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

Regulation 2025

(Autonomous)

Curriculum and Syllabus

Choice Based Credit System (CBCS)

BE- ELECTRONICS AND COMMUNICATION ENGINEERING

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

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

I. Program Educational Objective (PEO)

PEO1: Successful career - To enable graduates have a successful career in academia or industries associated with Electronics and Communication Engineering, or as entrepreneurs.

PEO2: Foundational concepts - To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.

PEO3: Analyze Methodology - To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.

II. Program Outcomes (POs)

PO1: 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.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3: 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)

PO4: 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).

PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6: The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability

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with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8: Individual and Collaborative Teamwork: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9: 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

PO10: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.

PO11: 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: Core skills: Apply knowledge and skills to analyze, Design and develop analog and digital circuits for a electronics applications.

PSO2:Problem solving skills: Ability to Design and implement the approaches to solve challenges in the field of communication, signal processing, VLSI and Internet of Things (IoT).

PSO3: Professional career: Adapt to emerging Information and communication technologies (ICT) and develop innovative solutions for existing and newer problems.

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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														
		Communicative English - I	-	-	-	2	-	1	-	2	3	-	3	-	-	-
		Matrices and Calculus	3	3	1	1	-	-	-	2	-	2	3	-	-	-
		Engineering Physics	3	3	2	1	2	-	-	-	-	-	1	-	-	-
		Engineering Chemistry	3	2	2	1	1	2	-	-	-	-	1	-	-	-
		Problem Solving C Programming	2	3	3	3	2	-	-	-	-	2	2	3	3	3
		தமிழர் மரபு /Heritage of Tamils	-	-	-	-	-	1	1	-	1	-	-	-	-	-
		Idea Lab	2	3	3	3	2	-	-	-	-	2	2	3	3	3
		Yoga for Human Excellence	-	-	-	-	-	-	1	3	3	-	2	-	-	-
I	II	Communicative English - II	-	1	1	-	-	1	1	2	3	-	2	-	-	-
		Numerical Methods and Differential Equations	3	3	1	1	1	-	-	2	-	2	3	-	-	-
		Physics for Electronics Engineering	3	2	2	1	-	1	-	-	-	-	2	3	1	-
		Electric Circuit Analysis	3	3	2	2	-	-	-	-	1	-	-	3	3	2
		Python Programming	3	3	1	1	1	1	-	-	-	-	-			
		Engineering Graphics and CAD Modeling	3	1	2	-	2	-	-	-	3	-	2	2	2	-
		தமிழரும் தொழில்நுட்பமும் /Tamils and Technology	2	-	-	-	-	2	2	2	2	-	2			
		Vision Exploration Laboratory	3	-	-	3	-	-	-	-	-	-	-	2	1	1
II	III	Probability Theory and Complex functions	3	3	1	1	-	-	-	2	-	-	3	-	-	-
		Data Structures using C++	3	3	3	-	-	-	-	-	-	-	-	1	-	-
		Electronic Devices and Circuits	3	3	2	1	-	-	-	-	-	-	-	1	-	-
		Signals and Systems	3	3	2	1	-	-	-	-	-	-	1	1	-	-
		Electromagnetic fields	3	3	1	1	1	-	-	-	-	-	-	-	1	1
		Digital Systems Design	3	3	2	-	-	-	-	-	-	-	1	1	-	-
		Electronic Devices and Circuits Laboratory	2	2	2	1.6	1	-	-	-	-	-	-	2	2	2
		Digital Systems Design Laboratory	3	2	1	1	1	-	-	1	2	-	-	-	1	1
		Data Structures using C++ Laboratory	3	2	1	1	-	-	-	1	2	1	-	2	-	-

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II	IV	Analog Communication	3	3	-	-	-	-	-	3	-	-	2	-	-	-
		Linear Integrated Circuits	3	2	1	1	-	-	-	-	-	1	-	2	1	-
		Transmission lines and Waveguides	3	2	1	1	1	-	-	-	-	-	-	2	-	-
		Microprocessor and Microcontroller	3	2	2	2	-	-	-	-	-	-	-	2	1	-
		Digital Signal Processing	3	2	2	2	1	-	-	1	1	1	-	2	1	-
		Computer architecture and organization	3	2	2	2	1	-	-	1	1	1	-	2	1	-
		Introduction to Standards in Electronics and Communication	3	3	1	1	1	1	-	1	1	1	-	1	-	1
		Soft and Analytical Skills-I	3	3	1	1	1	-	-	1	1	1	-	1	-	-
		Analog Communication Laboratory	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Linear Integrated Circuits Laboratory	3	2	1	1	-	-	-	1	2	1	-	2	-	-
		Microprocessor and Microcontroller Laboratory	3	2	1	1	-	-	-	1	2	1	-	2	-	-

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

SUMMARY OF CREDITS

S.No	Course Category	Credits per Semester								Total Credits	Credits in %	Credits as per AU Curriculum R-2025	Credits as per AICTE Model Curriculum R-2022
		I	II	III	IV	V	VI	VII	VIII				
1	BS	11	6	4	-	-	-		-	21	11.3	17	16
2	HUM	5	4		-	-	-	8	-	17	9.1	18	23
3	ES(G)		4	-	-	-	-	-	-	4	2.15	9	29
4	ES(PC)	4	8	21.5	24.5	20	14	14	_	106	56.98	98	59
5	ES(PE)	-	-	-	-	3	6	-	-	9	4.83	15	12
6	OE	-	-	-	-	-	3	-	-	3	1.61	03	9
7	SL	-	-	-	-	-	1	-	-	1	0.53	01	15
8	SD	2	2	_	1	4	4	2	10	25	13.44	21	-
9	MC	√		√	√								
Total Credits / Semester		**22**	**24**	**23**	**21**	**23**	**23**	**20**	**10**	**186**	**100**	**185**	**163**

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CATEGORIZATION OF COURSES

1.Basic Science (BS)
2.Humanities(HUM)
3.Engineering Science (ES)
   i) General(G)
   ii) Program Core(PC)
   iii) Programme Elective(PE)
   iv) Emerging Technology(ET)
4. Open Elective(OE)
5. Self Learning(SL)
6. Skill Development(SD)
7. Value added Course(VA)
8. Off Campus(OC)
9. Mandatory Course(MC)

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.

Chairman
BoS / ECE

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

Regulation 2025 (UG)
Students Admitted AY 2025-26

Curriculum and Syllabus
B.E. Electronics and Communication 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, 7, 9, 11, 13	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**				

Chairman
BoS / ECE

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

Regulation 2025 (UG)
Students Admitted AY 2025-26

Curriculum and Syllabus
B.E. Electronics and Communication Engineering

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, 10,12	40	60	100
4.	25EEI23	Electric Circuit Analysis	ES(PC)	3	0	2	5	4	4, 6, 7, 9, 12, 13	50	50	100
5.	25CSI21	Python Programming	ES(PC)	3	0	2	5	4	4, 7, 9, 10,17	50	50	100
6.	25EEI21	Engineering Graphics and CAD Modeling	ES(G)	2	0	4	5	4	4, 7,9	50	50	100
7.	25TAT21	Tamils and Technology	HUM	1	0	0	1	1	2,4,6,9, 11	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**	**13**	**29**	**24**				

Chairman
BoS / ECE

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

Regulation 2025 (UG)
Students Admitted AY 2025-26
Curriculum and Syllabus
B.E. Electronics and Communication Engineering
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.	25CST31	Data Structures using C++	ES(PC)	3	0	0	3	3	4, 8, 9	40	60	100
3.	25ECT31	Electronic Devices and Circuits	ES(PC	3	0	0	3	3	4,7,9,11 ,12,13	40	60	100
4.	25ECT32	Signals and Systems	ES(PC)	3	1	0	4	4	4,9,11,1 2,13	40	60	100
5.	25ECT33	Electromagnetic Fields	ES(PC)	3	1	0	4	4	4,7,9,11 ,12,13	40	60	100
6.	25ECT34	Digital Systems Design	ES(PC)	3	0	0	3	3	4,7,9,11 ,12,13	40	60	100
Practicals												
7.	25ECL31	Electronic Devices and Circuits Laboratory	ES(PC)	0	0	3	3	1.5	4,7,8,9, 12	60	40	100
8.	25ECL32	Digital Systems Design Laboratory	ES(PC)	0	0	3	3	1.5	4,7,8,9, 12	60	40	100
9.	25CSL31	Data Structures using C++ Laboratory	ES(PC)	0	0	3	3	1.5	4,8,9	60	40	100
Mandatory Course												
10.		Mandatory Courses-II&	MC	3	0	0	3	0		100	-	100
			Total	**21**	**3**	**9**	**33**	**25.5**				

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

Chairman
BoS / ECE

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

Regulation 2025 (UG)
Students Admitted AY 2025-26
Curriculum and Syllabus
B.E. Electronics and Communication Engineering
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.	25ECT41	Analog Communication	ES(PC)	3	0	0	3	3	4,8,9,11	40	60	100
2.	25ECT42	Linear Integrated Circuits	ES(PC)	3	0	0	3	3	3,4,7,9	40	60	100
3.	25ECT43	Transmission lines and Waveguides	ES(PC)	3	0	0	3	3	4,7,9,11	50	50	100
4.	25ECT44	Microprocessor and Microcontroller	ES(PC)	3	0	0	3	3	4,9,11	40	60	100
5.	25ECI41	Digital Signal Processing	ES(PC)	3	0	2	5	4	3,4,9	50	50	100
6.	25ECT45	Computer Architecture and Organization	ES(PC)	3	0	0	3	3	4,9,11	40	60	100
7.	25ECT46	Introduction to Standards in Electronics and Communication	ES(PC)	1	0	0	0	1	4,8,9,10	100	-	100
8.	25SDC41	Soft and Analytical Skills - I	SD	1	0	0	1	1	4,8,10	100	-	100
Practicals												
9.	25ECL41	Analog Communication Laboratory	ES(PC)	0	0	3	3	1.5	4,9,11	60	40	100
10.	25ECL42	Linear Integrated Circuits Laboratory	ES(PC)	0	0	3	3	1.5	3,4,9,11	60	40	100
11.	25ECL43	Microprocessor and Microcontroller Laboratory	ES(PC)	0	0	3	3	1.5	3,4,9,11	60	40	100
Mandatory Course												
12.		Mandatory Courses-III&	MC	3	0	0	3	0		100	-	100
			Total	**21**	**0**	**11**	**20**	**25.5**				

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

Chairman
BoS / ECE

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

Regulation 2025 (UG)
Students Admitted AY 2025-26
Curriculum and Syllabus
B.E. Electronics and Communication Engineering
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.	25ECT51	Digital Communication	ES(PC)	3	0	0	3	3	4,9,11	40	60	100
2.	25ECT52	Embedded Systems and Industrial IoT	ES(PC)	3	0	0	3	3	4,8,9,11	40	60	100
3.	25ECT53	Control System	ES(PC)	3	1	0	3	4	4,7,8,9,11	40	60	100
4.	25ECT54	Antenna and wave Propagation	ES(PC)	3	0	0	3	3	4,9,11	40	60	100
5.	25ECI51	Data Communication Networks	ES(PC)	3	0	2	5	4	4,8,9,11	50	50	100
6.		Programme Elective I*	ES(PE)	-	-	-	-	3		40	60	100
7.	23ECI52	Industry Oriented Course-I	SD	1	0	2	3	2		50	50	100
8.	25SDC51	Soft and Analytical Skills – II	SD	1	0	0	1	1	4,8	100	-	100
Practicals												
9.	25ECL51	Digital Communication Laboratory	ES(PC)	0	0	3	3	1.5	4,9,11	60	40	100
10.	25ECL52	Embedded Systems and Industrial IoT Laboratory	ES(PC)	0	0	3	3	1.5	4,8,9, 11	60	40	100
11.	25ECL53	Summer internship -I@	SD	0	0	0	0	1	3,4,6,7,8, 9,11	100	-	100
		Total		**17**	**1**	**10**	**27**	**27**				
For Honours Degree												
12.		Capstone Design Project-Level I	SD	0	0	12	12	6		40	60	100
OR												
13.		Honours Elective-III	T	3	0	0	3	3		40	60	100

Chairman
BoS / ECE

14.		Honours Elective-IV	T	3	0	0	3	3		40	60	100
For Minor Degree												
15.		Minor Elective-III	T	3	0	0	3	3		40	60	100
16.		Minor Elective-IV	T	3	0	0	3	3		40	60	100

*** Programme Elective – I shall be chosen from the list of Programme electives (Streams) offered by same Programme..**

Chairman
BoS / ECE

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

Regulation 2025 (UG)
Students Admitted AY 2025-26
Curriculum and Syllabus
B.E. Electronics and Communication Engineering
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.	25ADI61	Essentials of Machine Learning	ES(PC)	3	0	2	5	4	4,8,9,10, 12,16	50	50	100
2.	25CYT61	Climate Change and Sustainability	HUM	2	0	0	2	2	4,6,7,9, 11	40	60	100
3.	25ECT61	VLSI and Chip Design	ES(PC)	3	0	0	3	3	4,8,9,11	40	60	100
4.	25ECT62	Wireless Communication	ES(PC)	3	0	2	5	4	4,9,10, 11	40	60	100
5.		Programme Elective II*	ES(PE)	-	-	-	-	3		40	60	100
6.		Programme Elective III*	PE(PE)	-	-	-	-	3		40	60	100
7.	23ECI61	Industry Oriented Course –II	SD	1	0	2	3	2		50	50	100
8.		Self learning course	SL	1	0	0	0	1		100	-	100
Practical's												
9.	25ECL61	VLSI Design Laboratory	ES(PC)	0	0	3	3	1.5	4,8,9, 11	60	40	100
10.	25ECL62	Wireless Communication Laboratory	ES(PC)	0	0	3	3	1.5	4,9,11	60	40	100
11.	25ECL63	Mini project	SD	0	0	0	4	2	2,3,4,7, 9,11	100	-	100
		Total		**12**	**0**	**12**	**28**	**27**				
For Honours Degree												
12.		Capstone Design Project-Level II	SD	0	0	12	12	6		40	60	100
OR												
13.		Honours Elective-III	T	3	0	0	3	3		40	60	100
14.		Honours Elective-IV	T	3	0	0	3	3		40	60	100

For Minor Degree												
15.		Minor Elective-III	T	3	0	0	3	3		40	60	100
16.		Minor Elective-IV	T	3	0	0	3	3		40	60	100

*** Programme Elective – II & III shall be chosen from the list of Programme electives (Streams) offered by same Programme.**

@ The students individually undergo Summer Internship in reputed firms/ research institutes / laboratories for the specified duration (04 Weeks) during summer vacation. After the completion of training, a detailed report should be submitted within ten days from the commencement of VII semester.

Chairman
BoS / ECE

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

Regulation 2025 (UG)
Students Admitted AY 2025-26
Curriculum and Syllabus
B.E. Electronics and Communication Engineering
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.	25UHV71	Universal Human Values – II	HUM	3	0	0	3	3	3,4,5,10, 11,16	40	60	100
2.	25ECT71	RF and Microwave Engineering	ES (PC)	3	0	0	3	3	4,8,9,11	40	60	100
3.	25EST71	Engineering Entrepreneurship and Development	HUM	3	0	0	3	3	4,5,8,9	40	60	100
4.	25ECT72	Millimeter wave and optical communication	ES (PC)	3	0	0	3	3	4,8,9,12, 13,15	40	60	100
5.		Programme Elective IV*	ES(PC)	-	-	-	-	3		40	60	100
6.		Programme Elective V*	ES(PC)	-	-	-	-	3		40	60	100
7.		Open Elective-I*	PE(OE)	-	-	-	-	3		40	60	100
Practicals												
8.	25ECL71	Microwave and Optical Laboratory	ES(PC)	0	0	4	4	2	4,9,11	60	40	100
9.	25ECL72	Summer internship-II@	SD	0	0	0	0	2	3,4,6,7,8,9, 11	100	-	100
			Total	**12**	**0**	**4**	**17**	**25**				
For Honours Degree												
10.		Capstone Design Project-Level III	SD	0	0	12	12	6		40	60	100
OR												
11.		Honours Elective-III	T	3	0	0	3	3		40	60	100
12.		Honours Elective-IV	T	3	0	0	3	3		40	60	100
For Minor Degree												
13.		Minor Elective-III	T	3	0	0	3	3		40	60	100

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14.		Minor Elective-IV	T	3	0	0	3	3		40	60	100

*** Programme Elective – IV & V shall be chosen from the list of Programme electives (Streams) offered by same Programme**

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

@ The students undergone Summer Internship - II during VI semester summer vacation and same will be evaluated in VII semester.

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

Regulation 2025 (UG)
Students Admitted AY 2025-26

Curriculum and Syllabus
B.E. Electronics and Communication Engineering

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.	25ECL81	Project Work	SD	0	0	20	20	10	4,8,9, 10,17	60	40	100
			Total	**0**	**0**	**20**	**20**	**10**				

TOTAL CREDITS: 186

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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

MANDATORY COURSES III											
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	Industrial Safety	MC	3	0	0	3	0	100	-	100

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PROGRAMME ELECTIVE COURSES: STREAMS

Semiconductor Chip Designand Testing	Signal Processing	RF Technologies	Biomedical Technologies	Underwater Technologies	Sensor Technologies and IoT	Space Technologies	High Speed Communications
Application specific Integrated circuit	Advanced Digital Signal Processing	RF Transceivers	Wearable Sensor Devices	Underwater Instrumentation System	Advanced Driver Assistance Systems	Radar Technologies	Optical Communication & Networks
VLSI Signal Processing	Image Processing	Signal Integrity	Medical Instrumentation	Underwater Imaging Systems	IoT Based System Design	Avionics Systems	Wireless Broad Band Networks
Low Power IC Design	Speech Processing	Antenna Design and Wave Guide	Robotics in medicine	Underwater Communication	Ad hoc and Wireless Sensor Networks	Positioning and Navigation Systems	5G and Beyond Communication Networks
VLSI Testing and Design For Testability	Deep Learning	MICs and RF System Design	Artificial Intelligence in Healthcare	Underwater Wireless Sensor Networks	Industry standard	Satellite Communication	Software Defined Networks
Mixed Signal IC Design Testing	DSP Architecture and Programming	EMI/EMC Pre Compliance Testing	Medical Imaging Systems	Underwater Navigation Systems	MEMS Design	Remote Sensing	Massive MIMO Networks
Analog IC Design	Computer Vision	RF ID System Design & Testing	Brain Computer Interface and Applications	Ocean Acoustics	Vehicular Technology	Rocketry and Space Mechanics	Advanced Wireless Communication Techniques
Fundamentals of nano electronics	Wavelets and its applications	RF passive circuits	Bio Inspired Computing	Underwater signal processing	Sensors and actuator devices for IoT	Spacecraft sensors and instrumentation	Green radio communication Techniques
Organic semiconductors, polymers and molecular electronics	Optical computing and signal Processing	Advanced radiation systems	Human Assistive Devices	Underwater acoustic communication	Foundation of robotics	Orbital mechanics	Multicarrier wireless communication

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Registration of Programme Elective Courses from Streams:

Programme Elective Courses will be registered in Semesters V, VI and VII. These courses are listed in groups called verticals that represent a particular area of specialization / diversified group. Students are permitted to choose all the Programme Electives from a particular Streams or from different Streams. Further, only one Programme 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 and 19).

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PROGRAMME ELECTIVE COURSES: STREAMS

STREAM1-SEMICONDUCTOR CHIP DESIGN AND TESTING											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE11	Application specific Integrated circuit	PE	3	0	0	3	3	40	60	100
2.	25ECE12	VLSI Signal Processing	PE	3	0	0	3	3	40	60	100
3.	25ECE13	Low Power IC Design	PE	3	0	0	3	3	40	60	100
4.	25ECE14	VLSI Testing and Design For Testability	PE	2	0	2	4	3	50	50	100
5.	25ECE15	Mixed Signal IC Design Testing	PE	2	0	2	4	3	50	50	100
6.	25ECE16	Analog IC Design	PE	2	0	2	4	3	50	50	100
7.	25ECE17	Fundamentals of nano electronics	PE	3	0	0	3	3	40	60	100
8.	25ECE18	Organic semiconductors, polymers and molecular electronics	PE	3	0	0	3	3	40	60	100

STREAM-2 SIGNAL PROCESSING											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE21	Advanced Digital Signal Processing	PE	2	0	2	4	3	50	50	100
2.	25ECE22	Image Processing	PE	3	0	0	3	3	40	60	100
3.	25ECE23	Speech Processing	PE	2	0	2	4	3	50	50	100
4.	25ECE24	Deep Learning	PE	2	0	2	4	3	50	50	100
5.	25ECE25	DSP Architecture and Programming	PE	2	0	2	4	3	50	50	100
6.	25ECE26	Computer Vision	PE	2	0	2	4	3	50	50	100
7.	25ECE27	Wavelets and its applications	PE	3	0	0	3	3	40	60	100
8.	25ECE28	Optical computing and signal Processing	PE	3	0	0	3	3	40	60	100

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STREAM-3- RF TECHNOLOGIES											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE31	RF Transceivers	PE	2	0	2	4	3	50	50	100
2.	25ECE32	Signal Integrity	PE	2	0	2	4	3	50	50	100
3.	25ECE33	Antenna Design and Wave guide	PE	2	0	2	4	3	50	50	100
4.	25ECE34	MICs and RF System Design	PE	2	0	2	4	3	50	50	100
5.	25ECE35	EMI/EMC Pre Compliance Testing	PE	2	0	2	4	3	50	50	100
6.	25ECE36	RFID System Design and Testing	PE	2	0	2	4	3	50	50	100
7.	25ECE37	RF passive circuits	PE	3	0	0	3	3	40	60	100
8.	25ECE38	Advanced radiation systems	PE	3	0	0	3	3	40	60	100

STREAM-4 BIOMEDICALTECHNOLOGIES											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE41	Wearable Sensor Devices	PE	3	0	0	3	3	40	60	100
2.	25ECE42	Medical Instrumentation	PE	3	0	0	3	3	40	60	100
3.	25BME44	Robotics in medicine	PE	3	0	0	3	3	40	60	100
4.	25BME47	Artificial Intelligence in Healthcare	PE	3	0	0	3	3	40	60	100
5.	25BME54	Medical Imaging Systems	PE	3	0	0	3	3	40	60	100
6.	25BME55	Brain Computer Interface and Applications	PE	3	0	0	3	3	40	60	100
7.	25BME58	Bio Inspired Computing	PE	3	0	0	3	3	40	60	100
8.	25BME73	Human Assistive Devices	PE	3	0	0	3	3	40	60	100

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STREAM-5 UNDERWATERTECHNOLOGIES											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE51	Under water Instrumentation System	PE	3	0	0	3	3	40	60	100
2.	25ECE52	Under water Imaging Systems	PE	2	0	2	4	3	50	50	100
3.	25ECE53	Underwater Communication	PE	2	0	2	4	3	50	50	100
4.	25ECE54	Underwater Wireless Sensor Networks	PE	2	0	2	4	3	50	50	100
5.	25ECE55	Under water Navigation Systems	PE	3	0	0	3	3	40	60	100
6.	25ECE56	Ocean Acoustics	PE	2	0	2	4	3	50	50	100
7.	25ECE57	Underwater signal processing	PE	3	0	0	3	3	40	60	100
8.	25ECE58	Underwater acoustic communication	PE	3	0	0	3	3	40	60	100

STREAM-6 SENSOR TECHNOLOGIES AND IOT											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE61	Advanced Driver Assistance Systems	PE	3	0	0	3	3	40	60	100
2.	25ECE62	IoT Based System Design	PE	3	0	0	3	3	40	60	100
3.	25ECE63	Ad hoc and Wireless Sensor Networks	PE	3	0	0	3	3	40	60	100
4.	25ECE64	Industrial IoT and Industry standard	PE	2	0	2	4	3	50	50	100
5.	25ECE65	MEMS Design	PE	2	0	2	4	3	50	50	100
6.	25ECE66	Vehicular Technology	PE	3	0	0	3	3	40	60	100
7.	25ECE67	Sensors and actuator devices for IoT	PE	3	0	0	3	3	40	60	100
8.	25ECE68	Foundation of robotics	PE	3	0	0	3	3	40	60	100

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STREAM-7 SPACE TECHNOLOGIES											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE71	Radar Technologies	PE	3	0	0	3	3	40	60	100
2.	25ECE72	Avionics Systems	PE	3	0	0	3	3	40	60	100
3.	25ECE73	Positioning and Navigation Systems	PE	3	0	0	3	3	40	60	100
4.	25ECE74	Satellite Communication	PE	3	0	0	3	3	40	60	100
5.	25ECE75	Remote Sensing	PE	3	0	0	3	3	40	60	100
6.	25ECE76	Rocketry and Space Mechanics	PE	3	0	0	3	3	40	60	100
7.	25ECE77	Spacecraft sensors and insrumentation	PE	3	0	0	3	3	40	60	100
8.	25ECE78	Orbital mechanics	PE	3	0	0	3	3	40	60	100

STREAM-8 HIGH SPEED COMMUNICATIONS											
S.No	Course Code	Course Title	Category	Periods / Week			Total Contact Period	Credits	Max.Marks		
				L	T	P			CA	ES	TM
1.	25ECE81	Optical Communication & Networks	PE	3	0	0	3	3	40	60	100
2.	25ECE82	Wireless Broad Band Networks	PE	3	0	0	3	3	40	60	100
3.	25ECE83	5G and Beyond Communication Networks	PE	2	0	2	4	3	50	50	100
4.	25ECE84	Software Defined Networks	PE	2	0	2	4	3	50	50	100
5.	25ECE85	Massive MIMO Networks	PE	2	0	2	4	3	50	50	100
6.	25ECE86	Advanced Wireless Communication Techniques	PE	3	0	0	3	3	40	60	100
7.	25ECE87	Green radio communication Techniques	PE	3	0	0	3	3	40	60	100
8.	25ECE88	Multicarrier wireless communication	PE	3	0	0	3	3	40	60	100

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OPEN ELECTIVES

S.NO.	COURSE CODE	COURSE TITLE	Category	PERIODS PER WEEK			Total Contact Period	Credits	Max. Marks		
				L	T	P			CA	ES	TM
OFFERED BY DEPARTMENT OF CIVIL ENGINEERING											
1	25CEO11	Civil and Infrastructure Engineering	OE	3	0	0	3	3	40	60	100
2	25CEO12	Environmental Pollution and waste management	OE	3	0	0	3	3	40	60	100
3	25CEO13	Environmental Impact Assessment	OE	3	0	0	3	3	40	60	100
4	25CEO14	Building Services	OE	3	0	0	3	3	40	60	100
5	25CEO15	Water, Sanitation and Health	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING											
1	25CSO11	Foundation of AR/VR	OE	3	0	0	3	3	40	60	100
2	25CSO12	Web Designing	OE	3	0	0	3	3	40	60	100
3	25CSO13	Block Chain fundamentals	OE	3	0	0	3	3	40	60	100
4	25CSO14	Knowledge Management	OE	3	0	0	3	3	40	60	100
5	25CSO15	Cloud Computing Essentials	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING											
1	25ECO11	Basics of Electronics in Automation	OE	3	0	0	3	3	40	60	100
2	25ECO12	Wireless Optical Communication	OE	3	0	0	3	3	40	60	100
3	25ECO13	Soft Computing techniques	OE	3	0	0	3	3	40	60	100
4	25ECO14	Consumer electronics	OE	3	0	0	3	3	40	60	100
5	25ECO15	Principles of communication Engineering	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING											
1.	25EEO11	Renewable Energy Sources	OE	3	0	0	3	3	40	60	100
2.	25EEO12	Electrical Vehicle	OE	3	0	0	3	3	40	60	100
3.	25EEO13	Energy Auditing and Conservation	OE	3	0	0	3	3	40	60	100
4.	25EEO14	Domestic and Industrial Electrical Installations	OE	3	0	0	3	3	40	60	100
5.	25EEO15	Embedded System Design and Control	OE	3	0	0	3	3	40	60	100

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OFFERED BY DEPARTMENT OF MECHANICAL ENGINEERING											
1	25MEO11	Industrial Instrumentation	OE	3	0	0	3	3	40	60	100
2	25MEO12	Energy Technology	OE	3	0	0	3	3	40	60	100
3	25MEO13	Reverse Engineering	OE	3	0	0	3	3	40	60	100
4	25MEO14	Fire Safety Engineering	OE	3	0	0	3	3	40	60	100
5	25MEO15	Entrepreneurship Development	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT ARTIFICIAL INTELLIGENCE AND DATA SCIENCE											
1	25ADO11	Introduction to Big Data	OE	3	0	0	3	3	40	60	100
2	25ADO12	Principles of Data Science	OE	3	0	0	3	3	40	60	100
3	25ADO13	Data Visualization and its Applications	OE	3	0	0	3	3	40	60	100
4	25ADO14	Data Warehousing and Mining	OE	3	0	0	3	3	40	60	100
5	25ADO15	Principles of Cyber Security	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT INFORMATION TECHNOLOGY											
1	25ITO11	Basics of Java Programming	OE	3	0	0	3	3	40	60	100
2	25ITO12	Ethical Hacking	OE	3	0	0	3	3	40	60	100
3	25ITO13	E-Commerce and Applications	OE	3	0	0	3	3	40	60	100
4	25ITO14	Basics of Android Application Development	OE	3	0	0	3	3	40	60	100
5	25ITO15	Introduction to Web Design	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF PHARMACEUTICAL TECHNOLOGY											
1	25PTO11	Nutraceuticals	OE	3	0	0	3	3	40	60	100
2	25PTO12	IPR for Pharma Industry	OE	3	0	0	3	3	40	60	100
3	25PTO13	Pharmaceutical Nanotechnology	OE	3	0	0	3	3	40	60	100
4	25PTO14	Basics of Human Anatomy and physiology	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT BIOMEDICAL ENGINEERING											
1	25BMO11	Biosensors and Instrumentation	OE	3	0	0	3	3	40	60	100
2	25BMO12	Medical Robotics	OE	3	0	0	3	3	40	60	100
3	25BMO13	Biometric Technology	OE	3	0	0	3	3	40	60	100
4	25BMO14	Healthcare Management systems	OE	3	0	0	3	3	40	60	100
5	25BMO15	IoT in Healthcare	OE	3	0	0	3	3	40	60	100

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OFFERED BY DEPARTMENT OF COMPUTERSCIENCE AND ENGINEERING (CYBER SECURITY)											
1	25CRO11	Mobile Device Security	OE	3	0	0	3	3	40	60	100
2	25CRO12	Malware Analysis	OE	3	0	0	3	3	40	60	100
3	25CRO13	Hardware Security	OE	3	0	0	3	3	40	60	100
4	25CRO14	Web and Mobile Application Security	OE	3	0	0	3	3	40	60	100
5	25CRO15	Information Security	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF COMPUTERSCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE AND MACHINE ENGINEERING)											
1	25AMO11	Ai for Everyone	OE	3	0	0	3	3	40	60	100
2	25AMO12	Machine Learning and its Applications	OE	3	0	0	3	3	40	60	100
3	25AMO13	Quantum AI	OE	3	0	0	3	3	40	60	100
4	25AMO14	Reinforcement Learning	OE	3	0	0	3	3	40	60	100
5	25AMO15	Network Automation using AIML	OE	3	0	0	3	3	40	60	100
OFFERED BY DEPARTMENT OF BIOTECHNOLOGY											
1	25BTO11	Biofertilizer Technology	OE	3	0	0	3	3	40	60	100
2	25BTO12	Ecology	OE	3	0	0	3	3	40	60	100
3	25BTO13	Biotechnology for Forensics	OE	3	0	0	3	3	40	60	100
4	25BTO14	Microbiology and Micromolecule	OE	3	0	0	3	3	40	60	100
5	25BTO15	Biodiversity and Taxonomy	OE	3	0	0	3	3	40	60	100

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		L	T	P	C
25IPA11 SDG No. 3,4,10,11,16	INDUCTION PROGRAMME (Common to B.E./B.Tech. all Branches)	-	-	-	0

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

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

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

"One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character. " Hence, the purpose of this programme is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.

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

(i) Ice breaking :

Ice-breaking activities were conducted within the respective departments/branches to facilitate interaction among students. These sessions helped participants become acquainted with one another, fostered a sense of belonging, and encouraged teamwork and effective communication. The activities created a friendly and engaging learning environment.

(ii) Creative Arts and Physical Activities:

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program. These would allow for creative expression and it would develop a sense of aesthetics and also enhance creativity which would, hopefully, grow into engineering design later. Physical Activities would involve a daily routine of physical activity with games and sports, gardening, etc.

(iii) Universal Human Values:

This is the anchoring activity of the Induction Programme. It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting stay in the hostel and department, be sensitive to others, etc. A module in Universal Human

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Values provides the base. Methodology of teaching this content is extremely important. It must not be through do's and dont's, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing.

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

(iv) Literary Activity:

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

(v) Proficiency Modules:

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

(vi) Lectures by Eminent People:

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

(vii) Visits to Local Area:

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

(viii) Familiarization to Dept./Branch & Innovations:

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

(ix) Department Specific Activities:

About a week can be spent in introducing activities (games, quizzes, social interactions, small experiments, design thinking etc.) that are relevant to the particular branch of Engineering/Technology/Architecture that can serve as a motivation and kindle interest in building things (become a maker) in that particular field. This can be conducted in the form of a workshop.

For example, CSE and IT students may be introduced to activities that kindle computational thinking, and get them to build simple games. ECE students may be introduced to building simple circuits as an extension of their knowledge in Science, and so on. Students may be asked to build stuff using their knowledge of science.

(x) Life at SVHEC and its activities:

A campus tour was organized to familiarize students with the college infrastructure and facilities. During the tour, students visited various academic blocks, laboratories, library, seminar halls, sports facilities, administrative offices, and other important locations within the campus. The session helped students gain a better understanding of the resources available to support their academic and personal development while fostering a sense of comfort and belonging in the new environment.

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A session on college activities was conducted to introduce students to the various academic, co-curricular, and extracurricular opportunities available on campus. Students were informed about clubs, professional societies, cultural events, sports activities, community service initiatives, and skill development programmes. The session encouraged active participation and highlighted the importance of holistic development alongside academic excellence.

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

REFERENCES:

1. Guide to Induction program from AICTE

COURSE OUTCOMES:

At the end of the course the students will be able

CO1: To listen to and understand general and complex academic information
CO2: To listen to and understand different points of view in a discussion
CO3: To speak fluently and accurately in formal and informal communicative contexts
CO4: To describe products and processes and explain their uses clearly as well a accurately
CO5: To express their opinions effectively in both formal and informal discussions

E. RESOURCES:

- https://www.ted.com/about/programs-initiatives/ted-talks-education
- https://learnenglish.britishcouncil.org/

CO's & PO's MAPPING:

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

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

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
CO1	-	-	-	-	-	-	-	2	3	-	3
CO2	-	-	-	-	-	-	-	2	3	-	2
CO3	-	-	-	1	-	-	-	3	3	-	3
CO4	-	-	-	1	-	-	-	3	3	-	3
CO5	-	-	-	-	-	-	-	2	3	-	2
AVR	-	-	-	1.00	-	-	-	2.40	3.00	-	2.60

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

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

COURSE OBJECTIVES:

- To understand the concepts of eigen values, eigenvectors 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

CO's – PO'sMAPPING:

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

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

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

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TOTAL: 45 PERIODS

LIST OF EXERCISE/EXPERIMENTS

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.

TOTAL: 30 PERIODS

TOTAL: 45 + 30 =75 PERIODS

COURSE OUTCOME

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
CO1	3	3	2	1	1	-	-	-	-	-	-
CO2	3	3	2	1	1	-	-	-	-	-	-
CO3	3	2	2	1	2	-	-	-	-	-	-
CO4	3	2	2	1	2	-	-	-	-	-	-
CO5	3	3	1	1	2	-	-	-	-	-	-
AVG	3.0	2.6	1.8	1.0	1.6	-	-	-	-	-	-

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

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Shree Venkateshwara Hi-Tech Engineering College (Autonomous)

25CYI11	ENGINEERING CHEMISTRY	L	T	P	C
SDG No. 4,6,7	(B.E./B.Tech-Common to 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

Classification 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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LIST OF EXPERIEMENTS

1. Determination of types and amount of alkalinity in a water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of chloride content of water sample by Argentometric method.
4. Determination of strength of given hydrochloric acid using pH meter.
5. Determination of strength of acids in a mixture of acids 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

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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ONLINE SOURCES:

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=0EWCqCIsFOA&list=PLyqSpQzTE6M8682dGkNTN8936vSY4CbqZ (NPTEL-NOC IITM)

Unit 3:
https://www.youtube.com/watch?v=jSNlmOwpxYg&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
CO1	3	3	3	3	1	3	-	-	-	-	-
CO2	3	2	2	1	3	3	-	-	-	-	2
CO3	3	2	2	2	2	2	-	-	-	-	-
CO4	3	2	3	2	2	2	-	-	-	-	-
CO5	3	2	2	2	2	2	-	-	-	-	-
AVG	3	2	2	2	2	2	-	-	-	-	2

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

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25CSI11
SDG No: 4, 8, 9, 10,17

PROBLEM SOLVING USING C PROGRAMMING
(Common to: B.E. / B.Tech. all Branches)

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

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அலகு - V

இந்திய தேசிய இயக்கம் மற்றும்
இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு

3

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

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

மின் - ஆதாரங்கள்:

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

CO's -PO's விவரணையாக்கம்::

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

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Shree Venkateshwara Hi-Tech Engineering College

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.

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.

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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

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
CO1	-	-	-	-	-	1	1	-	1	-	-
CO2	-	-	-	-	-	1	1	-	1	-	-
CO3	-	-	-	-	-	1	1	-	1	-	-
CO4	-	-	-	-	-	1	1	-	1	-	-
CO5	-	-	-	-	-	1	1	-	1	-	-
AVG	-	-	-	-	-	1	1	-	1	-	-

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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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BoS / Mech

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

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

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.

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		L	T	P	C
25ENI21	COMMUNICATIVE ENGLISH – II				
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
CO1	-	-	-	-	-	-	-	3	3	-	3
CO2	-	-	-	-	-	-	-	3	3	-	3
CO3	-	-	-	-	-	-	-	3	3	-	2
CO4	-	-	-	-	-	-	-	3	3	-	2
CO5	-	-	-	-	-	-	-	3	3	-	2
AVR	-	-	-	-	-	-	-	3.00	3.00	-	2.40

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

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

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

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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.
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 MAPPING

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

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

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25PHT23 SDG No. 3, 7, 8, 9, 10, 12	PHYSICS FOR ELECTRONICS ENGINEERING (Common to B.E. ECE, EEE)	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- To understand the electrical properties of materials
- To instill knowledge on physics of semiconductors, determination of charge carriers and device applications
- To understand the theory and applications of dielectric materials
- To establish a sound grasp of knowledge on different optical properties of materials, optical displays and applications
- To provide the students a sound platform towards learning about new engineering materials and their applications

UNIT-I ELECTRICAL PROPERTIES OF MATERIALS 9

Classical free electron theory – Expression for electrical conductivity – Thermal conductivity, expression – Wiedemann-Franz law – Success and failures – electrons in metals – Fermi- Dirac statistics – Density of energy states – Electron in periodic potential – Energy bands in solids.

UNIT-II SEMICONDUCTING MATERIALS 9

Intrinsic Semiconductors – Energy band diagram – direct and indirect band gap semiconductors – Carrier concentration in intrinsic semiconductors – extrinsic semiconductors – Carrier concentration in N-type & P-type semiconductors –Variation of Fermi level with temperature and impurity concentration - Hall effect and devices – Ohmic contacts – Schottky diode.

UNIT-III DIELECTRIC MATERIALS 9

Dielectrics – Dielectric constant – Polarization – Electric susceptibility – Types of polarization mechanisms: Electronic, ionic, orientational and space-charge –Frequency and temperature dependence – Dielectric loss – Dielectric breakdown – Ferroelectric materials.

UNIT-IV OPTICAL PROPERTIES OF MATERIALS 9

Classification of optical materials – carrier generation and recombination processes - Absorption emission and scattering of light in metals, insulators and semiconductors (concepts only) - photo current in a P-N diode – solar cell - LED – Organic LED – Laser

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diodes – Optical data storage techniques.

UNIT-V **NEW ENGINEERING MATERIALS** 9

Ceramics – types and applications – Composites: classification, role of matrix and reinforcement – processing of fibre reinforced plastics and fibre reinforced metals – Metallic glasses: Properties, preparation and applications – Shape memory alloys: Characteristics and applications – Carbon nanotubes: Properties and applications

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1:	Gain knowledge on the electrical properties of materials and their applications
CO2:	Understand clearly of semiconductor physics and functioning of semiconductor devices
CO3:	Get knowledge on theories and applications of dielectric materials
CO4:	Understand the optical properties of materials and working principles of various optical devices
CO5:	The students will understand the basics of ceramics, composites and nanomaterials

TEXT BOOKS:

1. S.O. Kasap, "Principles of Electronic Materials and Devices", McGraw Hill Education (Indian Edition), 2020.
2. R.Balasubramaniam, Callister's Materials Science and Engineering. Wiley (Indian Edition), 2020.

REFERENCE BOOKS:

1. Laszlo Solymar, Walsh, Donald, Syms and R.A. Richard, "Electrical Properties of Materials", Oxford Univ. Press (Indian Edition) 2015.
2. Jasprit Singh, "Semiconductor Optoelectronics: Physics and Technology", McGraw-Hill Education (Indian Edition), 2019.
3. Charles Kittel, "Introduction to Solid State Physics", Wiley India Edition, 2022.

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E- Resources:

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mm63
2. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mm67
3. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ph56

CO's –PO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	-	-	-	-	-	-	-	-
CO2	3	2	1	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	-	-
CO4	3	2	1	-	-	-	-	-	-	-	-
CO5	3	1	1	-	-	-	-	-	-	-	-
AVG	3.0	1.8	1.0	-	-	-	-	-	-	-	-

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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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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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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25TAT21	தமிழரும் தொழில்நுட்பமும்	L T P C
SDG No. 2, 4, 6, 9, 11	(B.E./B.Tech- அனைத்து பாடப்பிரிவுகளுக்கும் பொதுவானது)	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 நீர்பாசனத் 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 விவாதிப்பார்கள்.
CO5: பல்வேறு இணையப் பயன்பாடுகளில் அறிவியல் தமிழைப் பயன்படுத்திப்பார்ப்பார்கள்

மின் -ஆதாரங்கள்:

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

CO's -PO's விவரணையாக்கம்:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
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
AVG	2	-	-	-	-	2	2	2	2	-	2

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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 analyse 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

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

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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

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
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
AVG	2	-	-	-	-	2	2	2	2	-	2

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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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BoS / EEE

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 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.
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

CO'S – PO'S MAPPING:s

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

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

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25CST31 SDG No. 4,8,9,12,17	DATA STRUCTURES USING C++ (for B.E. – ECE)	L T P C 3 0 0 3

COURSE OBJECTIVES:

- To implement software solutions using C++ classes, objects, constructors, destructors, and operator overloading.
- To learn inheritance, polymorphism, virtual functions, and dynamic binding techniques for designing reusable and extensible object-oriented applications.
- To develop problem-solving skills by implementing and analyzing linear data structures such as arrays, stacks, queues, and linked lists using C++.
- To understand non-linear data structures including trees and graphs, their representations, traversals, and applications, along with the use of the Standard Template Library (STL).
- To analyze and evaluate searching and sorting algorithms based on asymptotic complexity and select appropriate algorithms for efficient data processing.

UNIT-I **DATA ABSTRACTION & OVERLOADING** 9

Overview of C++, Structures, Class Scope and Accessing Class Members, Reference Variables, Initialization, Constructors, Destructors, Member Functions and Classes, Friend Function, Dynamic Memory Allocation, Static Class Members, Container Classes and Integrators, Proxy Classes, Overloading: Function overloading and Operator Overloading.

UNIT-II **INHERITANCE & POLYMORPHISM** 9

Base Classes and Derived Classes, Protected Members, Casting Class pointers and Member Functions, Overriding, Public, Protected and Private Inheritance–Constructors and Destructors in derived Classes, Implicit Derived, Class Object to Base, Class Object Conversion, Composition Vs. Inheritance, Virtual functions, This Pointer, Abstract Base Classes and Concrete Classes, Virtual Destructors, Dynamic Binding.

UNIT-III **LINEAR DATA STRUCTURES** 9

Asymptotic Notations: Big-Oh, Omega and Theta, Best, Worst and Average case Analysis: Definition and an example, Arrays and its representations, Stacks and Queues, Linked lists, Linked list based implementation of Stacks and Queues, Evaluation of Expressions, Linked list based polynomial addition.

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UNIT-IV **NON-LINEAR DATA STRUCTURES** 9

Trees, Binary Trees, Binary tree representation and traversals, Threaded binary trees, Binary tree representation of trees, Application of trees: Set representation and Union, Find operations, Graph and its representations, Graph Traversals, Connected components. Standard template library.

UNIT-V **SEARCHING, SORTING AND COMPLEXITY ANALYSIS** 9

Insertion sort, Merge sort, Quicksort, Heapsort, Linear Search, Binary Search.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

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

CO1 : Apply C++ object-oriented programming concepts and overloading techniques

CO2 : Analyze inheritance and polymorphism mechanisms in C++

CO3 : Design and implement linear data structures and their applications

CO4 : Develop and utilize non-linear data structures and STL concepts

CO5 : Evaluate searching and sorting algorithms based on complexity analysis

TEXT BOOKS:

1. Bjarne Stroustrup, Programming: Principles and Practice Using C++, 3rd Edition, Addison-Wesley, 2024.
2. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 4th Edition, Pearson, 2014.

REFERENCE BOOKS:

1. Langsam, Augenstein and Tanenbaum, Data Structures Using C and C++,2ndEdition,Pearson Education, 2015.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, Introduction to Algorithms", Fourth Edition, Mcgraw Hill/ MIT Press, 2022.
3. AlfredV.Aho,Jeffrey D.Ullman, John E.Hopcroft, Data Structures and Algorithms,1st edition,Pearson, 2002.

E RESOURCES:

1. https://nptel.ac.in/courses
2. https://en.cppreference.com/

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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	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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25ECT31	ELECTRONIC DEVICES AND CIRCUITS	L	T	P	C
SDG No 4,7,9,12	(For B.E - ECE and BME)	3	0	0	3

COURSE OBJECTIVES:

To impart knowledge of

- Understand the structure of basic electronic devises
- Study the operation and applications of semiconductor devices and transistors.
- Exposing themselves to the operation and applications of amplifiers.
- Learn the principles of feedback amplifiers and oscillators.
- Design and simulate basic electronic circuits using LT spice

UNIT-I PN JUNCTION DEVICES 9

PN junction diode–structure, operation and V-I characteristics, diffusion and transient Capacitance-Rectifiers–Half Wave and Full Wave Rectifier, Zener diode-characteristics-Zener Reverse characteristics–Zener as regulator, Display devices-LED-characteristics, Laser diodes.

UNIT-II TRANSISTORS 9

BJT, JFET, MOSFET structure, operation, characteristics and biasing. UJT, Thyristor - SCR Structure and characteristics.

UNIT-III AMPLIFIERS 9

BJT small signal model-Analysis of CE, CB, CC amplifiers-Gain and frequency response. MOSFET small signal model-Analysis of CS and Source follower-Gain and frequency Response-High frequency analysis of CE amplifier. Introduction to LT Spice.

UNIT-IV MULTISTAGE AMPLIFIERS AND DIFFERENTIAL AMPLIFIER 9

Differential amplifier – Common mode and Differential mode analysis, Single tuned amplifiers – Gain and frequency response-Introduction to Power amplifiers–Class A, Class B and Class AB.

UNIT-V FEEDBACK AMPLIFIERS AND OSCILLATORS 9

Basic concepts of feedback –Properties of negative feedback,series,Shunt feedback- Positive feedback–Conditions for oscillations-RC Phase shift-Wein bridge,Hartley,Crystal and Colpitts Oscillators-Introduction to PCB Design

TOTAL: 45 PERIODS

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

CO1: Understand the construction and characteristics of basic electronic devices.
CO2: Comprehend the construction and functional characteristics of various transistors.
CO3: Study basic amplifier circuits and their frequency response.
CO4: Analyze the operation of differential and multistage amplifiers.
CO5: Design simple electronics circuits using simulation tools

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TEXT BOOKS:

1. David A. Bell, "Electronic Devices and Circuits", Oxford Higher Education press, 5 th Edition, 2010.
2. Donald A. Neamen, Microelectronics: Circuit Analysis and Design, McGraw-Hill Education, 4th Edition, 2021.
3. S. Salivahanan and N. Suresh Kumar, Electronic Devices and Circuits, McGraw Hill Education (India), 5th Edition, 2022.

REFERENCE BOOKS:

1. Adel S. Sedra, Kenneth C. Smith, Tony Chan Carusone, and Vincent Gaudet, Microelectronic Circuits, Oxford University Press, 8th Edition, 2020.
2. Muhammad H. Rashid, Microelectronic Circuits: Analysis and Design, Cengage Learning, 3rd Edition, 2017Thomas L.Floyd,"Electronic devices"PrenticeHall",10th Edition,2018.
3. Robert L.Boylestad,"Electronic Devices and Circuit Theory",11th Edition,2021.

E-RESOURCES:

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/courses/108101091

CO's – PO's & PSO's MAPPING

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

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

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BoS / ECE

25ECT32	SIGNALS AND SYSTEMS	L	T	P	C
SDG		3	1	0	4
4,9,11,12,13					

COURSE OBJECTIVES:

To impact knowledge of

- Classify and characterize CT and DT signals and systems.
- Apply Fourier series, Fourier Transform, and Laplace Transform for CT signal analysis.
- Analyze CT LTI systems using convolution and transform techniques.
- Analyze DT signals using sampling, DTFS, DTFT, and Z-Transform.
- Analyze DT LTI systems using difference equations, convolution, and Z-Transform

UNIT-I CLASSIFICATION OF SIGNALS AND SYSTEMS **12**

Standard signals- Classification of signals – Continuous time (CT) and Discrete Time (DT) signals, Operations on signals -Classification of systems- CT systems and DT systems- – Linear & Nonlinear, Time-variant& Time-invariant,Causal & Non-causal, Stable & Unstable

UNIT-II - ANALYSIS OF CONTINUOUS TIME SIGNALS **12**

Fourier series for periodic signals - Fourier Transform – properties- Laplace Transforms and Properties

UNIT-III LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS **12**

Impulse response - convolution integrals- Differential Equation- Fourier and Laplace transforms in Analysis of CT systems - Systems connected in series / parallel

UNIT-IV ANALYSIS OF DISCRETE TIME SIGNALS 12

Baseband signal Sampling–Fourier Transform of discrete time signals (DTFT), Properties of DTFT ,Discrete-Time Fourier Series (DTFS)– Properties of DTFS - Z Transform & Properties

UNIT-V LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS **12**

Impulse response–Difference equations-Convolution sum- Z Transform Analysis of Recursive & Non-Recursive systems-DT systems connected in series and parallel.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1: Classify and characterize CT and DT signals and systems.

CO2: Categorize the Fourier Series, Fourier Transform and Laplace Transform for CT signal analysis.

CO3: Comprehend CT LTI systems using convolution and transform techniques.

CO4: Determine DT signals using sampling, DTFS, DTFT and Z-Transform.

CO5: Examine DT LTI systems using difference equations, convolution and Z-Transform.

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TEXT BOOKS:

1.Oppenheim, A. V., Willsky, A. S., and Nawab, S. H., Signals and Systems, 2nd Edition, Pearson, Reprint 2022.

2. Simon haykin,Barry van veen,"Signals and Systems"2nd edition wiley publications,2021

3.Tarun Kumar and Rawat - Signals and Systems, 2nd Edition, Oxford University Press, Reprint 2020

REFERENCE BOOKS:

1.B. P. Lathi, "Principles of Linear Systems and Signals", 3rd Edition, Oxford, 2019

2.M. J. Roberts, "Signals and Systems Analysis using Transform methods and MATLAB", McGraw-Hill Education, 2018.

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc21_ee28

CO's – PO's & PSO's MAPPING

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

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

Chairman
BoS / ECE

25ECT33		L	T	P	C
SDG	ELECTROMAGNETIC FIELDS	3	1	0	4
4,7,9,11,12,13					

COURSE OBJECTIVES:

To impact knowledge of

- Understand electromagnetic field concepts and apply vector calculus theorems for field analysis in different coordinate systems.
- Impart knowledge on the basics of static magnetic field and the associated laws.
- Understand magnetostatic principles and analyze magnetic fields, magnetic circuits, and related electromagnetic effects.
- Know electromagnetic induction, Maxwell's equations, and their relationship between field theory and circuit theory.
- Study the significance of Time varying fields.

UNIT-I INTRODUCTION **12**

Sources and effects of electromagnetic fields, Rectangular, cylindrical and spherical coordinate systems, Line, surface and volume integrals, Gradient of a scalar field, Divergence of a vector field, Divergence theorem, Curl of a vector field, Stoke's theorem, Helmholtz's theorem, Verify theorems for different path, surface and volume, Electric field, Coulomb's law, Gauss's law and applications.

UNIT-II ELECTROSTATICS **12**

Electric potential, Conductors in static electric field, Dielectrics in static electric field, Electric flux density and dielectric constant, Boundary conditions, Capacitance, Parallel, cylindrical and spherical capacitors, Electrostatic energy, Poisson's and Laplace's equations.

UNIT-III MAGNETOSTATICS **12**

Lorentz force equation, Ampere's law, Vector magnetic potential, Biot-Savart law and applications, Magnetic field intensity and idea of relative permeability, Calculation of magnetic field intensity for various current distributions Magnetic circuits, Behaviour of magnetic materials, Boundary conditions, Inductance and inductors, Magnetic energy, Magnetic forces and torques.

UNIT-IV ELECTRODYNAMIC FIELDS **12**

Magnetic Circuits - Faraday's law – Transformer and motional EMF – Displacement current -Maxwell's equations (differential and integral form) – Relation between field theory and circuit theory – Applications.

UNIT-V ELECTROMAGNETIC WAVES **12**

Plane waves in lossless media, Plane waves in lossy media (low-loss dielectrics and good conductors), Group velocity, Electromagnetic power flow and Poynting vector, Normal incidence at a plane conducting boundary, Normal incidence at a plane dielectric boundary.

TOTAL :60 PERIODS

Chairman
BoS / ECE

COURSE OUTCOMES:

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

CO1: Relate the fundamentals of vector, coordinate system to electromagnetic concepts.

CO2: Analyze the characteristics of Electrostatic field.

CO3: Interpret the concepts of Electric field in material space and solve the boundary conditions.

CO4: Analyze electromagnetic induction and Maxwell's equations to understand dynamic electromagnetic field behavior and its applications..

CO5: Evaluate the propagation of electromagnetic waves and their interaction with different media and boundaries.

TEXT BOOKS:

1. D.K. Cheng, Field and wave electromagnetics, 2nd ed., Pearson (India), 2020

2. M.N.O.Sadiku and S.V. Kulkarni, Principles of electromagnetics, 6th ed., Oxford(Asian Edition), 2019

3. Rohit Khurana, "Electromagnetic Field Theory", 6th edition, Vikash Publishers,2018

REFERENCE BOOKS:

1. Edward C. Jordan & Keith G. Balmain, "Electromagnetic waves and Radiating Systems", Second Edition, Prentice-Hall Electrical Engineering Series, 2021.

2. B.M. Notaros, "Electromagnetics", Pearson: New Jersey, 2021

3.R.L.Yadhava, "Electomagnetic fields and waves", 2nd edition, Khanna Publishers, 2019

E-RESOURCES:

https://onlinecourses.swayam2.ac.in/aic21_ge25/preview

CO's – PO's & PSO's MAPPING

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

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

Chairman
BoS / ECE

25ECT34 SDG NO:4,8,9	DIGITAL SYSTEM DESIGN	L T P C 3 0 0 3

COURSE OBJECTIVES:

To impart knowledge of

- The fundamental concepts of number systems, Boolean algebra, and logic simplification techniques used in digital system design.
- The principles of combinational logic design to develop arithmetic and data processing circuits.
- Synchronous sequential circuits using flip-flops, counters, and shift registers for digital applications.
- Asynchronous sequential circuits to identify hazards, race conditions, and implement hazard-free circuit designs.
- The characteristics of logic families and implement digital systems using programmable logic devices.

UNIT-I BASIC CONCEPTS **9**

Review of number systems-representation-conversions, Review of Boolean algebra-theorems, canonical forms and Standard forms, Simplification of Boolean expressions using universal gates -Karnaugh map, Tabulation methods.

UNIT-II COMBINATIONAL LOGIC CIRCUITS **9**

Half and Full Adders, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Magnitude Comparator, Decoder, Encoder, Priority Encoder, Mux/Demux.

UNIT-III SYNCHRONOUS SEQUENTIAL CIRCUITS **9**

Latches, Flip flops – SR, JK, T, D, Master/Slave FF, Triggering of FF, Analysis and design of clocked sequential circuits – Design - Moore/Mealy models, Counters, Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

UNIT-IV ASYNCHRONOUS SEQUENTIAL CIRCUITS **9**

Stable and Unstable states, cycles and races, race free assignments, Hazards, Essential Hazards, Fundamental and Pulse mode sequential circuits, Design of Hazard free circuits.

UNIT-V LOGIC FAMILIES AND PROGRAMMABLE LOGIC DEVICES **9**

Logic families- RTL ,TTL,ECL, CMOS - Implementation of combinational logic/sequential logic design using standard ICs, PROM, PLA and PAL.

TOTAL: 45 PERIODS

Chairman
BoS / ECE

COURSE OUTCOMES:

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

CO1: Minimize complex digital logic functions using Boolean algebra, Karnaugh maps, and tabulation methods to achieve simplified circuit structures.

CO2: Formulate functional combinational logic systems by integrating standard modules

CO3: Synthesize synchronous sequential circuits, including counters, shift registers, and Moore/Mealy finite state machines, utilizing appropriate flip-flops.

CO4: Resolve race conditions and hazards in asynchronous sequential circuits to ensure stable and reliable digital system performance.

CO5: Critique digital system implementations based on the performance characteristics of various logic families and programmable logic devices.

TEXT BOOKS:

1. M. Morris Mano and Michael D. Ciletti, 'Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog, 6e', Pearson, 6th Edition, 2018
2. Floyd T.L., "Digital Fundamentals", 11th Edition by Pearson Education, 2020.

REFERENCE BOOKS:

1. William I. Fletcher, "An Engineering Approach to Digital Design - softcover", PrenticeHall of India, 2015.
2. John. F. Wakerly, "Digital Design Principles and Practices", Pearson Education, 5th Edition, 2018.
3. Charles H. Roth, Jr. and Larry L. Kinney, 'Fundamentals of Logic Design', Cengage Learning, 7th Edition, 2014.

E-RESOURCES:

1. https://archive.nptel.ac.in/content/storage2/courses/106108099//Digital%20Systems.pdf

2.https://archive.nptel.ac.in/courses/108/105/108105132/

CO's – PO's & PSO's MAPPING:

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

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

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BoS / ECE

		L	T	P	C
25ECL31	**ELECTRONIC DEVICES AND CIRCUITS LABORATORY**	**0**	**0**	**3**	**1.5**
SDG 4,9,12	(For B.E- ECE and BME)				

COURSE OBJECTIVES:

To impart knowledge of

- Understand the construction, operation, and V-I characteristics of PN junction diodes and Zener diodes.
- Analyze the working principles and performance of rectifiers, filters, and voltage regulator circuits.
- Study the operation, characteristics, and applications of transistors such as BJT and FET.
- Develop a comprehensive understanding of the behavior and functioning of electronic devices and circuits.
- Analyze the characteristics and performance of amplifier circuits used in electronic systems.

LIST OF EXPERIMENTS

1. Characteristics of PN Junction Diode and Zener diode.
2. Full Wave Rectifier with Filters.
3. Design of Zener diode Regulator.
4. Characteristics and analysis of SCR.
5. MOSFET Drain Characteristicand Transfer Characteristics.
6. Frequency response of CB,CE and CC Amplifier.
7. Design and analysis of Feedback Amplifier.
8. Design of RC Oscillators and LC Oscillators using BJT.
9. Design and analysis of amplifier circuits using Simulation Tools(LT Spice)
10. Design and analysis of Oscillator circuits using Simulation Tools(LT Spice)

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1: Measure and analyze the characteristics of PN junction diode, Zener diode, SCR, and MOSFET devices.

CO2: Design and evaluate rectifier circuits, filter circuits, and Zener diode voltage regulators.

CO3: Analyze the frequency response and performance characteristics of CB, CE, and CC amplifier configurations

CO4: Design and implement feedback amplifiers and RC/LC oscillator circuits using electronic devices.

CO5: Simulate and validate the performance of amplifier and oscillator circuits using LT Spice simulation tools.

Chairman
BoS / ECE

REFERENCE BOOKS:

1. Manual prepared by the faculty of ECE Department, SVHEC

E-RESOURCES:

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/courses/108101091

CO's – PO's & PSO's MAPPING

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

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

Chairman
BoS / ECE

25ECL32 SDG NO: 4,8,9	DIGITAL SYSTEM DESIGN LABORATORY	L T P C 0 0 3 1.5

COURSE OBJECTIVES:

To impart knowledge of

- The fundamental concepts of digital logic gates and Boolean algebra.
- Combinational logic circuits using basic logic gates.
- Arithmetic circuits such as adders and subtractors for digital applications.
- Implement sequential logic circuits using counters.
- Implement sequential logic circuits using shift registers.

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using logic gates
2. Implementation of Half and full adder/subtractor circuits
3. Implementation of BCD adder circuits
4. Implementation and verification of decoder / encoder using logic gates
5. Implementation of multiplexer / demultiplexer using logic gates
6. Design and verify the Synchronous Counter
7. Design and Verify the Serial In - Parallel Out Shift Registers
8. Design of counters – 4-bit ripple counter.
9. Design of universal shift register
10. Introduction to HDL Coding and simulation of Logic Gates.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Manual prepared by the faculty of Electronics and Communication Engineering Department, SVHEC.
2. M. Morris Mano and Michael D. Ciletti, 'Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog, 6e', Pearson, 6th Edition, 2018
3. John.F.Wakerly, "Digital design principles and practices", Pearson Education, 5th Edition, 2018

E-RESOURCES:

1. https://de-iitr.vlabs.ac.in/
2. https://www.vlab.co.in/broad-area-electronics-and-communications

Chairman
BoS / ECE

COURSE OUTCOMES:

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

CO1: Validate the operational characteristics, truth tables, and fundamental laws of Boolean algebra using basic digital logic gates.

CO2: Formulate arithmetic and data-routing combinational networks, including adders, subtractors, converters, coders, and multiplexers.

CO3: Synthesize synchronous counter networks using flip-flops to achieve specified multi-state sequence requirements.

CO4: Construct asynchronous ripple counters using cascaded flip-flop configurations to evaluate multi-bit binary counting transitions.

CO5: Appraise the shifting behaviors, timing mechanics, and data transfer modes of SIPO and universal shift registers.

CO's – PO's & PSO's MAPPING

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

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

Chairman
BoS / ECE

25CSL31
SDG No. 4,8,9,12

DATA STRUCTURES USING C++ LABORATORY

(for B.E. - ECE)

L	T	P	C
0	0	3	1.5

COURSE OBJECTIVES:

- To develop proficiency in implementing object-oriented programming concepts such as constructors, destructors, member functions, friend functions, inheritance, and polymorphism using C++.
- To design and implement dynamic memory allocation, function and operator overloading, and virtual functions for building reusable and efficient software applications.
- To apply linear data structures such as arrays, linked lists, stacks, and queues to solve computational problems and expression evaluation.
- To implement non-linear data structures and graph algorithms, including tree traversals, shortest path algorithms, and minimum spanning tree algorithms.
- To develop and analyze searching and sorting algorithms, evaluating their efficiency and suitability for different applications.

LIST OF EXPERIMENTS

1. Program to Implement Constructors and Destructors.
2. Program to implement Member Functions, Classes and Friend Functions.
3. Program to Implement Dynamic Memory Allocation and Overloading.
4. Program to Implement various inheritances.
5. Program to Implement virtual functions and dynamic binding.
6. Implementation of method overriding and operator overloading.
7. Program to implement various operations on arrays and linked lists.
8. Program to implement various operations on stacks and queues using array and linked list.
9. Program to evaluate the infix expressions by converting into prefix and postfix expressions.
10. Program to Implement Binary Tree Traversal and Graph Traversal Algorithm.
11. Program to Implement the Single Source Shortest Path Algorithm and All Pair Shortest Path Algorithm.
12. Program to find the Minimal Spanning Tree for a Graph.
13. Program to Implement Linear Search and Binary Search Algorithms.
14. Program to Implement Insertion Sort, Merge Sort, Quick Sort and Heap Sort Algorithms

TOTAL: 45 PERIODS

Chairman
BoS/CSE&IT

COURSE OUTCOMES:

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

CO1: Implement object-oriented programming concepts including constructors, destructors, member functions, friend functions, inheritance, polymorphism, and overloading in C++ applications.

CO2: Design programs using dynamic memory allocation, virtual functions, dynamic binding, and method overriding to develop modular and reusable software.

CO3: Develop applications using arrays, linked lists, stacks, and queues, and apply them for expression evaluation and other computational problems.

CO4: Implement tree and graph data structures and solve problems using traversal, shortest path, and minimum spanning tree algorithms.

CO5: Apply and compare searching and sorting algorithms to efficiently organize and retrieve data based on performance requirements.

CO's–PO's & PSO's MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	1	2	2	1	-	-	-	2	1	2	2	2	2	3
CO2	3	3	1	1	-	-	-	1	1	1	3	1	2	2
CO3	2	1	3	1	-	-	-	1	1	2	3	3	3	3
CO4	3	1	3	3	-	-	-	1	2	3	3	2	1	2
CO5	3	2	1	1	2	-	-	3	3	3	1	3	1	3
Avg.	2.4	1.8	2	1.4	2	-	-	1.6	1.6	2.2	2.4	2.2	1.8	2.6

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

Chairman
BoS/CSE&IT

25MDC32
SDG NO. 4,5,10,16

ELEMENTS OF LITERATURE

L	T	P	C
3	0	0	0

COURSE OBJECTIVES:

- To understand the fundamental concepts, genres, and functions of literature as an artistic and cultural expression.
- To develop critical reading, analytical thinking, and effective communication skills through the study of literary texts.
- To examine the relevance of literature in fostering empathy, ethical awareness, and human relationships in contemporary society.
- To analyze the structural and thematic elements of fiction, poetry, and drama to appreciate literary creativity and interpretation.
- To enhance imagination, aesthetic sensibility, and cultural awareness for personal and professional growth.

UNIT-I INTRODUCTION TO ELEMENTS OF LITERATURE 9

a) Nature of Literature: Meaning, Characteristics, literature as an art form.
b) Functions of Literature: The aesthetic, moral, and cultural functions of literature.
c) Types of Literature: Introduction to the three main genres: Prose, Poetry, and Drama.

UNIT-II RELEVANCE OF LITERATURE 9

a) Enhances Reading, thinking, discussing and writing skills.
b) Develops finer sensibility for better human relationship.
c) Increases understanding of the problem of humanity without bias.

UNIT-III ELEMENTS OF FICTION 9

a) Fiction, fact and literary truth.
b) Fictional modes and patterns.
c) Plot character and perspective.

UNIT-IV ELEMENTS OF POETRY 9

a) Emotions and imaginations.
b) Figurative language.
c) Figures of Speech: Simile, metaphor, conceit, symbol, pun, personification irony and trend.

UNIT-V ELEMENTS OF DRAMA 9

a) Drama as representational art.
b) Drama as narration, mediation and persuasion.
c) Features of tragedy, comedy and satire.

TOTAL: 45 PERIODS

Chairman
BoS / S&H

COURSE OUTCOME:

At the end of the Course the students will able to

CO1: Explain the nature, functions, and major genres of literature and their significance in society

CO2: Demonstrate improved reading, writing, discussion, and critical thinking skills through engagement with literary texts

CO3: Analyze the essential elements of fiction, including plot, character, perspective, and literary truth.

CO4: Interpret poetic devices, figurative language, and figures of speech to appreciate the aesthetic dimensions of poetry

CO5: Evaluate the characteristics and purposes of drama, including tragedy, comedy, and satire, and their impact on audiences

TEXT BOOKS:

1) An Introduction to Literary Studies, Mario Klarer, Routledge, 2013.
2) The Elements of Fiction: A Survey, Ulf Wolf (ed), Wolfstuff, 2014.
3) The Elements of Drama, J.L.Styan, Literary Licensing, 2011.

REFERENCE BOOKS:

1) To be decided by the teacher and student, on the basis of individual student so as to enable him or her to write the term paper.
2) The Experience of Poetry, Graham Mode, Open college of Arts with Open Unv Press, 1991.
3) An Introduction to the Study of English Literature, W.H. Hudson, Atlantic, 2007.

E. RESOURCES:

- **NPTEL: Introduction to World Literature** – IIT Madras
  https://onlinecourses-archive.nptel.ac.in/noc19_hs12/course
- **NPTEL: English Language and Literature** – IIT Guwahati
  https://nptel.ac.in/courses/109103020

CO's-PO's MAPPING :

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	1	-	-	-	2	-	2	-	2	-
CO2	2	2	-	-	-	-	-	-	2	3	-
CO3	2	3	1	1	-	1	-	2	-	2	-
CO4	1	2	2	-	-	-	-	2	-	3	-
CO5	1	1	-	-	-	2	-	2	-	2	-
AVR	1.40	1.80	1.50	1.00		1.67		2.00	2.00	2.40	

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

Chairman
BoS / S&H

		L	T	P	C
25ECI41	DIGITAL SIGNAL PROCESSING				
SDG 3,4,9		3	0	2	4

COURSE OBJECTIVES:

To impact knowledge of

- Learn discrete Fourier transforms properties of DFT and its application to linear filtering.
- Understand and design IIR digital filters using analog filter transformations and realization structures.
- Familiarize and design FIR digital filters using various methods.
- Expose about Finite word length effects in digital systems.
- Understand Multirate signal processing techniques and DSP architecture for efficient digital signal processing applications.

UNIT-I DISCRETE FOURIER TRANSFORM 9

Discrete Fourier transform (DFT) -Properties of DFT -Linear filtering using DFT. Filtering long data sequences - overlap save and overlap add method. Fast computation of DFT - Radix-2 Decimation-in-time (DIT) Fast Fourier transform (FFT), Decimation-in-frequency (DIF) Fast Fourier transform (FFT).

UNIT-II INFINITE IMPULSE RESPONSE FILTERS 9

Characteristics of practical frequency selective filters. characteristics of commonly used analog filters - Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (First and Second order LPF, HPF, BPF, BRF) - Impulse invariance method, Bilinear transformation,Structure of IIR filter - direct form I, direct form II, Cascade, parallel realizations.

UNIT-III FINITE IMPULSE RESPONSE FILTERS 9

Design of FIR filters - symmetric and Anti-symmetric FIR filters - design of linear phase FIR filters using Fourier series method - FIR filter design using windows (Rectangular, Hamming and Hanning window), FIR filter structures - linear phase structure, direct form realizations.

UNIT-IV FINITE WORD LENGTH EFFECTS 9

Fixed point and floating point number representation - ADC - quantization - truncation and rounding - quantization noise - input / output quantization - coefficient quantization error product quantization error - overflow error - limit cycle oscillations due to product quantization and summation - scaling to prevent overflow.

Chairman
BoS / ECE

UNIT-V MULTIRATE SIGNAL PROCESSING 9

Decimation, Interpolation, Sampling rate conversion by a rational factor –Applications of multirate signal processing-Speech coding,Subband coding,Digital Processing of Audio Signals,DSP Architecture-Fixed and Floating point architecture principles.

TOTAL -45 PERIODS

PRACTICAL EXERCISES :30 PERIODS

MATLAB / EQUIVALENT SOFTWARE PACKAGE/ DSP PROCESSOR BASED IMPLEMENTATION

1. Generation of Standard Signals.
2. Linear and Circular convolutions.
3. Auto correlation and Cross Correlation.
4. Frequency Analysis using DFT.
5. Design of FIR filters (LPF/HPF/BPF/BSF).
6. Design of Butterworth and Chebyshev IIR filters (LPF/HPF/BPF/BSF) and demonstrate the filtering operations.
7. Study of architecture of Digital Signal Processor.
8. Perform MAC operation using various addressing modes.
9. Generation of various signals Using Processor.
10. Implementation of FIR Filter Using processor.
11. Implementation of IIR Filter Using processor.
12. Implement an Up-sampling and Down-sampling operation in DSP Processor.

TOTAL HOURS (45+30) =75 PERIODS

COURSE OUTCOMES:

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

CO1: Solve the DFT and FFT for discrete time signals.

CO2: Develop the digital IIR filters by using different techniques.

CO3: Determine digital FIR filters by using windows techniques.

CO4: Characterize the effects of finite precision representation on digital filters.

CO5: Summarize the concept of multirate signal processing applications.

TEXT BOOKS:

1.John G. Proakis and Dimitris G.Manolakis, Digital Signal Processing – Principles, Algorithms and Applications, Fifthh Edition, Pearson Education / Prentice Hall, 2022

2. B. Venkataramani, M. Bhaskar, 'Digital Signal Processors, Architecture, Programming and Applications', Tata Mc Graw Hill, New Delhi, Second edition 2020.

Chairman
BoS / ECE

REFERENCE BOOKS:

1. Emmanuel C. Ifeachor& Barrie. W. Jervis, "Digital Signal Processing", Second Edition, Pearson Education / Prentice Hall, 2020
2. Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata Mc Graw Hill, Reprint 2021.
3. Andreas Antoniou, "Digital Signal Processing", Tata Mc Graw Hill, 2016.

E-RESOURCES:

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/courses/117102060

CO's – PO's & PSO's MAPPING

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

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

Chairman
BoS / ECE

25ECT41	ANALOG COMMUNICATION	L	T	P	C
SDG4,8,9,11		3	0	0	3

COURSE OBJECTIVES:

To impact knowledge of

- Understand the principles of Analog Modulation Schemes
- Analyze various Angle modulation techniques and their characteristics
- Apply the concepts of generation and detection in AM &FM..
- Evaluate the noise performance of analog modulation techniques and communication receivers.
- Examine pulse modulation techniques and multiplexing methods

UNIT-I AMPLITUDE MODULATION SYSTEMS 6

Introduction to Communication Systems – Elements of Communication Systems – Need for Modulation – Bandwidth and Power Considerations – Amplitude Modulation (AM) – Generation and Detection of AM – DSB-SC Generation and Detection – SSB Generation and Detection – VSB Modulation

UNIT-II ANGLE MODULATION 9

Frequency Modulation and Phase Modulation – Relationship between FM and PM – Modulation Index – Narrowband FM and Wideband FM – Frequency Spectrum of FM Signals – Bandwidth Requirements and Carson's Rule – Power Relations in Angle Modulation

UNIT-III GERNERATION AND DETECTION IN AM & FM 9

AM Generation Methods : Square Law Modulator , Balanced Modulator for DSB-SC Generation , AM Detection Methods : Envelope Detector - Square Law Detector – Coherent Detector - Generation of FM: Direct and Indirect Methods – FM Detection Techniques – FM Discriminator – PLL as FM Demodulator.

UNIT-IV NOISE CHARACTERIZATION 12

Noise sources and types – Noise figure and noise temperature – Noise in cascaded systems- Signal-to-Noise Ratio (SNR) - Narrow band noise–Noise performance in AM systems – Noise performance in FM systems – Pre-emphasis and De-emphasis – Capture effect, Threshold effect.

UNIT-V PULSE MODULATION SYSTEMS 9

Sampling theorem, Types of Sampling. Pulse modulation schemes – PAM, PPM and PWM generation and detection-Pulse code modulation. Conversion of PWM to PPM. Multiplexing Techniques - FDM and TDM - problems related to FDM and TDM.

TOTAL : 45 PERIODS

COURSE OUTCOMES:

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

CO1: Understand the various Analog Communication systems.

CO2: Explain the performance and spectral characteristics of angle modulation techniques such as FM and PM.

CO3: Apply generation and detection techniques for AM and FM.

CO4: Analyze the noise performance of AM and FM Systems.

CO5: Comprehend and compare the different pulse modulation techniques

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TEXT BOOKS:

1. Simon Haykin, Michael Moher, Introduction to Analog and Digital Communications, 2nd Edition (Indian Adaptation), Wiley India, 2022. (Units I–V)
2. Marcelo S. Alencar, Valdemar C. da Rocha Jr., Analog Communication Systems, 2nd Edition, Springer, 2020.
3. B. P. Lathi and Zhi Ding, Modern Digital and Analog Communication Systems, 5th Edition, Oxford University Press, 2019/2021.
4. George Kennedy and Bernard Davis, Electronic Communication Systems, 5th Edition, McGraw-Hill Education, 2011.

REFERENCE BOOKS:

1. Simon Haykin and Michael Moher, An Introduction to Analog and Digital Communications, Wiley India, 2nd Edition (Indian Adaptation), 2022.
2. Marcelo S. Alencar and Valdemar C. da Rocha Jr., Analog Communication Systems, Springer, 2nd Edition, 2020.
3. B. P. Lathi and Zhi Ding, Modern Digital and Analog Communication Systems, Oxford University Press, 5th Edition, 2019.
4. Sanjay Sharma, Analog Communication Systems, S.K. Kataria & Sons, 3rd Edition, 2018

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/noc24_ee135/preview, "Analog Communication", Prof. Goutam Das, IIT Kharagpur.
2. https://nptel.ac.in/courses/108104091, "Principles of Communication Systems – I", Prof. Aditya K. Jagannatham, IIT Kanpur.

CO's – PO's & PSO's MAPPING(rework)

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

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

Chairman
BoS / ECE

25ECT42 SDG 3,4,7,9	LINEAR INTEGRATED CIRCUITS	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

- Introduce the basic building blocks of linear integrated circuits
- Learn the linear and non-linear applications of operational amplifiers
- Introduce the theory and applications of analog multipliers and PLL
- Learn the theory of ADC and DAC
- Introduce the concepts of waveform generation and introduce some special function ICs

UNIT-I BASICS OF OPERATIONAL AMPLIFIERS 9

Ideal Operational Amplifier - General operational amplifier stages -and internal circuit diagrams of IC 741, DC and AC performance characteristics, Frequency compensation and its techniques - Open and closed loop configurations

UNIT-II APPLICATIONS OF OPERATIONAL AMPLIFIERS 9

Inverting and non inverting-Sign Changer, Scale Changer, Voltage Follower, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Comparators, Schmitt trigger, Precision rectifier, clipper and clamper, Low-pass, high-pass and band-pass filters.

UNIT-III ANALOG MULTIPLIER AND PLL 9

Analog multiplier ICs and their applications, Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, application of PLL for AM detection, FM detection, Frequency synthesizing and clock synchronization.

UNIT-IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS 9

Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode R - 2R Ladder types - switches for D/A converters, high speed sample-and-hold circuits, A/D Converters – specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type.

UNIT-V WAVEFORM GENERATORS AND SPECIAL FUNCTION ICS 9

Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, Timer IC 555, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator, Switched capacitor filter.

TOTAL : 45 PERIODS

Chairman
BoS / ECE

COURSE OUTCOMES:

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

CO1: Analyze the characteristics and configurations of operational amplifiers

CO2: Design linear and nonlinear applications of OP – AMPS.

CO3: Design applications using analog multiplier and PLL.

CO4: Design ADC and DAC using OP – AMPS.

CO5: Generate waveforms using OP – AMP Circuits and analyze special function ICs.

TEXT BOOKS:

1. D.Roy Choudhry, Shail B Jain, "Linear Integrated Circuits", New Age International Pvt. Ltd., 2025, Seventhth Edition. (Unit I – V).
2. Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", McGraw-Hill Education, 2014, Fourth Edition.
3. Ramakant A. Gayakwad, "OP-AMPS and Linear Integrated Circuits", 4th Edition, Pearson Education, 2021

REFERENCE BOOKS:

1. S.Salivahanan,V.S.Kanchana Bhaaskaran, "Linear Integrated Circuits", 3rd Edition, Tata Mc Graw-Hill, 2018 (Unit I – V).
2. Robert F. Coughlin and Frederick F. Driscoll, Operational Amplifiers and Linear Integrated Circuits , 6th Edition, Pearson Education 2015.

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc24 ee73, "Integrated Circuits and Applications", Prof. Shaik Rafi Ahamed, IIT Guwahati

CO's – PO's & PSO's MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	1	2	1	1
CO2	2	3	3	2	-	-	-	-	-	-	-	2	1	1
CO3	1	-	-	2	-		-	-	-	-	-	2	1	1
CO4	1	-	-	2	-	-	-	-	-	-	-	2	1	1
CO5	1	2	3	3	-	-	-	-	-	-	-	2	1	1
AVG	1.4	2.5	3	2.2	-	-	-	-	-	-	1	2	1	1

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

Chairman
BoS / ECE

25ECT43 SDG 4,7,9,11	TRANSMISSION LINES AND WAVEGUIDES	L	T	P	C
		3	0	0	3

COURSE OBJECTIVES:

To impact Knowledge of

- Introduce the fundamental concepts of transmission line theory
- Understanding of high-frequency transmission line behavior.
- Learn the impedance matching technique and applications of Smith chart
- Propagation of electromagnetic waves between parallel conducting planes.
- Provide a thorough understanding of waveguide theory

UNIT-I TRANSMISSION LINE THEORY **9**

General theory of Transmission lines - Wavelength, velocity of propagation - Waveform distortion - the distortion less line - Loading and types- Line not terminated in Z_0 - Reflection coefficient - calculation of current, voltage, power delivered and efficiency of transmission - Input and transfer impedance - Open and short-circuited lines - reflection factor and reflection loss.

UNIT-II HIGH FREQUENCY TRANSMISSION LINES **9**

Transmission line equations at radio frequencies - Line of Zero dissipation - Voltage and current on the dissipation less line, Standing Waves, Nodes, Standing Wave Ratio - Input impedance of the dissipation less line - Open and short-circuited lines - Power and impedance measurement on lines - Reflection losses - Measurement of VSWR and wavelength.

UNIT-III IMPEDANCE MATCHING IN HIGH FREQUENCY LINE **9**

Impedance matching: Quarter wave transformer, One Eighth wave line, Half wave line- Impedance matching by stubs- Single stub and double stub matching - Smith chart – Application of Smith chart, Solutions of problems using Smith chart - Single and double stub matching using Smith chart.

UNIT-IV WAVEGUIDES AND CHARACTERISTICS IN PARALLEL PLANES **9**

Waves between parallel planes - Transverse electric waves -Transverse magnetic waves - Characteristics of TE and TM waves - Transverse electromagnetic waves - Velocities of propagation - Attenuation in parallel plane waves - Wave impedance.

UNIT-V GUIDED WAVES AND WAVE GUIDE THEORY **9**

Rectangular wave guides - TE and TM waves in rectangular wave guides - Dominant mode - Cut off frequency in wave guides - Impossibility of TEM waves in wave guides - Circular wave guides- TE and TM waves in circular wave guides - Attenuation factor and Q of wave guides

TOTAL : 45 PERIODS

COURSE OUTCOMES:

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

CO1: Analyze transmission line characteristics and losses

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BoS / ECE

CO2: Calculate SWR and input impedance in transmission lines

CO3: Design impedance matching networks using Smith Charts

CO4: Analyze TE and TM wave propagation characteristics

CO5: Evaluate waveguide parameters and propagation modes for microwave applications.

TEXT BOOKS:

1. John D Ryder, "Networks lines and fields", Prentice Hall of India, New Delhi,2005.

2._Mathew M. Radmanesh, "Radio Frequency & Microwave Electronics", Pearson Education Asia, Second Edition, 2002

3.Edward C. Jordan and Keith G. Balmain"Electromagnetic Waves and Radiating Systems",Pearson Education,2008

REFERENCE BOOKS:

1. Annapurna Das & Sisir K. Das" Microwave Engineering "McGraw Hill India,2022/2023.

2.S.K. Kataria &Sons" RF and Microwave Engineering"2021–2024.

3.Uday A. Bakshi and Late Ajay V. Bakshi,"Transmission Lines and Waveguides,"Technical publication, Nov,2020

E-RESOURCES:

1. **NPTEL-Online Courses and Video lectures: https://nptel.ac.in/**
2. **Transmission Lines and Waveguides | Springer Nature Link**

CO's – PO's & PSO's MAPPING

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

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

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BoS / ECE

25ECT44	MICROPROCESSOR AND MICROCONTROLLER	L	T	P	C
SDG No.4,9,11	(COMMON TO ECE AND BME)	3	0	0	3

COURSE OBJECTIVES:

To impart knowledge of

- Understand the fundamentals of microprocessors, memory interfacing techniques, data transfer schemes, and the architecture of the 8086 microprocessor.
- Study the 8086 instruction set, addressing modes, assembly language programming, memory interfacing, and interrupt handling.
- Understand the interfacing of peripheral devices such as programmable peripheral interfaces, keyboard/display controllers, serial communication interfaces, and timer controllers.
- Learn the architecture, instruction set, programming techniques, I/O interfacing, timers, serial communication, and interrupt handling of the 8051 microcontroller.
- Study sensor interfacing, actuator control, RTC interfacing, and the design of microprocessor/microcontroller-based real-time systems.

UNIT-I INTRODUCTION TO MICROPROCESSORS 9

Microprocessors – 8085 Architecture - Microprocessor Instruction Set and Computer Languages – 8085 Programming Model – Memory decoding and Interfacing – Serial Interface – DMA – Data transfer schemes.

UNIT-II 8086 INSTRUCTION AND ASSEMBLY LANGUAGE PROGRAMMING 9

8086 Architecture – Signals – Min/Max mode system configuration – Bus Cycles - Addressing Modes – Assembler Directives – Instruction set – 8086 Assembly Language Programming – External Memory Interface – Interrupts and its applications.

UNIT-III PERIPHERAL INTERFACING 9

Serial Communication Interface (8251) – Programmable Timer Controller (8253) – Programmable Peripheral Interface (8255) – Direct Memory Access Controller (8257) – Interrupt Controller (8259) – Keyboard and Display Interface (8279).

UNIT-IV 8051 MICROCONTROLLER 9

8051 Microcontroller – Instruction Set – Assembly Language Programming – I/ O Interfacing – Timers – USART – Interrupts – 8051 Programming in C.

UNIT-V SYSTEM DESIGN 9

Sensor Interfacing – Relay and Motor Control – RTC Interfacing (DS12887) – System Design: Traffic Light Controller and Washing machine control.

TOTAL: 45 PERIODS

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BoS / ECE

COURSE OUTCOMES:

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

CO1: Apply memory interfacing techniques for 8085 and 8086 microprocessor-based systems.

CO2: Develop assembly language programs using 8086 instructions, addressing modes, subroutines, and interrupt handling techniques.

CO3: Apply interfacing and programming techniques for peripheral devices such as 8255, 8279, 8251, and 8253 in embedded applications.

CO4: Design and implement embedded system applications using 8051 assembly language and Embedded C programming.

CO5: Design real-time embedded systems incorporating sensors, actuators, real-time clocks (RTCs), and industrial control applications.

TEXT BOOKS:

1. Douglas V. Hall and S.S. Sriram, Microprocessors and Interfacing: Programming and Hardware, 3rd Edition, McGraw-Hill Education, 2023.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, The 8051 Microcontroller and Embedded Systems: Using Assembly and C, 3rd Edition, Pearson Education, 2022.

REFERENCE BOOKS:

1. Barry B. Brey, The Intel Microprocessors: Architecture, Programming and Interfacing, 9th Edition, Pearson Education, 2023.
2. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design, 4th Edition, Pearson Education, 2023.
3. Kenneth J. Ayala and Dhananjay V. Gadre, The 8051 Microcontroller and Embedded Systems, 3rd Edition, Cengage Learning, 2022.

E-RESOURCES:

1. https://nptel.ac.in/courses/108105102, Microprocessors and Microcontrollers, Prof. Santanu Chattopadhyay, IIT Kharagpur.
2. https://nptel.ac.in/courses/106108100, Microprocessors and Microcontrollers, Prof. Krishna Kumar, IISc Bangalore.

CO's – PO's & PSO's 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	1	2	-	-	-	-	-	-	3	3	2
CO3	3	3	3	2	2	-	-	-	-	1	-	3	2	2
CO4	3	3	3	2	3	1	2	-	1	1	-	3	3	3
CO5	3	3	3	3	3	1	1	-	1	1	1	3	3	3
AVG	3	2.8	2.4	1.8	2.2	1	1.5	-	1	1	1	3	2.6	2.2

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

Chairman
BoS / ECE

25ECT46	INTRODUCTION TO STANDARDS IN ELECTRONICS AND	L	T	P	C
SDG No. 4,8,9,10	COMMUNICATION	1	0	0	1

COURSE OBJECTIVES:

To impart knowledge of

- Understand the fundamentals of standards, standardization processes, and their importance in Electronics and Communication Engineering.
- Gain knowledge of international standards organizations and their roles in developing technical standards.
- Study standards related to electronic components, communication systems, and networking.
- Understand quality, safety, calibration, and EMC/EMI regulations.
- Explore emerging standards in IoT, 5G, Industry 4.0, cybersecurity, AI, and modern industrial applications.

UNIT-I INTRODUCTION TO STANDARDS 3

Introduction to Standards – Need for Standardization – Benefits of Standards – National and International Standards Organizations – Role of Standards in Electronics and Communication Engineering.

UNIT-II INTERNATIONAL STANDARDS BODIES 3

Overview of Standards Organizations – International Organization for Standardization – International Telecommunication Union – Institute of Electrical and Electronics Engineers – International Electrotechnical Commission.

UNIT-III ELECTRONIC COMPONENTS AND COMMUNICATION STANDARDS 3

Standards for Electronic Components – Passive and Active Components – PCB Standards – Packaging Standards – Semiconductor Standards – Communication Protocol Standards – Network Standards – Wireless Communication Standards – Data Communication Standards.

UNIT-IV QUALITY, SAFETY AND EMC STANDARDS 3

Quality Management Systems – ISO 9001 – ISO 17025 – Calibration Standards – Measurement Standards – Safety Standards – Electromagnetic Interference (EMI) – Electromagnetic Compatibility (EMC) Standards.

UNIT-V EMERGING STANDARDS AND INDUSTRIAL APPLICATIONS 3

IoT Standards – 5G Communication Standards – Industry 5.0 Standards – Smart Manufacturing Standards – Cyber security Standards – AI and Embedded System Standards.

TOTAL: 15 PERIODS

Chairman
BoS / ECE

COURSE OUTCOMES:

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

CO1: Analyze the role and importance of standards in Electronics and Communication Engineering applications.

CO2: Describe the functions and contributions of national and international standards bodies such as ISO, ITU, IEEE, IEC, and BIS.

CO3: Analyze standards related to electronic components, communication protocols, networking technologies, and interoperability requirements.

CO4: Apply quality, safety, calibration, EMI/EMC, and environmental standards for the design and evaluation of electronic systems.

CO5: Evaluate emerging standards in IoT, 5G, Industry 4.0, cyber security, AI, and industrial applications to address modern engineering challenges.

TEXT BOOKS:

1. Dr. Manju R., Ms. P. Devi, Dr. R. Sarath and Mr. China Raju Manda, Introduction to Standards in Electronics and Communication, SAN International Scientific Publications, 2025.
2. N. G. Nair and Deepa Jayakumar, Standards and Quality Practices in Engineering, 2nd Edition, McGraw-Hill Education, 2024.

REFERENCE BOOKS:

1. John Bird, Electrical and Electronic Principles and Technology, 7th Edition, Routledge, 2024.
2. Behrouz A. Forouzan, Data Communications and Networking, 6th Edition, McGraw-Hill Education, 2023.
3. A. K. Sawhney, Electrical and Electronic Measurements and Instrumentation, Revised Edition, Dhanpat Rai Publications, 2023.

E-RESOURCES:

1. https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ee123,Microelectronics: Devices to Circuits, By Prof. Sudeb Dasgupta|IIT Roorkee.
2. IEEE Standards Association (IEEE-SA)

CO's – PO's & PSO's 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	1
CO2	3	3	1	1	2	1	-	1	-	1	-	2	2	1
CO3	3	3	3	2	3	-	-	-	-	1	-	3	3	2
CO4	3	3	2	2	2	2	3	2	-	1	1	3	2	2
CO5	3	3	3	3	3	1	2	1	1	1	1	3	3	3
AVG	3	2.8	2.0	1.8	2.2	1.3	2.5	1.3	1	1	1	2.6	2.2	1.8

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

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BoS / ECE

25SDC41 SDG No.4,8,10	SOFT AND ANALYTICAL SKILLS – I (Common to B.E./B.Tech. All Branches)	L	T	P	C
		1	0	0	1

COURSE OBJECTIVES:

- Develop effective communication, presentation, and public speaking skills for academic and professional contexts.
- Enhance interpersonal, teamwork, collaboration, and professional etiquette skills required in the workplace.
- Strengthen students' aptitude and arithmetic problem-solving abilities through quantitative techniques.
- Improve logical reasoning and analytical thinking skills for competitive examinations and placement assessments.
- Equip students with the confidence and employability skills necessary for career development and lifelong learning.

UNIT-I **COMMUNICATION AND PRESENTATION SKILLS** 3

Communication Fundamentals (Verbal and Non-verbal Communication, Barriers to Effective Communication, Active Listening Skills); Public Speaking Skills and Overcoming Stage Fear (Glossophobia) ; Presentation Techniques (Seminar and TED Talk Presentations)

UNIT-II **COLLABORATIVE SKILLS FOR PROFESSIONAL SUCCESS** 3

Interpersonal Communication and Professional Etiquette; Teamwork, Team Dynamics, and Stages of Team Development (Tuckman's Model); Collaboration and Problem Solving in Group Discussions

UNIT-III **CRACKING APTITUDE** 3

Divisibility Rules –LCM & GCD(HCF) – Average

UNIT-IV **CORE ARITHMETIC** 3

Ratio & Proportion – Time & Work – Mixture & Alligation

UNIT-V **REASONING** 3

Coding- Decoding – Blood Relation- Direction Sense

TOTAL : 15 PERIODS

Chairman
BoS / S&H

COURSE OUTCOMES:

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

CO1 : Demonstrate effective communication, public speaking, and presentation skills in academic and professional environments.

CO2 : Apply interpersonal, teamwork, collaboration, and professional etiquette skills to work effectively in groups.

CO3 : Solve aptitude problems involving divisibility rules, LCM, HCF, and averages using appropriate quantitative techniques.

CO4 : Apply arithmetic concepts such as ratio and proportion, time and work, and mixture and alligation to solve quantitative problems.

CO5 : Analyze and solve logical reasoning problems involving coding-decoding, blood relations, and direction sense.

TEXT BOOKS:

1. Meenakshi Raman and Sangeeta Sharma, Technical Communication: Principles and Practice, 4th Edition, Oxford University Press, 2024.
2. R.S. Aggarwal, Quantitative Aptitude for Competitive Examinations, Revised Edition 2025, S. Chand Publishing.

REFERENCE BOOKS:

1. Barun K. Mitra, Personality Development and Soft Skills, 2nd Edition, Oxford University Press, 2023.
2. Arun Sharma, A Modern Approach to Verbal and Non-Verbal Reasoning, Revised Edition, McGraw Hill Education, 2024.

E. RESOURCES:

- https://www.indiabix.com/aptitude/questions-and-answers
- https://www.mindtools.com/pages/article/newLDR_86.htm
- https://www.tutorialspoint.com/quantitative_aptitude/index.htm

CO's-PO's MAPPING:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	-	2	3	-			
CO2	-	-	-	-	-	-	-	1	3	2	-			
CO3	3	2	-	-	-	-	-	-	-	-	-			
CO4	3	3	-	-	-	-	-	-	-	-	-			
CO5	2	3	-	1	-	-	-	-	-	-	-			
AVR	2.67	2.67		1.00				1.00	2.50	2.50				

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

Chairman
BoS / S&H

25ECL41 SDG 4,9,11	ANALOG COMMUNICATION LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OBJECTIVES:

- Study the AM & FM Modulation and Demodulation.
- Learn the filters for improving the performance of frequency modulation.
- Understand the Pulse Modulation.
- Verify the Sampling schemes.
- Simulate Analog Modulation Schemes.

LIST OF EXPERIMENTS

1. Amplitude modulation and demodulation.
2. Frequency modulation and demodulation.
3. Balanced modulator and Synchronous detector.
4. SSB modulation and Demodulation.
5. Pre-emphasis and de-emphasis.
6. Phase Locked Loop.
7. Characteristics of Mixer.
8. PAM modulation and demodulation.
9. PWM and PPM modulation and demodulation.
10. Sampling schemes verification.

USING MATLAB and Simulink toolbox

1. Amplitude modulation and demodulation.
2. Frequency modulation and demodulation.
3. Balanced modulator and Synchronous detector.
4. PAM modulation and demodulation.
5. PWM and PPM modulation and demodulation

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1: Analyze the practical aspects of various analog modulation schemes.

CO2: Evaluate the various measures that improve receiver performance.

CO3: Analyze the improvement of the noise performance of Communication system

CO4: Ability to study issues from communication links and channels, and their equalization techniques.

CO5: Apply the programming aspects of MATLAB in simulating various analog modulation techniques.

REFERENCE BOOKS:

SVHEC-R2025

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1. Manual prepared by the faculty of ECE Department, SVHEC

E-RESOURCES:

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

CO's – PO's & PSO's MAPPING

CO/ PO/ PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	-	-	-	1	1	-	-	-
CO2	3	3	3	3	3	2	-	-	-	1	1	-	-	-
CO3	3	3	3	3	3	2	-	-	-	1	1	-	-	-
CO4	3	3	3	3	3	3	-	-	-	1	1	-	-	-
CO5	3	3	3	3	3	2	-	-	-	1	1	-	-	-
AVG	3	3	3	3	3	2.5	-	-	-	1	1	-	-	-

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

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25ECL42 SDG 3,4,9,11	LINEAR INTEGRATED CIRCUITS LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OBJECTIVES:

- Gain hands on experience in designing amplifiers
- Design oscillators and analyze the frequency
- Learn the fundamental principles of amplifier circuits and filters
- Differentiate the operation of converters
- Learn simulation software used in circuit design

LIST OF EXPERIMENTS

DESIGN AND ANALYSIS OF THE FOLLOWING CIRCUITS

1.Inverting and Non Inverting amplifier
2.RC Phase shift oscillator and Wien Bridge Oscillator
3.RC Integrator and Differentiator circuits using Op-Amp
4.Clippers and Clampers
5.Instrumentation amplifier
6.Active low-pass, High pass & Band pass filters
7.PLL Characteristics and its use as frequency multiplier, clock synchronization
8.R-2R ladder type D-A converter using Op-Amp

SIMULATION USING LT SPICE

1.Astable, Monostable, Bistable Multivibrator
2.Schmitt Trigger circuit with Predictable hysteresis

COURSE OUTCOMES:

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

CO1: Design and analyze basic Op-Amp circuits

CO2: Design and evaluate oscillator circuits.

CO3: Analyze the characteristics of active filters, clippers, and clampers.

CO4: Analyze the applications of special analog IC circuits such as Phase-Locked Loops (PLLs) and Digital-to-Analog Converters.

CO5: Simulate and verify the operation of multivibrator and Schmitt trigger circuits

REFERENCE BOOKS:

1. Manual prepared by the faculty of ECE Department, SVHEC

E-RESOURCES:

1. NPTEL-Online Courses and Video lectures: https://nptel.ac.in/
2. https://www.vlab.co.in/broad-area-electronics-and-communications

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CO2	2	3	3	3	-	-	-	-	-	-	1	3	2	3
CO3	2	3	3	3	-	-	-	-	-	-	1	3	2	3
CO4	2	3	3	3	2	-	-	-	-	-	1	3	2	3
CO5	2	3	3	3	-	-	-	-	-	-	1	3	2	3
Avg	2	3	3	3	2	-	-	-	-	-	1	3	1.8	2.8

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		L	T	P	C
25ECL43	MICROPROCESSOR AND MICROCONTROLLER LABORATORY (COMMON TO ECE & BME)	0	0	3	1.5
SDG 3,4,9,11					

COURSE OBJECTIVES:

To impact knowledge of

- Simple arithmetic operations using assembly language program and study the addressing modes & instruction set of 8086 & 8051
- Simple program writing in assembly languages
- Assembly language program to convert Analog input to Digital output and Digital input to Analog output.
- Interfacing experiments with Microprocessor 8086
- Interfacing experiments with Microcontroller 8051.

LIST OF EXPERIMENTS

1. Searching number using 8085.
2. Data transfer (8251 USART) using 8085.
3. Basic arithmetic operation using 8086.
4. Logical operations using 8086.
5. Code conversion using 8086.
6. Traffic light controller using 8086.
7. Key board and Display using 8086.
8. Serial interface and Parallel interface using 8086.
9. Sorting number using 8051.
10. Stepper motor interface using 8051

TOTAL: 45 PERIODS

COURSE OUTCOMES:

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

CO1: Ability to write assembly language program for microprocessor.

CO2: Ability to write assembly language program for microcontroller

CO3: Ability to design and implement interfacing of peripheral with microprocessor and microcontroller

CO4: Ability to analyze, comprehend, design and simulate microprocessor-based systems used for control and monitoring.

CO5: Ability to analyze, comprehend, design and simulate microcontroller-based systems used for control and monitoring.

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CO3	3	3	3	3	3	2	-	-	-	1	1	2	2	1
CO4	3	3	3	3	3	3	-	-	-	1	1	2	2	-
CO5	3	3	3	3	3	2	-	-	-	1	1	2	2	1
AVG	3	3	3	3	3	2	-	-	-	1	1	2	2	1

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