SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE
(Autonomous)
Gobichettipalayam, Erode-638455

Regulation 2025 (UG)

Curriculum and Syllabus Choice Based Credit System (CBCS)

BE-ELECTRICAL AND ELECTRONICS ENGINEERING

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SHREE VENKATESHWARA HI-TECH ENGINEERING COLLEGE

(Autonomous)

Gobichettipalayam, Erode -638455

Regulation 2025 (UG)
Curriculum and Syllabus
BE-Electrical And Electronics Engineering

I. Program Educational Objective (PEO)

PEO1: **Professional Competence:** Excel in their professional careers or higher studies by acquiring a strong foundation in mathematics, science, and engineering principles.

PEO2: **Technical Expertise and Innovation:** Apply their knowledge and technical skills to identify, analyze, design, and solve real-world electrical and electronics engineering problems, using modern tools and techniques.

PEO3: **Lifelong Learning and Adaptability:** Engage in lifelong learning to adapt to rapidly evolving technologies and contribute to the advancement of the field through research, innovation, and entrepreneurship.

PEO4: **Ethics and Leadership:** Exhibit leadership qualities, effective communication skills, and a commitment to professional and ethical practices in multidisciplinary and multicultural work environments.

II. Program Outcomes (POs)

1. Engineering knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

3. **Design/development of solutions:** Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

4. **Conduct investigations of complex problems:** Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modeling, analysis & interpretation of data to provide valid conclusions. (WK8).

5. **Engineering tool usage**: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations

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to solve complex engineering problems. (WK2 and WK6)

6. **The Engineer and The World**: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

8. **Individual and Collaborative team work:** Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

9. **Communication:** Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

10. **Project management and finance:** Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

11. **Life-long learning**: Recognize the need for, and have the preparation and ability for (i) Independent and life-long learning (ii) adaptability to new and emerging technologies and (iii) Critical thinking in the broadest context of technological change. (WK8)

III. Program Specific Outcomes (PSOs)

PSO1: **Electrical Systems Design and Analysis:** Analyze the knowledge, design the systematic, and troubleshoot the complexity in the electrical systems, including power grids and industrial machines, using industry-standard simulation software and hardware tools.

PSO2: **Embedded Systems and Electronics Applications:** Design and develop the concepts of an integrated electronic systems and automation protocols that correlate with gap between digital hardware and intelligent software applications.

PSO3: **Sustainable and Renewable Energy Solutions:** Evaluate the efficiency and modern ability of renewable energy sources to create eco-friendly solutions that address global energy transitions and societal needs.

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Mapping of Course Outcome and Programme Outcome

Year	Sem	Course name	PO											PSO		
			1	2	3	4	5	6	7	8	9	10	11	1	2	3
I	I	Induction Programme														
		Communication English - I	-	-	-	2	-	1	-	-	2	3	-	-	-	-
		Engineering Mathematics-1	3	3	1	1	-	-	-	-	2	-	2	-	-	-
		Engineering Physics	3	3	2	1	2	-	-	-	-	-	-	-	-	-
		Engineering Chemistry	3	2	2	1	1	2	3	-	-	-	-	-	-	-
		Problem Solving Using C Programming	2	3	3	3	2	-	-	-	-	-	2	3	3	3
		Heritage of Tamils	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Communication English - I	-	-	-	-	-	-	-	1	3	3	-	-	-	-
	II	Communicative English - II	-	1	1	-	-	-	1	1	2	3	-	-	-	-
		Engineering Mathematics-II	3	3	1	1	1	-	-	-	2	-	2	-	-	-
		Physics For Electronics Engineering	3	2	1	-	-	-	-	-	-	-	-	-	-	-
		Electric Circuit Analysis	3	1	2	-	2	-	-	-	-	3	-	2	2	-
		Engineering Graphics and CAD Modeling	2	-	-	0.2	-	-	2	2	1	2	-	-	-	-
		Problem Solving and Python Programming	3	3	2	2	-	-	-	-	-	1	-	3	3	2
		Tamils and Technology	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Communicative English - II	3	3	3	2	-	-	-	-	-	1	-	3	3	2
II	III	DC Machines and Transformers	3	3	2	2	-	-	-	-	-	1	-	3	3	2
		Electromagnetic Fields	3	2	1	2	-	-	1.4	1	-	-	-	3	2	1
		Digital Electronics	3	2	2	1	-	-	-	-	-	1	-	3	1	-
		Electron Devices and Circuits	1	3	-	-	-	1	-	-	2	-	-	3	2	-
		Probability Theory and Complex Analysis	2	3	2	-	-	-	-	-	-	-	-	-	2	-
		Data Structures	3	3	2.6	-	-	-	-	-	2	-	-	-	-	-
		DC Machines and Transformers Laboratory	3	3	2	2	1	-	-	1	-	1	-	3	2	-
		Electron Devices and Circuits Laboratory	-	3	2.7	3	3	-	-	2	-	-	3	-	3	3
	IV	AC Machines	3	3	1.6	2.3	2.6	-	-	1	-	-	-	3	3	2
		Linear Integrated Circuits	3	2	3	-	-	-	-	-	-	-	-	3	2	2

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		Microprocessor and Microcontroller	3	2	1	1	1	-	-	-	-	-	-	2	3	-
	IV	Power Generation, Transmission & Distribution	3	1	-	-	-	-	-	-	-	1	-	1	1	-
		Measurements and Instrumentation	3	2	1	1	1	-	-	-	-	-	-	3	3	-
		Soft and Analytical Skills-I	2.8	1.4	0.6	0.2	-	2.2	2.4	-	-	-	-	-	-	-
		AC Machines Laboratory	1	3	-	2	2	-	-	-	3	-	-	3	1	-
		Linear and Digital Circuits Laboratory	1	3	-	2	2	-	-	-	3	-	-	3	1	-
		Microprocessor and Microcontroller Laboratory	3	3	1	3	1	2	-	1	2	3	-	1	3	-

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SUMMARY OF CREDITS

S. No	Course Category	Credits per Semester								Total Credits	Credits in %	Credits as per AU Curriculum	AU Curriculum Credits in %
		I	II	III	IV	V	VI	VII	VIII				
1	BS	11	6	4						21	12.57	22 **(-1)**	13.50
2	HUM	5	4				2	8		19	4.79	21 (-2)	12.88
3	ES (G)		4							4	2.40	6 **(-2)**	3.68
4	ES (PC)	4	8	21	21	16	11	6		87	52.40	75 **(+12)**	46.01
5	ES (PE)					3	3	3		9	5.39	15 **(-6)**	9.20
6	OE							3		3	5.39	3(0)	1.84
7	SL						1			1	1.80	1(0)	0.61
8	SD	2	2		1	3	4	1	10	23	5.99	21 **(+2)**	12.88
9	MC	✔		✔	✔								
Total Credits / Semester		**22**	**24**	**25**	**22**	**22**	**21**	**21**	**10**	**167**	**100**	**163**	**100**

CATEGORIZATION OF COURSES

i. **BS** – Basic Science (Mathematics, Physics, Chemistry)

ii. **HUM** – Humanities (Languages, Management, Heritage, and others)

iii. **ES** – Engineering Science (General **(G)**, Programme Core **(PC)**, Programme Elective **(PE)**, Emerging Technology **(ET)**

iv. **OE** – Open Elective

v. **SL** – Self Learning

vi. **SD** – Skill Development

vii. **VA** - Value Added Courses

viii. **OC** - Off Campus Courses

ix. **MC**- Mandatory Courses

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ENROLLMENT FOR B.E./B.TECH. (HONOURS)/MINOR DEGREE (OPTIONAL)

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E./B.Tech.(Honours) or Minor Degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes.

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BE-Electrical And Electronics Engineering

SEMESTER I

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Induction Program												
1.	25IPA11	Induction Programme	-	-	-	-	-	0		-	-	-
Theory												
2.	25ENI11	Communicative English - I	HUM	3	0	2	5	4	4,5,8,9,16	50	50	100
3.	25MAT11	Matrices and Calculus	BS	3	0	0	3	3	4, 8,9, 11	40	60	100
4.	25PHI11	Engineering Physics	BS	3	0	2	5	4	3,4,9,11, 12	50	50	100
5.	25CYI11	Engineering Chemistry	BS	3	0	2	5	4	4,6,7	50	50	100
6.	25CSI11	Problem Solving using C Programming	ES(PC)	3	0	2	5	4	4, 8, 9,10 17	50	50	100
7.	25TAT11	Heritage of Tamils	HUM	1	0	0	1	1	3,4,8,11, 16	40	60	100
Practicals												
8.	25MEL11	Idea Lab	SD	0	0	4	4	2	4, 8, 9, 11, 12	60	40	100
Mandatory Course												
9.	25MDC11	Yoga for Human Excellence	MC	0	0	1	1	0	3, 4, 5, 10, 16	100	-	100
			Total	**16**	**0**	**13**	**29**	**22**				

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SEMESTER II

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25ENI21	Communicative English - II	HUM	2	0	2	4	3	4,5,8, 9,16	50	50	100
2.	25MAT21	Numerical Methods and Differential Equations	BS	3	0	0	3	3	4, 8, 9, 11	40	60	100
3.	25PHT23	Physics For Electronics Engineering	BS	3	0	0	3	3	3,7,8, 9,10,1 2	40	60	100
4.	25EEI23	Electric Circuit Analysis	ES(PC)	3	0	2	5	4	4,7,9, 12	50	50	100
5.	25CSI21	Python Programming	ES(PC)	3	0	2	5	4	4,8,9, 13	50	50	100
6.	25EEI21	Engineering Graphics and CAD Modeling	ES(G)	2	0	4	6	4	4, 7, 9,11,1 3	50	50	100
7.	25TAT21	Tamils and Technology	HUM	1	0	0	1	1	2,4,6, 9,11,1 2	40	60	100
Practicals												
8.	25EEL21	Vision Exploration Laboratory	SD	0	0	4	4	2	4, 8, 9, 10,12, 13,17	60	40	100
			Total	**17**	**0**	**14**	**32**	**24**				

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SEMESTER III

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25MAT33	Probability Theory and Complex Analysis	BS	3	1	0	4	4	4,8,9, 17	40	60	100
2.	25EET31	DC Machines and Transformers	ES(PC)	3	0	0	3	3	7,9,13	40	60	100
3.	25EET32	Electromagnetic Fields	ES(PC)	3	1	0	4	4	3,7,9	40	60	100
4.	25EET33	Digital Electronics	ES(PC)	3	0	0	3	3	7,9,12	40	60	100
5.	25EET34	Electron Devices and Circuits	ES(PC)	3	0	0	3	3	7,9,12	40	60	100
6.	25CSI32	Data Structures	ES(PC)	2	0	2	4	4	4, 8,9,12 ,17	50	50	100
Practicals												
7	25EEL31	DC Machines and Transformers Laboratory	ES(PC)	0	0	4	4	2	4,7,9	60	40	100
8	25EEL32	Electron Devices and Circuits Laboratory	ES(PC)	0	0	4	4	2	7,9,12	60	40	100
			Total	**17**	**2**	**10**	**29**	**25**				
Mandatory Courses												
10		Mandatory Course-II &	MC	3	0	0	3	0		100	-	100

& Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-II)

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SEMESTER IV

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25EET41	AC Machines	ES(PC)	3	0	0	3	3	7,9, 12	40	60	100
2.	25EET42	Linear Integrated Circuits	ES(PC)	3	0	0	3	3	3,7, 9	40	60	100
3.	25EET43	Microprocessor and Microcontroller	ES(PC)	3	0	0	3	3	7,9, 11	40	60	100
4.	25EET44	Power Generation, Transmission & Distribution	ES(PC)	3	0	0	3	3	7,9, 11	40	60	100
5.	25EET45	Measurements and Instrumentation	ES(PC)	3	0	0	3	3	7,9, 12	40	60	100
6.	25SDC41	Soft and Analytical Skills-I	SD	1	0	0	1	1	4,8, 10	100	-	100
Practicals												
7.	25EEL41	AC Machines Laboratory	ES(PC)	0	0	4	4	2	7,9, 12	60	40	100
8.	25EEL42	Linear and Digital Circuits Laboratory	ES(PC)	0	0	4	4	2	7,9, 12	60	40	100
9.	25EEL43	Microprocessor and Microcontroller Laboratory	ES(PC)	0	0	4	4	2	7,9, 11	60	40	100
			TOTAL	**16**	**0**	**12**	**28**	**22**				
Mandatory Courses												
10		Mandatory Courses – III &	MC	3	0	0	3	0		100	-	100

& **Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under Mandatory Course-II)**

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SEMESTER V

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25EET51	Power System Analysis	ES(PC)	3	0	0	3	3	7,9, 12	40	60	100
2.	25EEI52	Power Electronics	ES(PC)	2	0	2	4	4	4,9	40	60	100
3.	25EET53	Control Systems	ES(PC)	3	1	0	3	4	9,11	40	60	100
4.	25EET54	Electrical Machine Design	ES(PC)	3	1	0	4	3	9,11	40	60	100
5.		Programme Elective-I*	ES(PE)	-	-	-	-	3		40	60	100
6.	25EEI55	Industrial Oriented Course –I	SD	1	0	2	3	2		50	50	100
7.	25SDC51	Soft and Analytical Skills-II	SD	1	0	0	1	1	4,8	100	-	100
Practicals												
8.	25EEL51	Control and Instrumentation Laboratory	ES(PC)	0	0	4	4	2	7,9, 12	60	40	100
			Total	**17**	**0**	**9**	**26**	**22**				

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SEMESTER VI

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1.	25EET61	Protection and Switchgear	ES(PC)	3	0	0	3	3	7,9, 12	40	60	100
2.	25EEI62	Electric Drives	ES(PC)	2	0	2	4	3	9,12	40	60	100
3.	25EET63	Communication Engineering	ES(PC)	3	0	0	3	3	9,11	40	60	100
4.		Programme Elective – II*(from Emerging Technology)	ES(PE)	-	-	-	-	3		40	60	100
5.	25CYT61	Climate Change and Sustainability	HUM	2	0	0	2	2	9,12	40	60	100
6.	25EEI64	Industrial Oriented Course-II**	SD	1	0	3	3	2		100	-	100
7.		Self Learning Course	SL	1	0	0	1	1	1,5, 8, 17	-	-	-
Practicals												
8	25EEL61	Power System Laboratory	ES(PC)	0	0	4	4	2	7,9, 12	60	40	100
9	25EEL62	Mini Project	SD	0	0	4	4	2	4,9, 12,17	60	40	100
			Total	**17**	**0**	**9**	**26**	**21**				

Program Elective–IV to VI shall be chosen from the list Program electives (Streams) offered by same Programme

**** Open Elective – I shall be chosen from the list of open electives offered by other Programmes**

@ The students individually undergo training in reputed firms/ research institutes / laboratories for the specified duration (02Weeks) during VI semester summer vacation. After the completion of training, a detailed report should be submitted within ten days from the commencement of VII semester.

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SEMESTER VII

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1	25EET71	High Voltage Engineering	ES(PC)	3	0	0	3	3	7,9,12	40	60	100
2	25EET72	Embedded Systems	ES(PC)	3	0	0	3	3	9,12	40	60	100
3	25EST71	Engineering Entrepreneurship Development	HUM	3	0	0	3	3	4,7,6	40	60	100
4	25UHV71	Universal Human Values-II	HUM	3	0	0	3	3	7,9	40	60	100
5		Open Elective**	OE	3	0	0	3	3		40	60	100
6	25EEI73	Project Management	HUM	2	0	0	2	2	3,11	60	40	100
7		Programme Elective – III*	ES(PE)	-	-	-	-	3		-	-	100
Practicals												
8	25EEL71	Summer Internship @	SD	0	0	0	0	1	100	-	-	100
			Total	-	-	-	-	**21**				

*** Program Elective – VII shall be chosen from the list Program electives (Streams) offered by same Programme**

**** Open Elective – II to IV shall be chosen from the list of open electives offered by other Programmes**

 # Elective – Management shall be chosen from the list of Elective – Management course

@ The students undergone summer internship during VI semester summer vacation and same will be evaluated in VII semester

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SEMESTER VIII

S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	SDG Mapping	Max.Marks		
				L	T	P				CA	ES	TM
Theory												
1	25EEL81	Project Work	SD	0	0	20	20	10	4,8, 9,10 ,17	60	40	100
			Total	-	-	-	-	10				

Total Credits = 167

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MANDATORY COURSES II											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25MDC31	Introduction to Women and Gender Studies	MC	3	0	0	3	0	100	-	100
2.	25MDC32	Elements of Literature	MC	3	0	0	3	0	100	-	100
3.	25MDC33	Film Appreciation	MC	3	0	0	3	0	100	-	100
4.	25MDC34	Disaster Risk Reduction and Management	MC	3	0	0	3	0	100	-	100

MANDATORYCOURSESIII											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25MDC41	Well Being with Traditional Practices -Yoga, Ayurveda and Siddha	MC	3	0	0	3	0	100	-	100
2.	25MDC42	History of Science and Technology in India	MC	3	0	0	3	0	100	-	100
3.	25MDC43	Political and Economic Thought for a Humane Society	MC	3	0	0	3	0	100	-	100
4.	25MDC44	State,Nation Building and Politics in India	MC	3	0	0	3	0	100	-	100
5.	25MDC45	IndustrialSafety	MC	3	0	0	3	0	100	-	100

OPEN ELECTIVES

S. NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	SDG MAPPING	Max.Marks		
				L	T	P				CA	ES	TM
OFFERED BY DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING												
1.	25EEO11	Renewable Energy Sources	OE	3	0	0	3	3	7,9,11,13	40	60	100
2.	25EEO12	Electrical Vehicle	OE	3	0	0	3	3	7,9,11,13	40	60	100
3.	25EEO13	Energy Auditing and Conservation	OE	3	0	0	3	3	7,9,11,13	40	60	100
4.	25EEO14	Domestic and Industrial Electrical Installations	OE	3	0	0	3	3	7,9,11,13	40	60	100
5.	25EEO15	Microcontroller Based System Design	OE	3	0	0	3	3	7,9,11,13	40	60	100

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PROGRAMME ELECTIVE COURSES: STREAMS

Power Engineering	Converters and Drives	Embedded Systems	Emerging Technology	Advanced Computing	Diversified Courses
Electrical Energy Conservation and Sustainability	Special Electrical Machines	Embedded System Design	Electric Vehicle Architecture	Cloud computing	Energy Storage Systems
Under Ground Cable Engineering	Analysis of Electrical Machines	Embedded C-Programming	Design of Motor and Power Converters for Electric Vehicles	Machine Learning	Hybrid Energy Technology
Substation Engineering and Automation	Multilevel Power Converters	Embedded Processors	Electric Vehicle Design, Mechanics and Control	Java	Design and Modelling of Renewable Energy Systems
HVDC and FACTS	Power System Operation and control	Embedded Control for Electric Drives	Design of Electric Vehicle Charging System	Full Stack	Grid integrating Techniques and Challenges
Energy Management and Auditing	SMPS and UPS	Smart System Automation	Testing of Electric Vehicles	Soft Computing	Sustainable and Environmental Friendly HV Insulation System
Power Quality	Power Electronics for Renewable Energy Systems	Embedded System for Automotive Applications.	Grid Integration of Electric Vehicles	Big Data	Power System Transients
Smart Grids	Control of Power Electronics Circuits	VLSI Design	Intelligent control of Electric Vehicles	Cryptography	PLC Programming

Registration of Professional Elective Courses from Verticals:

Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialization / diversified group. Students are permitted to choose all the Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI.

The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E/B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to the Regulations 2025, (Clause 18,19).

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PROGRAM ELECTIVE COURSES: STREAMS

STREAMI: POWER ENGINEERING

S. NO.	COURSE CODE	COURSETITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25EEE11	Electrical Energy Conservation and Sustainability	ES(PE)	3	0	0	3	3	40	60	100
2.	25EEE12	Under Ground Cable Engineering	ES(PE)	3	0	0	3	3	40	60	100
3.	25EEE13	Substation Engineering and Automation	ES(PE)	3	0	0	3	3	40	60	100
4.	25EEE14	HVDC and FACTS	ES(PE)	3	0	0	3	3	40	60	100
5.	25EEE15	Energy Management and Auditing	ES(PE)	3	0	0	3	3	40	60	100
6.	25EEE16	Power Quality	ES(PE)	3	0	0	3	3	40	60	100
7.	25EEE17	Smart Grid	ES(PE)	3	0	0	3	3	40	60	100

STREAMII:CONVERTERS ANDDRIVES

S. NO.	COURSE CODE	COURSETITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25EEE21	Special Electrical Machines	ES(PE)	2	0	2	3	3	50	50	100
2.	25EEE22	Analysis of Electrical Machines	ES(PE)	2	0	2	3	3	50	50	100
3.	25EEE25	Multilevel Power Converters	ES(PE)	2	0	2	3	3	50	50	100
4.	25EEE24	Power System Operation and Control	ES(PE)	2	0	2	3	3	50	50	100
5.	25EEE25	SMPS and UPS	ES(PE)	2	0	2	3	3	50	50	100
6.	25EEE26	Power Electronics for Renewable Energy Systems	ES(PE)	2	0	2	3	3	50	50	100
7.	25EEE27	Control of Power Electronics Circuits	ES(PE)	2	0	2	4	3	50	50	100

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STREAM III: EMBEDDED SYSTEMS

S. NO.	COURSE CODE	COURSETITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25EEE31	Embedded System Design	ES(PE)	2	0	2	4	3	50	50	100
2.	25EEE32	Embedded C- programming	ES(PE)	2	0	2	4	3	50	50	100
3.	25EEE33	Embedded Processors	ES(PE)	2	0	2	4	3	50	50	100
4.	25EEE34	Embedded Control for Electric Drives	ES(PE)	2	0	2	4	3	50	50	100
5.	25EEE35	Smart System Automation	ES(PE)	2	0	2	4	3	50	50	100
6.	25EEE36	Embedded System for Automotive Applications	ES(PE)	2	0	2	4	3	50	50	100
7.	25EEE37	VLSI Design	ES(PE)	2	0	2	4	3	50	50	100

STREAM IV: EMERGING TECHNOLOGY

S. NO.	COURSE CODE	COURSETITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25EEE41	Electric Vehicle Architecture	ES(PE)	3	0	0	3	3	40	60	100
2.	25EEE42	Design of Motor and Power Converters for Electric Vehicles	ES(PE)	2	0	2	4	3	50	50	100
3.	25EEE43	Electric Vehicle Design, Mechanics and Control	ES(PE)	2	0	2	4	3	50	50	100
4.	25EEE44	Design of Electric Vehicle Charging System	ES(PE)	2	0	2	4	3	50	50	100
5.	25EEE45	Testing of Electric Vehicles	ES(PE)	2	0	2	4	3	50	50	100
6.	25EEE46	Grid Integration of Electric Vehicles	ES(PE)	3	0	0	3	3	40	60	100
7.	25EEE47	Intelligent Control of Electric Vehicles	ES(PE)	2	0	2	4	3	50	50	100

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STREAM V:ADVANCED COMPUTING

S. NO.	COURSE CODE	COURSETITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25EEE51	Cloud computing	ES(PE)	3	0	0	3	3	40	60	100
2.	25EEE52	Machine Learning	ES(PE)	3	0	0	3	3	40	60	100
3.	25EEE53	Java	ES(PE)	3	0	0	3	3	40	60	100
4.	25EEE54	Full Stack	ES(PE)	3	0	0	3	3	40	60	100
5.	25EEE55	Soft Computing	ES(PE)	3	0	0	3	3	40	60	100
6.	25EEE56	Big Data	ES(PE)	3	0	0	3	3	40	60	100
7.	25EEE57	Cryptography	ES(PE)	3	0	0	3	3	40	60	100

STREAM VI- DIVERSIFIED COURSES

S. NO.	COURSE CODE	COURSETITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25EEE61	Energy Storage Systems	ES(PE)	3	0	0	3	3	40	60	100
2.	25EEE62	Hybrid Energy Technology	ES(PE)	3	0	0	3	3	40	60	100
3.	25EEE63	Design and Modeling of Renewable Energy Systems	ES(PE)	3	0	0	3	3	40	60	100
4.	25EEE64	Grid integrating Techniques and Challenges	ES(PE)	2	0	2	4	3	50	50	100
5.	25EEE65	Sustainable and Environmental Friendly HV Insulation System	ES(PE)	3	0	0	3	3	40	60	100
6.	25EEE66	Power System Transients	ES(PE)	3	0	0	3	3	40	60	100
7.	25EEE67	PLC Programming	ES(PE)	3	0	0	3	3	40	60	100

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		L	T	P	C
25ENI11	COMMUNICATIVE ENGLISH–I	3	0	2	4
SDG No. 4,5,8,9,16	(Common to B.E./B.Tech. All Branches)				

COURSE OBJECTIVES:

- To build a strong foundation in basic grammar and communication skills through structured activities in listening, speaking, reading and writing.
- To develop the ability to express, describe and summarize ideas clearly using appropriate language structures and professional formats.
- To enhance technical communication by practicing structured descriptions, storytelling and data-based writing tasks.
- To enable clear and logical expression through organized speech, note-making and grammar-focused writing.
- To refine expressive and comparative communication skills using advanced vocabulary, professional formats and contextual grammar.

UNIT-I BUILDING BLOCKS OF COMMUNICATION 6+6

Grammar : Parts of Speech -Verbs - Word formation - Articles

Listening : Listening to Short Conversations & Descriptions

Speaking : Introducing oneself - Narrating Personal Experience

Reading : Reading Comprehension -Skimming - Scanning - Speed reading

Writing : Formal Letter Writing (Seeking Permission for Industrial Visit & In plant Training) - Instruction Writing

UNIT-II PROFESSIONAL AND SOCIAL COMMUNICATION 6+6

Grammar : Conjunction- Preposition- Cause And Effect Expression- Purpose and Means

Listening : Listening for Specific Information (Gap Filling); Listening the Announcement for Data

Speaking : Introducing the Peers- Describing about Person, Place, Things, Food, Culture, etc.

Reading : Reading Newspaper Articles & Technical Blogs

Writing : Professional Email Writing – Checklist

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UNIT-III	COMPREHENSION AND PRESENTATION SKILLS	6+6

Grammar : Types of Sentence - Negatives -Types of Question (Y/N & WH) - Degrees of Comparison.
Listening : Listening to TED Talks and Short Technical Reels
Speaking : Story Telling & Role Play
Reading : Reading comprehension- Reading Print Interview and Answering to the Questions
Writing : Paragraph Writing- Data Interpretation & Transcoding (Bar, Pie & Flow Chart)

UNIT-IV	ENGLISH FOR WORKPLACE READINESS	6+6

Grammar : Tense (Simple, Continuous, Perfect & Perfect Continuous)
Listening : Listening to Inspirational Speech & Professional Interviews
Speaking : Extempore Speech- Asking for Information (Direction & General Enquiries)
Reading : Reading Engineering/ Technical Essays - Reading Brochures
Writing : Note Making & Note Taking - Recommendation Writing

UNIT-V	ENGLISH FOR FORMAL AND FUNCTIONAL COMMUNICATION	6+6

Grammar : Modal Auxiliaries - Homophones & Homonyms - Numerical Adjectives - Phrasal Verbs
Listening : Listening to Telephonic Conversation- Listening to Product Description
Speaking : Master of Ceremony(MoC): Welcome Address & Vote of Thanks
Reading : Reading Graphical Materials for Comparison - Reading Advertisement
Writing : Report Writing (Accident/ Survey) - Compare and Contrast Essay Writing

TOTAL : 60 PERIODS

COURSE OUTCOMES:
At the end of the course,

CO1: Learners will be able to apply basic grammar rules and effectively use LSRW skills for formal and informal communication.

CO2: Learners will be able to construct coherent descriptions and summaries using appropriate connectors, prepositions, and professional vocabulary.

CO3: Learners will be able to describe processes and products clearly in spoken and written formats using suitable sentence structures and data interpretation skills.

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CO4: Learners will be able to classify information, make recommendations, and present structured content through both oral and written communication.

CO5: Learners will be able to express opinions, compare information, and write detailed reports using advanced grammar, graphical references, and formal structures.

TEXT BOOKS:

1. Department of English, AnnaUniversity, "English for Engineers & Technologists"Orient Blackswan Private Ltd,2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma,"Technical Communication – Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)", Mcgraw Hill Education, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- https://learnenglish.britishcouncil.org/

COs-Pos MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	2	3	-	3	-	-	-
CO2	-	-	-	-	-	-	-	2	3	-	2	-	1	-
CO3	-	-	-	1	-	-	-	3	3	-	3	-	1	-
CO4	-	-	-	1	-	-	-	3	3	-	3	-	-	-
CO5	-	-	-	-	-	-	-	2	3	-	2	-	1	-
AVR	-	-	-	1.00	-	-	-	2.40	3.00	-	2.60		1.00	

1- Low, 2- Medium, 3-High, "-" No Correlation

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25MAT11	MATRICES AND CALCULUS	L	T	P	C
SDG NO.4,8,9,11	(Common to B.E./B.Tech. all Branches)	3	0	0	3

COURSE OBJECTIVES :

- To understand the concepts of eigen values, eigen vectors and quadratic forms.
- To develop the skill on the geometric properties of curves using differential calculus.
- To equip students to analyze and optimize the functions of several variables.
- To make the students understand various techniques of integration.
- To apply vector calculus and its principles to evaluate vector fields.

UNIT-I MATRICES 9

Eigen values and Eigen vectors of a real matrix – Characteristic equation–Properties of Eigen values and Eigen vectors – Cayley - Hamilton theorem – Reduction of a quadratic form to canonical form by orthogonal transformation–Nature of quadratic forms.

UNIT-II DIFFERENTIAL CALCULUS 9

Curvature – Radius of curvature (Cartesian Co – ordinates only) – Centre of curvature and Circle of curvature – Involutes and Evolutes (Parabola, Ellipse).

UNIT-III FUNCTIONS OF SEVERAL VARIABLES 9

Euler's theorem for homogenous functions - Jacobians – Taylor's series expansion – Maxima and Minima for functions of two variables – Methods of Lagrangian multipliers.

UNIT-IV INTEGRAL CALCULUS 9

Definite and Indefinite integrals - Substitution rule - Techniques of Integration : Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Improper integrals.

UNIT-V VECTOR CALCULUS 9

Irrotational and solenoidal vector fields – Green's theorem in plane , Gauss divergence theorem and Stoke's theorem (Cube, Cuboid and Rectangular paralleopiped only).

TOTAL: 45 PERIODS

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COURSE OUTCOMES :

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

CO1: Assimilate the eigen values and eigen vectors in reduction of quadratic form into canonical form.

CO2: Analyze the center of curvature, circle of curvature and develop the evolutes.

CO3: Expand the Taylor series and calculate the extreme value for function of several variables.

CO4: Apply different methods of integration in solving practical problems.

CO5: Apply the divergence and curl in vector integral theorems of vector fields.

TEXTBOOKS :

1. James Stewart, "Calculus : Early Transcendental", Cengage Learning, 9th Edition, New Delhi, 2023. [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].
2. Grewal. B. S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2020.

REFERENCE BOOKS :

1. Thomas. G. B., Hass. J, and Weir. M.D, "Thomas Calculus", 14th Edition, Pearson India, 2022.
2. Anton. H, Bivens. I and Davis. S, " Calculus ", Wiley, 10th Edition, 2021.
3. Jain. R.K. and Iyengar. S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 5th Edition, 2019.
4. Ramana. B.V., "Higher Engineering Mathematics", McGraw Hill Education Pvt. Ltd, New Delhi, 2019.

E-Resources :

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc22_ma03
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc23_ma86

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CO's – PO's & PSO'S MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	-	-	-	2	-	2	3	1	3	1
CO2	3	3	2	2	-	-	-	3	-	2	3	1	3	1
CO3	3	3	2	2	-	-	-	3	-	2	3	2	3	2
CO4	3	3	2	1	-	-	-	2	-	2	3	2	3	2
CO5	3	2	2	1	-	-	-	2	-	2	3	3	3	3
AVG	3.00	2.80	2.00	1.40	-	-	-	2.40	-	2.00	3.00	1.80	3.00	1.80

1- Low, 2- Medium , 3-High, "-" No Correlation

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25PHI11	ENGINEERING PHYSICS	L	T	P	C
SDG No. 3, 4, 9, 11, 12	(B.E./B. Tech. - Common to all branches)	3	0	2	4

COURSE OBJECTIVES:

- To make the students effectively achieve an understanding of mechanics.
- Provide knowledge of elastic property, thermal property of materials and its applications.
- Impart knowledge of laser and their applications.
- Introduce the essential principles of fiber optics and its applications.
- Equipping the students to successfully understand the importance of quantum physics.

UNIT-I MECHANICS 10

Multi-particle dynamics: Center of mass (CM) – CM of continuous bodies – Motion of the CM – Moment of inertia – Theorems of M.I. – M.I of a diatomic molecule – Torque – Rotational energy state of a rigid diatomic molecule – Torsional pendulum – double pendulum.

UNIT-II PROPERTIES OF MATTER 10

Elasticity- Hooke's law – stress – strain diagram – Poisson's ratio – Factors affecting elasticity – bending of beams - Bending moment equation – Depression of a cantilever – Young's modulus by uniform bending – I-shaped girders.

UNIT-III LASER 9

Lasers: Stimulated absorption – Spontaneous emission – Stimulated emission – Population inversion-Einstein's coefficients derivation and their relations – Pumping methods – Types of lasers – CO_2 laser, Semiconductor lasers (Homojunction & Heterojunction) – Holography - Industrial and Medical Applications of lasers.

UNIT-IV FIBER OPTICS 8

Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle – Types of optical fibres (Material, Refractive Index, Mode) – Attenuation, Dispersion, Bending – Fiber optics communication system (qualitative) – Temperature and Displacement sensors – Fiber optic endoscope.

UNIT-V QUANTUM PHYSICS 8

Photons and light waves – Electrons and matter waves – The Schrodinger equation (Time dependent and time independent forms) – Particle in a one-dimensional rigid box for Eigen value and Eigen function – tunneling (qualitative) – Electron microscope - Scanning Tunneling microscope.

TOTAL: 45 PERIODS

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PRACTICAL EXERCISE:

1. Determination of rigidity modulus of wire and moment of inertia of regular objects – Torsion pendulum.
2. Determination of Young's modulus by Uniform bending method.
3. Determination of Simple harmonic oscillations of cantilever.
4. Determination of the wavelength of the laser using grating
5. Determination of width of the groove of CD using laser.
6. Determination of numerical aperture and acceptance angle in an optical fiber.
7. Determination particle size of Lycopodium powder using semiconductor laser.
8. Determination of thickness of a material by Air-wedge method.

COURSE OUTCOMES:

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

CO1:	Demonstrate the foundational knowledge in Mechanics.
CO2:	Interpret the elastic properties of solid materials and their applications.
CO3:	Apply the comprehended knowledge about laser and its applications.
CO4:	Apply the comprehended knowledge about fibre optic communication system in various engineering applications.
CO5:	Understand the fundamental principles of quantum mechanics.

TEXT BOOKS:

1. D.Kleppner and R.Kolenkow, "An Introduction to Mechanics," McGraw Hill Education (IndianEdition), 2021.
2. Arthur Beiser, Shobhit Mahajan, S.Rai Choudhury, "Concepts of Modern Physics," McGraw-Hill (Indian Edition), 2024.

REFERENCE BOOKS:

1. K.Thyagarajan and A.Ghatak, "Lasers: Fundamentals and Applications," Laxmi Publications, (Indian Edition), 2023

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2. D.Halliday, R.Resnick and J.Walker, "Principles of Physics," Wiley (Indian Edition), 2021
3. N.Garcia, A.Damask and S.Schwarz, "Physics for Computer Science Students," Springer-Verlag, 2012

PRACTICAL REFERENCES:

1. A.K. Katiyar (Author), C.K. Pandey, Engineering Physics: Theory and Practical Paperback, 2015.

E- RESOURCES:

1. https://archive.nptel.ac.in/courses/113/106/113106039/
2. https://vlab.amrita.edu/?sub=1
3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph52
4. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph36

CO's- PO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	-	-	-	-	3	3	3
CO2	3	3	2	1	1	-	-	-	-	-	-	2	3	2
CO3	3	2	2	1	2	-	-	-	-	-	-	3	2	3
CO4	3	2	2	1	2	-	-	-	-	-	-	3	2	3
CO5	3	3	1	1	2	-	-	-	-	-	-	3	3	2
AVG	3.00	2.60	1.80	1.00	1.60							2.80	2.60	2.60

1 - Low, 2 - Medium , 3 - High, '-' - no correlation

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25CYI11	ENGINEERING CHEMISTRY	L	T	P	C
SDG No. 4,6,7	(Common to B.E. / B.Tech. all Branches)	3	0	2	4

COURSE OBJECTIVES:

- To provide foundational knowledge on water quality and water treatment processes.
- To introduce the principles of nanochemistry, methods of synthesizing nanomaterials, and their applications.
- To familiarize students with polymer chemistry, polymerization techniques, and the manufacturing methods of plastics.
- To impart knowledge on fuels and combustion, including manufacturing of fuels, fuel analysis, and alternative energy sources.
- To develop an understanding of electrochemistry and its applications in energy storage devices and electric vehicles.

UNIT-I **WATER AND ITS TREATMENT** 9

Water quality parameters – Estimation of hardness by EDTA method - Boiler troubles - Internal treatment and External treatment of boiler feed water – Ion exchange method and zeolite process – Desalination method: Reverse Osmosis.

UNIT-II **NANOCHEMISTRY** 9

Basics of Nanochemistry - Size-dependent properties - Types of nanomaterials: nanoparticle, nanowire, nanorod and nanotube - Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, electrochemical deposition - Applications of nanomaterials.

UNIT-III **POLYMER CHEMISTRY** 9

Basics of polymer chemistry - Mechanism of polymerization: Addition (Free Radical); condensation and copolymerization - Thermoplastics & thermosetting plastics - Preparation, properties and uses of Nylon 6, 6 and Epoxy resin - Fabrication of plastics - (Compression, Injection & Extrusion moulding).

UNIT-IV **FUELS AND COMBUSTION** 9

Classi ication of fuels - Carbonization, Manufacture of metallurgical coke (Otto Hoffmann method) - Manufacture of synthetic petrol (Bergius process) - Knocking - octane number, cetane number - Power alcohol and biodiesel - Flue gas analysis - ORSAT Method.

UNIT-V **ELECTROCHEMISTRY AND STORAGE DEVICES** 9

Types of cells – types of electrodes: calomel electrode, glass electrode – Nernst equation – EMF series - Batteries: Primary battery - Dry cell, Secondary battery - lead acid battery and lithium-ion-battery; H_2-O_2 fuel cell; Supercapacitors - Electric vehicles.

TOTAL: 45 HOURS

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PRACTICAL EXERCISES:

1. Determination of types and amount of alkalinity in a water sample.
2. Determination of total, temporary & permanent hardness of water sample by EDTA method.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of amount of given hydrochloric acid using pH meter.
5. Determination of amount of acids in a mixture of acids ($HCl+CH_3COOH$) using conductivity meter.
6. Conductometric titration of barium chloride against sodium sulphate (precipitation titration).
7. Estimation of iron content of the given solution using potentiometer.
8. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.

TOTAL: 30 HOURS

GRAND TOTAL: 45 + 30 = 75 HOURS

COURSE OUTCOMES:

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

CO1: Assess the quality of water from water quality parameter and propose suitable treatment methodologies to treat water.

CO2: Summarize the basic concepts of nanochemistry in designing the synthesis of nanomaterials for engineering and technology applications.

CO3: Understand the basic knowledge of polymers to apply the futuristic material needs.

CO4: Familiar with the concepts of fuels for engineering processes and applications.

CO5: Apply the concept of electrochemistry in the fabrication of energy storage devices.

TEXT BOOKS:

1. Dr. A. Ravikrishnan, "Engineering Chemistry", Sri Krishna Hi-tech Publishing Company Pvt. Limited, 23rd Edition, 2023.
2. S. S. Dara, "A text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018.

REFERENCE BOOKS:

1. Shashi Chawla, "A Text Book of Engineering Chemistry", Dhanpat Rai & Co (Pvt.) Ltd, New Delhi, 2011.
2. O.G. Palanna, "Engineering Chemistry", McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.

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E-RESOURCES:

Unit1:
https://www.youtube.com/watch?v=4SRMmqH2s4&list=PLLy_2iUCG87AZvtaiuD3r4HATrBKhb90P (IIT ROORKEE NPTEL) & https://www.youtube.com/watch?v=o6iurO2Cwd0 (NPTEL-NOC IITM)

Unit 2:
https://www.youtube.com/watch?v=0EWCqClsFOA&list=PLyqSpQzTE6M8682dGkNTN8936vSY4CbqZ (NPTEL-NOC IITM)

Unit 3:
https://www.youtube.com/watch?v=jSNImOwpxYg&list=PLbMVogVj5nJT0slH3tuas5BIp1DG8ZpMj (NPTELHRD)

Unit 4:
https://www.youtube.com/watch?v=1-EliKQ0erA (AKTU DIGITAL EDUCATION)

Unit 5:
https://www.youtube.com/watch?v=nh2xbyOaERw &
https://www.youtube.com/watch?v=iFVVv23ZzGE (IIT ROORKEE NPTEL)

CO's- PO's MAPPING

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	3	-	-	-	-	-	-	-	-
CO2	3	2	1	1	2	2	-	-	-	-	1	-	-	1
CO3	3	3	1	1	1	1	-	-	-	-	-	1	-	1
CO4	3	2	1	1	1	1	-	-	-	-	-	-	-	-
CO5	3	2	2	1	2	2	-	-	-	-	-	-	-	1
AVR	3.0	2.4	1.6	1.0	1.4	1.8	-	-	-	-	1.0	1.0	-	1.0

1- Low, 2- Medium , 3-High, "-" No Correlation

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		L	T	P	C
25CSI11 SDG No: 4, 8, 9, 10,17	**PROBLEM SOLVING USING C PROGRAMMING** (Common to: B.E. / B.Tech. all Branches)	3	0	2	4

COURSE OBJECTIVES:

- To learn how to think algorithmically to solve a problem.
- To gain knowledge of fundamental programming concepts in C programming.
- To explore the basic concept of arrays and pointers.
- To learn concept of functions and structures.
- To gain proficiency in file handling techniques.

UNIT-I **COMPUTATIONAL THINKING** 9

Overview of Computational Thinking and Key Techniques – Overview of Software Development Life Cycle – Introduction to Algorithmic Thinking – Elements: Sequence, Selection and Repetition – Representation of Flow Chart – Overview of Flow algorithm Tool – Pseudo- code– Introduction to programming languages

UNIT-II **BASICS OF C PROGRAMMING** 9

Introduction to C - Structure of C Programming - Compiling - Executing and Debugging - Character Set – Tokens - Identifiers - Data Types – Variable – Constants - Evaluating Expression - Type Conversion - Input and Output - Decision control and looping statements

UNIT-III **ARRAYS AND POINTERS** 9

Introduction to Arrays - Declaration and Initialization of Single Dimensional Arrays - Array Operations - Declaration and Initialization of Two-Dimensional Arrays - Multidimensional Arrays - Declaring and Initializing Strings - Reading and Writing Strings - String Operations - Array of Strings. Introduction to Pointers - Pointer operators - Pointer arithmetic - Arrays and pointers - Array of pointers.

UNIT-IV **FUNCTIONS AND STRUCTURES** 9

Function - Types of Function – Elements - Pass by value - Pass by reference – Recursion - Storage Classes. Introduction to structures - Declaring and Defining Structure Variables - Accessing Structure Members - Structure Initialization - Nested structures - Array of structure – typedef - Union

UNIT-V **FILE PROCESSING** 9

Files: Introduction – Using files in C – Read data from files – Writing data to files – Error handling during File operation – Command line arguments.

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TOTAL : 45 PERIODS

PRACTICAL EXERCISES:

1. Implementation of algorithm, flowchart and pseudo code to solve electricity billing.
2. Implementation of algorithm, flowchart and pseudo code to solve retail shop billing.
3. Implementation of if, if-else, nested if and switch statements.
4. Implementation of while, do-while and for loops.
5. Implementation of sorting and searching algorithms.
6. Implementation of one-dimensional array, passing array to functions and array operations.
7. Implementation of programs for implementing various string operations like "copy", "finding length", "compare", "concatenate" with and without built-in library functions.
8. Implementation of pointer operators, call by reference, pointers with array.
9. Implementation of function calls, recursion, call by value.
10. Implementation of structure and nested structure.
11. Implementation of array of structures.
12. Implementation of file operations.
13. Implementation of file to read N character using file functions.

TOTAL: 30 PERIODS

TOTAL: 75 (45+30) PERIODS

COURSE OUTCOMES:

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

CO 1 : Construct algorithmic solutions for a given computational problem.

CO 2 : Demonstrate the understanding of fundamental concepts of C programming.

CO 3 : Utilize appropriate concepts of arrays and pointers to solve the programming problems effectively.

CO 4 : Apply concepts of functions and structures in C programming

CO 5 : Implement file I/O operations to store and retrieve data from files.

TEXT BOOKS:

1. GVenkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data Scientists", 1st Edition, Notion Press, 2021.
2. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2023.
3. Kernighan, B.W and Ritchie, D.M, "The C Programming language", Second Edition, Pearson Education, 2023.

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REFERENCE BOOKS:

1. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2023
2. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C",

McGraw-Hill Education, 2024.

3.Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2022.

4. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2024.

E-RESOURCES:

1. Tutorial point - https://www.tutorialspoint.com/c programming/index.htm
2. Greek for geeks - https://www.geeks for geeks.org/c-programming-language/

CO's – PO's & PSO's MAPPING

CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	1	2	-	3	3	1	2	2
CO2	2	3	2	1	2	1	1	2	-	3	2	2	2	2
CO3	3	2	2	1	3	1	1	2	-	3	3	2	2	2
CO4	2	3	3	1	2	2	1	2	-	3	2	2	3	2
CO5	2	2	3	2	1	-	-	2	1	2	2	2	2	2
AVG	2.2	2.4	2.4	1.2	2	1.3	1	2	1	2.8	2.4	1.8	2.2	2

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

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25TAT11	HERITAGE OF TAMILS	L	T	P	C
SDG No. 3, 4, 8,11, 16	(B.E./B.Tech-Common to all branches)	1	0	0	1

COURSE OBJECTIVES:

- To understand the Sangam and modern literature of Tamil.
- To learn the heritage of Tamil culture.
- To recognize the various art forms of Tamils.
- To explain the Thinai concept of Tamils.
- To realize the contribution of Tamils to Indian national movement and Indian culture.

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 Modernliterature 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 CONCEPTS 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.

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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 otherparts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL : 15 PERIODS

COURSE OUTCOMES:

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

CO1: Gain knowledge about various literatures of Tamil.

CO2: Learn the uniqueness of Tamil cultural heritage.

CO3: Find various art forms of Tamil Nadu.

CO4: Understand the Thinai concepts in Tamil.

CO5: Distinguish the contribution of Tamils to Indian national movement and Indian culture.

TEXT BOOK:

1. Heritage of Tamils, Dr. P. Inthirani, Jai Balaji Publications, Chennai.

REFERENCES:

1. Thamizhaga Varalarum Makkal Panpaadum, Dr. K. K. Pillai, Ulaga Tamizharaichi Niruvanam, Chennai.

E- RESOURCES:

1. https://www.tamilvu.org/

CO's –PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO2	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO3	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO4	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO5	-	-	-	-	-	1	1	-	1	-	-	-	-	-
AVG	-	-	-	-	-	1	1	-	1	-	-	-	-	-

1 - Low, 2 - Medium , 3 - High, '-' - No Correlation

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25TAT11	தமிழர் மரபு	L	T	P	C
SDG No. 3, 4, 8,11, 16	(B.E./B.Tech- அனைத்து பாடப்பிரிவுகளுக்கும் பொதுவானது)	1	0	0	1

பாடநெறி நோக்கங்கள்:

- தமிழின் இலக்கியங்கள் மற்றும் நவீன இலக்கியங்களைப் புரிந்துகொள்ளுதல்.
- தமிழ் கலாச்சார பாரம்பரியத்தைக் கற்றுக்கொள்ளுதல்.
- தமிழர்களின் பல்வேறு கலைவடிவங்களைக் கண்டறிதல்.
- தமிழர்களின் திணைக்கோட்பாடுகளை விளக்குதல்.
- இந்திய சுதந்திர போராட்ட இயக்கங்களுக்கும் இந்திய கலாச்சாரத்திற்குமான தமிழர்களின் பங்களிப்பை உணர்தல்.

அலகு - I மொழி மற்றும் இலக்கியம் 3

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

அலகு - II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை 3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப்பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை - இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு - III நாட்டுப்புறக் கலைகள் மற்றும் வீரவிளையாட்டுகள் 3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு - IV தமிழர்களின் திணைக் கோட்பாடுகள் 3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம்

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மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு : சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவு, கல்வியும் - சங்ககால நகரங்களும் துறைமுகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு - V இந்திய தேசிய இயக்கம் மற்றும் 3

இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

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

மொத்தம்: 15 பாடவேளைகள்

பாடநெறி முடிவுகள்:

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

CO1: தமிழின் பல்வேறு இலக்கியங்களைப் பற்றிய அறிவைப் பெறுவார்கள்.

CO2: தமிழ் கலாச்சார பாரம்பரியத்தின் தனித்தன்மையைக் கற்றுக்கொள்வார்கள்.

CO3: தமிழகத்தின் பல்வேறு கலைவடிவங்களைக் கண்டறிவார்கள்.

CO4: தமிழர்களின் திணைக்கோட்பாடுகளை அறிந்துகொள்வார்கள்.

CO5: தமிழ் சுதந்திரப்போராட்ட வீரர்கள் மற்றும் தமிழ் கலாச்சாரத்தை இந்தியாவின் மற்ற பகுதியுடன் ஒப்பிடும் திறனைப் பெறுவார்கள்.

பாடநூல்:

1. தமிழர் மரபு, முனைவர் ப. இந்திராணி, ஜெய் பாலாஜி பதிப்பகம், சென்னை.

பார்வை நூல்:

1. தமிழக வரலாறும் மக்கள் பண்பாடும், டாக்டர் கே. கே. பிள்ளை, உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.

மின் - ஆதாரங்கள்:

1. https://www.tamilvu.org/

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CO's –PO's விவரணையாக்கம்:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO2	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO3	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO4	-	-	-	-	-	1	1	-	1	-	-	-	-	-
CO5	-	-	-	-	-	1	1	-	1	-	-	-	-	-
AVG	-	-	-	-	-	1	1	-	1	-	-	-	-	-

1 - Low, 2 - Medium, 3 - High, '-' - No Correlation

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25MEL11	IDEA LAB	L	T	P	C
SDG No. 4, 8, 9, 11, 12	(Common to B.E./B.Tech all branches)	0	0	4	2

Course Objectives:

The main learning objective of this course is to prepare the students to:

- Develop hands-on skills in schematic design and PCB layout for custom electronic circuits.
- Enable students to fabricate, assemble, and test PCBs using standard manufacturing practices.
- Impart practical knowledge in embedded system programming using Arduino and Raspberry Pi platforms.
- Provide exposure to workshop tools including welding, lathes, and plumping equipment for physical prototyping.
- Facilitate the design and fabrication of complete working prototypes through integration of embedded hardware and 3D-printed or machined enclosures.

LIST OF EXPERIMENTS:

1. Schematic and PCB layout design of a suitable circuit.
2. Fabrication and testing of the Printed Circuit Board (PCB).
3. Embedded programming using Arduino and/or Raspberry Pi.
4. Familiarity and use of welding equipment.
5. Familiarity and use of lathe operations.
6. Familiarity and use of plumping equipment.
7. 3D Printing practice using Fusion Deposit Modeling (FDM).
8. Design and implementation of a capstone project involving embedded hardware, software and machined or 3D printed enclosure.

TOTAL : 60 PERIODS

COURSE OUTCOMES:

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

CO1:	Design and simulate electronic circuits and translate them into PCB layouts using industry-standard tools.
CO2:	Fabricate and test printed circuit boards ensuring reliability and functionality of electronic components.
CO3:	Write and debug embedded programs using Arduino/Raspberry Pi for real-world applications
CO4:	Operate welding, lathe, and plumping tools to build enclosures and mechanical fixtures for prototypes.
CO5:	Integrate embedded systems with 3D-printed/machined parts to develop and present a functional capstone project.

REFERENCE BOOKS:

1. AICTE's Prescribed Textbook: Workshop / Manufacturing Practices (with Lab Manual), ISBN: 978-9391505332
2. Make Your Own PCBs with EAGLE: From Schematic Designs to Finished Boards. Simon Monk and Duncan Amos. McGraw Hill Education. ISBN-13 : 978-1260019193.

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3. 3D Printing & Design, Dr. Sabrie Soloman, ISBN: 978-9386173768, Khanna Book Publishing Company, New Delhi.
4. Programming Arduino: Getting Started with Sketches. 2nd edition. Simon Monk. McGraw Hill. ISBN-13: 978-1259641633
5. The Big Book of Maker Skills: Tools & Techniques for Building Great Tech Projects. Chris Hackett. Weldon Owen; 2018. ISBN-13: 978-1681884325.

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc25_ee163/preview
2. https://onlinecourses-archive.nptel.ac.in/noc18_cs05/course
3. https://www.autodesk.com/learn/ondemand/collection/fusion-360

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	3	-	2	-	-	-	-	1	-
CO2	3	2	3	2	2	-	-	-	-	1	-
CO3	3	3	3	2	3	-	-	-	-	2	-
CO4	2	1	2	-	2	-	-	-	-	1	-
CO5	3	3	3	2	3	-	-	-	2	3	2
Avg	3	2	3	2	2	-	-	-	2	2	2

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

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25MDC11	YOGA FOR HUMAN EXCELLENCE	L	T	P	C
SDG No. 3,4,5,10,16	(Common to B.E./B.Tech. all Branches)	0	0	1	0

COURSE OBJECTIVES:

- To introduce students to simpli ied physical exercises, breathing techniques, relaxation practices and Yogasanas for maintaining physical health and well-being.
- To develop awareness of body–mind coordination through the practice of Kaya Kalpa exercises, meditation and self-regulation techniques.
- To enhance concentration, emotional balance and mental peace through systematic training in meditation and mindfulness practices.
- To inculcate ethical values, self-discipline, responsibility and healthy lifestyle habits for holistic personality development.
- To promote individual and social harmony by fostering positive thinking, self-awareness and the application of yogic principles in daily life.

UNIT-I SIMPLIFIED PHYSICAL EXERCISES 3

Physical exercises: Hand exercises – Leg exercises. Breathing exercises: Eye exercises – Kapalabathi. Makarasana. Body massages: Acupressure – Relaxation.

UNIT-II KAYA KALPA 3

Kaya Kalpa Exercise – Aswini Mudra – Moola-Bandha – Ojas Breath (Kayakalpa Exercise should be learnt directly from the World Community Service Centre.)

UNIT-III MEDITATION 3

Agna. Santhi : Clearence. Thuriya. Thuriyatheetham meditation

UNIT-IV HUMAN RESOURCES DEVELOPMENT 3

Roles and responsibilities of a human being (Due the Duty, 4 Ashramas) - Desire Alignment (Aasai seeramaithal) - Discipline (olukkam formula) - Diet/Food control (Organ Clock) - Five duties, Five limitations (Ivaghai kadamaighal, Indhil Alavu murai) - Bene its of Blessings (comparing to Law of attraction)- Individual peace leads to world peace.

UNIT-V YOGASANAS 3

Suriya Namaskar, Padmasana, Vajrasana, Sukasana, Trikonasana , Saral matsyasana, Gomugasana, Mandukasana, Arthamatsyendrasana, Ushtrasana, Siddhasana, Shavasana

TOTAL : 15 PERIODS

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BoS / S&H

COURSE OUTCOMES:
At the end of the course,

CO1: Demonstrate simplified physical exercises, breathing techniques, relaxation methods, and acupressure practices to promote physical fitness and health.

CO2: Practice Kaya Kalpa exercises and related techniques to improve vitality, self-control, and overall well-being.

CO3: Apply meditation techniques to enhance concentration, emotional stability, mental clarity, and inner peace.

CO4: Analyze and adopt ethical values, self-discipline, healthy lifestyle habits, and social responsibilities for holistic personality development.

CO5: Perform Yogasanas effectively and integrate yogic principles into daily life for achieving physical, mental, and social well-being.

TEXT BOOKS:

1. Yoga Practices – I: VISION, Vethathiri Publications.
2. Yogasana – Vethathiri Publications

REFERENCE BOOKS:

1. Simpli ied Physical Exercises – Vethathiri Publications.
2. Sound Health Through Yoga – Dr. K. Chandrasekaran.

E. RESOURCES:

- https://www.vethathiri.edu.in/
- https://www.kundaliniyoga.edu.in/

COs-POs-PSOs MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	-	1	2	-	-	-	-	-	-
CO2	1	-	-	-	-	-	-	2	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	3	-	-	-	-	-	-
CO4	-	1	-	-	-	2	1	3	1	1	-	-	-	-
CO5	1	-	-	-	-	1	1	3	-	-	-	-	-	-
1.2	1.00	1.00	-	-	-	1.50	1.00	2.60	1.00	1.00	-	-	-	-

Low, 2- Medium, 3-High, "-" No Correlation

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25EEI21 SDGNO:4,7,9, 11,13	ENGINEERING GRAPHICS AND CAD MODELING (For B.E – EEE& ECE)	L	T	P	C
		2	0	4	4

Course Objectives:

- Develop foundational knowledge and practical skills in manual engineering drawing.
- Gain proficiency in utilizing Electrical CAD (ECAD) software
- Design and draft electrical power distribution layouts and motor control circuits.
- Construct and manage complex control wiring diagrams.
- Apply advanced ECAD functionalities

UNIT-I	INTRODUCTION TO ENGINEERING DRAWING (MANUAL DRAWING)	9

Drawing instruments and their uses - BIS conventions and lettering - Types of lines and dimensioning - Scales – plain and diagonal - Geometrical constructions – lines, angles, triangles, polygons, circles, tangents

UNIT-II	INTRODUCTION TO ELECTRICAL CAD SOFTWARE AND BASIC SYMBOLS	9

Introduction to ECAD software –Overview of interface, toolbars, and workspace layout - Creation of layers and use of line types for electrical drawings - Standard electrical symbols – switches, fuses, lamps, sockets, MCBs, relays.

UNIT-III	ELECTRICAL WIRING USING ECAD	9

Drawing power distribution layouts using ECAD tools - Motor control circuit diagrams – DOL starter, star-delta starter, forward-reverse starter - Components representation – contactors, overload relays, limit switches, push buttons

UNIT-IV	CONTROL CIRCUITS USING ECAD	9

Creating control wiring diagrams with interlocking and sequence control -Use of editing tools – copy, mirror, rotate, scale, move, trim, and extend in ECAD - Assigning wire numbers, tags, and cross-references -Generating panel wiring diagrams with terminal numbering.

UNIT-V	ADVANCED ECAD APPLICATIONS AND PROJECT DRAWING	9

Creation and management of symbol libraries - Customizing electrical symbols and component attributes - Multi-sheet project creation and cross-sheet referencing - Bus bar, control panel, and distribution board layout in ECAD

TOTAL:	45 periods

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LAB COMPONENT: **15 PERIODS**

1. Practice inserting and connecting standard schematic symbols from the software's library, including: switches (SPST, DPDT), fuses, lamps, sockets, MCBs, and relays.
2. Draw a detailed single-line diagram (SLD) of a building's power distribution system
3. Draw the complete power circuit and control circuit for a DOL starter for an induction motor, including the circuit breaker, contactor, and thermal overload relay.
4. Create a control wiring diagram for a system requiring sequence control.
5. Draw a detailed physical layout (not schematic) of a Bus Bar system and a Distribution Board (DB).

COURSE OUTCOMES

The students will be able to

CO1	Utilize various drawing instruments effectively and apply BIS conventions for lettering and line types in engineering drawings.
CO2	Navigate and customize the interface, toolbars, and workspace layout of ECAD software for electrical drawing purposes.
CO3	Design and draw power distribution layouts using ECAD tools, adhering to standard electrical practices.
CO4	Create complex control wiring diagrams incorporating interlocking and sequence control logic using ECAD software.
CO5	Develop multi-sheet projects with effective cross-sheet referencing for large-scale electrical designs.

Text Books:

1. Engineering Drawing, Special Edition-MRCET, McGrahill Publishers, 2017.
2. Engineering Drawing, N.D. Bhatt
3. Engineering Drawing by K.Venu Gopal&V.Prabu Raja New Age Publications.
4. Principles and Practice An Integrated Approach to Engineering Graphics and AutoCAD 2026, By Randy H. Shih

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Reference Books:

1. Engineering drawing – P.J. Shah .S.Chand Publishers.
2. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
3. Handbook of Electrical Design Details, The McGraw-Hill Companies.

Online Sources:

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/

CO & PO MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	1	-	2	1	-
CO2	3	3	2	2	-	-	-	-	-	1	-	2	1	-
CO3	3	3	3	3	-	-	-	-	-	1	-	3	2	-
CO4	3	3	3	3	-	-	-	-	-	1	-	3	2	-
CO5	3	3	3	2	-	-	-	-	-	1	-	3	2	-
Avg	3	2.8	2.4	2.2	-	-	-	-	-	1	-	2.6	1.6	-

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

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25EEL21 SDG NO:4,8,9,10,12,17	VISION EXPLORATION LABORATORY	L	T	P	C
		0	0	4	2

(For B.E. EEE, ECE & BME)

COURSE OBJECTIVES:

- Identify the problem statement of the customers.
- Understand the needs of the customers.
- Draw upon, interpret, and weight all the findings.
- Generate as many different ideas as possible and visualize them.
- Develop a prototype of ideas and test them.

LIST OF ACTIVITIES

Vision exploration is human-centered problem-solving tool which emphasize on empathy, collaboration, co-creation and stakeholder feedback to unlock creativity and innovation, to devices feasible and viable, idea/solutions.

Note: Each activity must use one or two design thinking tools from each phases for assessment.

S.No	Activities	Sugesstion tools	Name of the tools
1	Introduction Overview of design thinking, Design thinking phases and tools.(6 hours)	Text book	1. Problem statements 2. Design Principles 3. Question 5x Why 4. Stakeholder Map 5. 5Wh questions 6. Interview for Empathy 7. Extreme & Lead User 8. Emotional Response Cards 9. Empathy Map 10. Persona & User Profile 11. Analysis-Question-Builder 12. Customer Journey Map 13. AEIOU 14. Peers Observing Peers 15. HMW-question 16. Storytelling 17. Context Mapping 18. Define Success 19. Critical Items Diagram 20. Brainstorming 21. 2x2 Matrix 22. 6-3-5-Methode 23. Analogien & Benchmarking 24. Exploration Map 25. Prototype to Test 26. Service Blueprint 27. MVP 28. Testing Sheet 29. Feedback-Capture-Grid
2	Understanding phase Learning about the users, their needs, problems, and experiences. (10 hours)	Dt 1 - 08	
3	Observe phase Observe the behavior, problems, and needs without interference (10 hours)	Dt 09 - 14	
4	Define phase Involves analyzing user research data and organize research fingins. (10 hours)	Dt 15 - 19	
5	Ideate phase Generate ideas through the phase an review the idea. (10 hours)	Dt 20 - 23	
6	Prototype & Test Phase Importance of protype and testing in design thinking –create simple and scale down version of prototype (10 hours)	Dt 24 - 30	
7	Report Submission (4 hours)		

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			30. Experience Testing

Case studies:

Students are required to acquire knowledge of Vision Exploration tools and apply these concepts using case studies such as

such as Smart Energy Systems, Embedded and Communication Systems, IoT-based Systems, Biomedical Devices, Healthcare Monitoring Systems, Smart Transportation and Industrial Automation..etc

TOTAL : 60 PERIODS

COURSE OUTCOMES:

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

CO1 : Getting customer insights and appropriate problem statement.

CO2 : Observe the customer pains and gains to have better understanding.

CO3 : Develop a point of view from the various insights gathered and write a problem Statement.

CO4 : Ideate and develop innovative solution to the customer problem.

CO5 : Create a prototype as a solution base and test the same.

TEXT BOOKS:

1. The Design Thinking Playbook, Michael Lewrick, Patrick Link, Larry Leifer, Wiley, 2018.
2. Thinking: A Comprehensive Textbook, Shalini Rahul Tiwari (Author), Rohit Rajendra Swarup (Author), First Edition, Wiley, 2024.

REFERENCE BOOKS:

1. Design Thinking for dummies, Chrisian Muller- Roterberg, Willey, 2020.
2. Design Thinking: A Hands-on Approach,Chandramouli Subramanian, Thiyagarajan Paramasivan, Sankaran Venkataramani,Atlantic,2025.

E-RESOURCES

1. DT-Tools- https://en.dt-toolbook.com/tools-eng
2. https://onlinecourses.swaya m2.ac.in/aic23_ge17/unit?un it=9&lesson=13
3. https://archive.nptel.ac.in/co urses/110/106/110106124/

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	1	1	2	1	2	2	3	2	2
CO2	3	2	2	3	3	2	2	2	1	3	2	3	2	2
CO3	3	3	2	3	3	2	2	2	3	3	2	3	2	2
CO4	3	3	3	3	3	2	3	3	3	2	2	3	2	2
CO5	3	3	3	3	3	2	2	2	3	2	2	3	2	2
AVG	**3**	**2.6**	**2.4**	**3**	**3**	**2**	**2**	**2.2**	**2.2**	**2.4**	**2**	3	2	2

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

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25EEI23 SDG NO:4,7,9,12	ELECTRIC CIRCUIT ANALYSIS (For B.E./EEE &ECE)	L	T	P	C
		3	0	2	4

Course Objectives:

- To learn the basic concepts and behavior of DC and AC circuits.
- To apply the network theorems concepts in DC and AC circuits.
- To analyze the transient and steady state response of RL, RC, RLC circuits.
- To analyze the concept of Resonance and coupling circuits.
- To understand the concept of three phase circuits and power measurement.

UNIT-I	BASIC CIRCUIT ANALYSIS	9

Basic components of electric circuits, Charge, Current, Voltage and Power, Voltage and current sources, Ohms law, Kirchhoff's laws, Series and parallel connected Independent sources, Resistors in series and parallel, Voltage division and Current division rule, Mesh current and node voltage methods of analysis DC Circuits.

UNIT-II	NETWORK REDUCTION AND THEOREMS	9

Network Reduction: Source transformation,Star delta conversion.Theorems: Superposition theorem, Thevenin's theorem,Norton's theorem, Maximum power transfer theorem to DCcircuits.

UNIT-III	TRANSIENT RESPONSE ANALYSIS	9

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	THREE PHASE CIRCUITS	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.

TOTAL: 45 PERIODS	

LAB COMPONENT: **15 PERIODS**

1. Verifications of KVL and KCL laws.
2. Verifications of Thevenin& Norton theorem.
3. Verification of Superposition Theorem&maximum power transfer Theorem
4. Determination of Resonance Frequency of Series & Parallel RLC Circuits
5. Transient analysis of RL and RC circuits.
6. Measurement of three phase power.

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TOTAL: 45+15= 60 PERIODS

COURSE OUTCOMES

The students will be able to

CO1	Explain circuit's behavior using circuit laws and analyze the mesh analysis and nodal analysis.
CO2	Apply the network theorems to determine behavior of the given DC and AC circuits.
CO3	Analyze steady state response and transient response for any RC, RL and RLC circuits.
CO4	Analyze the frequency response of series and parallel resonance circuits and coupled circuits.
CO5	Explain the concepts of three phase circuits and power measurements.

Text Books:

1. William H. HaytJr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", McGraw Hill publishers, 9thedition, New Delhi, 2020.
2. Charles K. Alexander & Mathew N.O.Sadiku, "Fundamentals of Electric Circuits", McGraw- Hill, 2nd Edition, 2003.
3. Joseph Edminister and MahmoodNahvi, —Electric Circuits, Schaum's Outline Series, Tata McGraw Hill Publishing Company, New Delhi, Fifth Edition Reprint 2016.

Reference Books:

1. Robert.L. Boylestead, "Introductory Circuit Analysis", Pearson Education India, 12th Edition, 2014. David Bell, "Fundamentals of Electric Circuits", Oxford University press, 7thEdition, 2009.
2. John O Mallay, Schaum's Outlines "Basic Circuit Analysis", The McGraw Hill companies, 2nd Edition, 2011
3. Allan H.Robbins, Wilhelm C.Miller, "Circuit Analysis Theory and Practice", Cengage Learning, Fifth Edition, 1st Indian Reprint 2013

Online Sources:

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/

CO & PO MAPPING

CO/PO /PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	1	-	3	2	1
CO2	3	3	2	2	-	-	-	-	-	1	-	3	3	2
CO3	3	3	3	3	-	-	-	-	-	1	-	3	3	3
CO4	3	3	3	3	-	-	-	-	-	1	-	3	3	3
CO5	3	3	3	2	-	-	-	-	-	1	-	3	3	3
Avg	**3**	**2.8**	**2.4**	**2.2**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**3**	**2.8**	**2.4**

1 -low,2-medium,3-high,'-'-nocorrelation

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CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	1	-	3	2	1
CO2	3	3	2	2	-	-	-	-	-	1	-	3	3	2
CO3	3	3	3	3	-	-	-	-	-	1	-	3	3	3
CO4	3	3	3	3	-	-	-	-	-	1	-	3	3	3
CO5	3	3	3	2	-	-	-	-	-	1	-	3	3	3
AVG	3	2.8	2.4	2.2	-	-	-	-	-	1	-	3	2.8	2.4

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

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25ENI21	COMMUNICATIVE ENGLISH – II	L	T	P	C
SDG No. 4,5,8.9,16	(Common to B.E./B.Tech. All Branches)	2	0	2	3

COURSE OBJECTIVES:

- To develop the learners' fundamental communication skills by introducing basic grammar, everyday conversations, and descriptive writing.
- To enable learners to understand and apply advanced grammar structures, enhance their listening skills for process comprehension, improve presentation abilities, read technical documents, and write formal complaint and editorial letters.
- To equip learners with essential communication skills for interviews, group discussions, debates, and professional correspondence.
- To develop learners' skills in reported speech, descriptive speaking, review listening, fluent reading, and formal correspondence.
- To prepare learners for job interviews, professional speaking, resume writing, and job-related communication.

UNIT-I INTRODUCTION TO EFFECTIVE COMMUNICATION 6+3

Grammar : Prefix/ Suffix- Active and Passive Voice- Model Passive

Listening : Listening to Short literary Texts - Listening to a Presentation and Completing Gap Filling Exercise

Speaking : Talking about Daily Routine, Hobbies, Favorites, Family, etc.

Reading : Describing a Product through Comparing & Contrasting it with other Products

Writing : Writing a short biography on Achievers based on given hints.

UNIT-II PROCESS COMMUNICATION AND TECHNICAL WRITING 6+3

Grammar : Subject - Verb Agreement -Infinitives - Gerunds

Listening : Listening to Process Description and Drawing a Flow Chart

Speaking : General and Technical Presentation.

Reading : Reading Technical Manuals.

Writing : Writing Complaint Letter to Companies - Letter to the Editor.

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UNIT-III ADVANCED COMMUNICATION FOR PROFESSIONAL SUCCESS 6+3

Grammar : If Clause -One Word Substitution

Listening : Listening to Interview Techniques and Etiquettes

Speaking : Participating in Group Discussion - Developing Persuasive Skills and Argument Construction (Debate)

Reading : Reading of Articles (Editorials)

Writing : Compose Emails for Internship Request, Placement Enquires and Industrial Visits

UNIT-IV DESCRIPTIVE AND INTERACTIVE COMMUNICATION 6+3

Grammar : Reported Speech - Compound Words

Listening : Listening to Book and Movie Review

Speaking : Describing Working Mechanism

Reading : Reading for Improving Fluency and Intonation.

Writing : Writing letter of Invitation, Acceptance and Declination

UNIT-V CAREER-ORIENTED COMMUNICATION SKILLS 6+3

Grammar : Content vs. Function Words – Fixed & Semi Fixed Expression - Relative Phrase

Listening : Listening to job Interviews and Answering to the Exercise

Speaking : Offline and Online Interviews.

Reading : Matching the Heading to the Paragraph.

Writing : Job Application & Internship Application with Resume.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

At the end of the Course the students will able to

CO 1: Apply basic grammar, communicate daily situations, comprehend listening tasks, compare products and write short biographies.

CO 2: Correct grammar, present processes effectively, interpret technical texts and draft form

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letters.

CO 3: Use conditional sentences, participate confidently in debates and discussions, follow interview protocols, analyze editorials and compose professional emails.

CO 4: Use reported speech, describe processes, listen and respond to reviews, read with fluency and draft formal invitation letters.

CO 5: Apply grammar structures, face interviews confidently, match texts with headings, and draft job applications with resumes.

TEXT BOOKS:

1. Department of English, Anna University, "English for Engineers & Technologists" Orient Blackswan Private Ltd, 2020.
2. Dr.Veena Selvam, Dr.Sujatha Priyadarshini, & CO, Department of English, Anna University, "English for Science & Technology" Cambridge University Press, 2021.

REFERENCE BOOKS:

1. Meenakshi Raman & Sangeeta Sharma, "Technical Communication–Principles and Practices", Oxford Univ. Press, New Delhi, 2016.
2. Lakshminarayanan, "A Course Book on Technical English", Scitech Publications (India) Pvt.Ltd. 2012.
3. Aysha Viswamohan, "English For Technical Communication (With CD)". Mcgraw HillEducation, ISBN : 0070264244, 2008.
4. Effective Communication Skill, Kulbhusan Kumar, R S Salaria, Khanna Publishing House, 2016.

E. RESOURCES:

- https://learnenglish.britishcouncil.org/

CO's-PO's MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	3	3	-	3	-	-	-
CO2	-	-	-	-	-	-	-	3	3	-	3	-	1	-
CO3	-	-	-	-	-	-	-	3	3	-	2	-	1	-
CO4	-	-	-	-	-	-	-	3	3	-	2	-	-	-
CO5	-	-	-	-	-	-	-	3	3	-	2	-	-	-
AVR	-	-	-	-	-	-	-	3.00	3.00	-	2.40	-	1.00	-

1- Low, 2- Medium, 3-High, "-" No Correlation

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25MAT21	NUMERICAL METHODS AND DIFFERENTIAL EQUATIONS	L	T	P	C
SDG NO.4,8,9,11	(Common to B.E./B.Tech. all Branches)	3	0	0	3

COURSE OBJECTIVES:

- To introduce the basic concepts of solving algebraic and transcendental equations.
- To introduce the numerical techniques of interpolation in various intervals and differentiation and integration in engineering and technology.
- To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.
- To familiarize students how to solve the higher-order linear differential equations.
- To enable students to understand the definition and properties of the Laplace transform apply it to solve differential and integral equations and analyze the behavior of systems in the frequency domain.

UNIT-I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 9

Newton Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting-Gauss Jordan method – Iterative methods of Gauss Jacobi and Gauss Seidel – Eigen values of a matrix by Power method.

UNIT-II INTERPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL INTEGRATION 9

Lagrange's and Newton's divided difference interpolations – Newton's forward and backward difference interpolation – Numerical single integrations using Trapezoidal and Simpson's 1/3 rules.

UNIT-III NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9

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

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UNIT-IV ORDINARY DIFFERENTIAL EQUATIONS 9

Linear higher order differential equations with constant coefficients – Method of variation of parameters – Cauchy's and Legendre's linear differential equations.

UNIT-V LAPLACE TRANSFORMS 9

Laplace transform: Sufficient conditions – Transform of elementary functions – Basic Properties – Transform of periodic functions. Inverse Laplace transform: Standard results – statement of Convolution theorem and its applications – Solution of linear second order ODE with constant coefficients using Laplace transformation techniques.

TOTAL : 45 PERIODS

COURSE OUTCOMES :

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

CO1 : Apply the numerical techniques of interpolation in various intervals and differentiation and integration for engineering problems.

CO2 : Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.

CO3 : Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.

CO4 : Apply various techniques in solving differential equations.

CO5 : Understand Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

TEXT BOOKS :

1. Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10th Edition, New Delhi, 2019.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016.

REFERENCE BOOKS :

1. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2015.

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2. Burden, R.L and Faires, J.D, "Numerical Analysis", 9th Edition, Cengage Learning, 2016.
3. T.K.V Iyengar, B.krishna Gandhi, S.Ranganatham, M.V.S.S.N Prasad, " Laplace Transforms, Numerical Methods and complex variables", S.Chand, 10th march 2025.

E-Resources :

1. https://www.scribd.com/document/854329544/Iterative-Methods
2. https://www.youtube.com/watch?v=yPNSIhE_FZM

CO's – PO's & PSO'S MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	2	-	2	3	2	3	2
CO2	3	3	2	1	1	-	-	2	-	2	2	1	3	2
CO3	3	3	2	1	1	-	-	2	-	2	3	2	3	3
CO4	3	3	2	1	1	-	-	2	-	2	3	2	3	2
CO5	3	2	2	1	1	-	-	2	-	3	3	2	3	2
AVG	3.00	2.80	2.00	1.00	1.00	-	-	2.00	-	2.20	2.80	1.80	3.00	2.20

1-Low, 2- Medium , 3-High, "-" No Correlation

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25CSI21 SDG No: 4, 8, 9, 10,17	PYTHON PROGRAMMING (Common to: B.E. / B.Tech. all Branches)	L 3	T 0	P 2	C 4

COURSE OBJECTIVES:

- To understand the basics of python data types and operators
- To learn to solve problems using Python conditionals and loops.
- To define Python , lists, tuples, dictionaries to represent complex data .
- To define python function and use function calls to solve problems.
- To develop python program using modules and files.

UNIT-I PYTHON FUNDAMENTALS 9

Python Interpreter and Interactive Mode --Variables - Immutable variables - Data types - Tokens – Keywords - Operators - Python Reserved Words Statements – Indentation - Understanding error messages

UNIT-II STRING AND CONTROL FLOW 9

Strings – Single-quote, double quote and multi-line strings – String Operations (Concatenation, Repetition, Indexing, Slicing, Splitting and Joining) Control Flow – If/Else Statements – for, while statements – Range ( ) function – break and continue statement.

UNIT-III LIST, TUPLES, DICTIONARIES 9

Lists - list operations - list slices - list methods - list loop - Tuples - assignment - tuple operations - Dictionaries - Operations and Methods in Dictionary - Looping and Dictionaries.

UNIT-IV FUNCTIONS 9

Functions- Elements of User Defined Functions - Fruitful Functions - Parameters and Arguments - Lambda Functions or Anonymous Functions - Scope - Function Composition

UNIT-V MODULES AND FILES 9

Modules: Standard Modules - OS and SYS modules - User defined Modules - Importing modules – Writing into a File - Reading from a File - File Methods

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TOTAL : 45 PERIODS

PRACTICAL EXERCISES:

List of Experiments

1. Python programming using simple Input/Output statements and data types.
2. Implement a python program using Operators.
3. Implementing programs using Strings.
4. Develop a python program using String operations.
5. Scientific problems using Decision making statements.
6. Develop a python program using Looping statements.
7. Create real-time applications using Lists
8. Applications using Tuples.
9. Develop real-time applications using Dictionaries.
10. Program using user defined functions.
11. Develop a python program using Lambda function.
12. Computations using NumPy functions.
13. Develop applications using File handling techniques.
14. Implement programs using written modules and Python Standard Libraries.

TOTAL : 30 PERIODS

TOTAL : 75(45+30) PERIODS

COURSE OUTCOMES:

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

CO1 : Understand and use the Python interpreter and IDE for writing, running, and debugging code using data types and operators.

CO2 : Write simple Python programs using conditionals and loops for solving problems.

CO3 : Decompose a Python program using Python lists, tuples, dictionaries etc.

CO4 : Decompose a Python program into functions.

CO5 : Read and write data from/to files in Python programs and perform mathematical and scientific calculations using the math modules.

TEXT BOOKS:

1.R. G. Dromey "How to Solve it by Computer", Pearson Education., 2024.

2.Robert Sedgewick "Introduction to Programming in Python", Pearson Education., 2024.

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REFERENCE BOOKS:

1. John V. Guttag "Introduction to Computation and Programming using Python", The MIT press., 2016.
2. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021.

E-RESOURCES:

1. https://www.python.org/

CO's – PO's & PSO's MAPPING

CO'S	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	3	3	2	2	2	2	2	2	2	3	3	3
CO2	2	3	3	3	2	2	2	2	2	2	2	3	3	3
CO3	2	2	3	2	2	2	2	2	2	1	2	3	3	3
CO4	1	2	3	3	1	2	2	2	2	1	2	2	3	3
CO5	2	2	3	3	2	2	2	2	2	1	2	2	3	3
AVG	1.8	2.4	3	2.8	1.8	2	2	2	2	1.4	2	2.6	3	3

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

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25MEI21	ENGINEERING GRAPHICS	L	T	P	C
SDG No.	(Common to B.E. - Civil, CSE, Mech, BME, CSE(CS),	3	0	2	4
4, 8, 9, 11	CSE(AIML) & B.Tech. - BT, IT, PT, AIDS)				

Course Objectives:

The main learning objective of this course is to prepare the students to:

- Construct standard plane curves and geometrical shapes used in engineering applications
- Draw and interpret projections of points, lines, and plane surfaces using first angle projection method
- Visualize and draw projections of basic solids and model them using CAD software
- Perform sectioning of solids and development of lateral surfaces for practical engineering applications using manual and CAD method
- Convert pictorial and isometric views into orthographic projections through freehand sketching and CAD practice

CONCEPTS AND CONVENTIONS (Not for Examination)

Importance of graphics in engineering applications - Use of drafting instruments - BIS conventions and specifications — Size, layout and folding of drawing sheets — Lettering and dimensioning.

UNIT-I PLANE CURVES 9

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.

UNIT-II PROJECTION OF POINTS, LINES AND PLANE SURFACE 9

Principal Planes - First angle projection - Projection of points - Projection of straight lines inclined to both the principal planes by rotating line method.

Projection of planes inclined to both the principal planes by rotating object method.

UNIT-III PROJECTION OF SOLIDS 9+10

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes and parallel to the other by rotating object method.

Practical: Projection of prisms, pyramids, cylinder and cone using CAD software.

UNIT-IV PROJECTION OF SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES 9+10

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.

Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones.

Practical: Projection of sectioning of above solids and Development of lateral surfaces of simple and sectioned solids using CAD software.

UNIT-V ORTHOGRAPHIC PROJECTION 9+10

Orthographic projection- Freehand sketching of multiple views from pictorial views of objects.

Practical: Orthographic projections from given isometric and pictorial views of simple objects using CAD software.

TOTAL : 75 PERIODS

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COURSE OUTCOMES:

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

CO1: Create standard plane curves and geometrical shapes used in engineering applications

CO2: Produce and interpret projections of points, lines, and plane surfaces using the first angle projection method

CO3: Generate projections and CAD models of basic engineering solids

CO4: Execute sectional views and surface developments of solids using appropriate manual and CAD techniques

CO5: Analyze pictorial and isometric views to generate complete and accurate orthographic projections

TEXT BOOKS:

1. K Venugopal, Engineering Drawing and Graphics, Sixth edition, New Age International, 2013.
2. Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.

REFERENCE BOOKS:

1. Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edit ion, 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.

E-RESOURCES:

1. https://archive.nptel.ac.in/courses/112/102/112102304/
2. https://onlinecourses.nptel.ac.in/noc20_me79/preview
3. https://www.youtube.com/watch?v=ANEvQyt3PnU

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO2	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO3	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO4	3	1	2	-	2	-	-	-	3	-	2	2	2	-
CO5	3	1	2	-	2	-	-	-	3	-	2	2	2	-
Avg	3	1	2	-	2	-	-	-	3	-	2	2	2	-

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

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BoS / Mech

25TAT21	TAMILS AND TECHNOLOGY	L	T	P	C
SDG No: 2, 4, 6, 9, 11	(Common to B.E./B. Tech. all branches)	1	0	0	1

COURSE OBJECTIVES:

- To understand about weaving and ceramic technology of Tamils.
- To compare the design and constructive technology of Cheras, Cholas, Pallavas and Nayakkars.
- To gain knowledge in various manufacturing technology of Tamils.
- To analyses the agriculture and fishery knowledge of Tamils.
- To learn about scientific Tamil and its usage in online platforms.

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

UNIT-III MANUFACTURING TECHNOLOGY 3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone 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.

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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

COURSE OUTCOMES:

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

CO1: Relate the weaving ceramic technology of Tamils.

CO2: Understand the knowledge of Tamils in design and construction technology.

CO3: Recognize the manufacturing technology knowledge of Tamils.

CO4: Criticize the agriculture and fishery knowledge of Tamils.

CO5: Apply scientific Tamil in Various online platforms.

TEXT BOOK:

1. Tamils and Technology, Dr. P. Inthirani, Jai Balaji Publications, Chennai.

REFERENCES:

1. Thamizhaga Varalarum Makkal Panpaadum, Dr. K. K. Pillai, Ulaga Tamizharaichi Niruvanam, Chennai.

E- RESOURCES:

1. https://www.tamilvu.org/
2. https://sorkuvai.com/

CO's –PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO2	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO3	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO4	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO5	2	-	-	-	-	2	2	2	2	-	2	1	-	-
AVG	2	-	-	-	-	2	2	2	2	-	2	1	-	-

1 - Low, 2- Medium , 3-High, '-' No Correlation

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25TAT21 SDG No. 2, 4, 6, 9, 11	தமிழரும் தொழில்நுட்பமும் (B.E./B.Tech- அனைத்துப் பாடப்பிரிவுகளுக்கும் பொதுவானது)	L T P C 1 0 0 1

பாடநெறி நோக்கங்கள்:

- நெசவு மற்றும் பானைத்தொழில்நுட்பத்தைப் புரிந்து கொள்ளுதல்.
- சேர, சோழ, பல்லவ மற்றும் நாயக்கர்களின் வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பத்தை ஒப்பிடுதல்.
- தமிழர்களின் பல்வேறு உற்பத்தி தொழில்நுட்பத்தைப் பற்றிய அறிவைப் பெறுதல்.
- தமிழர்களின் வேளாண்மை மற்றும் கடல்சார் அறிவைப் பெற்றுக்கொள்ளுதல்.
- அறிவியல் தமிழையும் அதன் இணையப்பயன்பாட்டையும் கற்றல்.

அலகு - I நெசவு மற்றும் பானைத் தொழில்நுட்பம் 3

சங்க காலத்தில் நெசவுத்தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு - II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம் 3

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப்பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும் கோவில்களும் - சோழர் காலத்து 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 - III உற்பத்தித் தொழில்நுட்பம் 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

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அலகு - IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம் 3

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

அலகு - V அறிவியல் தமிழ் மற்றும் கணினித்தமிழ் 3

அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்

மொத்தம்: 15 பாடவேளைகள்

பாடநெறி முடிவுகள் :

இப்பாடத்தைப் படிப்பதின் முடிவில் மாணவர்கள்

CO1: நெசவு மற்றும் பானைத்தொழில்நுட்பத்தை பற்றிப் புரிந்துகொள்வார்கள்

CO2: வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பத்தில் தமிழர்களின் அறிவைப் பெறுவார்கள்

CO3: தமிழர்களின் உற்பத்தி தொழில்நுட்பத்தை கண்டறிவார்கள்

CO4: தமிழர்களின் வேளாண்மை மற்றும் கடல்சார் அறிவைக் குறித்து விவரித்திப்பார்கள்.

CO5: பல்வேறு இணையப் பயன்பாடுகளில் அறிவியல் தமிழைப் பயன்படுத்திப்பார்ப்பார்கள்

பாடநூல்:

1. தமிழரும் தொழில்நுட்பமும், முனைவர் ப. இந்திராணி, ஜெய் பாலாஜி பதிப்பகம், சென்னை.

பார்வை நூல்:

1. தமிழக வரலாறும் மக்கள் பண்பாடும், டாக்டர் கே. கே. பிள்ளை, உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை.

மின் -ஆதாரங்கள்:

1. https://www.tamilvu.org/
2. https://sorkuvai.com/

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CO's –PO's விவரணையாக்கம்:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO2	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO3	2	-	-	-	-	2	2	2	2	-	2	-	-	-
CO4	1	-	-	-	-	1	1	1	1	-	1	-	-	-
CO5	2	-	-	-	-	2	2	2	2	-	2	1	-	-
AVG	2	-	-	-	-	2	2	2	2	-	2	1	-	-

1- Low, 2- Medium , 3 - High,'-' No Correlation

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25CSL21 SDG No. 4,8,9,10,12,13,17	DESIGN THINKING PRACTICES (Common to B.E CSE, CSE(AIML), CSE(CS) / B.Tech IT and AIDS)	L	T	P	C
		0	0	4	2

COURSE OBJECTIVES:

- Identify the problem statement of the customers.
- Understand the needs of the customers.
- Draw upon, interpret, and weight all the findings.
- Generate as many different ideas as possible and visualize them.
- Develop a prototype of ideas and test them.

LIST OF ACTIVITIES

Design Thinking is human-centered problem-solving tool which emphasize on empathy, collaboration, co-creation and stakeholder feedback to unlock creativity and innovation, to devices feasible and viable, idea/solutions.

Note: Each activity must use one or two design thinking tools from each phases for assessment.

S.No	Activities	Sugesstion Tools	Name of the tools
1	**Introduction** Overview of design thinking, Design thinking phases and tools.(6 hours)	Text book	1. Problem statements 2. Design Principles 3. Question 5x Why 4. Stakeholder Map 5. 5Wh questions 6. Interview for Empathy 7. Extreme & Lead User 8. Emotional Response Cards 9. Empathy Map 10. Persona & User Profile 11. Analysis-Question-Builder 12. Customer Journey Map 13. AEIOU 14. Peers Observing Peers 15. HMW-question 16. Storytelling 17. Context Mapping 18. Define Success 19. Critical Items Diagram 20. Brainstorming 21. 2x2 Matrix 22. 6-3-5-Methode 23. Analogien & Benchmarking 24. Exploration Map 25. Prototype to Test 26. Service Blueprint 27. MVP 28. Testing Sheet 29. Feedback-Capture-Grid 30. Experience Testing
2	**Understanding phase** Learning about the users, their needs, problems, and experiences. (10 hours)	Dt 1 - 08	
3	**Observe phase** Observe the behavior, problems, and needs without interference (10 hours)	Dt 09 - 14	
4	**Define phase** Involves analyzing user research data and organize research fingins. (10 hours)	Dt 15 - 19	
5	**Ideate phase** Generate ideas through the phase an review the idea. (10 hours)	Dt 20 - 23	
6	**Prototype & Test Phase** Importance of protype and testing in design thinking –create simple and scale down version of prototype (10 hours)	Dt 24 - 30	
7	**Report Submission** (4 hours)		

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Case studies:
Students are required to acquire knowledge of Design Thinking tools and apply these concepts using case studies such as Student information systems, Hotel management, Transport management, Library Management System, Inventory and Supply Chain Management, Public Service Management and Employee management etc.,

TOTAL : 60 PERIODS

COURSE OUTCOMES:

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

CO1 : Getting customer insights and appropriate problem statement.
CO2 : Observe the customer pains and gains to have better understanding.
CO3 : Develop a point of view from the various insights gathered and write a problem Statement.
CO4 : Ideate and develop innovative solution to the customer problem.
CO5 : Create a prototype as a solution base and test the same.

TEXT BOOKS:

1. Thinking: A Comprehensive Textbook, Shalini Rahul Tiwari (Author), Rohit Rajendra Swarup (Author), First Edition, Wiley, 2024.
2. The Design Thinking Playbook, Michael Lewrick, Patrick Link, Larry Leifer, Wiley, 2018.

REFERENCE BOOKS:

1. Design Thinking: A Hands-on Approach,Chandramouli Subramanian, Thiyagarajan Paramasivan, Sankaran Venkataramani,Atlantic,2025.
2. Design Thinking for dummies, Chrisian Muller- Roterberg, Willey, 2020.

E-RESOURCES

1. DT-Tools- https://en.dt-toolbook.com/tools-eng
2. https://onlinecourses.swaya m2.ac.in/aic23_ge17/unit?un it=9&lesson=13
3. https://archive.nptel.ac.in/co urses/110/106/110106124/

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	3	3	1	1	1	2	2	1	3	2	2
CO2	3	2	2	3	3	2	2	1	3	2	1	3	2	2
CO3	3	3	2	3	3	2	2	3	3	2	1	3	2	2
CO4	3	3	3	3	3	2	3	3	2	2	2	3	2	2
CO5	3	3	3	3	3	2	2	3	2	2	1	3	2	2
AVG	3	2.6	2.4	3	3	2	2	2.2	2.4	2	1.2	3	2	2

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

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		L	T	P	C
25MAT31	DISCRETE MATHEMATICS AND				
SDG NO.4,8,9,17	COMPUTATIONAL STRUCTURES	3	1	0	4

(for B.E. /B.Tech - CSE, IT, AIDS, AIML & Cyber -Security)

COURSE OBJECTIVES:

- To enhance student's logical and mathematical maturity and their ability to deal with abstraction.
- To introduce fundamental combinatorial principles for solving mathematical computational problems.
- To understand the basic concepts of graphs and graph models.
- To familiarize students with the applications of algebraic structures.
- To understand the concepts and significance of lattices and Boolean algebra, which are widely used in computer science and engineering.

UNIT-I LOGIC AND PROOFS 9+3

Propositional logic –Propositional equivalences –Predicates and quantifiers – Nested quantifiers– Rules of inference - Introduction to proofs – Consistency of premises and Indirect method of proof.

UNIT-II COMBINATORICS 9+3

Mathematical induction – Strong induction and well ordering – The basics of counting – The pigeonhole principle – Permutations and combinations – Recurrence relations – Solving linear recurrence relations–Inclusion and exclusion principle and its applications.

UNIT-III GRAPHS AND GRAPH MODELS 9+3

Graphs and graph models–Graph terminology and special types of graphs–Matrix representation of graphs and graph isomorphism – Connectivity – Euler and Hamilton paths.

UNIT-IV ALGEBRAIC STRUCTURES 9+3

Algebraic systems–Semi groups and monoids – Groups – Subgroups –Normal subgroup and cosets – Lagrange's theorem – Definitions and examples of Rings and Fields.

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25MAT33	PROBABILITY THEORY AND COMPLEX ANALYSIS	L	T	P	C
SDG NO.4,8,9,17	(for B.E. ECE & EEE)	3	1	0	4

COURSE OBJECTIVES:

- To introduce core probability concepts such as axioms, conditional probability, and Bayes' theorem, while equipping students to handle random variables and their properties, such as moments and generating functions.
- To enable students to understand, apply, and interpret standard probability distributions in various real-world scenarios and introduce to the basic concepts of two dimensional random variables.
- To understand relationships between multiple random variables and derive marginal and conditional distributions from joint distributions.
- To introduce students to the core concepts of complex analysis, enabling them to verify analyticity using the Cauchy-Riemann equations and understand Conformal mappings, including bilinear transformations.
- To evaluate complex contour integrals using the fundamental theorems of complex analysis, focusing on Cauchy's theorems and the residue method.

UNIT-I **PROBABILITY AND RANDOM VARIABLES** **9+3**

Axioms of probability – Conditional probability – Baye's theorem - Discrete and continuous random variables – Moments – Moment generating functions.

UNIT-II **DISTRIBUTION FUNCTIONS** **9+3**

Discrete distributions: Binomial, Poisson and Geometric distributions- Continuous distributions: Uniform, Exponential, Normal distributions.

UNIT-III **TWO-DIMENSIONAL RANDOM VARIABLES** **9+3**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression.

UNIT-IV **ANALYTIC FUNCTIONS** **9+3**

Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar

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coordinates - Properties – Harmonic conjugates –Conformal mapping: Mapping by functions $w = z + c, cz, \frac{1}{z}$, Bilinear transformation.

UNIT-V **COMPLEX INTEGRATION** **9+3**

Cauchy's integral theorem – Cauchy's integral formula – Residues – Residue theorem – Application of residue theorem for evaluate of realintegrals – Applications of circular contour and semicircular contour (with poles NOT on real axis).

TOTAL : 60 PERIODS

COURSE OUTCOME:

At the end of the Course the students will able to

CO1: Understand and apply the axioms of probability, conditional probability and Bayes' theorem to solve problems, and analyze discrete and continuous random variables using moments and moment generating functions.

CO2: Compute probabilities using Uniform, Exponential and Normal distributions, including use of parameters and standardization for the Normal distribution.

CO3: Analyze bivariate random variables using joint, marginal, and conditional distributions, compute and interpret covariance and correlation between variables, and apply simple linear regression models to fit and assess relationships in data.

CO4: Apply the properties of analytic and harmonic functions to solve problems arising in complex analysis. Construct and evaluate bilinear (Möbius) transformations and use them to map regions in the complex plane effectively.

CO5: Apply Cauchy's integral theorem and Cauchy's integral formula to evaluate complex line integrals, and use the theory of residues and the residue theorem with circular and semicircular contours (with poles not on the real axis) to compute real definite integrals.

TEXT BOOKS:

1. Johnson. R.A., Miller. I and Freund. J., "Miller and Freund's Probability and Statistics forEngineers", Pearson Education, Asia, 9th Edition, 2016.
2. Ibe, O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier,1st Indian Reprint, 2007.

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3. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44th Edition,2018.

REFERENCE BOOKS:

1. Devore. J.L.,"Probability and Statistics for Engineering and the Sciences",Cengage Learning,New Delhi, 8th Edition, 2014.
2. Papoulis. A. and Unnikrishnapillai . S., "Probability, Random Variables and StochasticProcesses", McGraw Hill Education India, 4th Edition, New Delhi, 2010.
3. Ross . S.M., "Introduction to Probability and Statistics for Engineers and Scientists",5th Edition, Elsevier, 2014.
4. Spiegel. M.R., Schiller. J. and Srinivasan . R.A., "Schaum's Outline of Theory and Problems ofProbability and Statistics", Tata McGraw Hill Edition, 4th Edition, 2012.
5. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons,10th Edition, New Delhi, 2016.

E-Resources :

1. https://www.youtube.com/watch?v=V44y-aWTSYE&list=PLyqSpQzTE6M9JEOrchuG0by2TQn1NKBIS
2. https://www.youtube.com/watch?v=flUk8zwqGV0
3. http://acl.digimat.in/nptel/courses/video/111102160/L01.html
4. https://www.youtube.com/watch?v=JOfnCCNj4gQ
5. https://www.youtube.com/watch?v=b5VUnapu-qs

CO's – PO's MAPPING & PSO's MAPPING :

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PS01	PS02	PS03
CO1	3	3	3	-	-	-	-	2	-	-	1	2	3	2
CO2	3	3	3	-	-	-	-	2	-	-	1	2	3	2
CO3	3	3	2	-	-	-	-	2	-	-	1	2	3	3
CO4	3	3	2	-	-	-	-	2	-	-	1	2	2	2
CO5	3	3	3	-	-	-	-	2	-	-	1	2	2	2
AVG	3.00	3.00	2.60	-	-	-	-	2.00	-	-	1.00	2.00	2.60	2.20

1-Low, 2- Medium, 3-High, "-" No Correlation

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25EET31 SDGNO:7,9,13	DC MACHINES AND TRANSFORMERS	L	T	P	C
		3	0	0	3

Course Objectives:

- To understand the construction, operation, and characteristics of DC generators and DC motors.
- To study the principles, performance, and applications of single-phase and three-phase transformers.
- To analyze the characteristics, losses, efficiency, and testing methods of DC machines and transformers.
- To understand transformer connections, parallel operation, and special transformer configurations.
- To develop the ability to evaluate the performance and operating conditions of electrical machines through standard tests.

UNIT-I	D.C.GENERATORS	9

Introduction to Single excited Double excited system-Constructional Details - Principle of Operation - E.M.F Equation - Methods of Excitation - Types – No load and Load characteristics of Series, Shunt and Compound generators - Armature Reaction,– Commutation, losses efficiency-Applications.

UNIT-II	D.C MOTORS	9

Principle of Operation - Back E.M.F and Torque Equation - Characteristics of Series, Shunt & Compound Motors -3 point ,4 point Starters, Losses and efficiency- Testing of DC Machines - Brake Test, Swinburne's Test & Hopkinson's Test -Applications.

UNIT-III	SINGLE-PHASE TRANSFORMERS	9

Introduction to single-phase Transformers (Construction and principle of operation) – emf equation – operation on no-load and on load –lagging, leading and unity power factors loads – phasor diagrams– equivalent circuit – regulation – losses and efficiency – effect of variation of frequency and supply voltage on losses – all day efficiency, Applications.

UNIT-IV	THREE PHASE TRANSFORMERS	9

Construction of Three Phase Transformer - Transformer Connections – Vector Diagram- Scott connection - Three Phase to Single Phase Transformer conversion – Parallel operation of transformers Toroidal Transformer.

UNIT-V	TESTING OF TRANSFORMERS	9

Open Circuit and Short Circuit tests – Sumpner's test – separation of losses–– Parallel operation with equal and unequal voltage ratios – auto transformer – equivalent circuit – comparison with two winding transformers.

Total Hours	45

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COURSE OUTCOMES

CO's	OUTCOME
The students will be able to:	
CO1	Explain the construction, operation, and characteristics of DC generators and DC motors.
CO2	Analyze the performance, losses, efficiency, and testing of DC machines.
CO3	Describe the operation, equivalent circuit, regulation, and efficiency of single-phase transformers.
CO4	Explain three-phase transformer connections, parallel operation, testing procedures, and fault identification.
CO5	Perform transformer tests and evaluate transformer performance, losses, efficiency, and operating characteristics.

CO, PO & PSO MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	-	-	-	-	-	1	1	3	2	1
CO2	3	3	2	2	-	-	-	-	-	1	1	3	3	2
CO3	3	3	3	3	-	-	-	-	-	1	1	3	3	3
CO4	3	3	3	3	-	-	-	-	-	1	1	3	3	3
CO5	3	3	3	2	-	-	-	-	-	1	1	3	3	3
Avg	3	3	2	2	-	-	-	-	-	1	1	3	3	2

Text Books

1. I. J. Nagrath & D. P. Kothari, *Electric Machines*, McGraw Hill Education, 6th Edition, 2023.
2. P. S. Bimbhra, *Electrical Machinery*, Khanna Publishers, 8th Edition, 2022.

Reference Books

1. Stephen J. Chapman, *Electric Machinery Fundamentals*, McGraw-Hill Education, 2022.
2. P. S. Bimbhra, *Electrical Machines*, Vikas Publishing House, 3rd Edition, 2023.

Online Sources

1. **NPTEL – Electrical Machines**
   - https://nptel.ac.in
2. **SWAYAM Courses**
   - https://swayam.gov.in
3. **MIT OpenCourseWare – Electric Machines**

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Online Sources

1. **NPTEL – Electrical Machines**
   - https://nptel.ac.in
2. **SWAYAM Courses**
   - https://swayam.gov.in
3. **MIT OpenCourseWare – Electric Machines**
   - https://ocw.mit.edu

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25EET32 SDG No: 3,7,9	ELECTROMAGNETIC FIELDS	L	T	P	C
		3	1	0	4

Course Objectives:

- 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.
- Acquire knowledge on the concepts of Magneto static fields, magnetic flux density, Boundary Conditions and its applications.
- To impart knowledge on the concepts of Different methods of EMF generation and Maxwell's equations.
- Acquire knowledge on the concepts of Electromagnetic waves and characterizing parameters.

UNIT-I	VECTOR ANALYSIS	11

Review of scalar and vector fields, Different Coordinate Systems- Cartesian, Cylindrical and Spherical Co-ordinate system- System Transformation-Differential Elements in different Coordinate Systems- Gradient, Divergence, and Curl – Divergence theorem- Stokes theorem.

UNIT-II	ELECTROSTATICS	13

Coulomb's law - Electric field intensity –Electric Flux density- Gauss's law- Electric Potential- Poisson's and Laplace's equations- Capacitance of two dielectric, three dielectric, Coaxial cable, Energy density, Boundary conditions.

UNIT-III	MAGNETOSTATICS	13

Magnetic Flux- Magnetic Flux Density-Lorentz force, Biot – Savart's Law - Ampere's Circuit Law magnetic field intensity (H) – H due to straight conductors, circular loop, Solenoid, Toroidal Coil, Magnetic materials – Magnetization, Magnetic force, Torque, Inductance of a Co-axial Cable, Solenoid, Toroid, Energy and Energy density, Boundary conditions.

UNIT-IV	ELECTRODYNAMIC FIELDS	11

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 – Polarization.

Total Hours	60

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COURSE OUTCOMES

CO's	OUTCOME
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, Boundary conditions along with their applications.
CO4	Interpret the different methods of EMF generation and Maxwell's equations
CO5	Illustrate the concept of electromagnetic waves and characterizing parameters

CO, PO & PSO MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	3	1	-	-	1	3	2	1
CO2	3	2	1	2	-	-	1	1	-	-	1	3	2	1
CO3	3	2	1	2	-	-	1	1	-	-	1	3	2	1
CO4	3	2	1	2	-	-	1	1	-	-	1	3	2	1
CO5	3	2	1	2	-	-	1	1	-	-	1	3	2	1
Avg	**3**	**2**	**1**	**2**	**-**	**-**	**1.4**	**1**	**-**	**-**	**1**	**3**	**2**	**1**

Text Books:

1. William H. Hayt and John A. Buck, 'Engineering Electromagnetics', 10th edition McGraw Hill Special Indian edition, 2024.
2. Mathew N. O. Sadiku, S.V. Kulkarni 'Elements of Electromagnetics', 8th Edition, Oxford University Press, 2023.
3. Field and wave electromagnetic David.K. Cheng, Field and wave electromagnetic, 3rd edition, Pearson (India), 2022

Reference Books:

1. Electromagnetic Field Theory Fundamentals, Bhag Singh Guru and Huseyin R.Hiziroglu,, Third Edition, Cambridge University Press, 2022.
2. Electromagnetic Waves and Antennas, Sophocles J.Orfanidis, Electromagnetic Waves and Antennas, Latest Revised Edition, Rutgers University 2021.

Online Sources

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/

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25EET33 SDGNO: 7,9,12	DIGITAL ELECTRONICS	L	T	P	C
		3	0	0	3

Course Objectives:

- To formalize numeric code translations, error checking, and algorithmic minimization of multi-variable switching expressions.
- To evaluate, design, and optimize modular combinational building blocks for arithmetic, processing, and data-routing architectures.
- To synthesize, reduce, and map both synchronous clocked logic and hazard-free asynchronous fundamental-mode sequential networks.
- To contrast the physical characteristics, fan-out limitations, and internal structural constraints of integrated logic families alongside programmable frameworks (PROMs, PLAs, PALs).
- To architect hardware using hardware description language (VHDL) abstractions, mastering concurrent, sequential, and multi-level structural modeling styles

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UNIT-I	NUMBER SYSTEM AND BOOLEAN ALGEBRA	9

Review of number system-Types and conversion of codes-BCD, Gray code, Excess 3 code; Error detection and correction codes; Boolean algebra: De-Morgan's theorem, Simplification of functions using K-maps- Quine McCluskey method-Applications.

UNIT-II	COMBINATIONAL CIRCUIT	9

Design of functions using logic gates, Design of Half & Full Adders, Subtractors , Comparators, Code converters, Encoders, Decoders, Multiplexers and Demultiplexers-Applications.

UNIT-III	SYNCHRONOUS AND ASYNCHRONOUS SEQUENTIAL CIRCUITS	9

Flip flops - SR, JK , D and T, Shift registers , Analysis of synchronous and asynchronous sequential circuits, Moore and Melay model, Design of synchronous sequential circuits- state diagram; state reduction; state assignment,, Modulo Counters.

UNIT-IV	PROGRAMMABLE LOGIC DEVICES AND LOGIC FAMILIES	9

Programmable Logic Devices – Programmable Read Only Memory (PROM) -Programmable Logic Array (PLA) – Programmable Array Logic (PAL). Logic Families – TTL – ECL – IIL – CMOS.

UNIT-V	INTRODUCTION TO VHDL	9

Digital design process flow- Entities and Architecture-Concurrent Statements-Sequential statements -Behavioral, Dataflow, and structural modeling -simple VHDL codes,Applications.

Total Hours	45

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COURSE OUTCOMES

CO's	OUTCOME
The students will be able to:	
CO1	Apply Boolean algebra and number systems to design the digital circuits.
CO2	Design and realize the combinational circuits using logic gates
CO3	Analyze the synchronous and asynchronous sequential circuits and design the synchronous sequential circuits using basic flip flops.
CO4	Examine the operation of various Programmable Logic Devices and logic families.
CO5	Develop simple programs in VHDL.

CO, PO & PSO MAPPING

PO/PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	1	-	-	-	-	-	1	-	3	-	-
CO2	3	2	3	1	-	-	-	-	-	1	-	3	1	-
CO3	3	2	3	1	-	-	-	-	-	1	-	3	1	-
CO4	3	2	3	1	-	-	-	-	-	1	-	3	1	-
CO5	3	2	-	-	-	-	-	-	-	1	-	3	1	-
Avg	3	2	2	1	-	-	-	-	-	1	-	3	1	-

Text Books:

1. Thomas L Floyd, 'Digital fundamentals', Pearson Education Limited, 12th Edition, 2025.
2. Thomas L Floyd, 'Digital fundamentals', Pearson Education Limited, 11th Edition, 2018
3. A.Anand kumar, Fundamentals of digital circuits, 3rd Edition, PHI Learning Pvt Ltd, 2014 .

Reference Books:

1. Floyd, Digital Fundamentals, Pearson Education, 10 th edition, 2011.
2. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India, 4th edition, 2013.
3. Tocci R.J., Neal S. Widmer, 'Digital Systems: Principles and Applications', Pearson Education Asia, 12th Edition, 2017.

Online Sources

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/

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25EET34 SDGNO:7,9,12	ELECTRON DEVICES AND CIRCUITS	L	T	P	C
		3	0	0	3

Course Objectives:

- Understand the basic structure, characteristics, and applications of semiconductor devices.
- Analyze the operation and biasing of BJT, FET, MOSFET, UJT, thyristors, and IGBT devices.
- Evaluate the performance of single-stage and multistage amplifiers using BJT and MOSFET configurations.
- Study the principles of feedback amplifiers and oscillator circuits for signal generation and amplification applications.

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 structure operation and characteristics, CB, CE, CC Configurations and Biasing – JFET structure operation and characteristics, Biasing of JFET, MOSFET- Construction structure, operation, characteristics and Biasing , UJT Construction, Equivalent Circuit and Characteristics, SCR and IGBT - Structure and characteristics – Applications.

UNIT-III	AMPLIFIERS	9

BJT small signal model – Two port devices and Hybrid 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 and Low frequency analysis.

UNIT-IV	MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER	9

Multistage amplifiers – BICMOS amplifier, Differential amplifier Introduction, Configuration – Common mode and Difference mode analysis – FET input stages – Single tuned amplifiers – Gain and frequency response – Neutralization methods, power amplifiers –Types (Qualitative analysis) – Push Pull Class B Power amplifier.

UNIT-V	FEEDBACK AMPLIFIERS AND OSCILLATORS	9

Introduction – Classification – Advantages of negative feedback – Analysis of feedback amplifier - Voltage / Current, series, Shunt feedback – Oscillators – positive feedback – Condition for oscillations, Classification of Oscillators, phase shift – Wien bridge, Hartley, Colpitts and Crystal oscillators.

Total Hours	45

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COURSE OUTCOMES

CO's	OUTCOME
The students will be able to:	
CO1	Understand the basics of diodes, rectifiers, Zener diodes, and display devices.
CO2	Adapt the knowledge of biasing of BJT, JFET, MOSFET, UJT, thyristors, and IGBT.
CO3	Analyze the gain and frequency response of BJT and MOSFET amplifiers.
CO4	Understand the performance of multistage, differential, tuned, and power amplifiers.
CO5	Acquire knowledge about feedback amplifiers and the working of oscillator ad its types of circuits.

CO, PO & PSO MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	-	2	1	-	-	2	-	-	3	2	-
CO2	3	3	3	-	3	1	-	-	2	-	-	3	2	-
CO3	3	3	3	-	1	1	-	-	2	-	-	3	2	-
CO4	3	3	3	-	1	-	-	-	2	-	-	3	2	-
CO5	3	3	3	-	2	1	-	-	2	-	-	3	2	-
Avg	3	3	3	-	2	1	-	-	2	-	-	3	2	-

Text Books

1. "Electronic Devices and Circuits", S Chand Publishing, 2nd Ed. (JNTUH, R25), 2026, Authors : Ramana Pilla & Chitambara Rao Karedla
2. Electronic Devices and Circuit Theory, Pearson Education, 12th Edition, 2023.Authors: Robert L. Boylestad and Louis Nashelsky

Reference Books

1. U.A.Bakshi, A.P.Godse, "Electric Circuits and Electron Devices", 1st Edition, Aril 2025, Technical Publications.
2. S Salivahanan, N Suresh , "Electronic Devices And Circuits", 5th Edition 2022, McGraw-Hill Education,
3. Microelectronic Circuits, Oxford University Press, 8th Edition, 2020. Authors: Adel S. Sedra, Kenneth C. Smith, Tony Chan Carusone, and Vincent Gaudet
4. Floyd, T. L., & Buchla, D. M., Electronic Devices, 11th Edition, Pearson Education, 2018.

Online Sources

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/Preview - Semiconductor devices and circuits.

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25CSI32 SDG No:4, 8, 9, 12,17	DATA STRUCTURES (for BE/B.Tech.–CSE ,IT,AIDS,AIML,CS and EEE)	L	T	P	C
		3	0	2	4

COURSE OBJECTIVES:

- To understand the fundamentals of data structures, abstract data types, and algorithm complexity analysis.
- To learn array and linked list representations and their operations for efficient data storage and manipulation.
- To study stack and queue data structures and their applications in problem solving.
- To understand tree structures, tree traversal techniques, and priority queue implementations.
- To learn hashing techniques and graph traversal algorithms for efficient data processing.

UNIT-I **INTRODUCTION** **8**

Need for data structures – Types of data structures – Abstract Data Type – Algorithm complexity analysis of linear and non-linear data structures – Best case and worst-case complexities – Asymptotic notations.

UNIT-II **ARRAYS AND LISTS** **8**

Array representation and operations – Matrix representation using multi-dimensional arrays – Linked list representation – Operations on singly linked list – Types of linked list – Polynomial addition – Sparse matrices.

UNIT-III **STACKS AND QUEUES** **9**

Stack ADT – Representation and operations – Expressing handling – Role of stack in implementing recursive algorithms – Queue ADT – Representation and operations – Types of queues – Circular queue – Dequeue – Priority queue.

UNIT-IV **TREES** **10**

Terminologies – Binary Tree – Traversal – Expression trees – Binary Heap – Priority queue implementation using Binary Heap – Binary Search Tree – AVL Tree – m-way search trees – B Tree – B+ Tree – Application – Tree structure.

UNIT-V **HASHING AND GRAPHS** **10**

Hash table – Hash functions – Resolving collisions – Rehashing. GRAPHS: Graph terminologies – Types of graphs – Representation – Breadth First Search – Depth First Search – Topological sort.

TOTAL : 45 PERIODS

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PRACTICALS:

1. Solving problems using arrays.
2. Searching and Sorting algorithms.
3. Implementation of linked list.
4. Applications of linked list.
5. Implementation of stack and queue.
6. Applications of stack.
7. Operations on Binary Search Trees.
8. Applications of Binary Search Tree, AVL tree.
9. Graphs – Depth First Search and Breadth First Search.
10. Hashing and Collision Resolution.

TOTAL:30 PERIODS

TOTAL:75(45+30) PERIODS

COURSE OUTCOMES:

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

CO1 : Explain the concepts of data structures, abstract data types, and algorithm complexity analysis.

CO2 : Apply array and linked list operations for solving data organization and manipulation problems.

CO3 : Implement stack and queue operations and apply them in recursive and scheduling applications.

CO4 : Analyze and implement tree structures, binary heaps, binary search trees, AVL trees, and B-trees.

CO5 : Apply hashing techniques and graph traversal algorithms such as BFS, DFS, and topological sorting for problem solving.

TEXT BOOKS:

1. Mark Allen Weiss, 'Data Structures and Algorithm Analysis in C'. 2nd Edition, Pearson Education, 2019.
2. Jean Paul Tremblay, Sorenson, 'An Introduction to Data Structures with Applications'. 2nd Edition, McGraw Hill Publishing Company, New Delhi, 2017.

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REFERENCE BOOKS:

1. Amol M. Jagtap, Ajit S. Mali, 'Data Structures Using C – A Practical Approach for Beginners'. Chapman and Hall/CRC, 1st edition, 2021.
2. Aaron M Tanenbaum, Moshe J Augenstein and Yedidyah Langsam, 'Data Structures Using C and C++'. 2nd edition, Prentice Hall, 2021.

E-RESOURCES:

1. https://nptel.ac.in/courses/106102064
2. https://onlinecourses.nptel.ac.in/noc25_cs81/preview

CO's – PO's & PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	1	2	2	1	-	1	2	1	3	2	1	3
CO2	1	2	1	2	2	-	-	1	1	1	2	2	2	2
CO3	2	3	1	2	3	-	-	1	1	1	2	2	1	2
CO4	2	1	-	1	1	-	-	2	1	1	2	2	3	1
CO5	1	2	1	2	2	1	-	1	2	1	3	2	2	3
AVG	**1.6**	**2.2**	**1**	**1.8**	**2**	**1**	**-**	**1.2**	**1.4**	**1**	**2.4**	**2**	**1.8**	**2.2**

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

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25EEL31 SDG No:4,7,9	DC MACHINES AND TRANSFORMERS LABORATORY	L	T	P	C
		0	0	4	2

Course Objectives:

- Perform various tests on DC generators, DC motors, and single-phase transformers using appropriate instruments and connections.
- Obtain and analyze the operating and performance characteristics of DC machines under different loading conditions.
- Evaluate the speed control methods and efficiency of DC motors using standard testing procedures.
- Determine the parameters, losses, efficiency, and operating characteristics of single-phase transformers through experimental methods.

List of Experiments	60

1. OCC and load characteristics of self excited DC shunt generator.
2. OCC and load characteristics of separately excited DC shunt generator.
3. Load characteristics of DC series generator.
4. Load characteristics of DC compound generator (Differential and Cumulative).
5. Load characteristics of DC shunt motor.
6. Load characteristics of DC series motor.
7. Load characteristics of DC compound motor (Differential and Cumulative).
8. Speed control of DC shunt motor.
9. Swinburne's test on DC shunts motor.
10. Hopkinson's test.
11. OC and SC test on Single Phase Transformer.
12. Load test on Single Phase Transformer.
13. Parallel Operation of Single Phase Transformer.
14. Sumpner's Test on Single Phase Transformer

TotalHours	60

COURSEOUTCOMES

CO's	OUTCOMES
The students will be able to	
CO1	Perform tests and analyze the open-circuit and load characteristics of various DC generators.
CO2	Determine and interpret the performance characteristics of DC shunt, series, and

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	compound motors under different loading conditions.
CO3	Evaluate speed control methods and estimate the efficiency and losses of DC motors using Swinburne's and Hopkinson's tests.
CO4	Determine transformer parameters, losses, and efficiency using OC, SC, and Sumpner's tests on single-phase transformers.
CO5	Analyze the load characteristics and parallel operation of single-phase transformers for practical applications.

CO,PO &PSO MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	-	-	-	-	2	-	3	3	-
CO2	3	3	3	2	2	-	-	-	-	2	-	3	3	-
CO3	3	3	2	1	1	-	-	-	-	2	-	3	1	-
CO4	3	3	3	3	2	-	-	-	-	2	-	3	1	-
CO5	2	1	1	-	-	-	-	-	-	-	-	3	1	-
Avg	3	3	2	2	1	-	-	1	-	1	-	3	2	-

Reference:

1. SVHEC-Dc Machines And Transformers Laboratory Manual.

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25EEL32 SD NO:7,9,12	ELECTRONIC DEVICES AND CIRCUITS LABORATORY	L	T	P	C
		0	0	4	2

Course Objectives:

- Investigate the characteristics and operation of semiconductor devices and transistor configurations through experimentation.
- Analyze the performance of electronic circuits such as amplifiers, oscillators, rectifiers, and filters.
- Design and test analog electronic circuits using active and passive components for various applications.
- Utilize laboratory instruments and measurement techniques to evaluate electronic circuit parameters and responses.

List of Experiments	60

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 Hours	60

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COURSEOUTCOMES

CO's	OUTCOMES
The students will be able to	
CO1	Analyze the characteristics of semiconductor devices and transistor configurations including diode, Zener diode, photodiode, phototransistor, and BJT experimentally.
CO2	Determine the characteristics and applications of JFET and UJT devices and generate saw-tooth waveforms using UJT circuits.
CO3	Design and evaluate the frequency response of amplifier circuits and differential amplifiers using FET.
CO4	Design and analyze oscillator circuits and perform measurement of frequency and phase angle using CRO.
CO5	Investigate the performance of rectifiers, filters, and light-activated relay circuits for practical electronic applications.

CO,PO &PSO MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	-	3	3	3	3	-	-	2	-	-	3	-	3	3
CO2	-	3	3	3	3	-	-	2	-	-	3	-	3	3
CO3	-	3	2	3	3	-	-	2	-	-	3	-	3	3
CO4	-	3	3	3	3	-	-	2	-	-	3	-	3	3
CO5	-	3	2	3	3	-	-	2	-	-	3	-	3	3
Avg	-	3	2.7	3	3	-	-	2	-	-	3	-	3	3

Reference:

1. SVHEC-Electronic Devices and Circuits laboratory Manual.

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