AL-AMEEN ENGINEERING COLLEGE

(Autonomous)

Accredited by NAAC with "A" Grade :: An ISO Certified Institution
(Affiliated to Anna University, Chennai & Approved by AICTE, New Delhi)
Karundevanpalayam, NanjaiUthukkuli Post, Erode – 638 104, Tamilnadu, INDIA.

CURRICULUM & SYLLABI
SEMESTERS – I to VIII
(Regulations 2023)

CHOICE BASED CREDIT SYSTEM
B.E., Electronics and Communication Engineering
Applicable to the Students admitted to B.E. ECE Programme from the AY 2023-24 onwards

KNOWLEDGE LEVELS (BLOOM'S TAXONOMY)

Notation	Knowledge Levels
K1	Remembering
K2	Understanding
K3	Applying
K4	Analysing
K5	Evaluating
K6	Creating

VISION
Envisioned to be a leading program of eminence, catering to the transdisciplinary world of electronic engineering systems, linking India with rest of the world.

MISSION
1. To develop graduates with a robust knowledge of Electronics and Communication Engineering and its contribution to the electronic consumer world including its vast involvement in industry 4.0 and start-ups, recognizing the engineering's social commitment and civic sense.   2. To incalculate research inclinations and lifelong learning habits, for facing the complexity of the huge requirements of Electronics and Communication Engineering in the future of electronic world, particularly uplifting the rural India in a sustainable manner.   3. To grow graduates in strong inter-personal and intra-personal skills and positivism towards the society of the ever-changing transdisciplinary world of work.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)	
PEO 1	Take up careers in VLSI, Signal Processing, Information and Communication, Embedded system & Control Engineering.
PEO 2	Pursue higher education /research and practice profession.
PEO 3	Adapt to the technological advancement for providing the sustainable engineering solutions to meet organization/society needs.

PROGRAM OUTCOMES (POs)	
PO 1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAM SPECIFIC OUTCOMES (PSOs)	
PSO 1	Apply the knowledge of electronics and communication Engineering in VLSI, Signal processing, Information and Communication, Embedded system & Control Engineering.
PSO 2	Design and Implement products using the cutting – edge software and hardware tools.

CURRICULUM

SEMESTER I

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSE									
1	23MA1T1	Calculus & Differential Equations	BS	40	60	3	1	0	4
THEORY COURSES WITH LABORATORY COMPONENTS									
2	23EN1LT2	Communicative English	HS	50	50	3	0	2	4
3	23PH1LT3	Engineering Physics	BS	50	50	3	1	2	5
4	23CY1LT4	Engineering Chemistry	BS	50	50	3	1	2	5
5	23CS1LT5	Problem Solving and C programming	ES	50	50	3	0	4	5
MANDATORY COURSES									
6		Universal Human Values 1 - Induction Programme	MC	-	-	-	-	-	-
7	23HS1T6	Heritage of Tamil	MC	100	-	1	0	0	1
Total						16	3	10	24

SEMESTER II

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSES									
1	23EN2T1	Technical English	HS	40	60	3	0	0	3
2	23HS2T2	Environmental Sciences	MC	100	-	3	0	0	0
3	23HS2T3	Tamils and Technology	MC	100	-	1	0	0	1
4	23MA2T5	Laplace Transforms and Complex Analysis	BS	40	60	3	1	0	4
THEORY COURSES WITH LABORATORY COMPONENTS									
5	23EE2LT1	Electrical Circuits Analysis	ES	50	50	3	0	4	5
6	23EC2LT2	Electronic Devices and Circuits	ES	50	50	3	0	4	5
Total						16	1	8	18

SEMESTER III

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
		THEORY COURSES							
1	23HS3T1	Constitution of India	MC	100	-	3	0	0	0
2	23EC3T2	Analog Electronics	PC	40	60	3	0	0	3
3	23MA3T3	Transforms and Random Processes	BS	40	60	3	1	0	4
4	23EC3T4	Signals and Systems	PC	40	60	3	1	0	4
5	23EE3T5	Electromagnetic Theory	PC	40	60	3	1	0	4
		THEORY COURSE WITH LABORATORY COMPONENT							
6	23EC3LT1	Linear Integrated Circuits	PC	50	50	2	0	4	4
		LABORATORY COURSE							
7	23EN3L1	Interpersonal CommunicationSkills Laboratory - I	HS	60	40	0	0	3	1.5
Total						**17**	**3**	**7**	**20.5**

SEMESTER IV

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSES									
1	23HS4T1	Universal Human Values 2: Understanding Harmony	HS	100	-	2	1	0	3
2	23EC4T2	Digital Signal Processing	PC	40	60	3	1	0	4
3	23EC4T3	Analog & Digital Communication	PC	40	60	3	1	0	4
THEORY COURSES WITH LABORATORY COMPONENTS									
4	23EE4LT1	Control Systems Engineering	PC	50	50	2	0	4	4
5	23EC4LT2	Digital Electronics	PC	50	50	2	0	4	4
LABORATORY COURSES									
6	23EN4L1	Interpersonal Communication Skills Laboratory - II	HS	60	40	0	0	3	1.5
7	23EC4L2	Digital Signal Processing Laboratory	PC	60	40	0	0	2	1
8	23EC4L3	Analog and Digital Communication Laboratory	PC	60	40	0	0	2	1
Total						**12**	**3**	**15**	**22.5**

SEMESTER V

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSES									
1		Transmission Lines and Antennas	PC	40	60	3	1	0	4
2		Microprocessor and Microcontroller	PC	40	60	3	0	0	3
3		Professional Elective-I	PE	40	60	3	0	0	3
THEORY COURSES WITH LABORATORY COMPONENTS									
4		Computer Communication Networks	PC	50	50	2	0	4	4
5		Open Elective-I	OE	50	50	2	0	4	4
LABORATORY COURSES									
6		Microprocessor and Microcontroller laboratory	PC	60	40	0	0	2	1
7		RF and Antenna Design laboratory	PC	60	40	0	0	2	1
MANDATORY COURSE									
8		Soft Skills - I	MC	100	-	2	1	0	0
Total						**15**	**2**	**12**	**20**

SEMESTER VI

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	T	P	C
THEORY COURSES									
1		VLSI Design	PC	40	60	3	0	0	3
2		Wireless Communication	PC	40	60	3	0	0	3
THEORY COURSES WITH LABORATORY COMPONENTS									
3		Professional Elective-II	PE	50	50	2	0	4	4
4		Professional Elective-III	PE	50	50	2	0	4	4
5		Open Elective-II	OE	50	50	2	0	4	4
LABORATORY COURSE									
6		VLSI Design Laboratory	PC	60	40	0	0	2	1
MANDATORY COURSES									
7		Soft Skills - II	MC	100	-	1	0	0	0
8		Technical Seminar	EEC	100	-	0	0	2	1
Total						**13**	**0**	**16**	**20**

SEMESTER VII

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSES									
1		Professional Elective-IV	PE	40	60	3	0	0	3
2		Open Elective-III	OE	40	60	3	0	0	3
3		Human Values and Ethics	HS	40	60	3	0	0	3
THEORY COURSE WITH LABORATORY COMPONENTS									
3		Embedded and Real Time Systems	PC	50	50	2	0	4	4
4		Optical and Microwave Engineering	PC	50	50	2	0	4	4
5		Professional Elective-V	PE	50	50	2	0	4	4
LABORATORY COURSE									
6		Project Phase - I	EEC	100	-	0	0	6	3
Total						**15**	**0**	**18**	**24**

SEMESTER VIII

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
LABORATORY COURSES									
1		Project Phase -II	EEC	60	40	0	0	24	12
2		Industrial Training / Internship	EEC	100	-	4 WEEKS			1
Total						**0**	**0**	**24**	**13**

Total Credits: 162

HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT (HS)

S. No.	Course Code	Course Title	L	T	P	C
1	23EN2T1	Technical English	3	0	0	3
2	23EN3L1	Interpersonal Communication Skills Laboratory - I	0	0	3	1.5
3	23HS4T1	Universal Human Values 2: Understanding Harmony	2	1	0	3
4	23EN4L1	Interpersonal Communication Skills Laboratory – II	0	0	3	1.5
5		Human Values and Ethics	3	0	0	3

BASIC SCIENCES (BS)

Sl.No.	Course Code	Course Title	L	T	P	C
1	23MA1T1	Calculus & Differential Equations	3	1	0	4
2	23PH1LT3	Engineering Physics	3	1	2	5
3	23CY1LT4	Engineering Chemistry	3	1	2	5
4	23MA2T5	Laplace Transforms and Complex Analysis	3	1	0	4
5	23MA3T3	Transforms and Random Processes	3	1	0	4

ENGINEERING SCIENCES (ES)

Sl.No.	Course Code	Course Title	L	T	P	C
1	23CS1LT5	Problem Solving and C programming	3	0	4	5
2	23EE2LT1	Electrical Circuits Analysis	3	0	4	5
3	23EC2LT2	Electronic Devices and Circuits	3	0	4	5

PROFESSIONAL CORE (PC)

Sl.No.	Course Code	Course Title	L	T	P	C
1.	23EC3T2	Analog Electronics	3	0	0	3
2.	23EC3T4	Signals and Systems	3	1	0	4
3.	23EE3T5	Electromagnetic Theory	3	1	0	4
4.	23EC3LT1	Linear Integrated Circuits	2	0	4	4
5.	23EC4T2	Digital Signal Processing	3	1	0	4
6.	23EC4T3	Analog & Digital Communication	3	1	0	4
7.	23EE4LT1	Control Systems Engineering	2	0	4	4
8.	23EC4LT2	Digital Electronics	2	0	4	4
9.	23EC4L2	Digital Signal Processing Laboratory	0	0	2	1
10.	23EC4L3	Analog and Digital Communication Laboratory	0	0	2	1
11.		Transmission Lines and Antennas	3	1	0	4
12.		Microprocessor and Microcontroller	3	0	0	3
13.		Computer Communication Networks	2	0	4	4
14.		Microprocessor and Microcontroller laboratory	0	0	2	1
15.		RF and Antenna Design laboratory	0	0	2	1
16.		VLSI Design	3	0	0	3
17.		Wireless Communication	3	0	0	3
18.		VLSI Design Laboratory	0	0	2	1
19.		Embedded and Real Time Systems	2	0	4	4
20.		Optical and Microwave Engineering	2	0	4	4

PROFESSIONAL ELECTIVES (PE)

**Vertical 1 -Sensor Technologies and IOT**

PE No.	Course Code	Course Title	L	T	P	C
PE I		Sensors and Transducers for IOT	3	0	0	3
PE II		IoT based Smart System	2	0	4	4
PE III		Automation Using IoT	2	0	4	4
PE IV		IoT Architecture and Protocols	3	0	0	3
PE V		Wearable sensor Devices	2	0	4	4

**Vertical 2 -Emerging and Healthcare Electronics**

PE No.	Course Code	Course Title	L	T	P	C
PE I		Nano Electronics Device	3	0	0	3
PE II		Fabrication Technologies	2	0	4	4
PE III		Advanced Display Technologies	2	0	4	4
PE IV		Medical Electronics	3	0	0	3
PE V		Flexible Electronics	2	0	4	4

**Vertical 3 -Multiband Communication**

PE No.	Course Code	Course Title	L	T	P	C
PE I		Adhoc and Wireless Sensor networks	3	0	0	3
PE II		Network Security for Communication	2	0	4	4
PE III		Vehicular Communication Network	2	0	4	4
PE IV		Advanced Communication System	3	0	0	3
PE V		Body Area Network and Sensors	2	0	4	4

Vertical 4 -VLSI Design						
PE No.	Course Code	Course Title	L	T	P	C
PE I		Analog IC Design	3	0	0	3
PE II		Verilog Programming	2	0	4	4
PE III		Physical Design Automation	2	0	4	4
PE IV		System on Chip	3	0	0	3
PE V		CAD for VLSI Circuits	2	0	4	4

Vertical 5 -Signal Processing						
PE No.	Course Code	Course Title	L	T	P	C
PE I		Discrete time signal processing	3	0	0	3
PE II		Digital Image Processing	2	0	4	4
PE III		Digital Speech Processing	2	0	4	4
PE IV		Image Signal Processing	3	0	0	3
PE V		Digital Video Signal Processing	2	0	4	4

Vertical 6 -Embedded System &Robotics						
PE No.	Course Code	Course Title	L	T	P	C
PE I		Introduction to robotics and its application	3	0	0	3
PE II		AVR Family	2	0	4	4
PE III		AVR Interrupts and ARM	2	0	4	4
PE IV		Logical Thinking and Circuit Making	3	0	0	3
PE V		Robotics	2	0	4	4

OPEN ELECTIVES (OE)

Sl.No.	Course Code	Course Title	L	T	P	C
1		Sensors and Transducers for IoT	3	0	0	3
2		Medical Electronics	3	0	0	3
3		Nano Electronics Device	3	0	0	3
4		Adhoc and Wireless Sensor networks	3	0	0	3
5		Introduction to Robotics and its Application	3	0	0	3

EMPLOYABILITY ENHANCEMENT COURSES (EEC)
PRACTICAL COURSES AND PROJECT WORK

Sl. No.	Course Code	Course Title	L	T	P	C
1		Technical Seminar	0	0	2	1
2		Project Phase -I	0	0	6	3
3		Project Phase -II	0	0	24	12
4		Industrial Training / Internship	4 Weeks			1

MANDATORY COURSES (MC)

Sl.No.	Course Code	Course Title	L	T	P	C
1		Universal Human Values 1 - Induction Programme	0	0	0	0
2	23HS1T6	Heritage of Tamil	1	0	0	1
3	23HS2T2	Environmental Sciences	3	0	0	0
4	23HS2T3	Tamil and Technology	1	0	0	1
5	23HS3T1	Constitution of India	3	0	0	0

6		Soft Skills - I	2	1	0	0
7		Soft Skills - II	1	0	0	0

VALUE ADDED COURSES (VAC)

S.No.	Course Code	Course Title	Credit
1		The Internet of Things using LoRaWAN Technology	1
2		IoT Application Design using Raspberry Pi and Python	1
3		Deep Learning	1
4		Internet of Things using Arduino and Cloud	1
5		Artificial Intelligence using Python	1
6		Machine Learning & AI	1
7		Integrated Full Stack Web Development with IoT	1
8		PCB Design with 3D Printing Material	1
9		Real-time AI Processing in Embedded Systems	1
10		The Internet of Things using LoRaWAN Technology	1
11		MYSQL	1
12		Java Script	1
13		Python	1
14		HTML	1
15		R Language	1
16		Design of Applications in IoT	1
17		Verilog Programming	1
18		Industrial IoT using MSP430 & CC3200 Launchpad	1

19		PCB Design and Fabrication	1
20		Artificial Intelligence using Raspberry Pi	1

CURRICULUM BREAKDOWN STRUCTURE

Subject	AICTE suggested breakdown of credits	Total number of credits	Curriculum Content (% of total number of credits of the program)
Humanities and Social Sciences including Management (HS)	15	16	9.88%
Basic Sciences (BS)	23	22	13.58%
Engineering Sciences (ES)	17	15	9.26%
Professional Core (PC)	61	61	37.65%
Program Electives (PE)	12	18	11.11%
Open Electives (OE)	12	11	6.79%
Employability Enhancement Courses (EEC) – Practical Courses and Project Work	20	17	10.49%
Mandatory Courses (MC)	0	2 (AU)	1.23%
Total	**160**	**162**	**100.00%**

CREDIT SUMMARY

Sl. No.	Subject Area	Credits per Semester								Total Credits	AICTE Suggested Credits
		I	II	III	IV	V	VI	VII	VIII		
1	HS	4	3	1.5	4.5			3		16	15
2	BS	14	4	4						22	23
3	ES	5	10							15	17
4	PC			15	18	13	7	8		61	61
5	PE					3	8	7		18	12
6	OE					4	4	3		11	12
7	EEC						1	3	13	17	20
8	MC	1	1	0		0	0			2 (AU)	0
TOTAL		24	18	20.5	22.5	20	20	24	13	162	160

SEMESTER I

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSE									
1	23MA1T1	Calculus & Differential Equations	BS	40	60	3	1	0	4
THEORY COURSES WITH LABORATORY COMPONENTS									
2	23EN1LT2	Communicative English	HS	50	50	3	0	2	4
3	23PH1LT3	Engineering Physics	BS	50	50	3	1	2	5
4	23CY1LT4	Engineering Chemistry	BS	50	50	3	1	2	5
5	23CS1LT5	Problem Solving and C programming	ES	50	50	3	0	4	5
MANDATORY COURSES									
6		Universal Human Values 1 - Induction Programme	MC	-	-	-	-	-	-
7	23HS1T6	Heritage of Tamil	MC	100	-	1	0	0	1
Total						16	3	10	24

Semester	Programme	Course Code	Course Name	L	T	P	C
I	B.E. / B.Tech., Common to all	23MA1T1	CALCULUS AND DIFFERENTIAL EQUATIONS	3	1	0	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Apply eigen values and eigenvectors to convert quadratic form to canonical form through orthogonal diagonalization.	K3	1
CO2	Understand the basic concepts of derivatives to estimate maxima and minima of multivariable functions.	K2	2
CO3	Identify appropriate integral techniques to find area and volume of the given region	K3	3
CO4	Apply various integral theorems for solving engineering problems involving cubes and parallelepipeds.	K3	4
CO5	Solve first order Ordinary Differential Equations and apply them to certain physical situations.	K3	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO2	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO3	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO4	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO5	3	3	3	3	-	-	-	1	3	2	-	2	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**MATRICES**	**9 + 3**
Eigen values and Eigen vectors – properties (without proof) – Cayley Hamilton theorem (Without proof) –Diagonalization using orthogonal transformation.		
Topic - 2	**FUNCTIONS OF SEVERAL VARIABLES**	**9 + 3**
Partial derivatives – Total derivative – Jacobians - Taylor's series expansion – Extreme values of functions of two variables – Lagrange's multipliers method.		
Topic - 3	**MULTIPLE INTEGRALS**	**9 + 3**
Double integrals – Change of order of integration – Triple integrals – Applications in area and volumes.		
Topic - 4	**LINE AND SURFACE INTEGRALS**	**9 + 3**
Gradient, Divergence and curl– Directional Derivative – Irrotational and solenoidal vector fields – Green's theorem – Green's theorem in a plane – Gauss divergence theorem – Stokes theorem (excluding proof).		
Topic - 5	**ORDINARY DIFFERENTIAL EQUATION**	**9 + 3**
Second and higher order linear differential equations with Constant coefficients – Variable coefficients – Euler Cauchy equation – Legendre's equation – Method of variation of Parameters–Simple Applications.		

THEORY	45		TUTORIAL	15		PRACTICAL	0		TOTAL	60

BOOK REFERENCES	
1	Jain R.K and Iyengar S.R.K, "Advanced Engineering Mathematics", 5rd Edition, Narosa Publishing House, New Delhi, Reprint 2019.
2	Ramana B.V., "Higher Engineering Mathematics", Tata Mcgraw Hill Publishing Company, New Delhi, 2017.
3	Kreyszig E., "Advanced Engineering Mathematics", 10th Edition, John Wiley Sons, 2012. (E-BOOK)
4	Glyn James., "Advanced Modern Engineering Mathematics", Pearson Education Limited, 2018.
5	N P Bali, Manish Goyal, "A Text Book of Engineering Mathematics", 9rd Edition, Laxmi Publication Private Limited, 2010.
6	Grewal B.S., "Higher Engineering Mathematics", 43nd Edition,Khanna Publications New Delhi, 2015

OTHER REFERENCES	
1	https://www.slideshare.net/mailrenuka/matrices-and-application-of-matrices
2	https://testbook.com/maths/application-of-vector# :~:text =Application % 20of % 20 Vector % 20 Calculus, gravitational % 20 fields %2 C% 20 and %20 fluid %20 flow. & text = To % 20 find %20 the % 20 rate % 20 of, mass % 20 of % 20 a% 20 fluid % 20 flows.
3	https://youtu.be/wtuq1oSButE
4	https://www.slideshare.net/abhinavsomani3/applications-of-maths-in-our-daily-life-41607055

Semester	Programme	Course Code	Course Name	L	T	P	C
I	B.E. / B.Tech., Common to all	23EN1LT2	COMMUNICATIVE ENGLISH	3	0	2	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Improve communication skills and language comprehension with error-free strategies.	K2	1
CO2	Analyze the effectiveness of soft skills in different scenarios.	K3	2
CO3	Explore the fascinating world of word-stress, sentence stress and intonation.	K4	3
CO4	Enhance reading and writing skills to excel in career.	K4	4
CO5	Develop strong public speaking abilities.	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO2	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO3	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO4	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO5	-	-	-	-	-	-	-	1	3	3	-	3	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests (Theory Component)
	2	Laboratory Record and Model Practical Examinations (Laboratory Component)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**LANGUAGE INTROSPECTION**	**9**

GRAMMAR COMPONENTS: Vocabulary Building - Word Formation–Prefixes and Suffixes– 'Wh' questions and Yes or No questions.

LINGUISTIC FUNCTIONS: Short comprehension Passages –Skimming and Scanning-Developing hints

Topic - 2	**SOFT SKILLS**	**9**

GRAMMAR COMPONENTS: Sentence structures- Punctuation – Kinds of sentences - Subject-verb Agreement.

LINGUISTIC FUNCTIONS: Introducing and Sharing Information from Newspaper including Dialogues and Conversations– Short Narrative Descriptions – Paragraph Writing – Greeting- Jumbled Sentences-

Topic - 3	**CAREER GUIDANCE**	**9**

GRAMMAR COMPONENTS: Single-word substitutes –Pronouns – Degrees of Comparison

LINGUISTIC FUNCTIONS: Reading Comprehension – Verbal and Non-verbal Communication –Public Speaking - Describing and Classification of Different Kinds of Innovation – Narration Act. (Language through Literature)- Negotiation Skills.

Topic - 4	**TECHNICAL WRITING**	**9**

GRAMMAR COMPONENTS: Articles- Modal Verbs – Uses of Prepositions (of Time, Place, Direction and Spatial Relations)

LINGUISTIC FUNCTIONS: Preparing Instructions and Manuals - Reporting Events and Research – Writing Recommendations – Interpreting Diagrammatic Representations, esp. Bar Graphs and Pie Charts.

Topic - 5	**BUSINESS CORRESPONDENCE**	**9**

GRAMMAR COMPONENTS: Numerical Adjectives –Phrases and Clauses- Synonyms and Antonyms-Different Tense Forms of Verbs.
LINGUISTIC FUNCTIONS: Writing short Essays- Dialogue Writing- Technical and Business Proposals – Role play – Narrating Incidents – Extempore and persuasive speech- Conversations - Telephonic Conversations.

THEORY	**45**		**TUTORIAL**	**0**		**PRACTICAL**	**0**		**TOTAL**	**45**

LIST OF EXPERIMENTS	
Experiment-1	Self-introduction and introducing others
Experiment-2	Negotiation Skills
Experiment-3	Public Speaking
Experiment-4	Body Language
Experiment-5	Narrating incidents
Experiment-6	Telephonic Conversation
Experiment-7	Representations
Experiment -8	Technical Proposals

THEORY	0		TUTORIAL	0		PRACTICAL	30		TOTAL	30

BOOK REFERENCES	
1	Technical English 1 Paperback – 15 December 2019 by Prof. Ravindra Nath Tiwari (Author)
2	Developing English Language Skills-I: (NEP 2020 for the University of Delhi) by Pooja Khanna
3	Sem-I Communication Skills I Edition/Reprint: 2022 Author(s): B.v.pathak Publisher: **NIRALI PRAKASHAN** Product ID: 591991
4	Sem-1 Communication Skills (English) ISBN: 9788119883493 Edition/Reprint: 2023-24 Author(s): Dr. Yogesh Malshette Publisher: **NIRALI PRAKASHAN** Product ID: 626280
5	English Language & Comprehension (Useful For Graduate Level) ISBN: 9789386791672 Edition / Reprint: 2022 Author(s): Editorial Board Publisher: UPKAR PRAKASHAN Product ID: 514358 Country of Origin: India
6	Communication Skills in English| AICTE Prescribed Textbook (English) DIP122EN Paperback – Big Book, 1 January 2022by Anjana Tiwari (Author)

OTHER REFERENCES	
1	https://youtu.be/x60GHpQ8gJk?list=PLWPirh4EWFpFIElSxplDlEhRDZHkBD-0n
2	https://youtu.be/BO7j-X87rM8
3	https://youtu.be/QMIQv7yPlkI
4	https://www.youtube.com/live/zb07Wo9_2Lc?si=nnPc83pP-gFHvRfD

Semester	Programme	Course Code	Course Name	L	T	P	C
I	B.E. / B.Tech., Common to all	23PH1LT3	ENGINEERING PHYSICS	3	1	2	5

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Utilize the conceived concepts and techniques for synthesizing novel crystals.	K2	1
CO2	Classify the extensive properties of solid materials to use it in material fabrication field.	K2	2
CO3	Understand the principles of thermodynamics and apply it in real systems.	K2	3
CO4	Analyze the properties of the Laser beam and apply it in industrial and medical field.	K3	4
CO5	Apply advanced technical methods by assessing the fibre optics.	K3	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	2	-	-	1	3	2	1	2	-	-
CO2	3	2	2	2	2	-	-	1	3	2	1	2	-	-
CO3	3	2	2	1	2	-	-	1	3	2	1	2	-	-
CO4	3	2	2	2	2	-	-	1	3	2	1	2	-	-
CO5	3	2	2	1	2	-	-	1	3	2	1	2	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests (Theory Component)
	2	Laboratory Record and Model Practical Examinations (Laboratory Component)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT			
Topic - 1	**CRYSTAL PHYSICS**		**9+3**
Unit cell-Bravais lattices, directions and planes in a crystal, Miller indices – inter-planar distances - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - growth of single crystals: solution and melt growth techniques.			
Topic - 2	**PROPERTIES OF MATTER**		**9+3**
Hooke's Law - Stress-Strain Diagram - Elastic moduli - Poisson's Ratio - Expression for bending moment of beam and depression of Cantilever - Expression for Young's modulus by Non-uniform bending and its experimental determination.			
Topic - 3	**THERMAL PHYSICS**		**9+3**
Transfer of heat energy - thermal conduction, convection and radiation – heat conductions in solids – thermal conductivity - Lee's disc method - theory and experiment - conduction through compound media (series and parallel) – thermal insulation – applications: heat exchangers, refrigerators, ovens and solar water heaters.			
Topic - 4	**LASER TECHNOLOGY**		**9+3**
Laser characteristics -Spontaneous emission and stimulated emission-Einstein's coefficients-Pumping methods- Components of a laser -CO_2 laser-Solid state laser(Nd:YAG)-Semiconductor diode lasers – Application of laser in science and technology.			
Topic - 5	**FIBER OPTICS**		**9+3**
Fiber optical communication system – Structure of an optical fiber- Numerical aperture and acceptance angle-Classification of optical fibers (Materials, modes and refractive index profile)- Displacement and temperature sensor- Medical Endoscopy.			

THEORY	45		TUTORIAL	15		PRACTICAL	00		TOTAL	60	

LIST OF EXPERIMENTS	
Experiment-1	Determination of Young's modulus by non- uniform bending.
Experiment-2	Determination of Young's modulus by uniform bending.
Experiment-3	Torsional pendulum - determination of moment of inertia and rigidity modulus.
Experiment-4	Determination of velocity of sound and compressibility of liquid – Ultrasonic Interferometer.
Experiment-5	Determination of Wavelength, and particle size using Laser.
Experiment-6	Determination of thermal conductivity of a bad conductor using Lee's disc method.
Experiment-7	Air wedge – determination of thickness of a thin wire.
Experiment -8	Determination of acceptance angle and numerical aperture of an optical fiber.

THEORY	00		TUTORIAL	00		PRACTICAL	30		TOTAL	30

BOOK REFERENCES	
1	Avadhanulu M N, Kshirsagar P G and Arun Murthy TVS, "A Text book of Engineering Physics", 2^{nd}Edition, S Chand Publishing, New Delhi, 2022
2	Dr.G.Senthilkumar " Engineering Physics-1" Revised & Animated Version, VRB Publishers Pvt.Ltd.,2017
3	Dr.R.Suresh " A Text book of Engineering Physics", 2^{nd}Edition, Sri Krishna Hi-tech Publishing Pvt, Ltd., Chennai,2019.
4.	Dr.P.Mani " A Text book of Engineering Physics",Dhanam Publications.,Chennai.,2022.
5.	Dr.M.Arumugam " A Text book of Engineering Physics", Anuradha Publications.,Chennai.,2020.
6.	Serway and Jewett, "Physics for Scientists and Engineers with Modern Physics", 6th Edition, Thomson Brooks Cole, 2008

OTHER REFERENCES	
1	https://nptel.ac.in/courses/115/105/115105099/
2	https://nptel.ac.in/courses/115/106/115106061/
3	https://www.youtube.com/watch?v=_JOchLyNO_w
4	https://www.journals.elsevier.com › Journals
5	https://nptel.ac.in/courses/118/104/118104008/
6	https://www.digimat.in/nptel/courses/video/122107035/L37.html

Semester	Programme	Course Code	Course Name	L	T	P	C
I	B.E. / B.Tech., Common to all	23CY1LT4	ENGINEERING CHEMISTRY	3	1	2	5

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Apply the suitable water softening methods to avoid boiler troubles.	K3	1
CO2	Analyze the calorific value of different types of fuels.	K2	2
CO3	Choose suitable forms of energy sources for applying it in energy sectors.	K2	3
CO4	Understand the working process of spectroscopy to analyse the wavelength of electromagnetic radiations.	K3	4
CO5	Classify the types of polymers for fabrication.	K3	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2	-	-	2	1	2	2	2	2	-	-
CO2	3	2	1	1	-	-	2	1	2	2	2	2	-	-
CO3	3	2	2	1	-	-	3	1	2	2	2	2	-	-
CO4	3	2	2	1	1	-	1	1	2	2	2	2	-	-
CO5	3	2	1	2	-	-	1	1	2	2	2	2	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests (Theory Component)
	2	Laboratory Record and Model Practical Examinations (Laboratory Component)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT			
Topic - 1	**WATER CHEMISTRY**		**9+3**
Hardness of water – Types – Units – Boiler troubles (Scale and Sludge, Priming and Foaming and Caustic Embrittlement) – Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and Calgon conditioning) and External treatment (Ion exchange process and Zeolite process) – Desalination of brackish water – Reverse Osmosis.			
Topic - 2	**FUELS**		**9+3**
Fuels: Introduction - Classification of fuels – Coal – Analysis of coal (Proximate and Ultimate Analysis) - Carbonization - Manufacture of metallurgical coke (Otto Hoffmann method) - Petroleum – Bergius Process - Knocking - Octane number - Diesel oil - Cetane number - Natural gas - Compressed natural gas (CNG) - Liquefied petroleum gases (LPG) - Power alcohol.			
Topic - 3	**BATTERIES AND FUEL CELLS**		**9+3**
Batteries - Types of batteries – primary battery - dry cell. Secondary battery - lead acid battery, Nickel-Cadmium battery - Lithium Batteries - Fuel cells – Hydrogen -Oxygen fuel cell. - Solar energy conversion - solar cells – Application.			
Topic - 4	**SPECTROSCOPY**		**9+3**
Introduction – Laws of spectroscopy - Block diagram, Instrumentation, Working and application of Visible spectroscopy and Ultra Violet spectroscopy – Infrared spectroscopy – Flame photometry – Atomic adsorption spectroscopy.			
Topic - 5	**ENGINEERING MATERIALS**		**9+3**
Polymer – Types of polymerization – Preparation, properties, uses of Nylon(6,6), Poly Vinyl Chloride (PVC). Plastics – Types - Rubbers – SBR – Nanomaterials – Synthesis and its applications of Nanomaterials. Abrasives – Classification, Properties - Manufacture of SiC.			

THEORY	**45**		**TUTORIAL**	**15**		**PRACTICAL**	**0**		**TOTAL**	**60**

LIST OF EXPERIMENTS	
Experiment-1	Estimation of total hardness in water by EDTA method.
Experiment-2	Determination of viscosity coefficient of a given oil / fuel / polymer using Ostwald's viscometer.
Experiment-3	Estimation of Ferrous Ammonium Sulfate (FAS) using standard potassium Dichromate solution potentiometrically.
Experiment-4	Estimation of sodium / potassium present in water using photometer.
Experiment-5	Synthesis of Polymers (Phenol Formaldehyde or Urea Formaldehyde Resins).
Experiment-6	Conductometric estimation of Strong Acid and Weak acid from a given mixture.
Experiment-7	Determination of chloride content of water sample by Argentometric method.
Experiment -8	Determination of strength of given hydrochloric acid using pH meter.

THEORY	**0**		**TUTORIAL**	**0**		**PRACTICAL**	**30**		**TOTAL**	**30**

	BOOK REFERENCES
1	S.S Dara and S.S. Umare ' A Textbook of Engineering Chemistry for Anna University', S.Chand Publication, 2020
2	Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019
3	"Engineering Chemistry" by Dr.A.Ravikrishna, Sri Krishna Hi Tech Publishing Company, 2021
4	"Experiments In Engineering Chemistry" – Payal B Joshi, I.K. International Publishing House. 2016
5	Group Theory and Spectroscopy by Pragati Prakashan Alka L Gupta and Mukesh Kumar Alka L Gupta and Mukeshkumar ,2021
6	Anil Kumar P.V Polymer Chemistry, First Edition -2021

	OTHER REFERENCES
1	https://sctevtodisha.nic.in/wp-content/uploads/2021/03/Engineering-Chemistry-1ST-YEAR-LM.pdf
2	https://www.youtube.com/watch?v=Fyq4Q5yWDDU&list=PLyqSpQzTE6M927gXIZdVbbsyj9cmxam-b
3	https://www.youtube.com/watch?v=nh2xbyOaERw
4	https://archive.nptel.ac.in/courses/104/106/104106122/
5	https://nptel.ac.in/courses/118104008
6	https://www.britannica.com/science/water

Semester	Programme	Course Code	Course Name	L	T	P	C
I	B.E. / B.Tech., Common to all	23CS1LT5	PROBLEM SOLVING AND C PROGRAMMING	3	0	4	5

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Understand the basic concepts to write efficient C program.	K2	1
CO2	Implement the identified looping and control statements in C program for developing applications.	K3	2
CO3	Understand the concepts of arrays and strings to develop C program with different dimensions.	K3	3
CO4	Write and implement C programs using user defined functions.	K4	4
CO5	Apply dynamic memory allocation functions for assigning memory space during execution.	K3	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	-	-	-	2	2	3	3	2	3	-	-
CO2	1	2	3	2	2	-	2	2	3	3	-	3	-	2
CO3	3	2	2	-	-	-	2	2	3	3	2	3	-	2
CO4	1	3	2	2	-	-	2	2	3	3	-	3	2	-
CO5	3	2	-	-	-	-	2	2	3	3	3	3	-	2

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests (Theory Component)
	2	Laboratory Record and Model Practical Examinations (Laboratory Component)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**PROBLEM SOLVING AND C PROGRAMMING BASICS**	**9**
General Problem Solving: Algorithms, Flowcharts and Pseudo-codes, implementation of algorithms Basics of C Programming: Introduction to C - Structure of C program - Programming Rules – Compilation – Errors - C Declarations: Tokens - keywords - identifiers - constants - data types - variable declaration and initialization - type conversion - constant and volatile variables - operators and expressions.		
Topic - 2	**DECISION CONTROL STATEMENTS**	**9**
Managing Input and Output operations, Decision Control Statements: Decision control statements, Selection / conditional branching Statements: if, if-else, nested if, if-elif-else statements. Basic loop Structures/Iterative statements: while loop, for loop, selecting appropriate loop. Nested loops break and continue statements.		
Topic - 3	**ARRAYS AND STRINGS**	**9**
Introduction to Array - Definition - Array initialization - Characteristics - One Dimensional Array - Array operations -Two dimensional arrays -Strings and String handling functions.		
Topic - 4	**FUNCTIONS**	**9**
Functions: Basics - definition - Elements of User defined Functions - return statement, Function types, Parameter Passing Techniques, Function returning more values - Passing Array to Functions - Recursion - Storage classes.		
Topic - 5	**POINTERS AND FILE MANAGEMENT**	**9**
Pointer concepts - Pointers & Arrays, Structure concepts - Defining, Declaring, Accessing Member Variables, Structure within Structure - Union - File Management in C- Dynamic Memory allocation.		

THEORY	45		TUTORIAL	0		PRACTICAL	0		TOTAL	45

LIST OF EXPERIMENTS	

Experiment-1	Draw the flowchart for the following using Raptor tool.
	    a) Simple interest calculation
	    b) Greatest among three numbers
	    c) Find the sum of digits of a number.

Experiment-2	Programs for demonstrating the use of different types of operators like arithmetic, logical, relational and ternary operators (Sequential and Selection structures).
Experiment-3	Programs for demonstrating repetitive control statements like 'for', 'while' and 'do-while' (Iterative structure).
Experiment-4	Programs for demonstrating one-dimensional and two-dimensional numeric array.
Experiment-5	Programs to demonstrate modular programming concepts using functions.
Experiment-6	Programs to implement various character and string operations with and without built-in library functions.

Experiment-7	Programs to demonstrate the use of pointers.						
Experiment-8	Programs to illustrate the use of user-defined data types.						
Experiment-9	Programs to implement various file management.						
Experiment-10	Program Using Dynamic memory allocation functions.						
THEORY	**0**	**TUTORIAL**	**0**	**PRACTICAL**	**60**	**TOTAL**	**60**

BOOK REFERENCES	
1	Ashok N. Kamthane, "Programming in C", 2nd Edition., Pearson Education, 2013.
2	Sumitabha Das, "Computer Fundamentals and C Programming", 1st Edition, McGraw Hill, 2018.
3	Yashavant Kanetkar, "Let us C", 16th Edition, BPB Publications, 2018.
4.	C programming for problem solving. Paperback – Import, 9 October 2020 by Sukhendra Singh (Author), Hemant Jain (Author)
5.	Let Us C: Authentic guide to C programming language - 19th Edition Paperback – 15 December 2022 by Yashavant Kanetkar (Author)

OTHER REFERENCES	
1	R. G. Dromey, "How to Solve it by Computer", Pearson Education India; 1st edition, ISBN10: 8131705625, ISBN-13: 978-8131705629.
2	Maureen Spankle, "Problem Solving and Programming Concepts", Pearson; 9th edition, India, ISBN10: 9780132492645, ISBN-13: 978- 013249264.
3	ReemaThareja., "Programming in C ", 2nd Edition, Oxford University Press, New Delhi, 2018.
4	Balagurusamy E., "Programming in ANSI C", 7th Edition, Mc Graw Hill Education, 2017.

Semester	Programme	Course Code	Course Name	L	T	P	C
I	B.E. / B.Tech., Common to all	23HS1T6	HERITAGE OF TAMIL	1	0	0	1

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Understand the extensive literature of Tamil and its classical nature.	K2	1
CO2	Understand the heritage of sculpture, painting and musical instruments of ancient people.	K2	2
CO3	Review on folk and material arts of Tamil people.	K2	3
CO4	Realization of thinai concepts trade and victory of chozha dynasty.	K2	4
CO5	Understand the contribution of tamils in Indian freedom struggle, self esteem movement and siddha medicine.	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**LANGUAGE AND LITERATURE**	**3**
Language Families in India – Dravidan 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 and Jainism in Tamil Land – Bakthi Literature Azhwars and Nayanmars – Forms of Minor Poetry – Development of Modern Literature in Tamil- Constribution of Bharathiyar and Bharathidhasan		
Topic - 2	**HERITAGE –ROCK ART PAINTINGS TO MODENT ART-SCULPTURE**	**3**
Hero stone to modern sculpture – Bronze icons – Tribes and their handicrafts – Art of Temple car making – Massive Terracotta sculptures,Villages deities, Thiruvalluvar Statue at Kanyakumari, Making of Musical instruments – Mirudhangam , Parai, Veenai , Yazh and Nadhaswaram – Role of Temples in Social and Economic Life of Tamils		
Topic - 3	**FOLK AND MARTIAL ARTS**	**3**
Therukoothu, Karagattam,Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance – Sports and Games of Tamils		
Topic - 4	**THINAI CONCEPT OF TAMILS**	**3**
Flora and Fauna of Tamils & Aham and Puram concept from Tholkappiyam and Sangam Literature – Aram concept of Tamils – Education And Literacy during Sangam Age – Ancient Cities and Ports of Sangam Age – Export and Import during Sangam Age – Overseas Conquest of Cholas		
Topic - 5	**CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE**	**3**
Contribution of Tamils to Indian Freedom Struggle – The Cultural Influence of Tamils over the other parts of India – Self –Respect movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions and Manuscripts – Print History of Tamil Books		

THEORY	15		TUTORIAL	0		PRACTICAL	0		TOTAL	15

BOOK REFERENCES	
1	தமிழக வரலாறு –மக்களும் பண்பாடும் கேகே பிள்ளை (வெளியீடு : தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2	கணினித் தமிழ் – முனைவர். இல. சுந்தரம் (விகடன் பிரசுரம்)
3	கீழடி வைகை நதி கரையில் சங்க கால நகர நாகரிகம் தொல்லியல் துறை வெளியீடு
4	Social Life of Tamils(Dr.K.K.Pillai) A joint publication of TNTB and ESC and RMRL – (in print)
5	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) Published by International Institute of Tamil Studies.
6	The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi) Published by International Institute of Tamil Studies.

Semester	Programme	Course Code	Course Name	L	T	P	C
I	B.E. / B.Tech., Common to all	23HS1T6	தமிழர் மரபு	1	0	0	1

பாடம் கற்றதின் விளைவுகள்			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	தமிழ் மொழியின் செந்தன்மை மற்றும் இலக்கியங்கள் குறித்து தெரிதல் புரிதல்.	K2	1
CO2	தமிழர்களின் சிற்பக்கலை ஓவியக்கலை மற்றும் இசைக்கருவிகள் குறித்து தெளிவு புரிதல்.	K2	2
CO3	தமிழர்களின் நாட்டுப்புற கலைகள் மற்றும் வீர விளையாட்டுகள் குறித்து அறிமுகம் புரிதல்.	K2	3
CO4	தமிழர்களின் திணை கோட்பாடுகள் சங்க கால வணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்த தகவல்கள் புரிதல்.	K2	4
CO5	இந்திய தேசிய இயக்கம் சுயமரியாதை இயக்கம் மற்றும் சித்த மருத்துவம் பற்றி புரிதல்.	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
INDIRECT	1	Course Exit Survey

பாடத்திட்டங்கள்		
அலகு 1	**மொழி மற்றும் இலக்கியம்**	3
இந்திய மொழிக்குடும்பங்கள்- திராவிட மொழிகள்- தமிழ் ஒரு செம்மொழி- தமிழ் செவ்விலக்கியங்கள் -சங்க இலக்கியத்தின் சமயச்சார்பற்ற தன்மை -சங்க இலக்கியத்தில் பகிர்தல் அறம் -திருக்குறளில் மேலாண்மை கருத்துக்கள் - தமிழ்க்காப்பியங்கள் -தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம்- பக்தி இலக்கியம்- ஆழ்வார்கள் மற்றும் நாயன்மார்கள்- சிற்றிலக்கியங்கள்- தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி- தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.		
அலகு 2	**மரபு பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை-சிற்பக்கலை**	3
நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் -பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள்- தேர் செய்யும் கலை- சுடுமண் சிற்பங்கள்- நாட்டுப்புற தெய்வங்கள்- குமரி முனையில் திருவள்ளுவர் சிலை- இசைக்கருவிகள்- மிருதங்கம், பறை, வீணை, யாழ் ,நாதஸ்வரம் -தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு		
அலகு 3	**நாட்டுப்புற கலைகள் மற்றும் வீர விளையாட்டுகள்**	3
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து,ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்		
அலகு 4	**தமிழர்களின் திணைக்கோட்பாடுகள்**	3
தமிழகத்தின் தாவரங்களும், விலங்குகளும்- தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக்கோட்பாடுகள்- தமிழர்கள் போற்றிய அறக்கோட்பாடு- சங்ககாலத்தில் எழுத்தறிவும், கல்வியும்- சங்க கால நகரங்களும், துறைமுகங்களும்- சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி- கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி		
அலகு 5	**இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்கு தமிழர்களின் பங்களிப்பு**	3

இந்திய விடுதலைப் போரில் தமிழர்களின் பங்கு- இந்தியாவின் பிற பகுதிகளில் தமிழ்ப்பண்பாட்டின் தாக்கம் -சுயமரியாதை இயக்கம்- இந்திய மருத்துவத்தில் சித்த மருத்துவத்தின் பங்கு -கல்வெட்டுகள் ,கையெழுத்துப்படிகள் -தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு

THEORY	15	TUTORIAL	0	PRACTICAL	0	TOTAL	15

	BOOK REFERENCES
1	தமிழக வரலாறு –மக்களும் பண்பாடும் கேகே பிள்ளை (வெளியீடு : தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2	கணினித் தமிழ் – முனைவர். இல. சுந்தரம் (விகடன் பிரசுரம்)
3	கீழடி வைகை நதி கரையில் சங்க கால நகர நாகரிகம் தொல்லியல் துறை வெளியீடு
4	Social Life of Tamils(Dr.K.K.Pillai) A joint publication of TNTB and ESC and RMRL – (in print)
5	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) Published by International Institute of Tamil Studies.
6	The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi) Published by International Institute of Tamil Studies.

SEMESTER II

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSES									
1	23EN2T1	Technical English	HS	40	60	3	0	0	3
2	23HS2T2	Environmental Sciences	MC	100	-	3	0	0	0
3	23HS2T3	Tamils and Technology	MC	100	-	1	0	0	1
4	23MA2T5	Laplace Transforms and Complex Analysis	BS	40	60	3	1	0	4
THEORY COURSES WITH LABORATORY COMPONENTS									
5	23EE2LT1	Electrical Circuits Analysis	ES	50	50	3	0	4	5
6	23EC2LT2	Electronic Devices and Circuits	ES	50	50	3	0	4	5
Total						16	1	8	18

Semester	Programme	Course Code	Course Name	L	T	P	C
II	B.E. / B.Tech., Common to all	23EN2T1	TECHNICAL ENGLISH	3	0	0	3

COURSE LEARNING OUTCOMES (COs)		
After Successful completion of the course, the students should be able to	**RBT Level**	**Topics Covered**
CO1 Learn about personality development to enhance interactions.	K2	1
CO2 Improve skills by cultivating self-confidence.	K4	2
CO3 Increase social abilities by mastering communication.	K2	3
CO4 Reveal true personality for stronger interactions.	K6	4
CO5 Develop the ability to speak confidently in any situation	K6	5

PRE-REQUISITE	COMMUNICATIVE ENGLISH

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)S														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	2	3	-	3	-	-
CO2	-	-	-	-	-	-	-	1	2	3	-	3	-	-
CO3	-	-	-	-	-	-	-	-	2	3	-	3	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	3	-	-
CO5	-	-	-	-	-	-	-	1	-	3	-	3	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT	
Topic - 1	**9**

GRAMMAR COMPONENTS: Mixed Tenses • Homophones • Homonyms • Words often Confused • Pairs of Words• Texting and SMS language

LINGUISTIC FUNCTIONS: - – Professional emails, Email etiquette •Paragraph Construction • Introduction to Presentation • Communication •Note Making • Reading advertisements

Topic - 2	**9**

GRAMMAR COMPONENTS: Abbreviations and Acronyms •Concord • Collocations – Fixed and Semi Fixed Expressions.
LINGUISTIC FUNCTIONS: Letters / emails of complaint •Telephoning Skills• Leadership and Team Management • Qualities of a Good Leader • Leadership Styles • Decision Making • Problem Solving • Technical Report Writing

Topic - 3	**9**

GRAMMAR COMPONENTS: Direct Indirect Speech • Active Passive Voice • Conditional Sentences
LINGUISTIC FUNCTIONS: Group Discussions • Letter to the Editor • Checklists • Reading Comprehension Memo • Notices/Circulars Agenda and Minutes of a Meeting.

Topic - 4	**9**

GRAMMAR COMPONENTS: Misspelled words • Spot the errors • Vocabulary Development • Guessing Meanings of Words.
LINGUISTIC FUNCTIONS: •Recommendations• Interviews: Types of Interviews • Preparing Resumes & CV • Covering Letter • Brainstorming.

Topic - 5	**9**

LINGUISTIC FUNCTIONS: Mock Presentation • Job / Internship application – Cover letter & Resume • Casual Conversation • Participating in a Group Discussion • Speeches for special Occasions.

THEORY	**45**		**TUTORIAL**	**0**		**PRACTICAL**	**0**		**TOTAL**	**45**

BOOK REFERENCES	
1	Teaching Communicative English By Dr.N.Badhri Ph.D (Eng.).,Ph.D(Edn.)., 2021.
2	Communicative English By S. Kannan Padmasani , 2019.
3	Technical English – II by Prof. Ravindra Nath Tiwari, 2020.
4	Communication Skills (Sem-2) Edition / Reprint: 2022 Author(s): Neelkamal Jhalni Publisher: Jhunjhunuwala Product ID: 526288
5	English Communication ISBN: 9789385879036 Edition/Reprint: 2023Author(s): Pooja Khanna Publisher: Vikash Pub House Pvt Ltd Product ID: 625971

OTHER REFERENCES	
1	https://youtu.be/RkOb-IjkBbw
2	https://youtu.be/8SyZWgzLQSo
3	https://youtu.be/0E9deF06NUU
4	https://youtu.be/CAU2zx2Ri_M?si=jWLm7ZGegmKwO8Ii
5	https://youtube.com/playlist?list=PLyViUDdoFYKypuYyhNF2ZC9xEUE8zDmzx&si=uYKTb1eZGCWwDVon

Semester	Programme	Course Code	Course Name	L	T	P	C
II	B.E. / B.Tech., Common to all	23HS2T2	ENVIRONMENTAL SCIENCES	3	0	0	0

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Understand the scientific inquiry in the field of ecosystems for future life.	K2	1
CO2	Identify the different methods of conservation of biodiversity by analysing the factors that contribute the threat to extinction.	K2	2
CO3	Enumerate the control plan for environmental pollution problems by identifying and quantifying it's magnitude and intensity	K2	3
CO4	Understand systematically the natural resources and identify the resource management.	K2	4
CO5	Solve current environmental problems by practising the adoption of sustainability in society and industry	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	-	-	2	1	2	3	2	3	2	-	2	-	-
CO2	1	-	-	2	-	2	3	2	3	2	-	2	-	-
CO3	1	-	-	2	-	2	3	2	3	2	-	2	-	-
CO4	1	-	-	2	-	2	3	2	3	2	-	2	-	-
CO5	1	2	2	3	-	2	3	2	3	2	-	2	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**ENVIRONMENT AND ECOSYSTEMS**	**9 + 3**

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs – Introduction, types, characteristic features, structure and function of the forest ecosystem and aquatic ecosystems (ponds, river and marine).
Activity: Study of the ecosystem structure in Cauvery River.

Topic - 2	**BIODIVERSITY**	**9 + 3**

Introduction to biodiversity - definition: genetic, species and ecosystem diversity – values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity – endangered and endemic species of India – In-situ and ex- situ conservation of biodiversity.
Activity: Study of common plants, insects, birds.

Topic - 3	**ENVIRONMENTAL POLLUTION**	**9 + 3**

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Thermal pollution (d) Noise pollution – solid waste management: causes, effects and control measures of municipal solid wastes – Hazardous and biomedical waste management -pollution case studies.
Activity: Study of air and water pollution in industry

Topic - 4	**NATURAL RESOURCES**	**9 + 3**

Forest resources: over-exploitation, deforestation, – Water resources: Rain water harvesting - watershed management - utilization of surface and ground water, conflicts over water, dams-benefits and problems Food resources: effects of modern agriculture, fertilizer - pesticide problems - Principles of Green Chemistry- Case studies
Activity: Tree plantation and maintenance within the campus

Topic - 5	**SUSTAINABILITY AND POPULATION**	**9 + 3**

From unsustainable to sustainable development – Environmental Impact Assessment (EIA) –environmental ethics: Issues and possible solutions – climate change, acid rain, ozone layer depletion, and case studies – Environment Protection Act 1986 – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act - Environment and Human Health – Value Education – HIV / AIDS – Women and Child Welfare.
Activity: Small group meetings about environment and human health in local area peoples and making poster and short films about HIV / AIDS – women and child welfare.

THEORY	**45**		**TUTORIAL**	**0**		**PRACTICAL**	**0**		**TOTAL**	**45**

BOOK REFERENCES	
1	Erach Bharucha, "Environmental Studies for Undergraduate Courses", Third Edition, Orient Blackswan Pvt Ltd (8 March 2021).
2	Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press, 2015.
3	Benny Joseph, "Environmental Science and Engineering", Tata McGraw-Hill Education, New Delhi, 2017.
4	E-book: The Sustainable Use of Natural Resources: The Governance Challenge Jennifer Bansard Mika Schröder April 2021.

5	E-book: The Climate Solution: India's Climate-Change Crisis and What We Can Do about it, Mridula Ramesh May 2018.
6	E-book : Biodiversity with Practical Paperback August 2022by Dr. Kalyan Das

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=LjFt7rlCU84&t=6s
2	https://archive.nptel.ac.in/courses/120/108/120108004/
3	https://archive.nptel.ac.in/courses/120/108/120108002/
4	https://archive.nptel.ac.in/courses/103/107/103107215/
5	https://archive.nptel.ac.in/courses/127/106/127106004/
6	https://archive.nptel.ac.in/courses/123/105/123105001/

Semester	Programme	Course Code	Course Name	L	T	P	C
II	B.E. / B.Tech., Common to all	23HS2T3	TAMILS AND TECHNOLOGY	1	0	0	1

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Understand the weaving ceramic technology of ancient Tamil people nature.	K2	1
CO2	Understand the construction technology, building materials in Sangam period and case studies.	K2	2
CO3	Infer the metal process, coin and beads manufacturing with relevant archeological evidence.	K2	3
CO4	Realize the agriculture methods, irrigation technology and pearl driving.	K2	4
CO5	Understand the knowledge of scientific tamil and tamil computing.	K2	5

PRE-REQUISITE	**Heritage of Tamils**

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
INDIRECT	1	Course Exit Survey

COURSE CONTENT			
Topic - 1	**WEAVING AND CERAMIC TECHNOLOGY**		**3**
Weaving Industry during Sangam Age-Ceramic technology-Black and Red Ware Potteries(BRW)-Graffiti on Potteries			
Topic - 2	**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			
Topic - 3	**MANUFACTURING TECHNOLOGY**		**3**
Art of Ship Building-Metallurgical studies-Iron industry- Iron smelting steel- Copper and gold-Coins are source of history- Minting of Coins-Beads making- industries Stone beads- Glass beads- Terracotta beads-Shell beats/bone beats- Archeological evidences-Gem stone types described in Silapathigaram			
Topic - 4	**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			
Topic - 5	**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			

THEORY	15	TUTORIAL	0	PRACTICAL	0	TOTAL	15

BOOK REFERENCES	
1	தமிழக வரலாறு –மக்களும் பண்பாடும் கேகே பிள்ளை (வெளியீடு : தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2	கணினித் தமிழ் – முனைவர். இல. சுந்தரம் (விகடன் பிரசுரம்)
3	கீழடி வைகை நதி கரையில் சங்க கால நகர நாகரிகம் தொல்லியல் துறை வெளியீடு
4	Social Life of Tamils(Dr.K.K.Pillai) A joint publication of TNTB and ESC and RMRL – (in print)
5	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) Published by International Institute of Tamil Studies.
6	The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi) Published by International Institute of Tamil Studies.

Semester	Programme	Course Code	Course Name	L	T	P	C
II	B.E. / B.Tech., Common to all	23HS2T3	தமிழரும் தொழில்நுட்பமும்	1	0	0	1

பாடம் கற்றதின் விளைவுகள்			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	சங்ககாலத் தமிழர்களின் நெசவு மற்றும் பானை வனைதல் தொழில்நுட்பம் குறித்த கற்றுணர்தல்.	K2	1
CO2	சங்ககாலத் தமிழர்களின் கட்டட தொழில்நுட்பம், கட்டுமான பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்து புரிதல்.	K2	2
CO3	சங்ககாலத் தமிழர்களின் உலோகத்தொழில் ,நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றி அறிதல்.	K2	3
CO4	சங்ககாலத் தமிழர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் பற்றி புரிதல்.	K2	4
CO5	நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்து புரிந்து கொள்ளலும் மற்றும் பயன்படுத்துதலும்.	K2	5

PRE-REQUISITE	தமிழர் மரபு

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO2	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO3	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO4	-	-	-	-	-	-	3	3	-	2	-	3	-	-
CO5	-	-	-	-	-	-	3	3	-	2	-	3	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
INDIRECT	1	Course Exit Survey

பாடத்திட்டங்கள்		
அலகு 1	நெசவு மற்றும் பானைத் தொழில்நுட்பம்	3
சங்ககாலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள்- பாண்டங்களில் கீறல் குறியீடுகள்.		
அலகு 2	வடிவமைப்பு மற்றும் கட்டிட தொழில்நுட்பம்	3
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் மற்றும் சங்ககாலத்தில் வீட்டு பொருட்களின் வடிவமைப்பு -சங்க காலத்தில் கட்டுமான பொருட்களும் நடுக்கல்லும் சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுர சிற்பங்களும் கோவில்களும் -சோழர் காலத்து பெருங் கோயில்கள் மற்றும் பிற வழிபாட்டுத்தலங்கள் -நாயக்கர் கால கோயில்கள்- மாதிரி கட்டமைப்புகள் பற்றி அறிதல் - மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் -செட்டிநாடு வீடுகள்- பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ சாரோ செமி கட்டிடக்கலை.		
அலகு 3	உற்பத்தித் தொழில்நுட்பம்	3
கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருகுதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள் - கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள்- எலும்புத் துண்டுகள்- தொல்லியல் சான்றுகள் -சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.		
அலகு 4	வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில்நுட்பம்	3
அணை, ஏரி, குளங்கள் ,மதகு - சோழர் காலக் குமிழித்தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.		
அலகு 5	அறிவியல் தமிழ் மற்றும் கணினித்தமிழ்	3
அறிவியல் தமிழின் வளர்ச்சி - கணினித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணைய கல்விக் கழகம் - தமிழ் மின்நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத்திட்டம்.		

THEORY	15	TUTORIAL	0	PRACTICAL	0	TOTAL	15

	BOOK REFERENCES
1	தமிழக வரலாறு –மக்களும் பண்பாடும் கேகே பிள்ளை (வெளியீடு : தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)
2	கணினித் தமிழ் – முனைவர். இல. சுந்தரம் (விகடன் பிரசுரம்)
3	கீழடி வைகை நதி கரையில் சங்க கால நகர நாகரிகம் தொல்லியல் துறை வெளியீடு
4	Social Life of Tamils(Dr.K.K.Pillai) A joint publication of TNTB and ESC and RMRL – (in print)
5	Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) Published by International Institute of Tamil Studies.
6	The Contribution of the Tamils to Indian Culture (Dr.M.Valarmathi) Published by International Institute of Tamil Studies.

Semester		Programme	Course Code	Course Name	L	T	P	C
II		B.E. ECE	23MA2T5	LAPLACE TRANSFORMS AND COMPLEX ANALYSIS	3	1	0	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Apply the concepts of Laplace transformation in core engineering applications.	K3	1
CO2	Solve linear differential equations using Laplace transform techniques.	K3	2
CO3	Apply the concepts of analytic functions and conformal mapping to transform the functions from z- plane into w- plane.	K3	3
CO4	Apply the techniques of integration to evaluate real and complex integrals.	K3	4
CO5	Evaluate contour integrals of a given function at given points using residue theorem	K2	5

PRE-REQUISITE	CALCULUS AND DIFFERENTIAL EQUATIONS

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO2	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO3	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO4	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO5	3	3	3	3	-	-	-	1	3	2	-	2	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**LAPLACE TRANSFORMS**	**9 + 3**
Laplace transform – Condition for existence – Transform of elementary function– Standard properties (Statement only)–Transform of unit step function– Impulse function – periodic function– Initial and final value theorem.		
Topic - 2	**INVERSE LAPLACE TRANSFORMS**	**9 + 3**
Inverse Laplace transform – Convolution theorem (without proof) – Standard properties (Statement only) – Second order linear differential equations with constant coefficients.		
Topic - 3	**ANALYTIC FUNCTIONS**	**9 + 3**
Analytic functions : Cauchy –Riemann equations (Cartesian form) and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Construction of analytic functions – Bilinear transformations		
Topic - 4	**COMPLEX INTEGRATION**	**9 + 3**
Complex integration – Statement and applications of Cauchy's integral theorem and Cauchy's integral formula- Taylor's and Laurent's series expansions.		
Topic - 5	**SINGULARITIES AND RESIDUES**	**9 + 3**
Singular points–Classification of singularities-Residues–Cauchy's residue theorem– Application of residue theorem for evaluation of real integrals–Use of circular contour and semi circular contour.		

THEORY	**45**		**TUTORIAL**	**15**		**PRACTICAL**	**0**		**TOTAL**	**60**

BOOK REFERENCES	
1	Grewal B.S., "Higher Engineering Mathematics", 42nd Edition,Khanna Publications New Delhi, 2011
2	JainR.K and Iyengar S.R.K, "Advanced Engineering Mathematics",4th Edition, NarosaPublishing House, New Delhi, Reprint 2014.
3	Ramana B.V., "Higher Engineering Mathematics",Tata Mcgraw Hill Publishing Company, New Delhi, 2011.
4	Kreyszig E., "Advanced Engineering Mathematics", 10th Edition, John Wiley Sons, 2010..
5	"Advanced Modern Engineering Mathematics", Third Edition, Glyn James, David Burley, Dick Clements, Phil Dyke John Sear, Nigel Steele Jerry Wright. Unversity of Brisb University of Plymouth University of Edinburgh Coventry University.
6	N P Bali, Manish Goyal, "A Text Book of Engineering Mathematics", 3rd Edition, Laxmi Publication Private Limited, 2009.

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=GSpbh94-Cjo
2	https://www.studocu.com/row/document/university-of-engineering-and-technology-lahore/principle-of-marketting/applications-of-complex-numbers-ppt/8436504
3	https://www.slideshare.net/sujathavvv/complex-analysis-208085345
4	https://slideplayer.com/slide/15496011/

Semester	Programme	Course Code	Course Name	L	T	P	C
II	B.E. EEE & ECE	23EE2LT1	ELECTRICAL CIRCUIT ANALYSIS	3	0	4	5

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Demonstrate the basic concepts related to electrical circuits / Networks.	K2	1
CO2	Apply the Laws / Rules of circuits in electrical networks.	K3	2
CO3	Compare electrical networks to rate its performance.	K4	3
CO4	Analyze electrical networks to infer their limitations.	K4	4
CO5	Develop a network based on a set of criteria / application and recommend a suitable electrical system.	K3	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	2	-	1	3	3	-	3	-	2
CO2	3	3	3	2	2	-	-	1	3	3	-	3	-	2
CO3	3	3	3	-	2	-	-	1	3	3	-	3	-	-
CO4	3	3	3	2	2	-	-	1	3	3	-	3	-	-
CO5	3	3	3	2	2	-	-	1	3	3	-	3	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests (Theory Component)
	2	Laboratory Record and Model Practical Examinations (Laboratory Component)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**BASIC CIRCUITS ANALYSIS**	**9**
Fundamentals of Electrical Engineering - Ohm's Law –Kirchoff's Law – DC & AC Circuits –Resistors in series and parallel circuits – Mesh current and node voltage analysis for DC & AC Circuits.		
Topic - 2	**NETWORK REDUCTION AND THEOREMS**	**9**
Network reduction: voltage and current division – source transformation – Star delta conversion – Thevenins and Norton Theorems – Superposition Theorem – Maximum power transfer theorem.		
Topic - 3	**TRANSIENT RESPONSE ANALYSIS**	**9**
Basic R, L and C elements -Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. sinusoidal input– Two port Networks– Z & Y parameters.		
Topic - 4	**RESONANCE AND COUPLED CIRCUITS**	**9**
Series and parallel resonance – Frequency response – Quality factor and Bandwidth – Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.		
Topic - 5	**THREE PHASE CIRCUITS**	**9**
A.C. circuits – Power, Power Factor and Energy– Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced& un-balanced – power measurement in three phase circuits.		

THEORY	45		TUTORIAL	0		PRACTICAL	0		TOTAL	45

LIST OF EXPERIMENTS	
Experiment-1	Simulation and experimental verification of electrical circuit problems using Kirchhoff's voltage law.
Experiment-2	Simulation and experimental verification of electrical circuit problems using Kirchhoff's current law.
Experiment-3	Simulation and experimental verification of electrical circuit problems using Thevenin's theorem.
Experiment-4	Simulation and experimental verification of electrical circuit problems using Norton's theorem.
Experiment-5	Simulation and experimental verification of electrical circuit problems using Superposition theorem.
Experiment-6	Simulation and experimental verification of Maximum Power transfer Theorem.
Experiment-7	Simulation and Experimental validation of R-C electric circuit transients.
Experiment -8	Simulation and Experimental validation of frequency response of RLC electric circuit.

Experiment- 9	Design and Simulation of series resonance circuit.
Experiment-10	Design and Simulation of parallel resonance circuit.
Experiment-11	Simulation of three phase balanced and unbalanced star, delta networks circuits.
Experiment-12	Study of CRO and measurement of sinusoidal voltage, frequency and power factor.

THEORY	0		TUTORIAL	0		PRACTICAL	60		TOTAL	60

BOOK REFERENCES	
1	Ramesh Babu, "Circuit Analysis", Scitech Publications, Bangalore, 6Th Edition, 2017.
2	Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", McGraw Hill, 2015.
3	Richard C. Dorf and James A. Svoboda, "Introduction to Electric Circuits", 7th Edition, John Wiley & Sons, Inc. 2015.
4	Mahadevan, K., Chitra, C., "Electric Circuits Analysis," Prentice-Hall of India Pvt Ltd., New Delhi, 2015.
5	Rao, "Electrical Circuit Analysis", Cengage Publications, New Delhi, 2013.

OTHER REFERENCES	
1	https://youtu.be/5hFC9ugTGLs
2	https://youtu.be/zs4MnEx7wTQ
3	https://youtu.be/shJAV59NS6k
4	https://youtu.be/zXMQeIpUzhQ
5	https://youtu.be/mc979OhitAg

SEMESTER III

Sl. No.	Course Code	Course Title	Cate gory	CIA	ESE	L	T	P	C
THEORY COURSES									
1	23HS3T1	Constitution of India	MC	100	-	3	0	0	0
2	23EC3T2	Analog Electronics	PC	40	60	3	0	0	3
3	23MA3T3	Transforms and Random Processes	BS	40	60	3	1	0	4
4	23EC3T4	Signals and Systems	PC	40	60	3	1	0	4
5	23EE3T5	Electromagnetic Theory	PC	40	60	3	1	0	4
THEORY COURSE WITH LABORATORY COMPONENT									
6	23EC3LT1	Linear Integrated Circuits	PC	50	50	2	0	4	4
LABORATORY COURSE									
7	23EN3L1	Interpersonal CommunicationSkills Laboratory - I	HS	60	40	0	0	3	1.5
Total						17	3	7	20.5

Semester	Programme	Course Code	Course Name	L	T	P	C
III	B.E. / B.Tech., Common to all	23HS3T1	CONSTITUTION OF INDIA	3	0	0	0

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Understand and abide the rules of the Indian constitution.	K2	1
CO2	Understand the functions of Central government.	K2	2
CO3	Understand the function of state government.	K2	3
CO4	Understand the various constitutional functions and laws.	K2	4
CO5	Understand the different culture among the people of India	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	2	2	2	3	3	-	3	-	1
CO2	-	-	-	-	-	1	2	2	3	3	-	3	-	1
CO3	-	-	-	-	-	1	2	2	3	3	-	3	-	1
CO4	-	-	-	-	-	1	2	2	3	3	-	3	-	1
CO5	-	-	-	-	-	1	2	2	3	3	-	3	-	1

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	INTRODUCTION	9
Historical Background – Constituent Assembly of India – Philosophical foundations of the Indian Constitution – Preamble – Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Role of the Election Commission.		
Topic - 2	STRUCTURE AND FUNCTION OF CENTRAL AND STATE GOVERNMENT	9
Union Government – Structures of the Union Government and Functions – President – Vice President– Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review. State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.		
Topic - 3	CONSTITUTION FUNCTIONS OF INDIA AND INDIAN SOCIETY	9
Indian Federal System – Central – State Relations – President's Rule – Constitutional Amendments – Constitutional Functionaries - Assessment of working of the Parliamentary System in India. Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections		
Topic - 4	POLICIES AND ACTS – GENERAL	9
Insurance and Bonding – Laws Governing Sale, Purchase and use of Urban and Rural Land – Land Revenue Codes – Tax Laws – Income Tax, Sales Tax , Excise and Custom duties and their Influence on Construction Cost – Legal Requirements for Planning – Property Law– Agency Law – Local Government Laws for Approval.		
Topic - 5	POLICIES AND ACTS ON INFRASTRUCTURE DEVELOPMENT	9
A Historical Review of the Government Policies on Infrastructure – Current Public Policies on Transportations – Power and telecom Sector – Plans for Infrastructure Development – Legal framework for Regulating Private Participation in Roads and Highways – Ports and Airport and Telecom.		

THEORY	45	TUTORIAL	0	PRACTICAL	0	TOTAL	45

BOOK REFERENCES	
1	Durga Das Basu, "Introduction to the Constitution of India", Prentice Hall of India, New Delhi,2018.
2	R.C.Agarwal, "Indian Political System", S.Chand and Company, New Delhi, 2004
3	Maciver and Page, "Society: An Introduction Analysis", Mac Milan India Ltd., New Delhi,2007
4	K.L.Sharma, "Social Stratification in India: Issues and Themes", Jawaharlal Nehru University, New Delhi,2006.

OTHER REFERENCES	
1	https://nptel.ac.in/courses/106/105/106105034/
2	https://www.youtube.com/watch?v=6XTYoZymbwE
3	https://www.youtube.com/watch?v=MP6VlAE_7WY

Semester	Programme	Course Code	Course Name	L	T	P	C
III	B.E. ECE		ANALOG ELECTRONICS	3	0	0	3

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Apply the multistage concept to improve gain of amplifiers (Apply)	K3	1
CO2	Illustrate the working principle of feedback topologies (Understand)	K2	2
CO3	Analyze the performance of various LC and RC oscillators (Analyze)	K4	3
CO4	Explain the fundamentals of tuned amplifier and multivibrators (Understand)	K2	4
CO5	Classify power amplifiers based on efficiency (Understand)	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2	1	1	-	-	-	-	-	3	2	1
CO2	2	3	3	2	1	1	-	-	-	-	-	3	2	0
CO3	2	3	2	3	1	1	-	-	-	-	-	2	1	0
CO4	2	2	3	3	2	1	-	-	-	-	-	2	2	1
CO5	2	2	3	2	2	1	-	-	-	-	-	3	2	1

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**HIGH GAIN BJT AMPLIFIERS**	**9**
Differential amplifiers - DC transfer characteristics and CMRR - Darlington amplifier - Bootstrap technique - Small signal analysis of cascade and cascode configurations - Multistage frequency effect		
Topic - 2	**FEEDBACK AMPLIFIERS**	**9**
General feedback structure - Effects of negative feedback - Feedback topologies – Feedback amplifier types – Voltage - series, Voltage – shunt, current – series, current – shunt – Stability analysis of feedback – Frequency compensations		
Topic - 3	**OSCILLATORS**	**9**
Classification of oscillators, Barkhausen criterion – Analysis of LC oscillators – Hartley, Colpitts – Analysis of RC oscillators – Phase-shift, Wienbridge – Crystal oscillators .		
Topic - 4	**TUNED AMPLIFIERS AND MULTIVIBRATORS**	**9**
Single tuned capacitive coupled amplifier, quality factor of a tank circuit, gain and bandwidth – stagger tuned amplifier – Astable multivibrator – Monostable Multivibrator – Bistable multivibrators – Schmitt trigger		
Topic - 5	**POWER AMPLIFIERS**	**9**
Class A power amplifier – Class B power amplifier – Push pull – Class AB power amplifier – Class C power amplifier – Distortions in power Amplifier		

THEORY	45		TUTORIAL	0		PRACTICAL	0		TOTAL	45

BOOK REFERENCES	
1	Adel S. Sedra and Kenneth C. Smith,"Microelectronic Circuits Theory and Applications", 7th edition, Oxford University Press India,2018
2	Sergio Franco,"Design with Operational Amplifiers and Analog Integrated Circuirs",4th edition, Tata Mc Graw-Hill,2016
3	Jacob Millmam, Christos C Halkais and Satyabrata Jit, "Electronic Devices and Circuits", 4th edition, McGraw Hill Education India,2015
4	David A. Bell,"Electronic Devices and Circuits",5th edition, Oxford University Press India,2014

OTHER REFERENCES	
1	https://youtu.be/z3MlkNUuq9w
2	https://www.youtube.com/live/mc6VFO6ooo8?feature=share
3	https://youtu.be/PY5kTptbJP4

Semester	Programme	Course Code	Course Name	L	T	P	C
III	B.E. ECE	23MA3T3	TRANSFORMS AND RANDOM PROCESSES	3	1	0	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Analyse the situation and select an appropriate techniques for solving problems based on Fourier transforms.	K3	1
CO2	Understand Z-transform and estimate inverse Z-transform of certain functions and use it to solve difference equations	K4	2
CO3	Relate and apply the concept of probability and random variables and predict probabilities of events in models.	K3	3
CO4	Interpret discrete and continuous probability distributions including requirements, mean and variance for making decisions	K2	4
CO5	Classify different types of random processes and use it to find whether it is SSS or WSS.	K2	5

PRE-REQUISITE	Calculus And Diffrenetial Equations, Laplace Transforms And Complex Analysis

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO2	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO3	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO4	3	3	3	3	-	-	-	1	3	2	-	2	-	-
CO5	3	3	3	3	-	-	-	1	3	2	-	2	-	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**FOURIER TRANSFORMS**	**9 + 3**
Fourier transform pair - Fourier sine and cosine transforms - Properties (without proof) - Transforms of simple functions - Convolution theorem - Parseval's identity.		
Topic - 2	**Z TRANSFORM**	**9 + 3**
Z-transforms- Elementary properties (statement only)- Inverse Z-transform (using partial fractions and residues)- Initial and final value theorems- Convolution theorem (without proof)- Formation of difference equations-Solution of difference equations using Z-transform.		
Topic - 3	**RANDOM VARIABLES**	**9 + 3**
Random Variables - Discrete and Continuous random variables – Probability mass and density functions – Mean and Variance.		
Topic - 4	**PROBABILITY DISTRIBUTIONS**	**9 + 3**
Discrete Distributions: Binomial distribution – Poisson distribution – Continuous Distributions: Exponential distribution – Normal distribution – Two Dimensional Random Variables: Joint probability distributions – Marginal and conditional distributions		
Topic - 5	**RANDOM PROCESS**	**9 + 3**
Introduction – Classification – Stationary process – Markov chains – Transition probabilities – Limiting distributions – Poisson process.		

THEORY	45		**TUTORIAL**	15		**PRACTICAL**	0		**TOTAL**	60

BOOK REFERENCES
1	Grewal B.S., "Higher Engineering Mathematics", 43nd Edition,Khanna Publications New Delhi, 2015
2	JainR.K and Iyengar S.R.K, "Advanced Engineering Mathematics",5th Edition, NarosaPublishing House, New Delhi, Reprint 2019.
3	Ramana B.V., "Higher Engineering Mathematics", Tata Mcgraw Hill Publishing Company, New Delhi, 2017.
4	Kreyszig E., "Advanced Engineering Mathematics", 10th Edition, John Wiley Sons, 2010.
5	Oliver . C. Lbe., "Fundamentals of applied probability and random processes" Academic Press, 2007.
6	Miller. S.L. and Childers. D.G., ―"Probability and Random Processes with Applications to Signal Processing and Communications ", Academic Press, 2013.

OTHER REFERENCES
1	https://youtu.be/tp_MdKz3fC8
2	https://youtu.be/5Z3KAKs-EZs
3	https://youtu.be/InVTlLPF2e8
4	https://youtu.be/8963i2DnFiQ
5	https://youtu.be/HfAXKnibhKw

Semester	Programme	Course Code	Course Name	L	T	P	C
III	B.E. ECE	20EC3T4	SIGNALS AND SYSTEMS	3	1	0	4

COURSE LEARNING OUTCOMES (COs)		
After Successful completion of the course, the students should be able to	**RBT Level**	**Topics Covered**
CO1 Understand the concepts of Signals and Systems	K2	1
CO2 Apply the concepts of Fourier series and Fourier transform in Continuous time Signals	K3	2
CO3 Apply the concepts of Laplace transform in LTI Continuous time systems	K3	3
CO4 Apply the concepts of Discrete Time Fourier Transform & Z Transform in Discrete Time signals	K3	4
CO5 Apply the concepts of Discrete Time Fourier Transform & Z Transform in LTI Discrete Time systems	K3	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2	3	2				3		3	2	
CO2	3	2	2	3	2	2				3		3	3	
CO3	3	1	3	3	2	2				3		3	3	
CO4	1	2	2	3	2	2				3		3	3	
CO5	1	1	2	3	2	2				3		3	3	

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**CLASSIFICATION OF SIGNALS AND SYSTEMS**	**9 + 3**
Continuous time signals (CT signals) - Discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential, Classification of CT and DT signals - Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals - Classification of systems – CT systems and DT systems - Static & Dynamic, Linear & Nonlinear, Time-variant & Time-invariant, Causal & Noncausal, Stable & Unstable		
Topic - 2	**ANALYSIS OF CONTINUOUS TIME SIGNALS**	**9 + 3**
Fourier series analysis-spectrum of Continuous Time (CT) signals- Fourier and Laplace Transforms in CT Signal Analysis – Properties		
Topic - 3	**LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS**	**9 + 3**
Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis of CT systems		
Topic - 4	**ANALYSIS OF DISCRETE TIME SIGNALS**	**9 + 3**
Baseband Sampling - DTFT – Properties of DTFT - Z Transform – Properties of Z Transform		
Topic - 5	**LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS**	**9 + 3**
Difference Equations-Block diagram representation-Impulse response - Convolution sum- Discrete Fourier and Z Transform Analysis of Recursive & Non-Recursive systems		

THEORY	45		TUTORIAL	15		PRACTICAL	0		TOTAL	60

BOOK REFERENCES	
1	Oppenheim, Willsky and Hamid, "Signals and Systems", 2nd Edition, Pearson Education, New Delhi, 2015. (Units I - V).
2	Simon Haykin, Barry Van Veen, "Signals and Systems", 2nd Edition, Wiley, 2002.
3	B.P.Lathi, "Principles of Linear Systems and Signals", 2nd Edition, Oxford, 2009.
4	M.J.Roberts, "Signals and Systems: Analysis Using Transform Methods & MATLAB, 3rd Edition", McGraw- Hill Education, 2018.
5	John Alan Stuller, "An Introduction to Signals and Systems", Thomson, 2007.

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1	https://www.youtube.com/watch?v=s8rsR_TStaA&list=PLBlnK6fEyqRhG6s3jYIU48CqsT5cyiD TO
2	https://www.youtube.com/watch?v=up55tuwestg&list=PLWPirh4EWFpHr_1ZCkuF9ToYUrmuj v9Aa
3	https://www.youtube.com/watch?v=ftKIWPBMWKs&list=PL9RcWoqXmzaIG-RWneeqDJ-FCt66S15pl
4	https://www.youtube.com/watch?v=MRy8xxvsZA4&list=PLUl4u3cNGP61kdPAOC7CzFjJZ8f1eMUxs&index=6
5	https://www.youtube.com/watch?v=-ISp35eMbsI&list=PLgzsL8klq6DJGMumdc_n80bw0nDNgsSas&index=2

Semester	Programme	Course Code	Course Name	L	T	P	C
II	B.E. EEE & ECE	23EE3T5	ELECTROMAGNETIC THEORY	3	1	0	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Relate the applications of basic mathematical concepts related to electromagnetic vector fields.	K2	1
CO2	Analyze the basic concepts about electrostatic fields, electrical potential, energy density and their applications.	K4	2
CO3	Analyze the concepts about magneto static fields, magnetic flux density, vector potential and its applications..	K4	3
CO4	Identify the various methods of emf generation and Maxwell's equations.	K3	4
CO5	Infer the basic concepts electromagnetic waves and characterizing parameters.	K2	5

PRE-REQUISITE	ELECTRICAL CIRCUITS ANALYSIS

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	3	-	-	-	-	2	-	2	3	2
CO2	3	2	2	2	2	-	-	-	-	2	-	2	2	2
CO3	3	3	2	2	2	-	-	-	-	1	-	2	3	2
CO4	3	2	2	2	2	-	-	-	-	2	-	2	2	3
CO5	3	3	2	2	1	-	-	-	-	2	-	2	2	2

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

	COURSE CONTENT	
Topic - 1	**VECTOR CALCULAS AND THEOREMS**	**9 + 3**
	Scalar and Vector - Coordinate Systems – Gradient, Divergence and Curl – Divergence theorem – Stoke's Theorem – Gauss's law.	
Topic - 2	**ELECTRO STATIC FIELD**	**9 + 3**
	Coulomb's Law, Electric field intensity: Line charge and circular disc - Electric potential – Electric Dipole – Poisson's and Laplace's equations - Boundary conditions, Capacitance: Two dielectric media, Co-axial cable.	
Topic - 3	**MAGNETO STATIC FIELD**	**9 + 3**
	Lorentz force – Biot–Savart's Law - Ampere's Circuit Law, Magnetic field intensity (H) : straight conductors, circular loop, Magnetic flux density (B) – Properties of magnetic materials – Boundary conditions – Inductance : Toroid & Co-axial cable.	
Topic - 4	**ELECTRODYNAMIC FIELDS**	**9 + 3**
	Faraday's law – Transformer and motional EMF – Maxwell's equations (differential and integral form) – Relation between field theory and circuit theory.	
Topic - 5	**ELECTROMAGNETIC WAVES**	**9 + 3**
	Electromagnetic wave equations – Waves in lossy and lossless dielectrics - Poynting Theorem and vector.	

THEORY	45		TUTORIAL	15		PRACTICAL	0		TOTAL	60

BOOK REFERENCES	
1	William H. Hayt and John A. Buck, Engineering Electromagnetics, McGraw Hill 2020
2	Mathew N. O. Sadiku, Principles of Electromagnetics, 6th Edition, Oxford University 2020
3	Edware CJordan, Electromagnetic waves & Radiation Systems, Prentice hall of India, Chennai, 2018.
4	Edminister and Joseph A., ―Theory and Problems of Electromagnetics, Revised 2nd Edition, Tata McGraw Hill Publishing Company, New Delhi, 2013.
5	S.P.Ghosh, Lipika Datta, Electromagnetic Field Theory, First Edition, McGraw Hill Education(India) Private Limited 2017

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=bwreHReBH2A
2	https://nptel.ac.in/courses/108/104/108104087/

Semester	Programme	Course Code	Course Name	L	T	P	C
III	B.E. ECE & EEE	23EC3LT1	LINEAR INTEGRATED CIRCUITS	2	0	4	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Explain the DC and AC characteristics of operational amplifier	K2	1
CO2	Build linear circuits using Op-Amp	K3	2
CO3	Construct comparator and Multivibrator circuit using Op-Amp	K3	3
CO4	Model the PLL with application and timer circuit using Op-Amp	K3	4
CO5	Examine the performance of different ADC and DAC Conversion techniques.	K4	5

PRE-REQUISITE

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	-	-	1	2	1	2	-	-	2	-	2
CO2	3	2	2	2	2	-	**2**	1	2	2	-	2	-	2
CO3	3	3	2	2	2	1	2	2	2	2	-	2	2	2
CO4	3	2	3	2	2	2	2	2	2	2	-	2	2	2
CO5	3	3	3	2	2	2	2	2	2	2	-	2	-	2

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Model Practical Examination and Laboratory Record
	3	End Semester Examinations
INDIRECT	1	Course End Survey

COURSE CONTENT		
Topic - 1	**OP-AMP CHARACTERISTICS**	6
Introduction – Ideal op-amp characteristics -differential amplifier – DC characteristics -Bias offset, Thermal drift – AC Characteristics – frequency response, Slew rate.		
Topic - 2	**OP-AMP APPLICATIONS**	6
Inverting and Non Inverting amplifier – Adder – subtractor – Instrumentation amplifier -Integrator – Differentiator.		
Topic - 3	**COMPARATORS AND MULTIVIBRATOR**	6
Comparator, Schmitt trigger – Multivibrators -Astable, Monostable using op-amp - IC Voltage regulator – Three terminal fixed and adjustable voltage regulator		
Topic - 4	**TIMERS AND PLL**	6
IC 555 Timer -Astable and monostable operation using IC555 timer -basic Principles of PLL with bock diagram -VCO-PLL applications-Frequency multiplier, AM and FM detection.		
Topic - 5	**D/A AND A/D CONVERTERS**	6
DAC and ADC specifications – D/A Conversion Techniques - Weighted resistor, R-2R ladder -A/D conversion technique – Flash , Successive approximation.		

THEORY	30		TUTORIAL	0		PRACTICAL	0		TOTAL	30

COURSE CONTENT	
Experiment-1	Design and construct the inverting amplifier using OP-Amp.
Experiment-2	Design and construct the non-inverting amplifier using OP-Amp.
Experiment-3	Design and construct integrator circuit using OP-Amp.
Experiment-4	Design and construct differentiator circuit using OP-Amp.
Experiment-5	Design and construct adder circuit using OP-Amp.
Experiment-6	Design and construct subtractor circuit using OP-Amp.
Experiment-7	Design and construct active low -pass filter using OP-Amp.
Experiment-8	Design and construct high pass filters using OP-Amp.
Experiment-9	Design and implement comparator circuit using OP-Amp
Experiment-10	Design and implement Schmitt trigger using OP-Amp

Experiment-11	Design and construct the Astable multivibrator circuit using NE555
Experiment-12	Design and construct the Monostable multivibrator circuit using NE555
Experiment-13	Generate a sinusoidal waveform generator using OP-Amp
Experiment-14	Construct the D/A converter Using OP-Amp
Experiment-15	Construct a DC power supply using IC regulator.

THEORY	0		TUTORIAL	0		PRACTICAL	60		TOTAL	60

BOOK REFERENCES	
1	Linear Integrated Circuits by D.Roy Choudhury, Shail B. Jain Paperback – 12 October 2018
2	Op-Amps and Linear Integrated Circuits	Fourth Edition	By Pearson Paperback – 29 May 2015
3	Linear Integrated Circuits 2017by Salivahanan (Author), Bhaaskaran (Author)
4	Design With Operational Amplifiers and Analog Integrated Circuits, Fourth Edition Sergio Franco San Francisco State University 2016

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=kiiA6WTCQn0
2	https://www.youtube.com/watch?v=h0Gmc-9IVVo
3	https://www.youtube.com/watch?v=fWN17g-JGro
4	https://www.youtube.com/watch?v=T9pLoa-7TTM&list=PLkgGpEcWYTx1haNcpfSYlxB7oZfMSg2VN

Semester	Programme	Course Code	Course Name	L	T	P	C
III	B.E. / B.Tech., Common to all	23EN3L1	INTERPERSONAL COMMUNICATION SKILLS LAB I	0	0	3	1.5

	After Successful completion of the course, the students should be able to	RBT Level
CO1	Use accurate and appropriate language in decisions to avoid errors.	K3
CO2	Learn to interact efficiently with individuals at all levels.	K3
CO3	Expose their personality effectively.	K4
CO4	Learn communication skills for socializing, telephone conversations, and negotiations.	K4
CO5	Assess the culture and professional principles.	K2

PRE-REQUISITE	COMMUNICATIVE ENGLISH & TECHNICAL ENGLISH

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	Programme Learning Outcomes (POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO2	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO3	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO4	-	-	-	-	-	-	-	1	3	3	-	3	-	-
CO5	-	-	-	-	-	-	-	1	3	3	-	3	-	-

LIST OF EXPERIMENTS	
Experiment-1	Conversation Practice Sessions (To be done as real-life interactions)
Experiment-2	Talking to friends
Experiment-3	Listening skills
Experiment-4	Email Etiquette
Experiment-5	Business English
Experiment-6	Discussion on the clips
Experiment-7	Decision Making
Experiment -8	Developing Conversation

THEORY	0	TUTORIAL	0	PRACTICAL	45	TOTAL	45

BOOK REFERENCES	
1	Communication skills in English by Anjana Tiwari, 2021
2	How to improve your communication skills by Dawood Khan,2021.
3	Comprehension & Communication Skills In English, ISBN: 9789327278873, Edition/Reprint: 2021, Author(s): Varinder Kumar, Publisher: KALYANI PUBLISHERS, Product ID: 577073,Country of Origin: India
4	Language Lab - Mentorship in Developing Communication Skills: Crafting Connections, Influencing Change: Your Roadmap to Effective Communication Kindle Edition by SIROHI WRITING (Author) Format: Kindle Edition Publication date - 26 January 2024
5	Comprehension & Communication Skills In English, ISBN: 9789327278873, Edition/Reprint: 2021, Author(s): Varinder Kumar, Publisher: KALYANI PUBLISHERS, Product ID: 577073,Country of Origin: India by Sumreen Mahmood (Author) Publication date 1 February 2024

OTHER REFERENCES	
1	https://youtu.be/cC2vxmBDAG8
2	https://youtu.be/l3RSiSUwlT0
3	https://youtu.be/cyXADWE7KPo
4	https://youtu.be/SByFAGGTDoQ
5	https://youtu.be/q8tIgb_BtiI
6	https://youtu.be/X3Fz_Gu5WUE

SEMESTER IV

Sl. No.	Course Code	Course Title	Category	CIA	ESE	L	T	P	C
THEORY COURSES									
1	23HS4T1	Universal Human Values 2: Understanding Harmony	HS	100	-	2	1	0	3
2	23EC4T2	Digital Signal Processing	PC	40	60	3	1	0	4
3	23EC4T3	Analog & Digital Communication	PC	40	60	3	1	0	4
THEORY COURSES WITH LABORATORY COMPONENTS									
4	23EE4LT1	Control Systems Engineering	PC	50	50	2	0	4	4
5	23EC4LT2	Digital Electronics	PC	50	50	2	0	4	4
LABORATORY COURSES									
6	23EN4L1	Interpersonal Communication Skills Laboratory - II	HS	60	40	0	0	3	1.5
7	23EC4L2	Digital Signal Processing Laboratory	PC	60	40	0	0	2	1
8	23EC4L3	Analog and Digital Communication Laboratory	PC	60	40	0	0	2	1
Total						**12**	**3**	**15**	**22.5**

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E. / B.Tech., Common to all	23HS4T1	UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY	2	1	0	3

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Understand Need, Basic Guidelines, Content and Process for Value Education	K2	1
CO2	Understand Harmony in the Human Being - Harmony in Myself	K2	2
CO3	Understand Harmony in the Family and Society- Harmony in Human Relationship	K2	3
CO4	Understand Harmony in the Nature and Existence - Whole existence as Coexistence	K2	4
CO5	Understand Harmony on Professional Ethics	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	2	2	3	3	-	2	2	-
CO2	-	-	-	-	-	-	2	2	3	3	-	2	2	-
CO3	-	-	-	-	-	-	2	2	3	3	-	2	2	-
CO4	-	-	-	-	-	-	2	2	3	3	-	2	2	-
CO5	-	-	-	-	-	-	2	2	3	3	-	2	2	-

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**Course Introduction - Need, Basic Guidelines, Content and Process for Value Education**	**9**

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; „Natural Acceptance" and Experiential Validation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.

Topic - 2	**Understanding Harmony in the Human Being - Harmony in Myself!**	**9**

7. Understanding human being as a co-existence of the sentient „I" and the material „Body"
8. Understanding the needs of Self („I") and „Body" - happiness and physical facility
9. Understanding the Body as an instrument of „I" (I being the doer, seer and enjoyer)
10. Understanding the characteristics and activities of „I" and harmony in „I"
11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
12. Programs to ensure Sanyam and Health.

Topic - 3	**Understanding Harmony in the Family and Society- Harmony in Human Relationship**	**9**

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship
14. Understanding the meaning of Trust; Difference between intention and competence
15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship
16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Topic - 4	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence	9

18. Understanding the harmony in the Nature

19. Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self regulation in nature

20. Understanding Existence as Co-existence of mutually interacting units in all pervasive space

21. Holistic perception of harmony at all levels of existence.

Topic - 5	Implications of the above Holistic Understanding of Harmony on Professional Ethics	9

22. Natural acceptance of human values

23. Definitiveness of Ethical Human Conduct

24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

25. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.

26. Case studies of typical holistic technologies, management models and production systems

27. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations

28. Sum up

THEORY	45		TUTORIAL	0		PRACTICAL	0		TOTAL	45

BOOK REFERENCES
1	Jeevan Vidya: E.K. Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004
3	The Story of Stuff (Book)by Annie Leonard , 2011
4	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5	Small is Beautiful - E. F Schumacher.
6	Slow is Beautiful - Cecile Andrews
7	Economy of Permanence - J C Kumarappa
8	India Wins Freedom - Maulana Abdul Kalam Azad
9	Vivekananda - Romain Rolland (English)
10	Gandhi - Romain Rolland (English)

OTHER REFERENCES
1	https://www.youtube.com/watch?v=XGxNCFjDGEg
2	https://www.c-span.org/video/?292709-1/the-story-stuff

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E. ECE	23EC4T2	DIGITAL SIGNAL PROCESSING	3	1	0	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Analyze the frequency domain behaviour of a given Discrete Time signal using Discrete FourierTransform	K4	1
CO2	Construction of Realization structures and design for IIR filters	K3	2
CO3	Construction of Realization structures and design for FIR filters	K3	3
CO4	Analyze the effect of finite word length for fixed &floating point number representation.	K4	4
CO5	Develop an algorithm using TSM320C6X Processor for simple signal processing applications.	K5	5

PRE-REQUISITE	SIGNALS AND SYSTEMS

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	3	3	1	-	-	1	1	-	3	1	1
CO2	2	3	2	2	3	1	-	-	1	1	-	2	1	1
CO3	2	3	2	2	3	1	-	-	1	1	-	2	1	1
CO4	2	2	1	2	2	2	-	-	1	1	-	3	1	1
CO5	2	2	1	2	2	2	2	-	-	1	-	3	1	1

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Assignment
	3	End Semester Examinations
INDIRECT	1	Course End Survey

COURSE CONTENT		
Topic - 1	**DISCRETE AND FAST FOURIER TRANSFORM**	**9+3**
Introduction to DFT – Properties of DFT – FFT Algorithms – Decimation in Time (DIT) and Decimation in Frequency (DIF) Algorithms –Filtering long data sequences - overlap save and overlap add method.		
Topic - 2	**IIR FILTER DESIGN**	**9+3**
Analog filter design (Butterworth filter design) – Discrete time IIR filter from analog filter – IIR filter design: Impulse Invariance, Bilinear transformation technique.		
Topic - 3	**FIR FILTER DESIGN**	**9+3**
Linear phase FIR filters – Filter design: windowing techniques (Rectangular Window, Hamming Window, Hanning Window), Frequency Sampling method.		
Topic - 4	**FINITE WORD LENGTH EFFECTS**	**9+3**
Quantization Noise – Truncation and Rounding errors – Input quantization error – Coefficient quantization error – Dead Band –Overflow limit cycle oscillations – Principle of scaling..		
Topic - 5	**DIGITAL SIGNAL PROCESSORS**	**9+3**
Overview of Digital Signal Processors – Von Neumann Architecture – Harvard Architecture – VLIW Architecture – Pipelining –Architecture and Addressing modes of DSP Processor(TMS320C50).		

THEORY	45		TUTORIAL	0	15	PRACTICAL	0		TOTAL	60

BOOK REFERENCES

1	John G. Proakis&Dimitris G. Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", Pearson Education / Prentice Hall, Fourth Edition, 2007.
2	Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", McGraw Hill, 4th edition 2013.
3	A.V.Oppenheim, R.W. Schafer and J.R. Buck, "Discrete-Time Signal Processing", Pearson, 8th Indian Reprint, 2004.

OTHER REFERENCES

1	http://www.nptelvideos.in/2012/12/digital-signal-processing.html, "Digital Signal Processing", Prof. S.C Dutta Roy, IIT Delhi.
2	http://www.nptelvideos.in/2012/11/digital-signal-processing.html, "Digital Signal Processing", Prof.T.K.Basu, IIT Kharagpur.
3	https://www.youtube.com/watch?v=W1cTpqM9DaU
4	https://www.youtube.com/watch?v=FtEShPAFpek&list=PL_mruqjnuVd87sjSDVS9wuit9CSpgIIfx
5	https://www.youtube.com/watch?v=8kcvyoHsXrw

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E.ECE	23EC4T3	ANALOG & DIGITAL COMMUNICATION	3	1	0	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Understand the knowledge about Analog modulation and demodulation schemes	K2	1
CO2	Explain the knowledge about Pulse modulation and demodulation schemes	K2	2
CO3	Determine the SNR of various communication systems and perform error control coding.	K3	3
CO4	Analyze the methods of baseband data transmission and reception.	K4	4
CO5	Analyze the performance of various Pass band data transmission and reception techniques	K4	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	1	-	-	-	1	-	3	2	1
CO2	2	1	2	2	2	1	-	-	-	1	-	3	2	1
CO3	3	2	2	1	2	1	-	-	-	1	-	2	2	1
CO4	3	2	2	2	1	1	-	-	-	1	-	2	2	1
CO5	3	2	2	2	1	1	-	-	-	1	-	3	3	1

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests
	2	Other Assessments (Assignment, Quiz etc.)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT			
Topic - 1	**ANALOG MODULATION SCHEMES**		9+3

Functional block diagram of communication systems- Linear modulation schemes: Generation of AM: DSBFC using balanced modulator- Introduction to DSBSC, SSBSC and VSB Signals-Comparison of Amplitude Modulation Systems. Principle of frequency and phase modulation– Relation between FM and PM waves–Frequency modulation: Narrowband and wide band FM-Transmission bandwidth of FM.

Topic - 2	**PULSE MODULATION SYSTEMS**		9+3

Pulse amplitude modulation–generation and detection of PWM and PPM-Sampling theorem-Quantization: Uniform and Non-uniform techniques - Pulse code modulation, Differential pulse code modulation, Delta Modulation, Adaptive Delta modulation -Classification of line coding and Decoding.

Topic - 3	**NOISE THEORY AND CODING TECHNIQUES**		9+3

Types of noise in communication systems, Noise temperature. Noise in CW modulation systems- signal to noise ratio (SNR), noise figure, noise in AM –SSB & FM receivers, pre-emphasis and de-emphasis. Coding Techniques: Shannon- Fano coding, Linear Block Codes.

Topic - 4	**BASEBAND PULSE DIGITAL MODULATION SCHEMES**		9+3

Pulse Code Modulation – Companding- Differential Pulse Code Modulation, Adaptive differential pulse code modulation – Delta Modulation-Adaptive Delta Modulation. Line coding techniques- NRZ / RZ – unipolar, polar, bipolar and biphase signals.

Topic - 5	**PASSBAND DATA TRANSMISSION AND RECEPTION**		9+3

Pass band Transmission model-Generation, detection ,signal space diagram, bit error probability and power spectra of Binary Modulation schemes (ASK,FSK,PSK), Quadrature Modulation schemes (QPSK,QAM) – Comparison of Binary and Quadrature modulation techniques.

THEORY	45		TUTORIAL	15		PRACTICAL	0		TOTAL	60

BOOK REFERENCES	
1	Simon Haykin, "Communications Systems", Wiley Education, 4th Edition, 2008
2	T L Singal, "Analog & Digital Communications", Tata McGraw-Hill Education, 4th Edition, 2012
3	B. Sklar, ―Digital Communication Fundamentals and Applications‖, 2nd Edition, Pearson Education, 2009
4	H P Hsu, Schaum Outline Series - ―Analog and Digital Communications‖, TMH 2006
5	B.P.Lathi, ―Modern Digital and Analog Communication Systems‖ 3rd Edition, Oxford UniversityPress 2007.

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=dZAg5YLyJqw
2	https://www.youtube.com/watch?v=qQcpnmJNluU
3	https://www.youtube.com/watch?v=bm0f8mBBsjc
4	https://www.youtube.com/watch?v=KXFF8m4uGDc
5	https://www.youtube.com/watch?v=M75X-QzY834

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E. – EEE & ECE	23EE4LT1	CONTROL SYSTEMS ENGINEERING	3	0	2	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Identify the usage of transfer function models for analysis physical systems and introduce the control system components.	K3	1
CO2	Analyze the time domain analysis of various models of linear system.	K4	2
CO3	Analyze the frequency domain analysis of various models of linear system.	K4	3
CO4	Analyze the design of appropriate compensator for the given specifications.	K4	4
CO5	Show the state variable representation of physical systems.	K2	5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	-	-	-	-	-	-	2	2	2
CO2	3	3	3	3	3	-	-	-	-	-	-	3	2	2
CO3	3	3	3	3	3	-	-	-	-	-	-	2	2	3
CO4	3	3	3	3	3	-	-	-	-	-	-	3	3	2
CO5	3	3	3	3	3	-	-	-	-	-	-	2	2	2

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests (Theory Component)
	2	Laboratory Record and Model Practical Examinations (Laboratory Component)
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**SYSTEMS AND ITS REPRESENTATION**	**9**
Basic elements in control systems — Open and closed loop system — Electrical analogy of mechanical system – Block diagram reduction technique – Signal flow graph.		
Topic - 2	**TIME DOMAIN ANALYSIS**	**9**
Time response of first order and second order systems for unit step test signals – Time domain specifications – Steady state response – Root locus technique - Effects of P, D, PI systems.		
Topic - 3	**FREQUENCY DOMAIN ANALYSIS**	**9**
Frequency response - Frequency domain specifications - Bode plot, Polar plot.		
Topic - 4	**STABILITY ANALYSIS**	**9**
Concepts of stability - Necessary conditions for Stability - Characteristics equation - Location of roots in S plane for stability - Routh Hurwitz criterion - Nyquist stability criterion.		
Topic - 5	**COMPENSATORS AND STATE VARIABLES**	**9**
Compensator - Design of Lag compensator - Lead compensator - Concept of state variables, state model, Controllability and observability.		

THEORY	45		TUTORIAL	0		PRACTICAL	0		TOTAL	45

LIST OF EXPERIMENTS	
Experiment-1	P, PI and PID controllers
Experiment-2	Stability Analysis
Experiment-3	Modeling of Systems – Machines, Sensors and Transducers
Experiment-4	Design of Lag, Lead and Lag-Lead Compensators
Experiment-5	Position Control Systems
Experiment-6	Synchro-Transmitter- Receiver and Characteristics
Experiment-7	Bridge Networks –AC and DC Bridges
Experiment -8	Dynamics of Sensors/Transducers a. Displacement b. Strain c. Flow
Experiment- 9	Power and Energy Measurement
Experiment-10	Signal Conditioning a. Instrumentation Amplifier b. Analog – Digital and Digital –Analog converters (ADC and DACs)

THEORY	0		TUTORIAL	0		PRACTICAL	30		TOTAL	30

BOOK REFERENCES	
1	Nagarath, I.J. and Gopal, M., Control Systems Engineering, New Age International Publishers, 2017
2	Benjamin C. Kuo, Automatic Control Systems, Prentice-Hall of India Pvt. Ltd. 2012.
3	K. Ogatta, Modern Control Engineering, Pearson Education, New Delhi, 2015.
4	M. Gopal, Control System Principles and Design, Tata McGraw-Hill, 2012
5	M. N. Bandyopadhyay, Control Engineering Theory and Practice, Prentice Hall of India, 2009.

OTHER REFERENCES	
1	John J.D., Azzo Constantine, H. and Houpis Sttuart, N Sheldon, "Linear Control System Analysis and Design with MATLAB", CRC Taylor& Francis Reprint 2009.
2	Control and Instrumentation Manual, Al-Ameen Publications, 2020.
3	https://youtu.be/V09Ct3RYSWU
4	https://youtu.be/65GGqUZNi4s
5	https://youtu.be/NQAQkSyOnBY

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E. ECE & EEE	23EC4LT2	DIGITAL ELECTRONICS	2	0	4	4

COURSE LEARNING OUTCOMES (COs)			
After Successful completion of the course, the students should be able to		**RBT Level**	**Topics Covered**
CO1	Apply Various reduction methods to simplify logic expression	K3	1
CO2	Implement the combinational logic circuits using gates	K3	2
CO3	Examine the performance of latches and flipflops	K3	3
CO4	Construct sequential logic using Flip flops	K3	4
CO5	Design hazard free circuits for asynchronous sequential circuits	K3	5

PRE-REQUISITE

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)													
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	1	-	-	1	1	-	3	2	1
CO2	3	3	3	2	2	1	-	-	1	1	-	3	2	1
CO3	2	3	2	3	1	1	-	-	1	1	-	2	1	1
CO4	3	3	2	3	2	1	-	-	1	1	-	2	2	1
CO5	3	2	2	2	2	1	-	-	1	1	-	3	2	1

COURSE ASSESSMENT METHODS		
DIRECT	1	Continuous Assessment Tests (Theory Component)
	2	Laboratory Record and Model Practical Examinations (Laboratory Component)
	4	End Semester Examinations
INDIRECT	1	Course Exit Survey

COURSE CONTENT		
Topic - 1	**BOOLEAN THEOREMS AND LOGIC REDUCTION**	6
Number System -Complements -Boolean theorems -Code -Logic gates -NAND and NOR gates – Representation of Boolean expression -SOP, POS Canonical form -simplification of logic functions using K-Map. Quine McCluskey method.		
Topic - 2	**COMBINATIONAL LOGIC DESIGN**	6
Adder/subtractor – implementation of combinational circuits – Multiplexers, decoders, encoders, demultiplexers – Code Converter		
Topic - 3	**LATCHES AND FLIPFLOPS**	6
Latches -NOR, NAND -Digital Pulses – Clocked Flip Flops – Master/Slave flip flop -Asynchronous input -Flip Flop timing considerations conversion of flip flop.		
Topic - 4	**SEQUENTIAL CIRCUITS**	6
General model of sequential circuits – Mealy/Moore models, excitation table, State table ,state diagram – design of Synchronous sequential circuits.		
Topic - 5	**REGISTERS AND HAZARDS**	6
Shift register -Ring Counter, Johnson counter -Hazards and essential Hazards in logic circuits – design of Hazard free Circuits.		

THEORY	30		TUTORIAL			PRACTICAL	0		TOTAL	30

COURSE CONTENT	
Experiment-1	Study of Logic gates.
Experiment-2	Verification of Boolean Theorems using basic gates.
Experiment-3	Design and implement of Half/Full Adder.
Experiment-4	Design and implement of Half/Full Subtractor.
Experiment-5	Design and implementation of combinational circuits using basic of binary to grey code converters.
Experiment-6	Design and implementation of combinational circuits using basic of BCD to Excess-3 converters.
Experiment-7	Design and implement of shift-registers
Experiment -8	Design and implement of synchronous counters.
Experiment- 9	Design and implementation of asynchronous mod -N counters.
Experiment-10	Design and implement of combinational circuits using MSI devices on Application using multiplexer & demultiplexer.

Experiment-11	Design and implement of combinational circuits using MSI devices 4 – bit binary adder / subtractor.
Experiment-12	Design and implement of combinational circuits using MSI devices Parity generator / checker
Experiment-13	Design and implement of combinational circuits using MSI devices on Magnitude Comparator.
Experiment-14	Design and implement of basic logic gates using VHDL simulator.
Experiment-15	Design and implement of combinational circuits using VHDL simulator.
Experiment-16	Design and implement of Sequential circuits using VHDL simulator.

THEORY	0		TUTORIAL	0		PRACTICAL	60		TOTAL	60

BOOK REFERENCES	
1	M. *Morris Mano*. Michael D. Ciletti, Digital Design 6[th]edition person 2018.
2	Charles H Roth, Jr,LarryL.Kinney "Fundamental of logic design",7[Th] edition, Kluwer Academic Publishers 2014
3	Thomas L. Floye," Digital Fundemantals",11th edition Prentice Hall,2015
4	A.AnandKumar,"Fundamentals of Digital Circuits "2nd Edition ,Tata McGraw Hill,2008

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=K73N9ES_8nI
2	https://www.youtube.com/watch?v=m5rEKAqHyKo
3	https://www.youtube.com/watch?v=jm0PGDSSBkI
4	https://www.youtube.com/watch?v=AaN72s5WfOM

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E. / B.Tech., Common to all	23EN4L1	INTERPERSONAL COMMUNICATION SKILLS LAB - II	0	0	3	1.5

	After Successful completion of the course, the students should be able to	RBT Level
CO1	Enhance academic potential with the essential English language abilities.	K3
CO2	Learn comprehend English texts with the assistance.	K2
CO3	Improve communication skills in any situation.	K4
CO4	Enhance speaking and academic conversation skills	K4
CO5	Develop ability to make interesting presentations.	K2

PRE-REQUISITE	COMMUNICATIVE ENGLISH, TECHNICAL ENGLISH &INTERPERSONAL COMMUNICATION SKILLS LAB - I

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	Programme Learning Outcomes (POs)												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	3	-	3	-	-
CO2	-	-	-	-	-	-	-	-	2	3	-	3	-	-
CO3	-	-	-	-	-	-	-	-	2	3	-	3	-	-
CO4	-	-	-	-	-	-	-	-	2	3	-	3	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	3	-	-

LIST OF EXPERIMENTS	
Experiment-1	Role Play
Experiment-2	Empathy
Experiment-3	Time Management
Experiment-4	Body Language
Experiment-5	Mock Interview
Experiment-6	Group Discussion
Experiment-7	Presentation
Experiment -8	Team Building Skills

THEORY	0	TUTORIAL	0	PRACTICAL	45	TOTAL	45

BOOK REFERENCES	
1	Communication Skill by Dale Carnegie,2022.
2	Communication: Core Interpersonal Skills by Gjyn O'Toolee,2020.
3	Effective Communication in the workplace by David L.Lewis, 2019.
4	25 Business Skills In English, ISBN: 9788122416572, Edition/Reprint: 1st, Author(s): McCracken, Mark Publisher: NEW AGE INTERNATIONAL (P) LTD PUBLISHERS, Product ID: 563189, Country of Origin: India
5	English Communication: Theory And Practice Author(s): Manoj Kumar Garg (ISBN: 9789382209898) Publisher: SCHOLAR TECH PRESS, Edition/Reprint: 2022, Country of Origin: India

OTHER REFERENCES	
1	https://youtu.be/cC2vxmBDAG8
2	https://youtu.be/l3RSiSUwlT0
3	https://youtu.be/cyXADWE7KPo
4	https://youtu.be/aZYHsnIAQqo
5	https://youtu.be/7LP-cXkaRIo?list=PLvbKJaHKFw3ZYTp2Fc9cj2LwZtIbOd5ux
6	https://youtu.be/PcDut8zfAsk

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E. ECE	23EC4L2	DIGITAL SIGNAL PROCESSING LABORATORY	0	0	2	1

COURSE LEARNING OUTCOMES (COs)	
After Successful completion of the course, the students should be able to	**RBT Level**
CO1 Understand the mathematical operation on discrete signals	K2
CO2 Sketch the magnitude and phase response of FFT, IIR and FIR filters	K3
CO3 Calculate circular convolution of discrete sequences	K3
CO4 Implement FIR, IIR filters using DSP processor	K4
CO5 Sketch and model the discrete signals using DSP processor.	K5

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	2	-	-	-	3	1	2	2	2	1
CO2	2	2	2	1	2	-	-	-	3	1	2	2	2	1
CO3	2	1	1	2	2	-	-	-	3	2	1	1	2	1
CO4	2	1	2	1	3	-	-	-	3	1	1	2	2	1
CO5	2	1	1	1	3	-	-	-	3	2	1	2	3	1

COURSE ASSESSMENT METHODS		
DIRECT	1	Laboratory Record
	2	Model Practical Examinations
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

LIST OF EXPERIMENTS	
1	Generation of signals.
2	Verification of sampling theorems.
3	Circular Convolution
4	Computation of DFT of a signal using FFT algorithms
5	Design and Simulation of IIR and FIR filters
6	Checking stability of a LTI system
7	Design and Simulation of IIR and FIR filters using DSP Kit
8	Linear Convolution using DSP Kit
9	Generation of Signals using DSP Kit
10	Implementation of FFT algorithms using DSP Kit

THEORY	0		TUTORIAL	0		PRACTICAL	30		TOTAL	30

BOOK REFERENCES	
1	Digital Signal Processing Laboratory Manual, Al-AmeenPublications,2020

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=pGdr9WLto4A&list=PL1CE5B4FFFA997E5D
2	https://www.youtube.com/watch?v=FtEShPAFpek&list=PL_mruqjnuVd87sjSDVS9wuit9CSpgIIfx
3	https://www.youtube.com/watch?v=UWQuMnWcmwc
4	https://www.youtube.com/watch?v=W1cTpqM9DaU
5	https://www.youtube.com/watch?v=8kcvyoHsXrw

Semester	Programme	Course Code	Course Name	L	T	P	C
IV	B.E.ECE	23EC4L3	ANALOG AND DIGITAL COMMUNINCATIONS LABORATORY	0	0	2	1

COURSE LEARNING OUTCOMES (COs)	

After Successful completion of the course, the students should be able to	RBT Level
CO1 Demonstrate generation and detection of analog and digital modulation techniques.	K3
CO2 Explain sampling, PCM, delta modulation, adaptive delta modulation and super heterodyne receiver.	K2
CO3 Compare the different analog and digital modulation techniques.	K2
CO4 Distinguish various line coding schemes used for digital data transmission.	K3
CO5 Apply time division multiplexing concepts in different pulse modulation techniques.	K3

PRE-REQUISITE	NIL

CO / PO MAPPING (1 – Weak, 2 – Medium, 3 – Strong)														
COs	**Programme Learning Outcomes (POs)**												**PSOs**	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	3	3	1	-	-	2	3	-	3	2	1
CO2	3	3	1	3	3	1	-	-	2	3	-	3	1	1
CO3	3	3	1	3	3	1	-	-	2	3	-	3	2	1
CO4	3	3	1	3	3	1	-	-	2	3	-	3	2	1
CO5	3	3	1	3	3	1	-	-	2	3	-	3	1	1

COURSE ASSESSMENT METHODS		
DIRECT	1	Laboratory Record
	2	Model Practical Examinations
	3	End Semester Examinations
INDIRECT	1	Course Exit Survey

LIST OF EXPERIMENTS	
1	Amplitude modulation and demodulation
2	Frequency modulation and demodulation.
3	DSB-SC Modulator & Detector
4	Pulse Amplitude Modulation & Demodulation
5	Pulse Width Modulation & Demodulation
6	Pulse Code Modulation & Demodulation
7	Time Division Multiplexing & Demultiplexing
8	Differential Pulse Code Modulation & Demodulation
9	Amplitude Shift Keying
10	Frequency Shift Keying

THEORY	0		TUTORIAL	0		PRACTICAL	30		TOTAL	30

BOOK REFERENCES	
1	Analog and Digital Communications Laboratory Manual, Al-AmeenPublications,2020

OTHER REFERENCES	
1	https://www.youtube.com/watch?v=A9N9EGe_4tU
2	https://www.youtube.com/watch?v=KKFC7u2Di5s
3	https://www.youtube.com/watch?v=P8SZaHaWbiI
4	https://www.youtube.com/watch?v=eymM0o30Z3A
5	amplitude shift keying experiment