CO1: Infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.		
CO2: Identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.		
CO3: Apply the knowledge of phase rule and composites for material selection requirements.		
CO4: Understand the importance of quantum physics. Recommend suitable fuels for engineering processes and applications.		
CO5: Recognize different forms of energy resources and apply them for suitable applications in energy sectors.		
TEXT BOOKS:		
1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.		
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.		
3. S.S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.		
REFERENCE BOOKS:		
1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.		
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.		
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.		
4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.		

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	2	1	-	1	1	-	-	-	-	1	-	-	-
2	2	-	-	1	-	2	2	-	-	-	-	-	-	-	-
3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
4	3	1	1	-	-	1	2	-	-	-	-	-	-	-	-
5	3	1	2	1	-	2	2	-	-	-	-	2	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24GE0101	PROBLEM SOLVING AND PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To understand the basics of algorithmic problem solving. To learn to solve problems using Python conditionals and loops. To define Python functions and use function calls to solve problems. To use Python data structures - lists, tuples, dictionaries to represent complex data. To do input/output with files in Python. 					
UNIT I	COMPUTATIONAL THINKING AND PROBLEM SOLVING	9			
Fundamentals of Computing – Identification of Computational Problems -Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.					
UNIT II	DATA TYPES, EXPRESSIONS, STATEMENTS	9			
Python interpreter and interactive mode, debugging; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.					
UNIT III	CONTROL FLOW, FUNCTIONS, STRINGS	9			
Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.					
UNIT IV	LISTS, TUPLES, DICTIONARIES	9			
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: simple sorting, histogram, Students marks statement, Retail bill preparation.					
UNIT V	FILES, MODULES, PACKAGES	9			
Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file, Voter's age validation, Marks range validation (0-100).					
TOTAL: 45 PERIODS					

COURSE OUTCOMES:

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

- CO1: Develop algorithmic solutions to simple computational problems.
- CO2: Write simple Python programs using conditionals and looping for solving problems.
- CO3: Decompose a Python program into functions.
- CO4: Represent compound data using Python lists, tuples, dictionaries etc.
- CO5: Read and write data from/to files in Python programs.

TEXT BOOKS:

1. Allen B. Downey, “Think Python: How to Think like a Computer Scientist”, 2nd Edition, O’Reilly Publishers, 2016.
2. Karl Beecher, “Computational Thinking: A Beginners Guide to Problem Solving and programming”, 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCE BOOKS:

1. Paul Deitel and Harvey Deitel, “Python for Programmers”, Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, “Computational Thinking: A Primer for Programmers and Data Scientists”, 1st Edition, Notion Press, 2021.
3. John V Guttag, “Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data“, Third Edition, MIT Press 2021.
4. Eric Matthes, “Python Crash Course, A Hands - on Project Based Introduction to Programming”, 2nd Edition, No Starch Press, 2019.
5. Martin C. Brown, “Python: The Complete Reference”, 4th Edition, Mc-Graw Hill, 2018.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	2	-	-	-	-	-	2	2	3	3	-
2	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
3	2	2	-	2	2	-	-	-	-	-	1	-	3	-	-
4	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
5	2	2	-	-	2	-	-	-	-	-	1	-	2	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24GE0102	தமிழர் மரபு	L	T	P	C
		1	0	0	1
அலகு 1	மொழி மற்றும் இலக்கியம்				3
இந்திய மொழிக் குடும்பங்கள் திராவிட மொழிகள் தமிழ் ஒரு செம்மொழி தமிழ் செவ்விவக்கியங்கள் 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 - சிற்பக் கலை				3
நடுகல் முதல் நவீன சிற்பங்கள் வரை ஐம்பொன் சிலைகள் பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் தேர் செய்யும் கலை சுடுமண் சிற்பங்கள் நாட்டுப்புறத் தெய்வங்கள் குமரிமுனையில் திருவள்ளூர் சிலை இசைக் கருவிகள் விணை, யாழ், நாதஸ்வரம், மிருதங்கம், பறை, தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு					
அலகு 3	நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்				3
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, 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 நாடுகளில் 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, கையெழுத்துப்படிக்கள் தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு.					
TOTAL: 15 PERIODS					

TEXT CUM REFERENCE BOOKS:

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

24GE0102	HERITAGE OF TAMILS	L	T	P	C
		1	0	0	1
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, Leather puppetry, 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: 15 PERIODS					
TEXT CUM REFERENCE BOOKS:					
<ol style="list-style-type: none"> 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. பொருறை - 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.

24GE0103	PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY	L	T	P	C
		0	0	4	2
OBJECTIVES:					
<ul style="list-style-type: none"> • To understand the problem-solving approaches. • To learn the basic programming constructs in Python. • To practice various computing strategies for Python-based solutions to real world problems. • To use Python data structures - lists, tuples, dictionaries. • To do input/output with files in Python. 					
LIST OF EXPERIMENTS:					
<p>Note: The examples suggested in each experiment are only indicative. The lab instructor is expected to design other problems on similar lines. The Examination shall not be restricted to the sample experiments listed here.</p> <ol style="list-style-type: none"> 1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc.) 2. Python programming using simple statements and expressions. (exchange the values of two variables, circulate the values of n variables, distance between two points) 3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern) 4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building –operations of list & tuples) 5. Implementing real-time/technical applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets & Dictionaries) 6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape) 7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters) 8. Implementing programs using written modules and Python Standard Libraries. (pandas, numpy. Matplotlib, scipy) 9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word) 10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voter’s age validity, student mark range validation) 11. Exploring Pygame tool. 12. Developing a game activity using Pygame like bouncing ball, car race etc. 					
TOTAL: 60 PERIODS					

COURSE OUTCOMES:

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

- CO1: Develop algorithmic solutions to simple computational problems.
- CO2: Implement programs in Python using conditionals and loops for solving problems.
- CO3: Deploy functions to decompose a Python program.
- CO4: Process compound data using Python data structures.
- CO5: Utilize Python packages in developing software applications.

TEXT BOOKS:

1. Allen B. Downey, “Think Python: How to Think like a Computer Scientist”, 2nd Edition, O’Reilly Publishers, 2016.
2. Karl Beecher, “Computational Thinking: A Beginner's Guide to Problem Solving and Programming”, 1st Edition, BCS Learning & Development Limited, 2017.

REFERENCE BOOKS:

1. Paul Deitel and Harvey Deitel, “Python for Programmers”, Pearson Education, 1st Edition, 2021.
2. G Venkatesh and Madhavan Mukund, “Computational Thinking: A Primer for Programmers and Data Scientists”, 1st Edition, Notion Press, 2021.
3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling and Understanding Data“, Third Edition, MIT Press, 2021
4. Eric Matthes, “Python Crash Course, A Hands - on Project Based Introduction to Programming”, 2nd Edition, No Starch Press, 2019.
5. Martin C. Brown, “Python: The Complete Reference”, 4th Edition, Mc-Graw Hill, 2018.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	3	-	-	-	-	-	3	2	3	3	-
2	3	3	3	3	2	-	-	-	-	-	2	-	3	-	-
3	3	2	-	2	2	-	-	-	-	-	1	-	3	-	-
4	1	2	-	-	1	-	-	-	-	-	1	-	2	-	-
5	2	-	-	-	2	-	-	-	-	-	1	-	2	-	-

1 – low, 2 – medium, 3 – high, ‘-‘– no correlation

24BS0101	PHYSICS AND CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2
PHYSICS LABORATORY		L	T	P	C
(Any Seven Experiments)		0	0	2	1
OBJECTIVES:					
<ul style="list-style-type: none"> • To learn the proper use of various kinds of physics laboratory equipment. • To learn how data can be collected, presented and interpreted in a clear and concise manner. • To learn problem solving skills related to physics principles and interpretation of experimental data. • To determine error in experimental measurements and techniques used to minimize such error. • To make the student as an active participant in each part of all lab exercises. 					
LIST OF EXPERIMENTS:					
<ol style="list-style-type: none"> 1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of regular and irregular objects. 2. Simple harmonic oscillations of cantilever. 3. Non-uniform bending - Determination of Young's modulus. 4. Uniform bending – Determination of Young's modulus. 5. Laser- Determination of the wave length of the laser using grating. 6. Air wedge - Determination of thickness of a thin sheet/wire. 7. a) Optical fibre -Determination of Numerical Aperture and acceptance angle. b) Compact disc- Determination of width of the groove using laser. 8. Acoustic grating- Determination of velocity of ultrasonic waves in liquids. 9. Ultrasonic interferometer – determination of the velocity of sound and compressibility of liquids. 10. Post office box -Determination of Band gap of a semiconductor. 11. Photoelectric effect. 12. Michelson Interferometer. 13. Melde's string experiment. 14. Experiment with lattice dynamics kit. 					
TOTAL: 30 PERIODS					
COURSE OUTCOMES:					
At the end of the course, the students will be able to					
CO1: Understand the functioning of various physics laboratory equipment.					
CO2: Use graphical models to analyze laboratory data.					
CO3: Use mathematical models as a medium for quantitative reasoning and describing physical reality.					
CO4: Access, process and analyze scientific information.					
CO5: Solve problems individually and collaboratively.					

Rubrics:**(i) CIA**

Description	Marks
Pre Lab Test	10
Observation	30
Post Lab Test	10
Record	25
Model exam	25
Total	100
CIA = 6(x) / 10	

*x- Student CIA total marks

(ii) ESE

Description	Marks
Aim/Apparatus required	10
Formula	10
Figure/Circuit diagram/Model graph	10
Tabulations/Observation	30
Calculations	20
Result	10
Viva voce	10
Total	100
ESE = 4(x) / 10	

*x- Student ESE total marks

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
2	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
3	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-
4	3	3	2	1	1	-	-	-	-	-	-	-	-	-	-
5	3	2	3	1	1	-	-	-	-	-	-	-	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

CHEMISTRY LABORATORY	L	T	P	C
(Any Seven Experiments)	0	0	2	1
OBJECTIVES:				
<ul style="list-style-type: none"> • To inculcate experimental skills to test basic understanding of water quality parameters such as acidity, alkalinity, hardness, DO, chloride and copper. • To induce the students to familiarize with electroanalytical techniques such as pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions. • To demonstrate the analysis of metals and alloys. • To demonstrate the synthesis of nano particles. 				
LIST OF EXPERIMENTS:				
<ol style="list-style-type: none"> 1. Preparation of Na₂CO₃ as a primary standard and estimation of acidity of a water sample using the primary standard. 2. Determination of total, temporary & permanent hardness of water by EDTA method. 3. Determination of DO content of water sample by Winkler's method. 4. Determination of chloride content of water sample by Argentometric method. 5. Estimation of copper content of the given solution by Iodometry. 6. Determination of strength of given hydrochloric acid using pH meter. 7. Determination of strength of acids in a mixture of acids using conductivity meter. 8. Estimation of iron content of the given solution using potentiometer. 9. Estimation of sodium /potassium present in water using flame photometer. 10. Preparation of nanoparticles (TiO₂/ZnO/CuO) by Sol-Gel method. 11. Corrosion experiments – weight loss method. 12. Proximate analysis of Coal. 				
TOTAL: 30 PERIODS				
COURSE OUTCOMES:				
At the end of the course, the students will be able to				
CO1: Analyze the quality of water samples with respect to their acidity, hardness and DO.				
CO2: Determine the amount of metal ions through volumetric and spectroscopic techniques.				
CO3: Analyze and determine the composition of coal and demonstrate the corrosion.				
CO4: Learn simple method of synthesis nanoparticles.				
CO5: Quantitatively analysis the impurities in solution by Electro analytical techniques.				

Rubrics:**(i) CIA**

Description	Marks
Pre Lab Test	10
Observation	30
Post Lab Test	10
Record	25
Model exam	25
Total	100
CIA = 6(x) / 10	

*x- Student CIA total marks

(ii) ESE

Description	Marks
Aim/Apparatus required	10
Formula	10
Figure/Circuit diagram/Model graph	10
Tabulations/Observation	30
Calculations	20
Result	10
Viva voce	10
Total	100
ESE = 4(x) / 10	

*x- Student ESE total marks

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
2	3	1	2	-	-	1	2	-	-	-	-	1	-	-	-
3	3	2	1	1	-	-	1	-	-	-	-	-	-	-	-
4	2	1	2	-	-	2	2	-	-	-	-	-	-	-	-
5	2	1	2	-	1	2	2	-	-	-	-	1	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24HS0102	ENGLISH LABORATORY I	L	T	P	C
		0	0	2	1
OBJECTIVES:					
<ul style="list-style-type: none"> To improve the communicative competence of learners. To help learners use language effectively in academic /work contexts. To develop various listening strategies to comprehend various types of audio materials like lectures, discussions, videos etc. To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts. To use language efficiently in expressing their opinions via various media. 					
UNIT I	INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION	6			
Listening for general information-specific details- conversation: Introduction to classmates - Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages; Listening and filling a form. Speaking - making telephone calls-Self Introduction; Introducing a friend; - politeness strategies- making polite requests, making polite offers, replying to polite requests and offers- understanding basic instructions (filling out a bank application for example).					
UNIT II	NARRATION AND SUMMATION	6			
Listening - Listening to podcasts, anecdotes / stories / event narration; documentaries and interviews with celebrities. Speaking - Narrating personal experiences / Events-Talking about current and temporary situations & permanent and regular situations* - describing experiences and feelings- engaging in small talk- describing requirements and abilities.					
UNIT III	DESCRIPTION OF A PROCESS / PRODUCT	6			
Listening - Listen to product and process descriptions; a classroom lecture; and advertisements about products. Speaking – Picture description- describing locations in workplaces- Giving instruction to use the product- explaining uses and purposes- Presenting a product- describing shapes and sizes and weights- talking about quantities (large & small)-talking about precautions.					
UNIT IV	CLASSIFICATION AND RECOMMENDATIONS	6			
Listening – Listening to TED Talks; Listening to lectures - and educational videos. Speaking – Small Talk; discussing and making plans-talking about tasks-talking about progress- talking about positions and directions of movement-talking about travel preparations- talking about transportation.					
UNIT V	EXPRESSION	6			
Listening – Listening to debates/ discussions; different viewpoints on an issue; and panel discussions. Speaking –making predictions- talking about a given topic-giving opinions-understanding a website-describing processes.					
TOTAL: 30 PERIODS					

COURSE OUTCOMES:

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

CO1: Listen to and comprehend general as well as complex academic information.

CO2: Listen to and understand different points of view in a discussion.

CO3: Speak fluently and accurately in formal and informal communicative contexts.

CO4: Describe products and processes and explain their uses and purposes clearly and accurately.

CO5: Express their opinions effectively in both formal and informal discussions.

ASSESSMENT PATTERN

1. One online / app based assessment to test listening /speaking.
2. End Semester ONLY listening and speaking will be conducted online.
3. Proficiency certification is given on successful completion of listening and speaking internal test and end semester exam.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
2	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
3	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
4	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-
5	3	3	3	3	1	3	3	3	3	3	3	3	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

SEMESTER II

24HS0203	PROFESSIONAL ENGLISH II	L	T	P	C
		2	0	0	2
OBJECTIVES:					
<ul style="list-style-type: none"> • To engage learners in meaningful language activities to improve their reading and writing skills. • To learn various reading strategies and apply in comprehending documents in professional context. • To help learners understand the purpose, audience, contexts of different types of writing. • To develop analytical thinking skills for problem solving in communicative contexts. • To demonstrate an understanding of job applications and interviews for internship and placements. 					
UNIT I	MAKING COMPARISONS	6			
Reading - Reading advertisements, user manuals, brochures; Writing – Professional emails, Email etiquette - Compare and Contrast Essay; Grammar – Mixed Tenses, Prepositional phrases.					
UNIT II	EXPRESSING CAUSAL RELATIONS IN SPEAKING AND WRITING	6			
Reading - Reading longer technical texts– Cause and Effect Essays, and Letters / emails of complaint, Writing - Writing responses to complaints. Grammar - Active Passive Voice transformations, Infinitive and Gerunds.					
UNIT III	PROBLEM SOLVING	6			
Reading - Case Studies, excerpts from literary texts, news reports etc. Writing – Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay. Grammar – Error correction; If conditional sentences.					
UNIT IV	REPORTING OF EVENTS AND RESEARCH	6			
Reading –Newspaper articles; Writing – Recommendations, Transcoding, Accident Report, Survey Report Grammar – Reported Speech, Modals Vocabulary – Conjunctions- use of prepositions.					
UNIT V	THE ABILITY TO PUT IDEAS OR INFORMATION COGENTLY	6			
Reading – Company profiles, Statement of Purpose, (SOP), an excerpt of interview with professionals; Writing – Job / Internship application – Cover letter & Resume; Grammar – Numerical adjectives, Relative Clauses.					
TOTAL: 30 PERIODS					

COURSE OUTCOMES:

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

CO1: Compare and contrast products and ideas in technical texts.

CO2: Identify and report cause and effects in events, industrial processes through technical texts.

CO3: Analyze problems in order to arrive at feasible solutions and communicate them in the written format.

CO4: Present their ideas and opinions in a planned and logical manner.

CO5: Draft effective resumes in the context of job search.

TEXT BOOKS:

1. “English for Engineers & Technologists”, Orient Blackswan Private Ltd, Department of English, Anna University, 2020.
2. Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN.Shoba, and Dr. Lourdes Joevani, “English for Science & Technology”, Department of English, Anna University, Cambridge University Press 2021.

REFERENCE BOOKS:

1. Raman. Meenakshi and Sharma Sangeeta, “Professional English”, Oxford university press, New Delhi, 2019.
2. V.N. Arora and Laxmi Chandra, “Improve Your Writing ed.,” Oxford Univ. Press, New Delhi, 2001.
3. Dr. V. Chellammal, “Learning to Communicate”, Allied Publishers, New Delhi, 2003.
4. Prof. R.C. Sharma & Krishna Mohan, “Business Correspondence and Report Writing”, Tata McGrawHill & Co. Ltd., New Delhi, 2001.
5. Krishna Mohan and Meera Bannerji, “Developing Communication Skills”, Macmillan India Ltd. Delhi, 1990.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
2	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
3	3	3	3	3	3	3	3	3	2	3	3	3	-	-	-
4	3	3	3	3	2	3	3	3	3	3	3	3	-	-	-
5	-	-	-	-	-	-	-	-	-	3	3	3	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24MA0202	ORDINARY DIFFERENTIAL EQUATIONS AND TRANSFORM TECHNIQUES	L	T	P	C
		3	1	0	4
OBJECTIVES:					
<ul style="list-style-type: none"> To acquaint the students with differential equations which are significantly used in engineering problems. To make the students to understand the vector calculus techniques. To develop the analytic solutions for partial differential equations used in engineering by Fourier series. To acquaint the student with Fourier, transform techniques used in wide variety of situations in which the functions used are not periodic. To develop Z-transform techniques in solving difference equations. 					
UNIT I	ORDINARY DIFFERENTIAL EQUATIONS	9+3			
Higher order linear differential equation with constant coefficient - Method of variation of parameters -Homogeneous equations of Euler–Cauchy and Legendre’s type – System of simultaneous linear differential equations with constant coefficients.					
UNIT II	VECTOR CALCULUS	9+3			
Gradient and directional derivative- Divergence and curl-Vector identities – irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral – Area of a curved surface- Volume integral- Green’s, Gauss divergence and Stoke’s theorem.					
UNIT III	FOURIER SERIES	9+3			
Dirichlet’s conditions–General Fourier series–Odd and even functions – Half-range Sine and Cosine series – Parseval’s identity – Computation of harmonics.					
UNIT IV	FOURIER TRANSFORMS	9+3			
Fourier integral theorem – Fourier transform pair - Fourier sine and cosine transforms – Properties – Transform of elementary functions – Inverse Fourier Transforms - Convolution theorem (without proof) – Parseval’s identity.					
UNIT V	Z–TRANSFORM AND DIFFERENCE EQUATIONS	9+3			
Z-transform – Properties of Z-transform – Initial and final value theorem - Inverse Z-transform – Evaluation of Inverse Z transform using partial fraction method and convolution theorem– Formation of difference equations–Solution of difference equations using Z - transform.					
TOTAL: 60 PERIODS					

COURSE OUTCOMES:

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

CO1: Solve higher order ordinary differential equations which arise in engineering applications.

CO2: Understand the concept of Vector calculus.

CO3: Apply Fourier series techniques in engineering applications.

CO4: Understand the Fourier transforms techniques in solving engineering problems.

CO5: Understand the Z-transforms techniques in solving difference equations.

TEXT BOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, 45th Edition, New Delhi, 2020.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, Wiley India Pvt Ltd., New Delhi, 2018.

REFERENCE BOOKS:

1. N. P. Bali and Manish Goyal, "A textbook of Engineering Mathematics", Laxmi Publications, Reprint, 2008.
2. Greenberg M. D., "Advanced Engineering Mathematics", Pearson Education 2nd Edition, 5th Reprint, Delhi, 2009.
3. Jain R. K. and Iyengar S. R. K., "Advanced Engineering Mathematics", Narosa Publications, 5th Edition, New Delhi, 2017.
4. Peter V. O'Neil, "Advanced Engineering Mathematics", Cengage Learning India Pvt., Ltd, 7th Edition, New Delhi, 2012.
5. Ramana B. V. "Higher Engineering Mathematics", Tata McGraw Hill Co. Ltd., 11th Reprint, New Delhi, 2010.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	3	1	2	-	-	2	1	1	3	-	-	-
2	3	3	2	3	1	2	-	-	2	1	1	3	-	-	-
3	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-
4	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-
5	3	3	1	1	-	-	-	-	2	-	-	3	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24PH0202	ENGINEERING PHYSICS II	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To understand the fundamentals of elasticity, stress-strain relationships, and material deformation under various forces. To enable the students to gain knowledge in conductor and semiconductor physics. To impart knowledge on the magnetic properties of materials. To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications. To instill an understanding of the significance of nanostructures, quantum confinement, and their resulting applications in nanodevices. 					
UNIT I	PROPERTIES OF MATTER	9			
Elasticity- Hooke's law- Relationship between three moduli of elasticity (qualitative) - Stress-strain diagram and its uses - factors affecting elastic modulus and tensile strength. Torsional stress and deformations - twisting couple - bending of beams. Bending moment - cantilever: theory and experiment. Uniform and non-uniform bending: theory and experiment - I-shaped girders - stress due to bending in beams.					
UNIT II	CONDUCTING AND SEMICONDUCTING MATERIALS	9			
Classical free electron theory of metals – Expression for electrical conductivity-Thermal conductivity expression – Wiedemann-Franz law –Quantum free electron theory - Postulates-Fermi-Dirac Statistics –Density of energy states. Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors – Carrier concentration in N-type & P-type semiconductors.					
UNIT III	MAGNETIC PROPERTIES OF MATERIALS	9			
Origin of magnetic moment - magnetic permeability and susceptibility–Magnetic material classification: diamagnetism– paramagnetism–ferromagnetism–Domain theory - Hysteresis curve – Soft and Hard magnetic materials – antiferromagnetism – ferrimagnetism - Magnetic principle in computer data storage –Magnetic hard disc (GMR sensor).					
UNIT IV	OPTICAL PROPERTIES OF MATERIALS	9			
Classification of optical materials – Optical processes in semiconductors: optical absorption and emission, charge injection and recombination, optical absorption, loss and gain. Optical processes in quantum wells – Optoelectronic devices: light detectors and solar cells – light emitting diode – optical processes in organic semiconductor devices – excitonic state – Electro-optics and nonlinear optics: Modulators and switching devices – plasmonics.					
UNIT V	NANOELECTRONIC DEVICES	9			
Introduction – quantum confinement – quantum structures: quantum wells, wires and dots – Tunneling – Single electron phenomena: Coulomb blockade – resonant-tunneling diode – single electron transistor –quantum states – classical bits – quantum bits or qubits – photo processes –					

spintronics – carbon nanotubes: Properties and applications.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1: Analyze and apply elasticity concepts to real-world structural and material applications.

CO2: Acquire knowledge on basics of conductor and semiconductor physics and its applications in various devices.

CO3: Illustrate the optical properties and their applications to optical devices.

CO4: Get knowledge on magnetic properties of materials and their applications in data storage.

CO5: Understand and apply quantum concepts and nanostructures in modern electronic and material technologies.

TEXT BOOKS:

1. S. O Pillai, “Solid State Physics”, 10th edition, NEW AGE International Publishers, 2022.
2. Hilmi Unlu and Norman. “Progress in Nano scale and Low-Dimensional Materials and Devices”, Springer International Publishers.
3. Jasprit Singh, ”Semiconductor Devices: Basic Principles”, Wiley (Indian Edition), 2007.
4. Arumugam M, “Engineering Physics”, Anuradha Publishers, 2010.
5. Parag K. Lala, “Quantum Computing: A Beginner's Introduction”, McGraw-Hill Education (Indian Edition), 2020.

REFERENCE BOOKS:

1. Charles Kittel, “Introduction to Solid State Physics” Wiley India Edition, 2019.
2. Senthil Kumar G. “Engineering Physics” VRB Publications, 2023.
3. Mani P. “Engineering Physics” Dhanam Publications, 2023.

CO – PO – PSO MAPPING:

CO	PO												PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	3	-	-	1	2	1	1	-	-	-	-	-	-	-	-	-
4	3	-	2	1	3	-	1	-	-	-	-	-	-	-	-	-
5	3	2	2	2	2	1	2	-	-	-	-	2	-	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24GE0204	ENVIRONMENTAL SCIENCE AND ENGINEERING	L	T	P	C
		2	0	0	2
OBJECTIVES:					
<ul style="list-style-type: none"> To introduce the basic concepts of environment, ecosystems and their functions. To acquire the knowledge about biodiversity and emphasize on the biodiversity of India and its conservation. To gain the knowledge about the different types of waste, how to handle them and their environmental impact. To learn about the causes effects and control measures of various pollutions and know the individual role in it. To learn how environmental issues, such as pollution, climate change and global warming to relate sustainable development. 					
UNIT I	ECOSYSTEMS				6
Concept of an ecosystem (Abiotic and biotic environment) - structure and function of an ecosystem–Producers-Consumers and decomposers. Energy flow in the ecosystem, (Nutrient cycle in the ecosystem) - Ecological succession - Food Chain - food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystems, Forest ecosystem, Grass land ecosystem, Desert ecosystems aquatic ecosystems [ponds, streams, lakes, rivers, ocean estuaries].					
UNIT II	BIODIVERSITY				6
Introduction to biodiversity-genetic, species and ecosystem diversity- value of biodiversity - consumptive use- productive use –social, ethical, aesthetic and option values. 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 conservation of biodiversity.					
UNIT III	WASTE MANAGEMENT				6
Municipal solid waste management: Sources, characteristics, collection and transportation, waste processing and disposal (including reuse options, biological methods, energy recovery processes and land filling) Hazardous waste management: Characteristics, generation, fate of materials in the environment, treatment and disposal Management of biomedical waste, plastic waste and E-waste: Sources, generation and characteristics; Waste management practices including storage, collection and transfer					
UNIT IV	ENVIRONMENTAL POLLUTION				6
Definition a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution d) Noise pollution-Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in pollution control. Flood Case study					
UNIT V	SOCIAL ISSUES AND THE ENVIRONMENT				6
From unsustainable to sustainable development – urban problems related to energy water					

conservation, rain water harvesting, watershed management- resettlement and rehabilitation of people; its problem and concerns. Issues and possible solutions: Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.

TOTAL: 30 PERIODS

COURSE OUTCOMES:

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

CO1: Recognize and understand the functions of environment, ecosystems.

CO2: Know the bio diversity and their values and conservation.

CO3: Learn about proper waste disposal and minimize waste.

CO4: Understand the causes, effects of pollution and how to control it.

CO5: Understand the relationship between environment and society.

TEXT BOOKS:

1. Anubha Kaushik and C. P. Kaushiks “Perspectives in Environmental Studies”, 6th Edition, New Age International Publishers ,2018.
2. Benny Joseph, “Environmental Science and Engineering”, Tata McGraw-Hill, New Delhi, 2016.
3. John Pichtel, “Waste management practices”, 2nd edition, Dev publication.
4. Allen, D. T. and Shonnard, D. R., “Sustainability Engineering: Concepts, Design and Case Studies”, Prentice Hall.
5. Bradley. A.S, Adebayo, A.O, and Maria, P. “Engineering applications in sustainable design and development”, Cengage learning.
6. Dr. Ashutosh Tripathi, “Environment and social issues”, publication in 2019.
7. Mackenthun, K. M., “Basic Concepts in Environmental Management”, Lewis Publication, London, 1998.

REFERENCE BOOKS:

1. R. K. Trivedi, “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards”, Vol. I and II, Enviro Media. edition, 2010.
2. Cunningham,W. P. Cooper and T.H.Gorhani, Environmental Encyclopedia’, Jaico Publ., House, Mumbai, 2001.
3. Yung Tse Hung, Lawrence K wang and Nazih K shammass, “Handbook of Environment and waste management”, volume 2.
4. Rajagopalan, R, “Environmental Studies From Crisisto Cure”, Oxford University Press, Third Edition, 2015.
5. Erach Bharucha, “Textbook of Environmental Studies for Undergraduate Courses”, Orient Blackswan Pvt.Ltd. 2013.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
2	2	1	-	-	-	2	3	-	-	-	-	2	-	-	-
3	3	2	-	-	-	3	3	-	-	-	-	2	-	-	-
4	3	-	1	-	-	2	2	-	-	-	-	2	-	-	-
5	3	2	1	-	-	2	2	-	-	-	-	1	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24GE0205	ENGINEERING GRAPHICS	L	T	P	C
		2	0	4	4
OBJECTIVES:					
<ul style="list-style-type: none"> • To draw engineering curves. • To draw freehand sketch of simple objects. • To draw orthographic projection of solids and section of solids. • To draw development of solids. • To draw isometric and perspective projections of simple solids. 					
UNIT I	PLANE CURVES AND FREEHAND SKETCHING	6+12			
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 - ortho graphic projection - principles - principle planes-first angle projection-projection of points.					
UNIT II	PROJECTION OF POINTS, LINES AND PLANE SURFACE	6+12			
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 and traces. Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.					
UNIT III	PROJECTION OF SOLIDS	6+12			
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes and parallel to the other by rotating object method. Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three Dimensional objects - Layout of views- Freehand sketching of multiple views from pictorial views of objects.					
UNIT IV	PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES	6+12			
Sectioning of above solids 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 cylinders and cones.					
UNIT V	ISOMETRIC AND PERSPECTIVE PROJECTIONS	6+12			
Principles of isometric projection - isometric scale - isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones - combination of two solid objects in simple vertical positions - Perspective projection of simple solids - Prisms, pyramids and cylinders by visual ray method.					
TOTAL: 90 PERIODS					

COURSE OUTCOMES:

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

- CO1: Use BIS conventions and specifications for engineering drawing.
- CO2: Construct the conic curves, involutes and cycloid.
- CO3: Solve practical problems involving projection of lines.
- CO4: Draw the orthographic, isometric and perspective projections of simple solids.
- CO5: Draw the development of simple solids.

TEXT BOOKS:

1. Bhatt N.D. and Panchal V.M., “Engineering Drawing”, Charotar Publishing House, 53rd Edition, 2019.
2. Natrajan K.V., “A Text Book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2018.
3. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015.

REFERENCE BOOKS:

1. Basant Agarwal and Agarwal C.M., “Engineering Drawing”, McGraw Hill, 2nd Edition, 2019.
2. Gopalakrishna K.R., “Engineering Drawing (Vol. I & II combined)”, Subhas Publications, Bangalore, 27th Edition, 2017.
3. 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.
4. Parthasarathy N. S. and Vela Murali, “Engineering Graphics”, Oxford University, Press, New Delhi, 2015.
5. Shah M.B., and Rana B.C., “Engineering Drawing”, Pearson Education India, 2nd Edition, 2009.
6. Venugopal K. and Prabhu Raja V., “Engineering Graphics”, New Age International (P) Limited, 2008.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
2	3	1	2	-	2	-	-	-	-	3	-	2	2	2	--
3	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
4	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
5	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24GE0206	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To introduce the basics of electric circuits and analysis. To impart knowledge in the basics of working principles and application of electrical machines. To introduce semiconductor diodes characteristics. To educate on the fundamental concepts of transistors. To introduce the basics of power system. 					
UNIT I	INTRODUCTION TO DC & AC CIRCUITS	9			
DC Circuits: Electrical Parameters – Ohm’s Law - Kirchhoff’s Laws –Independent and Dependent Sources –Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power.					
UNIT II	BASIC CONCEPTS OF ELECTRICAL MACHINES	9			
Faraday’s Law - working principle and applications of Transformer – DC motor – types and applications – AC motor, types & applications.					
UNIT III	SEMICONDUCTOR DIODES	9			
Review of intrinsic & extrinsic semiconductors – Theory of PN junction diode –application of diode – half wave and full wave rectifier - Zener diode and its characteristics – applications.					
UNIT IV	TRANSISTORS	9			
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – working of FET & UJT.					
UNIT V	BASICS OF POWER SYSTEM	9			
Power system structure – Generation, Transmission and Distribution - earthing – methods of earthing, protective devices – switch fuse unit – Miniature circuit breaker – types, safety precaution and First Aid.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course, the students will be able to					
CO1: Compute the electric circuit parameters for simple problems.					
CO2: Explain the working principle and applications of electrical machines.					
CO3: Analyze the characteristics of semiconductors.					
CO4: Explain the basic concepts of transistors.					
CO5: Explain the basic power system structure and protection schemes.					

TEXT BOOKS:

1. Kothari DP and I. J Nagrath, “Basic Electrical and Electronics Engineering”, Second Edition, McGraw Hill Education, 2020.
2. S. Salaivahanan, “Digital Electronics”, McGraw Hill Education (India) Private Limited, 18th Sept 2018.
3. Sedha R. S., “A textbook book of Applied Electronics”, S. Chand & Co., 2008.
4. V K Mehta and Rohit Mehta, “Principles of Electrical Machines”, S Chand and Company limited, second edition, 2019.

REFERENCE BOOKS:

1. Kothari DP and I.J Nagrath, “Basic Electrical Engineering”, Fourth Edition, McGraw Hill Education, 2019.
2. Thomas L. Floyd, “Digital Fundamentals”, 11th Edition, Pearson Education, 2017.
3. Albert Malvino, David Bates, “Electronic Principles”, McGraw Hill Education; 7th edition, 2017.
4. Mahmood Nahvi and Joseph A. Edminister, “Electric Circuits”, Schaum‘Outline Series, McGraw Hill, 2002.
5. H.S. Kalsi, “Electronic Instrumentation”, Tata McGraw-Hill, New Delhi, 2010.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
2	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
3	2	1	1	-	-	-	-	1	-	-	-	2	-	-	1
4	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1
5	2	2	1	-	-	-	-	1	-	-	-	2	-	-	1

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24GE0207	தமிழரும் தொழில்நுட்பமும்	L	T	P	C
		1	0	0	1
அலகு 1	நெசவு மற்றும் பானைத் தொழில்நுட்பம்				3
சங்க காலத்தில் நெசவுத் தொழில் பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.					
அலகு 2	வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்				3
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் 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	உற்பத்தித் தொழில் நுட்பம்				3
கப்பல் கட்டும் கலை உலோகவியல் -இரும்புத் தொழிற்சாலை இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் எலும்புத்துண்டுகள் தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.					
அலகு 4	வேளாண்மை மற்றும் நீர்ப்பாசனத் 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 மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் -தமிழ் மின் நூலகம் இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.					
TOTAL: 15 PERIODS					

TEXT CUM REFERENCE BOOKS:

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

24GE0207	TAMILS AND TECHNOLOGY	L	T	P	C
		1	0	0	1
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 in household materials during Sang am 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 beats - Archeological evidences - Gem stone types described in Silappathikaram.					
UNIT IV	AGRICULTURE AND IRRIGATION TECHNOLOGY				3
Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu 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: 15 PERIODS					
TEXT CUM REFERENCE BOOKS:					
<ol style="list-style-type: none"> 1. தமிழக வரலாறு மக்களும் பண்பாடும். கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்). 2. கணிணித் தமிழ் முனைவர் இல சுந்தரம். (விகடன் பிரசுரம்). 3. கீழடி-வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு). 4. பொருறை - 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.

24GE0208	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY											L	T	P	C
												0	0	4	2
OBJECTIVES:															
<ul style="list-style-type: none"> To train the students in conducting load tests on electrical machines. To gain practical experience in experimentally obtaining the characteristics of electronics devices and rectifiers. 															
LIST OF EXPERIMENTS:															
<ol style="list-style-type: none"> Verification of ohms and Kirchhoff's Laws. Study of starter. Speed control on DC Shunt Motor. Load test on DC Series Motor. Load test on Single Phase Transformer. Load Test on Single Phase Induction Motor. Characteristics of PN Diodes. Characteristics of BJT. Characteristics of Zener Diodes. Half wave and Full Wave rectifiers. 															
TOTAL: 60 PERIODS															
COURSE OUTCOMES:															
At the end of the course, the students will be able to															
CO1: Construct the circuit with appropriate connections for the given DC machine/transformer.															
CO2: Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods.															
CO3: Analyse the characteristics of PN diodes and BJT experimentally.															
CO4: Analyse the characteristics of half-wave and full-wave rectifier with and without filters experimentally.															
CO5: Understand DC motor starters.															
CO – PO – PSO MAPPING:															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	1	1	-	-	2	2	-	-	-	-	-	1
2	3	3	2	1	1	-	-	2	2	-	-	-	-	-	1
3	3	3	2	1	1	-	-	2	2	-	-	-	-	-	1
4	3	3	2	1	1	-	-	2	2	-	-	-	-	-	1
5	3	3	2	1	1	-	-	2	2	-	-	-	-	-	1
1 – low, 2 – medium, 3 – high, ‘-’ – no correlation															

24GE0209	ENGINEERING PRACTICES LABORATORY	L	T	P	C
		0	0	4	2
OBJECTIVES:					
The main learning objective of this course is to provide hands on training to the students in:					
<ul style="list-style-type: none"> • Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planning; making joints in wood materials used in common household wood work. • Wiring various electrical joints in common household electrical wire work. • Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work. • Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB. 					
GROUP – A (CIVIL & ELECTRICAL)					
PART I	CIVIL ENGINEERING PRACTICES	15			
PLUMBING WORK:					
<ul style="list-style-type: none"> a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household. b) Preparing plumbing line sketches. c) Laying pipe connection to the suction side of a pump d) Laying pipe connection to the delivery side of a pump. e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances. 					
WOOD WORK:					
<ul style="list-style-type: none"> a) Sawing b) Planning c) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint. 					
WOOD WORK STUDY:					
<ul style="list-style-type: none"> a) Studying joints in door panels and wooden furniture. b) Studying common industrial trusses using models. 					
PART II	ELECTRICAL ENGINEERING PRACTICES	15			
<ul style="list-style-type: none"> a) Introduction to switches, fuses, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket. b) Staircase wiring. c) Fluorescent Lamp wiring with introduction to CFL and LED types. d) Energy meter wiring and related calculations/ calibration. e) Study of Iron Box wiring and assembly. f) Study of Fan Regulator. (Resistor type and Electronic type using Diac/Triac/quadrac) 					

g) Study of emergency lamp wiring/Water heater.		
GROUP – B (MECHANICAL AND ELECTRONICS)		
PART III	MECHANICAL ENGINEERING PRACTICES	15
<p>WELDING WORK:</p> <p>a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding. b) Practicing gas welding.</p> <p>BASIC MACHINING WORK:</p> <p>a) (simple)Turning. b) (simple)Drilling. c) (simple)Tapping.</p> <p>ASSEMBLY WORK:</p> <p>a) Assembling a centrifugal pump. b) Assembling a household mixer. c) Assembling an air conditioner.</p> <p>SHEET METAL WORK:</p> <p>a) Making of a square tray</p> <p>FOUNDRY WORK:</p> <p>a) Demonstrating basic foundry operations</p>		
PART IV	ELECTRONIC ENGINEERING PRACTICES	15
<p>SOLDERING WORK:</p> <p>a) Soldering simple electronic circuits and checking continuity.</p> <p>ELECTRONIC ASSEMBLY AND TESTING WORK:</p> <p>a) Assembling and testing electronic components on a small PCB</p> <p>ELECTRONIC EQUIPMENT STUDY:</p> <p>a) Study an elements of smart phone. b) Assembly and dismantle of LED TV. c) Assembly and dismantle of computer/ laptop.</p>		
TOTAL: 60 PERIODS		

COURSE OUTCOMES:

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

CO1: Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.

CO2: Wire various electrical joints in common household electrical wire work.

CO3: Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipment's; Make a tray out of metal sheet using sheet metal work.

CO4: Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

CO5: Apply safety protocols and use personal protective equipment (PPE) effectively in all engineering practices.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
5	3	-	-	-	1	2	2	3	-	-	-	2	2	1	1

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

24HS0204	ENGLISH LABORATORY II	L	T	P	C
		0	0	2	1
OBJECTIVES:					
<ul style="list-style-type: none"> To identify varied group discussion skills and apply them to take part in effective discussions in a professional context. To analyses concepts and problems and make effective presentations explaining them clearly and precisely. To be able to communicate effectively through formal and informal writing. To be able to use appropriate language structures to write emails, reports and essays. To give instructions and recommendations that are clear and relevant to the context. 					
UNIT I					6
Speaking-Role Play Exercises Based on Workplace Contexts, - talking about competition discussing progress toward goals-talking about experiences- talking about events in life- discussing past events-Writing: writing emails (formal & semi-formal).					
UNIT II					6
Speaking: discussing news stories-talking about frequency-talking about travel problems-discussing travel procedures- talking about travel problems- making arrangements-describing arrangements discussing plans and decisions- discussing purposes and reasons- understanding common technology terms-Writing: - writing different types of emails.					
UNIT III					6
Speaking: discussing predictions-describing the climate-discussing forecasts and scenarios- talking about purchasing-discussing advantages and disadvantages- making comparisons- discussing likes and dislikes- discussing feelings about experiences-discussing imaginary scenarios Writing: short essays and reports-formal/semi-formal letters.					
UNIT IV					6
Speaking: discussing the natural environment-describing systems-describing position and movement- explaining rules-(example- discussing rental arrangements) - understanding technical instructions-Writing: writing instructions-writing a short article.					
UNIT V					6
Speaking: describing things relatively-describing clothing-discussing safety issues (making recommendations) talking about electrical devices-describing controlling actions- Writing: job application (Cover letter + Curriculum vitae)-writing recommendations.					
TOTAL: 30 PERIODS					

COURSE OUTCOMES:

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

- CO1: Speak effectively in group discussions held in a formal/semi-formal contexts.
- CO2: Discuss, analyses and present concepts and problems from various perspectives to arrive at suitable solutions.
- CO3: Write emails, letters and effective job applications.
- CO4: Write critical reports to convey data and information with clarity and precision.
- CO5: Give appropriate instructions and recommendations for safe execution of tasks.

REFERENCE BOOKS:

1. Butterfield Jeff, “Soft Skills for Everyone”, Cengage Learning: New Delhi, 2015.
2. “Interact English Lab Manual for Undergraduate Students”, Orient Blackswan: Hyderabad, 2016.
3. E. Suresh Kumar et al., “Communication for Professional Success”, Orient Blackswan: Hyderabad, 2015.
4. Raman, Meenakshi and Sangeeta Sharma, “Professional Communication”, Oxford University Press: Oxford, 2014,
5. S. Hariharan et al., “Soft Skills”, MJP Publishers: Chennai, 2010.

CO – PO – PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
2	2	3	3	3	1	3	3	3	3	3	3	3	-	-	-
3	2	2	3	3	1	3	3	3	3	3	3	3	-	-	-
4	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-
5	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-

1 – low, 2 – medium, 3 – high, ‘-’ – no correlation

SEMESTER III

24MA0303	NUMERICAL METHODS	L	T	P	C
		3	1	0	4
OBJECTIVES:					
<ul style="list-style-type: none"> • To introduce the basic concepts of solving algebraic and transcendental equations. • To introduce the numerical techniques of interpolation in various intervals in real life situations. • To acquaint the student with understanding of numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines. • To acquaint the knowledge of various techniques and methods of solving ordinary differential equations. • To understand the knowledge of various techniques and methods of solving various types of partial differential equations. 					
UNIT I	SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS	12			
Solution of algebraic and transcendental equations - Newton Raphson Method - Solution of linear system of equations - Gauss elimination method - Gauss Jordan method - Iterative methods of Gauss Jacobi and Gauss Seidel - Eigen values of a matrix by Power method and Jacobi's method for symmetric matrices.					
UNIT II	INTERPOLATION AND APPROXIMATION	12			
Interpolation with unequal intervals - Lagrange's interpolation - Newton's divided difference interpolation - Interpolation with equal intervals - Newton's forward and backward difference formulae.					
UNIT III	NUMERICAL DIFFERENTIATION AND INTEGRATION	12			
Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson's 1/3 rule - Romberg's Method Evaluation of double integrals by Trapezoidal and Simpson's 1/3 rules.					
UNIT IV	INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS	12			
Single step methods - Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first order equations - Multi step methods - Milne's and Adams - Bash forth predictor corrector methods for solving first order equations.					
UNIT V	BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS	12			
Finite difference techniques for the solution of two-dimensional Laplace's and Poisson's equations on rectangular domain - One dimensional heat flow equation by explicit and implicit (Crank Nicholson) methods.					
TOTAL: 60 PERIODS					
OUTCOMES:					
At the end of the course the students will be able to					
CO1: Understand the basic concepts and techniques of solving algebraic and transcendental equations.					
CO2: Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.					
CO3: Apply the numerical techniques of differentiation and integration for engineering problems.					
CO4: Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.					
CO5: Solve the partial and ordinary differential equations with initial and boundary conditions					

by using certain techniques with engineering applications.

TEXT BOOKS:

1. Burden R. L and Faires J. D, “Numerical Analysis”, 9th Edition, Cengage Learning, 2016.
2. Grewal B. S. and Grewal J. S., “Numerical Methods in Engineering and Science”, Khanna Publishers, 10th Edition, New Delhi, 2015.

REFERENCE BOOKS:

1. Brian Bradie, “A Friendly Introduction to Numerical Analysis”, Pearson Education, Asia, New Delhi, 2007.
2. Gerald C. F. and Wheatley P. O., “Applied Numerical Analysis”, Pearson Education, Asia, 6th Edition, New Delhi, 2006.
3. Mathews J. H, “Numerical Methods for Mathematics, Science and Engineering”, 2nd Edition, Prentice Hall, 1992.
4. Sankara Rao K, “Numerical Methods for Scientists and Engineers”, Prentice Hall of India Pvt. Ltd, 3rd Edition, New Delhi, 2007.
5. Sastry S, “Introductory Methods of Numerical Analysis”, PHI Learning Pvt. Ltd, 5th Edition, 2015.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	1	1	-	-	-	2	-	2	3	-	-	-
2	3	3	1	1	1	-	-	-	2	-	2	3	-	-	-
3	3	3	1	1	1	-	-	-	2	-	2	3	-	-	-
4	3	3	1	1	1	-	-	-	2	-	2	3	-	-	-
5	3	3	1	1	1	-	-	-	2	-	2	3	-	-	-

1-low,2-medium,3-high, ‘-‘- no correlation

24EE3301	ELECTRIC AND MAGNETIC FIELDS	L	T	P	C
		3	1	0	4
OBJECTIVES:					
<ul style="list-style-type: none"> To introduce the basic mathematical concepts related to electromagnetic vector fields. To impart knowledge on the concepts of Electrostatic fields, electric potential, energy density and their applications. Magneto static fields, magnetic flux density, vector potential and its applications. Different methods of emf generation and Maxwell's equations. Electromagnetic waves and characterizing parameters. 					
UNIT I	ELECTROSTATICS I	12			
Sources and effects of electromagnetic fields - Coordinate Systems - Vector fields - Gradient, Divergence, Curl - theorems and applications - Coulomb's Law - Electric field intensity - Field due to discrete and continuous charges - Gauss's law and applications.					
UNIT II	ELECTROSTATICS II	12			
Electric potential - Electric field and equipotential plots, Uniform and Non-Uniform field - Dielectric polarization & strength - Electric field in multiple dielectrics - Boundary conditions, Poisson's and Laplace's equations, Capacitance, Energy density, Applications.					
UNIT III	MAGNETOSTATICS	12			
Lorentz force, magnetic field intensity (H) - Biot-Savart's Law - Ampere's Circuit Law - H due to straight conductors, circular loop, infinite sheet of current, Magnetic flux density (B) - B in free space, conductor, magnetic materials - multiple media - Boundary conditions, Applications.					
UNIT IV	ELECTRODYNAMIC FIELDS	12			
Magnetic Circuits - Faraday's law - Transformer and motional EMF - Displacement current - Maxwell's equations (differential and integral form) - Relation between field theory and circuit theory - Applications.					
UNIT V	ELECTROMAGNETIC WAVES	12			
Electromagnetic wave generation and equations - Wave parameters; velocity, intrinsic impedance, propagation constant - Waves in free space, lossy and lossless dielectrics, conductors - skin depth - Poynting vector - Plane wave reflection and refraction.					
TOTAL: 60 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Visualize and explain Gradient, Divergence, and Curl operations on electromagnetic vector fields and identify the electromagnetic sources and their effects.					
CO2: Compute and analyze electrostatic fields, electric potential, energy density along with their applications.					
CO3: Compute and analyze magneto static fields, magnetic flux density, vector potential along with their applications.					
CO4: Explain different methods of emf generation and Maxwell's equations.					
CO5: Explain the concept of electromagnetic waves and characterizing parameters.					
TEXT BOOKS:					
1. S. Salivahanan and S. Karthie, Electromagnetic Fields and Waves, Pearson Education 2024.					
2. Mathew N. O. Sadiku, S.V. Kulkarni, "Principles of Electromagnetics", 6th Edition, Oxford University Press Inc. Asian edition, 2015.					
3. William H. Hayt and John A. Buck, "Engineering Electromagnetics", McGraw Hill Special Indian edition, 2014.					
4. Kraus and Fleish, "Electromagnetics with Applications", McGraw Hill International Editions, Fifth Edition, 2010.					

REFERENCE BOOKS:

1. V. V. Sarwate, "Electromagnetic fields and waves", Second Edition, Newage Publishers, 2018.
2. J. P. Tewari, "Engineering Electromagnetics - Theory, Problems and Applications", Second Edition, Khanna Publishers 2013.
3. Joseph. A. Edminister, "Schaum's Outline of Electromagnetics", Fifth Edition (Schaum's Outline Series), McGraw Hill, 2018.
4. S. P. Ghosh, Lipika Datta, "Electromagnetic Field Theory", First Edition, McGraw Hill Education (India) Private Limited, 2017.
5. K A Gangadhar, "Electromagnetic Field Theory", Khanna Publishers; Sixteenth Edition Eighth Reprint, 2015.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	-	-	-	-	3	1	-	-	-	1	3	2	1
2	3	2	1	2	-	-	1	1	-	-	-	1	3	2	1
3	3	2	1	2	-	-	1	1	-	-	-	1	3	2	1
4	3	2	1	2	-	-	1	1	-	-	-	1	3	2	1
5	3	2	1	2	-	-	1	1	-	-	-	1	3	2	1

1-low, 2-medium, 3-high, '-' - no correlation

24EE3302	ELECTRIC CIRCUIT ANALYSIS	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To introduce electric circuits and its analysis. To provide key concepts to analyze and understand electrical circuits. To impart knowledge on solving circuit equations using network theorems. To educate on obtaining the transient response of circuits. To introduce the phenomenon of resonance in coupled circuits. To introduce Phasor diagrams and analysis of single & three phase circuits. 					
UNIT I	BASIC CIRCUITS ANALYSIS	9			
Fundamentals concepts of R, L and C Elements - Energy Sources - Ohm's Law - Kirchhoff's Laws - DC Circuits - Resistors in series and parallel circuits - A.C Circuits - Average and RMS Value - Complex Impedance - Phasor diagram - Real and Reactive Power, Power Factor, Energy - Mesh current and node voltage methods of analysis D.C and A.C Circuits.					
UNIT II	NETWORK REDUCTION AND THEOREMS	9			
Network reduction: voltage and current division, source transformation - star delta conversion. Theorems - Superposition, Thevenin's and Norton's Theorem - Maximum power transfer theorem - Reciprocity Theorem - Millman's theorem - Tellegen's Theorem-Statement, application to DC and AC Circuits.					
UNIT III	TRANSIENT RESPONSE ANALYSIS	9			
Introduction - Laplace transforms and inverse Laplace transforms - standard test signals - Transient response of RL, RC and RLC circuits using Laplace transform for Source free, Step input and Sinusoidal input.					
UNIT IV	RESONANCE AND COUPLED CIRCUITS	9			
Series and parallel resonance - frequency response - Quality factor and Bandwidth - Self and mutual inductance - Coefficient of coupling - Dot Rule - Analysis of coupled circuits - Single Tuned circuits.					
UNIT V	ELECTROMAGNETIC WAVES	9			
Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced and unbalanced - phasor diagram of voltages and currents - power measurement in three phase circuits - Power Factor Calculations.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Explain circuit's behavior using circuit laws.					
CO2: Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit.					
CO3: Compute the transient response of first order and second order systems to step and sinusoidal input.					
CO4: Compute power, line/ phase voltage and currents of the given three phase circuit.					
CO5: Explain the frequency response of series and parallel RLC circuits.					
TEXT BOOKS:					
1. William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, 9 th edition, New Delhi, 2020.					
2. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2019.					
3. Allan H. Robbins, Wilhelm C. Miller, "Circuit Analysis Theory and Practice", Cengage Learning India, 2013.					

REFERENCE BOOKS:

1. Chakrabarti A, "Circuits Theory (Analysis and synthesis)", Dhanpat Rai & Sons, New Delhi, 2020.
2. Joseph A. Edminister, Mahmood Nahvi, "Electric circuits", Schaum's series, McGraw Hill, First Edition, 2019.
3. M E Van Valkenburg, "Network Analysis", Prentice Hall of India Pvt Ltd, New Delhi, 2015.
4. Richard C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", 7th Edition, John Wiley Sons, Inc. 2018.
5. Sudhakar A and Shyam Mohan S P, "Circuits and Networks Analysis and Synthesis", McGraw Hill, 2015.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	2	2	-	2	1	-	-	-	3	3	3	3
2	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3
3	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3
4	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3
5	3	3	3	3	2	-	2	1	-	-	-	3	3	3	3

1-low, 2-medium, 3-high, '-' - no correlation

24EE3303	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To understand the structure of basic electronic devices. To be exposed to active and passive circuit elements. To familiarize the operation and applications of transistor like BJT and FET. To explore the characteristics of amplifier, gain and frequency response. To learn the required functionality of positive and negative feedback systems. 					
UNIT I	PN JUNCTION DEVICES	9			
PN junction diode - structure, operation and V-I characteristics, diffusion and transition capacitance - Clipping & Clamping circuits - Rectifiers - Half Wave and Full Wave Rectifier - Display devices - LED, Laser diodes, Zener diode characteristics - Zener diode Reverse characteristics - Zener diode as regulator.					
UNIT II	TRANSISTORS AND THYRISTORS	9			
BJT, JFET, MOSFET - structure, operation, characteristics and Biasing UJT, Thyristors and IGBT - Structure and characteristics.					
UNIT III	AMPLIFIERS	9			
BJT small signal model - Analysis of CE, CB, CC amplifiers - Gain and frequency response - MOSFET small signal model - Analysis of CS and Source follower - Gain and frequency response - High frequency analysis.					
UNIT IV	MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER	9			
BIMOS cascade amplifier, Differential amplifier - Common mode and Difference mode analysis - FET input stages - Single tuned amplifiers - Gain and frequency response - Neutralization methods, power amplifiers - Types (Qualitative analysis).					
UNIT V	FEEDBACK AMPLIFIERS AND OSCILLATORS	9			
Advantages of negative feedback - voltage / current, series, Shunt feedback - positive feedback - Condition for oscillations, phase shift - Wien bridge, Hartley, Colpitts and Crystal oscillators.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode).					
CO2: Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes.					
CO3: Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT.					
CO4: Analyze the performance of various configurations of BJT and MOSFET based amplifier.					
CO5: Explain the characteristics of MOS based cascade and differential amplifier.					
TEXT BOOKS:					
1. S Salivahanan, N Suresh Kumar, Electronic Devices And Circuits, 5th Edition, McGraw Hill; Standard Edition, 2022.					
2. David A. Bell, "Electronic devices and circuits", Oxford University higher education, 5 th edition 2008.					
3. Sedra and smith, "Microelectronic circuits", 7 th Edition, Oxford University Press, 2017.					

REFERENCE BOOKS:

1. Balbir Kumar, Shail. B. Jain, "Electronic devices and circuits", PHI learning private limited, 2nd edition 2014.
2. Thomas L. Floyd, "Electronic devices", Conventional current version, Pearson prentice hall, 10th Edition, 2017.
3. Donald A Neamen, "Electronic Circuit Analysis and Design" Tata McGraw Hill, 3rd Edition, 2003.
4. Robert L. Boylestad, "Electronic devices and circuit theory", 11th edition, Pearson prentice Hall 2013.
5. Robert B. Northrop, "Analysis and Application of Analog Electronic Circuits to Biomedical Instrumentation", CRC Press, Second edition, 2012.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
2	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
3	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
4	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1
5	2	2	3	2	2	-	-	1	-	-	-	1	3	-	1

1-low,2-medium,3-high, '-' - no correlation

24EE3304	DC MACHINES AND TRANSFORMERS	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To understand the concept of electromechanical energy conversion system. To identify the appropriate machine for a given application based on its characteristics. To identify the appropriate test to determine the performance parameters of a given machine. To familiarize with the procedure for parallel operation of generators and transformers. To deliberate the working of auto transformer and three phase transformers. 					
UNIT I	ELECTROMECHANICAL ENERGY CONVERSION	9			
Fundamentals of Magnetic circuits- Statically and dynamically induced EMF - Principle of electromechanical energy conversion forces and torque in magnetic field systems - Winding Inductances-, magnetic fields in rotating machines - magnetic saturation and leakage fluxes. Introduction to Indian Standard Specifications (ISS) - Role and significance in testing.					
UNIT II	DC GENERATORS	9			
Principle of operation, constructional details, armature windings and its types, EMF equation, commutation, methods of improving commutation, interpoles, OCC and load characteristics of different types of DC Generators. Parallel operation of DC Generators, equalizing connections - applications of DC Generators.					
UNIT III	DC MOTORS	9			
Principle of operation, significance of back emf, torque equations, speed control of DC motors, starting methods of DC motors, load characteristics - losses and efficiency in DC machine, condition for maximum efficiency. Testing of DC Machines: Brake test, Swinburne's test, Hopkinson's test, Field test, Retardation test - applications of DC motors.					
UNIT IV	SINGLE PHASE TRANSFORMER	9			
Construction and principle of operation, equivalent circuit, phasor diagrams, testing - polarity test, open circuit and short circuit tests, voltage regulation, losses and efficiency, all day efficiency, back-to-back test, separation of core losses, parallel operation of single-phase transformers, applications of single-phase transformer.					
UNIT V	AUTOTRANSFORMER AND THREE PHASE TRANSFORMER	9			
Construction and working of auto transformer, comparison with two winding transformers, applications of autotransformer. Three Phase Transformer - Construction, types of connections and their comparative features, Scott connection, applications of Scott connection.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.					
CO2: Explain the construction and working principle of DC machines.					
CO3: Interpret various characteristics of DC machines.					
CO4: Compute various performance parameters of the machine, by conducting suitable tests.					
CO5: Draw the equivalent circuit of transformer and predetermine the efficiency and regulation.					
TEXT BOOKS:					
1. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 5 th Edition, 2017.					
2. P. S. Bimbhra, "Electric Machinery", Khanna Publishers, 2 nd Edition, 2021.					

REFERENCE BOOKS:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 6th Edition 2017.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2018.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, First Edition 2008.
4. Sahdev S. K. "Electrical Machines", Cambridge University Press, 2018.

CO-PO-PSO MAPPING:

CO	PO												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3	3	1	1	1	-	-	1	-	-	-	1	3	2
2	3	3	1	1	1	-	-	1	-	-	-	1	3	1
3	3	3	1	1	1	-	-	1	-	-	-	1	3	1
4	3	3	1	1	1	-	-	1	-	-	-	1	3	3
5	3	3	1	1	1	-	-	1	-	-	-	1	3	3

1-low, 2-medium, 3-high, '-' 'no correlation

24CS5307	C AND DATA STRUCTURES	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To learn how to write simple and modular C programs. To understand usage of Arrays, Pointers and strings. To learn linear data structures - lists, stacks and queues. To understand non-linear data structures - trees and graphs. To understand sorting, searching and hashing algorithms. 					
UNIT I	C PROGRAMMING FUNDAMENTALS	9			
Structure of 'C' program Data Types - Variables - Operators and Expressions - Decision Making: Branching statements, Looping statements - Functions - Declaration, Definition - Passing arguments by value, Recursive Functions - Arrays - Single and Multi-Dimensional Arrays.					
UNIT II	C PROGRAMMING - ADVANCED FEATURES	9			
Pointers - Passing arguments by address, Array of Pointers, Pointer to Pointer, Pointer to an array - Pointer to function - Structure: Declaration, Definition - Array of Structures - Pointer to Structure - Structure within a Structure - Union. Files: File Management functions, Random access in file-Working with Text Files and Binary Files.					
UNIT III	LINEAR DATA STRUCTURES	9			
Abstract Data Types (ADTs) - List ADT - Array-Based Implementation - Linked List - Doubly-Linked Lists - Circular Linked List - Stack ADT - Implementation of Stack - Applications - Queue ADT - Priority Queues - Queue Implementation - Applications.					
UNIT IV	NON-LINEAR DATA STRUCTURES	9			
Trees - Binary Trees - Tree Traversals - Expression Trees - Binary Search Tree - Hashing - Hash Functions - Separate Chaining - Open Addressing - Linear Probing- Quadratic Probing - Double Hashing - Rehashing.					
UNIT V	SORTING AND SEARCHING TECHNIQUES	9			
Insertion Sort - Quick Sort - Heap Sort - Merge Sort -Linear Search - Binary Search.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Solve simple problems using C and Control the sequence of the program using functions.					
CO2: Develop programs using structures, union and pointers.					
CO3: Define linear and non-linear data structures.					
CO4: Write functions to implement linear and non-linear data structure operations.					
CO5: Appropriately use sort and search algorithms for given application.					
TEXT BOOKS:					
1. Pradip Dey, Manas Ghosh, "Programming in C", AICTE Edition, Oxford University Press, 2018.					
2. Behrouz A. Forouzan, Richard F. Gilberg, P. Golda Jeyasheeli, G. Priyanka, S. T. Veena, "Problem solving Using C A Structured Programming Approach" Volume I & II First Edition, Cengage Publication, 2022.					
3. Mark Allen Weiss, Data Structures and Algorithm Analysis in C, 2 nd Edition, Pearson Education, 2005.					
REFERENCE BOOKS:					
1. Yashavant P. Kanetkar, "Let Us C, Authentic guide to C programming language", Eighteenth Edition, BPB Publications, 2021.					

2. Paul Deitel, Harvey Deitel, "C How to Program", Ninth Edition, Pearson, 2021.
3. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++, 2nd Edition, Pearson Education, 2015.
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Fourth Edition, McGraw Hill, MIT Press, 2022.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3
2	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2
3	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2
4	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1
5	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3

1-low, 2-medium, 3-high, '-' - no correlation

24EE3305	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- To enable the students to understand the behavior of semiconductor device based on experimentation.
- Be exposed to active and passive circuit elements.
- Familiarize the operation and characteristics of transistor like BJT and FET.
- Explore the characteristics of amplifier gain and frequency response.
- Learn the required functionality of positive and negative feedback systems.

LIST OF EXPERIMENTS:

1. Characteristics of Semiconductor diode, Zener diode, photo diode, and photo transistor.
2. Characteristics of NPN Transistor under common emitter, common collector and common base configurations.
3. Characteristics of JFET and draw the equivalent circuit.
4. Characteristics of UJT and generation of saw tooth waveforms.
5. Design and frequency response characteristics of a Common Emitter amplifier.
6. Characteristics of light activated relay circuit.
7. Design and testing of RC phase shift and LC oscillators.
8. Characteristics of Single-Phase half-wave and full wave rectifiers with inductive and capacitive filters.
9. Design of Differential amplifiers using FET.
10. Measurement of frequency and phase angle using CRO.
11. Realization of passive filters.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- CO1: Analyze the characteristics of PN, Zener diode and BJT in CE, CC, CB configurations experimentally.
- CO2: Analyze the characteristics of JFET and UJT experimentally.
- CO3: Analyze frequency response characteristics of a Common Emitter amplifier experimentally.
- CO4: Analyze the characteristics of RC phase shift and LC oscillators experimentally.
- CO5: Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	3	3	-	-	2	-	-	3	-	-	3	3
2	-	-	3	3	3	-	-	2	-	-	3	-	-	3	3
3	-	3	2	3	-	-	-	2	-	-	3	-	-	3	3
4	-	3	3	3	-	-	-	2	-	-	3	-	-	3	3
5	-	-	-	-	3	-	-	2	-	-	-	-	-	3	3

1-low, 2-medium, 3-high, '-' - no correlation

24EE3306	DC MACHINES AND TRANSFORMERS LABORATORY	L	T	P	C										
		0	0	3	1.5										
OBJECTIVES:															
<ul style="list-style-type: none"> To expose the students to determine the characteristics of DC machines and transformers by performing experiments on these machines. To provide hands on experience to evaluate the performance parameters of DC machines and transformer by conducting suitable tests. 															
LIST OF EXPERIMENTS:															
<ol style="list-style-type: none"> Open circuit and load characteristics of DC shunt generator- calculation of critical resistance and critical speed. Load characteristics of DC compound generator with differential and cumulative connections. Load test on DC shunt motor. Load test on DC compound motor. Load test on DC series motor. Swinburne's test and speed control of DC shunt motor. Hopkinson's test on DC motor - generator set. Load test on single-phase transformer and three phase transformers. Open circuit and short circuit tests on single phase transformer. Sumpner's test on single phase transformers. Separation of no-load losses in single phase transformer. Study of starters and 3-phase transformers connections. 															
TOTAL: 45 PERIODS															
COURSE OUTCOMES:															
At the end of the course the students will be able to															
CO1: Construct the circuit with appropriate connections for the given DC machine/transformer.															
CO2: Experimentally determine the characteristics of different types of DC machines.															
CO3: Demonstrate the speed control techniques for a DC motor for industrial applications.															
CO4: Identify suitable methods for testing of transformer and DC machines.															
CO5: Predetermine the performance parameters of transformers and DC motor.															
CO6: Understand DC motor starters and 3-phase transformer connections.															
CO-PO-PSO MAPPING:															
CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	1	1	-	-	-	-	1	-	-	-	3	1	1
2	3	3	1	1	-	-	-	-	1	-	-	-	3	3	2
3	3	3	1	1	-	-	-	-	1	-	-	-	3	3	2
4	3	3	1	1	-	-	-	-	1	-	-	-	2	3	2
5	3	3	1	1	-	-	-	-	1	-	-	-	2	3	2
6	3	3	1	1	-	-	-	-	1	-	-	-	2	3	1
1 - low, 2 - medium, 3 - high, '-' - no correlation															

24CS5308	C AND DATA STRUCTURES LABORATORY												L	T	P	C
													0	0	3	1.5
OBJECTIVES:																
<ul style="list-style-type: none"> • To develop applications in C. • To implement linear and non-linear data structures. • To understand the different operations of search trees. • To get familiarized to sorting and searching algorithms. 																
LIST OF EXPERIMENTS:																
<ol style="list-style-type: none"> 1. Practice of C programming using statements, expressions, decision making and iterative statements. 2. Practice of C programming using Functions and Arrays. 3. Implement C programs using Pointers and Structures. 4. Implement C programs using Files. 5. Development of real time C applications. 6. Array implementation of List ADT. 7. Array implementation of Stack and Queue ADTs. 8. Linked list implementation of List, Stack and Queue ADTs. 9. Applications of List, Stack and Queue ADTs. 10. Implementation of Binary Trees and operations of Binary Trees. 11. Implementation of Binary Search Trees. 12. Implementation of searching techniques. 13. Implementation of Sorting algorithms: Insertion Sort, Quick Sort, Merge Sort. 14. Implementation of Hashing - any two collision techniques. 																
TOTAL: 45 PERIODS																
COURSE OUTCOMES:																
At the end of the course the students will be able to																
CO1: Use different constructs of C and develop applications.																
CO2: Write functions to implement linear and non-linear data structure operations.																
CO3: Suggest and use the appropriate linear / non-linear data structure operations for a given problem.																
CO4: Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval.																
CO5: Implement sorting and searching algorithms for a given application.																
CO-PO-PSO MAPPING:																
CO	PO												PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	2	3	1	2	2	1	1	-	1	2	1	3	2	1	3	
2	1	2	1	2	2	-	-	-	1	1	1	2	2	2	2	
3	2	3	1	2	3	-	-	-	1	1	1	2	2	1	2	
4	2	1	-	1	1	-	-	-	2	1	1	2	2	3	1	
5	1	2	1	2	2	1	1	-	1	2	1	3	2	2	3	
1-low, 2-medium, 3-high, '- '- no correlation																

24GE0310	PROFESSIONAL DEVELOPMENT	L	T	P	C
		0	0	2	1
<p>OBJECTIVES:</p> <ul style="list-style-type: none"> • To be proficient in important Microsoft Office tools: MS WORD, EXCEL, POWERPOINT. • To be proficient in using MS WORD to create quality technical documents, by using standard templates, widely acceptable styles and formats, variety of features to enhance the presentability and overall utility value of content. • To be proficient in using MS EXCEL for all data manipulation tasks including the common statistical, logical, mathematical etc., operations, conversion, analytics, search and explore, visualize, interlink, and utilizing many more critical features offered. • To create and share quality presentations by using the features of MS PowerPoint, including: organization of content, presentability, aesthetics, using media elements and enhance the overall quality of presentations. 					
<p>LIST OF EXPERIMENTS:</p> <p>1. MS WORD:</p> <ol style="list-style-type: none"> a. Create and format a document. b. Working with tables. c. Working with Bullets and Lists. d. Working with styles, shapes, smart art, charts. e. Inserting objects, charts and importing objects from other office tools. f. Creating and Using document templates. g. Inserting equations, symbols and special characters. h. Working with Table of contents and References, citations. i. Insert and review comments. j. Create bookmarks, hyperlinks, endnotes footnote. k. Viewing document in different modes. l. Working with document protection and security. m. Inspect document for accessibility. <p>2. MS EXCEL:</p> <ol style="list-style-type: none"> a. Create worksheets, insert and format data. b. Work with different types of data: text, currency, date, numeric etc. c. Split, validate, consolidate, convert data Sort and filter data. d. Perform calculations and use functions: (Statistical, Logical, Mathematical, date, Time etc.) work with Lookup and reference formulae. e. Create and Work with different types of charts Use pivot tables to summarize and analyze data Perform data analysis using own formulae and functions. f. Combine data from multiple worksheets using own formulae and built-in functions to generate results. g. Export data and sheets to other file formats working with macros. h. Protecting data and securing the workbook. <p>3. MS POWERPOINT:</p> <ol style="list-style-type: none"> a. Select slide templates, layout and themes. b. Formatting slide content and using bullets and numbering. c. Insert and format images, smart art, tables, charts. d. Using Slide master, notes and handout master. e. Working with animation and transitions, Organize and Group slides. f. Import or create and use media objects: audio, video, animation. g. Perform slideshow recording and Record narration and create presentable videos. 					
TOTAL: 30 PERIODS					
<p>COURSE OUTCOMES:</p> <p>At the end of the course the students will be able to</p> <p>CO1: Use MS Word to create quality documents, by structuring and organizing content for</p>					

their day to day technical and academic requirements.

CO2: Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding.

CO3: Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.

CO4: Use MS PowerPoint to create high quality academic presentations by including common tables, charts and graphs.

CO5: Use MS PowerPoint to create high quality academic presentations by including Interlinking other elements, and using media objects.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	1	2	-	-	-	1	-	-	-	-	-	-	-
2	3	1	1	2	-	-	-	-	-	-	-	-	-	-	-
3	3	1	1	2	-	-	-	-	-	-	-	-	-	-	-
4	3	1	1	2	-	-	-	-	-	-	-	-	-	-	-
5	3	1	1	2	-	-	-	-	-	-	-	-	-	-	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

SEMESTER IV

24EE3401	GENERATION, TRANSMISSION AND DISTRIBUTION	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> • To impart knowledge about the configuration of the electrical power systems. • To study the line parameters and interference with neighboring circuits. • To understand the mechanical design and performance analysis of transmission lines. • To learn about different insulators and underground cables. • To understand and analyze the distribution system. 					
UNIT I	GENERATION OF ELECTRICITY	9			
Classification of energy sources – examples - commercial and non-commercial - schematic layout - working - comparisons - hydroelectric - thermal (coal, gas, diesel and nuclear) Selection of sites - criterion for selection of sites - Quantity of electricity generated - Grid connected systems - basic concept – advantages - interconnected grid systems distributed generation - Microgrid.					
UNIT II	TRANSMISSION LINE PARAMETERS	9			
Structure of electric power system - Parameters of single and three phase transmission lines with single and double circuits - Resistance, inductance, and capacitance of solid, stranded, and bundled conductors - application of self and mutual GMD; skin and proximity effects - Effects of earth on the capacitance of the transmission line - interference with neighboring communication circuits.					
UNIT III	MECHANICAL DESIGN OF LINES	9			
Mechanical design of overhead lines - Line Supports -Types of towers - Tension and Sag Calculation for different weather conditions - Methods of grounding - Insulators: Types, voltage distribution in insulator string, improvement of string efficiency, testing of insulators.					
UNIT IV	UNDERGROUND CABLES	9			
Underground cables - Types of cables - Construction of single-core and 3-core belted cables - Insulation Resistance - Potential Gradient - Capacitance of single-core and 3-core belted cables - Grading of cables - Power factor and heating of cables - DC cables.					
UNIT V	DISTRIBUTION SYSTEMS	9			
Distribution Systems - General Aspects - Kelvin’s Law - AC and DC distributions - Concentrated and Distributed loading - Techniques of Voltage Control and Power factor improvement - Distribution Loss - Types of Substations - Trends in Transmission and Distribution: EHVAC, HVDC and FACTS (Qualitative treatment only).					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Understand the structure of power system, computation of transmission line parameters for different configurations.					
CO2: Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance.					
CO3: Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system.					
CO4: Design the underground cables and understand the performance analysis of underground cable.					
CO5: Understand the modelling, performance analysis and modern trends in distribution system.					
TEXT BOOKS:					
1. Haridev Ram, Electrical Transmission and Distribution System, Discovery Publishing House, Edition 2025.					

2. D. P. Kothari, I. J. Nagarath, "Power System Engineering", McGraw Hill Publishing Company limited, New Delhi, Third Edition, 2019.
3. C. L. Wadhwa, "Electrical Power Systems", New Age International Ltd, seventh edition 2022.
4. S. N. Singh, "Electric Power Generation, Transmission and Distribution", Prentice Hall of India Pvt. Ltd., New Delhi, Second Edition, 2008.

REFERENCE BOOKS:

1. B. R. Gupta, "Power System Analysis and Design", S. Chand, New Delhi, Sixth Edition, 2011.
2. Luces M. Fualken berry, Walter Coffe, "Electrical Power Distribution and Transmission", Pearson Education, 2007.
3. Arun Ingole, "Power transmission and distribution", Pearson Education, first edition, 2018.
4. J. Brian Hardy and Colin R. Bayliss "Transmission and Distribution in Electrical Engineering", Newness; Fourth Edition, 2011.
5. G. Ramamurthy, "Handbook of Electrical power Distribution", Universities Press, 2013.
6. V. K. Mehta, Rohit Mehta, "Principles of power system", S. Chand & Company Ltd, New Delhi, 2013.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	-	-	-	-	-	1	-	-	-	-	3	1	1
2	3	2	1	1	-	1	-	2	-	-	-	-	3	2	1
3	3	2	1	1	-	1	-	2	-	-	-	-	3	3	1
4	3	2	1	1	-	1	-	2	-	-	-	-	3	3	1
5	3	2	1	1	-	1	-	2	-	-	-	-	3	3	1

1 - low, 2 - medium, 3 - high, '-' - no correlation

24EE3402	LINEAR INTEGRATED CIRCUITS AND APPLICATIONS	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To analyze the signal using Op-amp based circuits. To study the applications of Op-amp. To learn the applications of special ICs like Timers, PLL circuits, regulator Circuits. To study about IC fabrication procedure. 					
UNIT I	IC FABRICATION	9			
IC classification, fundamental of monolithic IC technology, epitaxial growth, masking and etching, diffusion of impurities - Realization of monolithic ICs and packaging - Fabrication of diodes, capacitance, resistance, FETs and PV Cell.					
UNIT II	CHARACTERISTICS OF OPAMP	9			
Ideal OP-AMP characteristics, DC characteristics, AC characteristics, differential amplifier: frequency response of OP-AMP; Basic applications of op-amp - Inverting and Non-inverting Amplifiers, summer, differentiator and integrator - V/I & I/V converters.					
UNIT III	APPLICATIONS OF OPAMP	9			
Instrumentation amplifier and its applications for transducer Bridge, Log and Antilog Amplifiers - Analog multiplier & Divider, first and second order active filters, comparators, multivibrators, waveform generators, clippers, clampers, peak detector, S/H circuit, D/A converter (R - 2R ladder and weighted resistor types).					
UNIT IV	SPECIAL ICs	9			
Functional block, characteristics of 555 Timer and its PWM application - IC-566 voltage-controlled oscillator IC; 565 - phase locked loop IC, AD633 Analog multiplier ICs.					
UNIT V	APPLICATION ICs	9			
AD623 Instrumentation Amplifier and its application as load cell weight measurement - IC voltage regulators - LM78XX, LM79XX; Fixed voltage regulators its application as Linear power supply - LM317, 723 Variability voltage regulators, switching regulator - SMPS - ICL 8038 function generator IC.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Ability to acquire knowledge in IC fabrication procedure Ability to analyze the characteristics of Op-Amp.					
CO2: Functional blocks and the applications of special ICs like Timers, PLL circuits.					
CO3: To understand the importance of Signal analysis using Op-amp based circuits.					
CO4: To understand and acquire knowledge on the Applications of Op-amp regulator Circuits.					
CO5: Ability to understand and analyze, linear integrated circuits their Fabrication and Application.					
TEXT BOOKS:					
1. Ramakant A. Gayakwad Contributor: Rekha S., Op-Amps and Linear Integrated Circuits, 4 th Edition, Pearson, 2021					
2. David A. Bell, "Op-amp & Linear ICs", Oxford, 2013.					
3. D. Roy Choudhary, Sheil B. Jani, "Linear Integrated Circuits", II edition, New Age, 2003.					
4. Ramakant A. Gayakward, "Op-amps and Linear Integrated Circuits", IV edition, Pearson Education, 2003.					

REFERENCE BOOKS:

1. Fiore, “Opamps & Linear Integrated Circuits Concepts & applications”, Cengage, 2010.
2. Floyd, Buchla, “Fundamentals of Analog Circuits”, Pearson, 2013.
3. Jacob Millman, Christos C. Halkias, “Integrated Electronics - Analog and Digital circuits system”, McGraw Hill, 2003.
4. Robert F. Coughlin, Fredrick F. Driscoll, “Op-amp and Linear ICs”, Pearson, 6th edition, 2012.
5. Sergio Franco, “Design with Operational Amplifiers and Analog Integrated Circuits”, McGraw Hill, 2016.
6. Muhammad H. Rashid, “Microelectronic Circuits Analysis and Design”, Cengage Learning, 2011.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
2	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
3	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
4	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1
5	2	2	3	2	2	-	-	1	-	-	-	1	3	2	1

1 - low, 2 - medium, 3 - high, '-' - no correlation

24EE3403	MEASUREMENTS AND INSTRUMENTATION	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To learn the basic functional elements of instrumentation. To study about fundamentals of electrical and electronic instruments. To analyze the comparison between various measurement techniques. To learn the various storage and display devices. To study the various transducers and the data acquisition systems. 					
UNIT I	CONCEPTS OF MEASUREMENTS	9			
Instruments: classification, applications - Elements of a generalized measurement system - Static and dynamic characteristics - Errors in Measurement - Statistical evaluation of measurement data.					
UNIT II	PARAMETERS IN ELECTRICAL SYSTEMS	9			
Classification of instruments - moving coil and moving iron meters - Induction type, dynamo meter type wattmeter's - Energy meter – Megger - Instrument transformers (CT&PT).					
UNIT III	AC/DC BRIDGES AND INSTRUMENTATION AMPLIFIERS	9			
Wheatstone bridge, Kelvin double bridge - Maxwell, Hay, Wien and Schering bridges - Errors and compensation in A.C. bridges - Instrumentation Amplifiers.					
UNIT IV	TRANSDUCERS FOR MEASUREMENT	9			
Classification of transducers - Measurement of pressure, temperature, displacement, flow, angular velocity - Digital Transducers - Smart Sensors.					
UNIT V	DIGITAL INSTRUMENTATION	9			
A/D converters: types and characteristics - Sampling, Errors - Measurement of voltage, Current, frequency and phase - D/A converters: types and characteristics – DSO - Data Loggers - Basics of PLC programming and Introduction to Virtual Instrumentation - Instrument standards.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Ability to understand the fundamental art of measurement in engineering.					
CO2: Ability to understand the structural elements of various instruments.					
CO3: Ability to understand the importance of bridge circuits.					
CO4: Ability to understand about various transducers and their characteristics by experiments.					
CO5: Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments.					
TEXT BOOKS:					
1. Prof. M. A. Chaudhari, Electrical Measurements and Instrumentation, Tech Knowledge Publications; 2025th edition.					
2. A.K. Sawhney, Puneet Sawhney, "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, New Delhi, Edition, 2011.					
3. H.S. Kalsi, "Electronic Instrumentation", Tata McGraw Hill, New Delhi, 2010.					
REFERENCE BOOKS:					
1. M. M. S. Anand, "Electronics Instruments and Instrumentation Technology", Prentice Hall India, New Delhi, 2009.					
2. J. J. Carr, "Elements of Electronic Instrumentation and Measurement", Pearson Education India, New Delhi, 2011.					
3. W. Bolton, "Programmable Logic Controllers", 6 th Edition, Elsevier, 2015.					
4. R. B. Northrop, "Introduction to Instrumentation and Measurements", Taylor & Francis, New Delhi, 3 rd Edition 2014.					

5. E. O. Doebelin and D. N. Manik, “Measurement Systems–Application and Design”, Tata McGraw Hill, New Delhi, 6th Edition 2017.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	2	3	-	3	2	-	2	-	-	-	3	3	3	3
2	3	2	3	2	-	-	-	-	-	3	-	3	3	3	3
3	3	2	3	-	3	2	-	-	-	-	-	3	3	3	3
4	3	2	3	-	-	-	-	2	-	-	-	-	3	3	3
5	3	2	3	2	3	-	-	-	-	3	-	3	3	3	3

1 - low, 2 - medium, 3 - high, '-' - no correlation

24EE3404	MICROPROCESSOR AND MICROCONTROLLER	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> • To study the addressing modes & instruction set of 8085 & 8051. • To develop skills in simple program writing in assembly languages. • To introduce commonly used peripheral/interfacing ICs. • To study and understand typical applications of micro-processors. • To study and understand the typical applications of micro-controllers. 					
UNIT I	INTRODUCTION TO 8085 ARCHITECTURES	9			
Functional block diagram - Memory interfacing - I/O ports and data transfer concepts - Timing Diagram - Interrupt structure.					
UNIT II	8085 INSTRUCTION SET AND PROGRAMMING	9			
Instruction format and addressing modes - Assembly language format - Data transfer, data manipulation & control instructions - Programming: Loop structure with counting & Indexing - Lookup table - Subroutine instructions, stack.					
UNIT III	INTERFACING BASICS AND ICs	9			
Study of Architecture and programming of ICs: 8255 PPI, 8259 PIC, 8251 USART, 8279 Keyboard Display controller and 8254 Timer/Counter - Interfacing with 8085 - A/D and D/A converter interfacing.					
UNIT IV	INTRODUCTION TO 8051 MICROCONTROLLERS	9			
Functional block diagram - Instruction format and addressing modes - Interrupt structure – Timer - I/O ports - keyboard and display interface - Temperature control system - stepper motor control - Usage of IDE for assembly language programming.					
UNIT V	INTRODUCTION TO RISC BASED ARCHITECTURE	9			
PIC16/18 architecture, Memory organization - Addressing modes - Instruction Set - Programming techniques – Timers - I/O ports - Interrupt programming.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Ability to write assembly language program for microprocessor and microcontroller.					
CO2: Ability to design and implement interfacing of peripheral with microprocessor and microcontroller.					
CO3: Ability to analyze, comprehend, design and simulate microprocessor-based systems used for control and monitoring.					
CO4: Ability to analyze, comprehend, design and simulate microcontroller-based systems used for control and monitoring.					
CO5: Ability to understand and appreciate advanced architecture evolving microprocessor field.					
TEXT BOOKS:					
1. A.P. Godse, Jairaj Solanke, Dr. D.A. Godse, Microprocessors & Microcontrollers, Technical Publications, 2023.					
2. Ramesh S. Gaonkar, "Microprocessor Architecture Programming and Application", Penram International (P) Ltd., Mumbai, 6 th Edition, 2013.					
3. Muhammad Ali Mazidi & Janice Gilli Mazidi, "The 8051 Micro Controller and Embedded Systems", Pearson Education, Second Edition, 2011.					
4. Muhammad Ali Mazidi & Janice Gilli Mazidi, "The PIC Micro Controller and Embedded Systems", 2010.					

REFERENCE BOOKS:

1. Douglas V. Hall, "Micro-processors & Interfacing", Tata McGraw Hill, 3rd Edition, 2017.
2. Krishna Kant, "Micro-processors & Micro-controllers", Prentice Hall of India, 2007.
3. Mike Predko, "8051 Micro-controllers", McGraw Hill, 2009.
4. Kenneth Ayala, "The 8051 Microcontroller", Thomson, 3rd Edition, 2004.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
2	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
3	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
4	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3
5	2	1	2	3	-	-	-	1	-	-	-	3	3	1	3

1 - low, 2 - medium, 3 - high, '-' - no correlation

24EE3405	AC MACHINES	L	T	P	C
		3	0	0	3
OBJECTIVES:					
<ul style="list-style-type: none"> To learn the Network Models and datalink layer functions. To understand routing in the Network Layer. To explore methods of communication and congestion control by the Transport Layer. To study the Network Security Mechanisms. To learn various hardware security attacks and their countermeasures. 					
UNIT I	SYNCHRONOUS GENERATOR	9			
Constructional details - Types of rotors - winding factors - EMF equation - Synchronous reactance - Armature reaction - Phasor diagrams of non-salient pole synchronous generator connected to infinite bus - Synchronizing and parallel operation - Voltage regulation.					
UNIT II	SYNCHRONOUS MOTOR	9			
Principle of operation - Torque equation - Operation on infinite bus bars - V and Inverted V curves - Power input and power developed equations - Starting methods - Hunting - natural frequency of oscillations - damper windings - synchronous condenser.					
UNIT III	THREE PHASE INDUCTION MOTOR	9			
Constructional details - Types of rotors - Principle of operation - Slip - cogging and crawling - Load test - No load and blocked rotor tests - Separation of losses - Double cage induction motors - Induction generators - Synchronous induction motor.					
UNIT IV	STARTING AND SPEED CONTROL OF THREE PHASE INDUCTION MOTOR	9			
Need for starting - Types of starters - DOL, Rotor resistance, Auto transformer and Star-delta starters - Speed control - Voltage control, Frequency control and pole changing - Cascaded Connection - V/f control - Slip power recovery Scheme - Braking of three phase induction motor: Plugging, dynamic braking and regenerative braking.					
UNIT V	SINGLE PHASE INDUCTION MOTORS AND SPECIAL MACHINES	9			
Constructional details of single phase induction motor - Double field revolving theory and operation - No load and blocked rotor test - Starting methods of single-phase induction motors - Capacitor-start capacitor-run Induction motor - Shaded pole induction motor - Linear induction motor - Repulsion motor - Hysteresis motor - AC series motor - Servo motors - Stepper motors - introduction to magnetic levitation systems.					
TOTAL: 45 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to					
CO1: Ability to understand the construction and working principle of Synchronous generator.					
CO2: Ability to understand the construction and working principle of Synchronous Motor.					
CO3: Ability to understand the construction and working principle of Three Phase Induction Motor.					
CO4: Acquire knowledge about the starting and speed control of induction motors.					
CO5: To gain knowledge about the basic principles and working of Single-phase induction motors and Special Electrical Machines.					
TEXT BOOKS:					
1. Bimbhra P.S., Electric Machines, Second Edition, Khanna Publishing House, Edition: 2, 2021.					
2. A. E. Fitzgerald, Charles Kingsley, Stephen. D. Umans, "Electric Machinery", McGraw Hill publishing Company Ltd, 6 th Edition, 2017.					
3. Stephen J. Chapman, "Electric Machinery Fundamentals", 4 th edition, McGraw Hill Education on Pvt. Ltd., 4 th Edition, 2017.					

4. D.P. Kothari and I.J., “Nagrath Electric Machines”, McGraw Hill Publishing Company Ltd, 5th Edition, 2017.
5. P.S. Bhimbhra, “Electrical Machinery”, Khanna Publishers, Edition, 2021.

REFERENCE BOOKS:

1. Vincent Del Toro, “Basic Electric Machines”, Pearson India Education, 2016.
2. M.N. Bandyopadhyay, “Electrical Machines Theory and Practice”, PHI Learning PVT LTD., New Delhi, 2011.
3. B. R. Gupta, “Fundamental of Electric Machines”, New age International Publishers, 3rd Edition, Reprint, 2015.
4. Murugesh Kumar, “Electric Machines”, Vikas Publishing House Pvt. Ltd, First edition, 2010.
5. Alexander S. Langsdorf, “Theory of Alternating-Current Machinery”, McGraw Hill Publications, 2001.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
2	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
3	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
4	3	3	2	3	3	-	-	1	-	-	-	-	3	3	2
5	3	3	1	1	2	-	-	1	-	-	-	-	3	3	2

1 - low, 2 - medium, 3 - high, '-' - no correlation

24EE3406	DIGITAL ELECTRONICS	L	T	P	C
		3	0	0	3
OBJECTIVES: <ul style="list-style-type: none"> To learn the fundamentals of combinational and sequential digital circuit. To impart the implementation of combinational circuits using Gates and to design various synchronous and asynchronous circuits. To acquire the basic knowledge of digital simulation techniques for development of application-oriented logic circuit. 					
UNIT I	BOOLEAN ALGEBRA AND MINIMISATION	9			
Binary system, Boolean algebra and logic gates: Boolean functions, Canonical and standard Forms - Digital logic gates - Integrated circuits, NAND and NOR implementation. Minimization using K-maps & Quine McCluskey method.					
UNIT II	COMBINATIONAL CIRCUITS	9			
Adder, Subtractor, Comparators, Code Converters, Encoders, Decoders, Multiplexers and Demultiplexers.					
UNIT III	SEQUENTIAL CIRCUITS	9			
Flip flops - SR, D, JK and T, shift registers, counters - ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, state assignments analysis and design of synchronous sequential circuits, state diagram; state reduction, FSM.					
UNIT IV	PROGRAMMABLE LOGIC DEVICES	9			
Introduction to Programmable Logic Devices: PROM - PLA - PAL, CPLD - FPGA.					
UNIT V	DESIGN OF COMBINATIONAL AND SEQUENTIAL CIRCUITS USING VHDL	9			
Introduction to VHDL: Design - combinational logic - Types - Operators - Packages (Examples: adders, flip flops, counters, encoders, decoder, Multiplexers, De-Multiplexers).					
TOTAL: 45 PERIODS					
COURSE OUTCOMES: At the end of the course the students will be able to CO1: Ability to understand the fundamentals of digital electronics and logic families. CO2: Ability to analyse and design combinational logic circuits. CO3: Ability to analyse and design sequential logic circuits. CO4: Ability to understand the fundamentals of Programmable Logic Devices. CO5: Ability to develop VHDL code for the design and implementation of digital circuits and systems.					
TEXT BOOKS: <ol style="list-style-type: none"> R P Jain (Deceased) and Kishor Sarawadekar, Modern Digital Electronics, 5th Edition, McGraw Hill; Standard Edition, 2022. Thomas L Floyd, "Digital fundamentals", Pearson Education Limited, 11th Edition, 2018. Morris Mano. M, "Digital Logic and Computer Design", Prentice Hall of India, 3rd Edition, 2005. Donald D. Givone, "Digital Principles and Design", Tata McGraw Hill, 1st Edition, 2003. 					

REFERENCE BOOKS:

1. Tocci R. J., Neal S. Widmer, "Digital Systems: Principles and Applications", Pearson Education Asia, 12th Edition, 2017.
2. Donald P Leach, Albert Paul Malvino, Goutam Sha, "Digital Principles and Applications", Tata McGraw Hill, 7th Edition, 2010.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
2	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
3	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
4	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1
5	3	3	3	1	3	-	-	1	-	-	-	1	3	-	1

1 - low, 2 - medium, 3 - high, '-' - no correlation

.24EE3407	AC MACHINES LABORATORY												L	T	P	C
													0	0	3	1.5
OBJECTIVES:																
<ul style="list-style-type: none"> To expose the students to the operation of synchronous machines and induction motors and give them experimental skill. 																
LIST OF EXPERIMENTS																
<ol style="list-style-type: none"> Regulation of three phase alternator by EMF. Regulation of three phase alternator by MMF. V and Inverted V curves of Three Phase Synchronous Motor. Load test on three-phase induction motor. No load and blocked rotor tests on three-phase induction motor (Determination of equivalent circuit parameters). Separation of No-load losses of three-phase induction motor. Load test on single-phase induction motor. No load and blocked rotor test on single-phase induction motor. Study of Induction Motor Starters. Measurements of negative sequence and zero sequence impedance of alternators. 																
TOTAL: 45 PERIODS																
COURSE OUTCOMES:																
At the end of the course, the students will be able to																
CO1: Ability to understand and analyze EMF and MMF methods.																
CO2: Ability to analyze the characteristics of V and Inverted V curves.																
CO3: 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.																
CO4: Acquire hands on experience of conducting various tests on induction motors and obtaining their performance indices using standard analytical as well as graphical methods to understand the importance of single and three phase Induction motors.																
CO5: Ability to acquire knowledge on separation of losses.																
CO-PO-PSO MAPPING:																
CO	PO												PSO			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
1	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2	
2	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	2	
3	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	1	
4	3	3	1	1	-	-	-	1.5	1	-	-	3	3	3	1	
5	3	3	1	1	-	-	-	1.5	1	-	-	2	3	3	2	
1- low, 2 - medium, 3 - high, '-' - no correlation																

24EE3408	LINEAR AND DIGITAL CIRCUITS LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- To learn design, testing and characterizing of circuit behavior with combinational logic gate ICs.
- To learn design, testing and characterizing of circuit behavior with register/ counter and sequential logic ICs.
- To learn design, testing and characterizing of circuit behavior with OPAMP ICs.
- To learn design, testing and characterizing of circuit behavior with analog Ics like 555 timer VCO and regulators.
- To learn design, testing and characterizing of circuit behavior with digital Ics like decoders, multiplexers.

LIST OF EXPERIMENTS

1. Implementation of Boolean Functions, Adder and Subtractor circuits.
2. Code converters: Excess-3 to BCD and Binary to Gray code converter and vice-versa.
3. Parity generator and parity checking.
4. Encoders and Decoders.
5. Counters: Design and implementation of 3-bit modulo counters as synchronous and Asynchronous types using FF IC's and specific counter IC.
6. Shift Registers: Design and implementation of 4-bit shift registers in SISO, SIPO, PISO, IPO modes using suitability IC's.
7. Study of multiplexer and de multiplexer.
8. Timer IC application: Study of NE/SE 555 timer in Astability, Monostability operation.
9. Application of Op-Amp: inverting and non-inverting amplifier, Adder, comparator, Integrator and Differentiator.
10. Voltage to frequency characteristics of NE/ SE 566 IC.
11. Variability Voltage Regulator using IC LM317.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- CO1: Ability to understand and implement Boolean Functions.
- CO2: Ability to understand the importance of code conversion.
- CO3: Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.
- CO4: Ability to acquire knowledge on Application of Op-Amp.
- CO5: Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	-	-	-	3	-	-	-	1.5	-	-	3	3	2	1	2
2	-	-	3	3	-	-	-	1.5	-	-	3	3	2	1	2
3	-	3	2	3	3	-	-	1.5	-	-	3	3	2	1	2
4	-	3	3	3	3	-	-	1.5	-	-	3	3	2	1	2
5	-	-	-	-	-	-	-	1.5	-	-	-	3	-	-	-

1 - low, 2 - medium, 3 - high, '-' - no correlation

24EE3409	MICROPROCESSOR AND MICROCONTROLLER LABORATORY	L	T	P	C
		0	0	3	1.5

OBJECTIVES:

- To perform simple arithmetic operations using assembly language program and study the addressing modes & instruction set of 8085 & 8051.
- To develop skills in simple program writing in assembly languages.
- To write an assembly language program to convert Analog input to Digital output and Digital input to Analog output.
- To perform interfacing experiments with μ P8085.
- To perform interfacing experiments with μ C8051.

PROGRAMMING EXERCISES/EXPERIMENTS WITH μ P8085:

1. Simple arithmetic operations: Multi precision addition / subtraction / multiplication / division.
2. Programming with control instructions: Increment / Decrement, Ascending / Descending order, Maximum / Minimum of numbers, Rotate instructions, Hex /ASCII /BCD code conversions.
3. Stepper motor controller interface.
4. Displaying a moving / rolling message in the student trainer kit's output device.

PROGRAMMING EXERCISES/EXPERIMENTS WITH μ C8051:

5. Simple arithmetic operations with 8051: Multi precision addition / subtraction / multiplication / division.
6. Programming with control instructions: Increment / Decrement, Ascending / Descending order, Maximum/Minimum of numbers, Rotate instructions, Hex / ASCII /BCD code conversions.
7. Stepper motor controller interface.
8. Programming PIC architecture with software tools.

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

- CO1: Ability to write assembly language program for microprocessor.
- CO2: Ability to write assembly language program for microcontroller.
- CO3: Ability to design and implement interfacing of peripheral with microprocessor and microcontroller.
- CO4: Ability to analyze, comprehend, design and simulate microprocessor-based systems used for control and monitoring.
- CO5: Ability to analyze, comprehend, design and simulate microcontroller-based systems used for control and monitoring.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
2	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
3	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
4	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3
5	2	1	2	3	-	-	-	1.5	-	-	-	3	3	1	3

1 - low, 2 - medium, 3 - high, '-' - no correlation

24GE0411	SOFT SKILLS I	L	T	P	C
		0	0	4	2
OBJECTIVES:					
<ul style="list-style-type: none"> To develop students' comprehensive understanding and effective use of English grammar. To enhance students' analytical and logical thinking abilities. To make sense of problems, develop strategies to find solutions and persevere in solving them. To reason, model, and draw conclusion so make decision with mathematical, statistical, and quantitative information. To understand the fundamental principles of C programming. 					
UNIT I	ENGLISH PHASE I	12			
Vocabulary: Synonyms, Antonyms, Grammar: Subject-Verb Agreement, Tenses and Articles, Prepositions and Conjunctions, Speech and Voices, Comprehension: Inferential and Literal Comprehension, Contextual Vocabulary, Comprehension Ordering.					
UNIT II	LOGICAL REASONING PHASE I	12			
Logical Reasoning - Phase I Deductive Reasoning: Coding Deductive Logic, Directional Sense, Blood Relations, Objective Reasoning, Selection Decision Tables, Puzzles.					
UNIT III	QUANTITATIVE REASONING PHASE I	12			
Numbers- HCF & LCM of Numbers - Decimal Fractions - Simplification - Square Roots & Cube Roots - Average - Problems on Numbers - Problems on Ages - Surds & Indices.					
UNIT IV	NUMERACY SKILLS PHASE I	12			
Pipes & Cisterns - Problems on Trains - Boats & Streams - Allegation or Mixture - Simple Interest - Compound Interest -Logarithms - Area -Volume & Surface Areas.					
UNIT V	CODING PROFICIENCY PHASE I	12			
Introduction to C Programming - Operators and Expressions - Control Structures - Functions.					
TOTAL: 60 PERIODS					
COURSE OUTCOMES:					
At the end of the course the students will be able to:					
CO1: Develop vocabulary for effective communication and reading skills.					
CO2: Build the logical reasoning and quantitative skills.					
CO3: Solve various concepts of number systems and their techniques in solving the HCF, LCM factors and decimals.					
CO4: Solve the problems on pipes and cisterns, simple interest, compound interest, growth and depreciation.					
CO5: Understand the fundamental principles of structured programming and apply them to write efficient and error-free C programs.					
TEXT BOOKS:					
1. Dr. R. S. Aggarwal, "A Modern Approach to Verbal and Non-Verbal Reasoning", Revised Edition, S. Chand Publications.					
2. Abhijit Guha, "Quantitative Aptitude for Competitive Examinations", Fourth Edition, McGraw Hill Publications.					
3. Y. Kanetkar, "Let Us C", 16 th ed., BPB Publications, 2016.					
4. R. Gopalan & V. Rajagopalan, "English for Competitive Examinations", Second Edition, Shorff Publishers.					

REFERENCE BOOKS:

1. U. Mohan Rao, "Quantitative Aptitude for Competitive Examinations", Scitech Publications Pvt Ltd, India.
2. Dinesh Khattar, "The Pearson Guide to Quantitative Aptitude for Competitive Examinations", Third Edition, Pearson Education Pvt Ltd, India, 2016.
3. E. Balagurusamy, "Programming in ANSI C", 7th ed., McGraw Hill Education, 2017.
4. Logical Reasoning for Competitive Examinations, Veranda RACE Publications, 2022.
5. General English for Competitive Examinations, Veranda Learning Solutions Ltd, Volume-2, 2022.

CO-PO-PSO MAPPING:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	2	-	-	3	-	-	-	-	-	2	-	2	-	-	-
2	2	1	-	-	2	-	-	2	-	2	-	2	-	-	-
3	3	1	-	-	-	-	-	-	-	-	-	2	-	-	-
4	3	1	-	-	-	-	-	-	-	-	-	2	-	-	-
5	3	1	-	-	-	-	-	-	-	-	-	2	-	-	-

1 - low, 2 - medium, 3 - high, '-' - no correlation