Department of Electronics & Communication Engineering

B. Tech (Electronics and Communication Engineering)

VISION

- To become a pole of excellence in technical education, research and innovation by inculcating knowledge of science, engineering, technology and management for the growth of socially responsible individuals.
- To be recognized as a leader in ECE education and research, with state-of-the-art facilities and highly qualified faculty.
- To develop an innovative and industry-ready workforce that can provide technological solutions for the betterment of society.

MISSION

- To inculcate innovation, design, and entrepreneurship amongst the students through outcome-based learning
- To encourage and facilitate faculty, researchers, and students to work synergistically across the boundaries of various disciplines.
- To promote research and development, technical consultancy and symbiotic partnership between industry and the Institute with high regard for ethical principles and human values and to pursue knowledge as a process of lifelong learning.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: Demonstrate comprehensive knowledge of analytical foundations in Electronics and Communication Engineering in terms of founding principles of design, computing, communication, critical thinking and problem-solving abilities to handle the real-world problems by applying theoretical foundations and practical skills in different fields of Electronics and Communication Engineering.

PEO2: To inculcate managerial and entrepreneur skills, ethical and professional attitude and multidisciplinary approach to meet the needs of industry, imbibe lifelong learning and research aptitude to the emerging technologies with global competence.

PROGRAM SPECIFIC OUTCOME (PSOs)

PSO1: To demonstrate the ability to design and develop complex systems in the areas of next generation Communication Systems, IoT based Embedded Systems, Advanced Signal and Image Processing, latest Semiconductor technologies and RF Technology.

PSO2: To demonstrate the ability to solve complex Electronics and Communication Engineering problems using latest hardware and software tools along with analytical skills to contribute to useful, frugal and eco-friendly solutions.

PSO3: To demonstrate an ability to make use of acquired technical knowledge to get employed in the field of Electronics and Communication and also to become successful Entrepreneur.

PROGRAMME OUTCOMES (POs):

PO1: Engineering Knowledge.

PO2: Problem Analysis.

PO3: Design/Development of Solutions.

PO4: Conduct Investigations of Complex Problems.

PO5: Engineering Tool Usage.

PO6: The Engineer and The World.

PO7: Ethics.

PO8: Individual and Collaborative Teamwork.

PO9: Communication.

PO10: Project Management and Finance.

PO11: Life-Long Learning.

Credit Definition

Type	Duration (in hours)	Credit
Lecture (L)	1	1
Tutorial (T)	1	1
Practical (P)	2	1

Total Credit Distribution for the Entire Programme

Semester	Credits										Credits/Semester
	MC	ME	Project	NM	NV	MDC	AEC	SEC	VAC	INT	
1	8	0	0	1	1	7	2	1	0	0	20
2	12	0	0	1	1	4	2	1	2	0	23
3	14	0	0	0	1	0	2	4	3	0	24
4	16	0	0	0	1	0	2	4	0	0	23
5	17	0	2	4	1	0	0	0	0	0	24
6	11	3	2	4	1	0	0	0	0	0	21
7	0	7	4	4	0	0	0	0	2	4	21
8	0	4	8	4	0	0	0	0	0	0	16
Credits/Course	**72**	**20**	**12**	**20**	**12**	**9**	**8**	**9**	**6**	**4**	**172**

Category Definition

Definition of Category/Type	Abbreviation
Major Compulsory	**MC**
Major Elective	**ME**
Non-Major Specific Subject Course	**NM**
Non-major Vocational Education and Training	**NV**
Multidisciplinary Courses	**MDC**
Ability Enhancement Courses	**AEC**
Skill Enhancement Courses	**SEC**
Value Added Courses	**VAC**
Internship	**INT**

FIRST YEAR

SEMESTER-I

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Engineering Physics		MDC	3	3	0	0
2	Engineering Mathematics		MDC	3	3	0	0
3	Basic Electrical and Electronics Engineering		MC	3	3	0	0
4	Engineering Graphics -I		SEC	1	0	0	2
5	Programming for problem Solving using C		MC	3	3	0	0
6	Engineering Physics Lab		MDC	1	0	0	2
7	Basic Electrical and Electronics Engineering Lab		MC	1	0	0	2
8	Programming for problem Solving using C Lab		VAC	1	0	0	2
9	Communicative English I		AEC	2	2	0	0
10	NCC/YOGA		NM	1	0	0	2
11	Vocational-Soft Skill Development-I		NV	1	0	0	2
Total Credits				20 Credits			

SEMESTER-II

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Engineering Chemistry		MDC	3	3	0	0
2	Numerical Analysis and Optimisation Techniques		MC	3	3	0	0
3	Electronic Devices		MC	3	3	0	0
4	Engineering Graphics -II		SEC	1	0	0	2
5	Introduction to Python		MC	3	3	0	0
6	Engineering Chemistry Lab		MDC	1	0	0	2
7	Numerical Analysis and Optimisation Techniques Lab		MC	1	0	0	2
8	Electronic Devices Lab		MC	1	0	0	2
9	Introduction to Python Lab		MC	1	0	0	2
10	Communicative English II		AEC	2	2	0	0
11	Environmental Science		VAC	2	2	0	0
12	Vocational-Soft Skill Development-II		NV	1	0	0	2
13	NCC/YOGA		NM	1	0	0	2
Total Credits				23 Credits			

SECOND YEAR

SEMESTER-III

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Digital System Design		MC	3	3	0	0
2	Signals & Systems		MC	3	3	0	0
3	Network Theory		MC	3	3	0	0
4	Probability Theory and Stochastic Processes		MC	3	2	0	0
5	Data Structures & Algorithms		SEC	3	3	0	0
6	Digital System Design Lab		MC	1	0	0	2
7	Signals & Systems Lab		MC	1	0	0	2
8	Data Structures & Algorithms Lab		SEC	1	0	0	2
9	Basic Management		VAC	3	3	0	0
10	Foreign Language I		AEC	2	2	0	0
11	Vocational-Soft Skill Development-III		NV	1	0	0	2
Total Credits				24 Credits			

SEMESTER-IV

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Analog Electronics		MC	3	3	0	0
2	Analog Communication		MC	3	3	0	0
3	Microprocessor and Microcontroller		MC	3	3	0	0
4	Computer Organisation and Architecture		MC	3	3	0	0
5	Data Base Management System (DBMS)		SEC	3	3	0	0
6	Analog Electronics Lab		MC	1	0	0	2
7	Analog Communication Lab		MC	1	0	0	2
8	Microprocessor and Microcontroller Lab		MC	1	0	0	2
9	Computer Architecture Lab		MC	1	0	0	2
10	Data Base Management System (DBMS) Lab		SEC	1	0	0	2
11	Foreign Language II		AEC	2	2	0	0
Total Credits				23 Credits			

THIRD YEAR

SEMESTER-V

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Digital Signal Processing		MC	3	3	0	0
2	Electromagnetic Theory		MC	3	3	0	0
3	Control System		MC	3	3	0	0
4	Digital Communication		MC	3	0	0	0
5	Microwave Theory and Technique		MC	3	3	0	0
6	Slot for minor		NM	4	3	0	2
7	Digital Signal Processing Lab		MC	1	0	0	2
8	Digital Communication Lab		MC	1	0	0	2
9	Minor Project/Mentor Seminar		NM	2	0	0	4
10	Vocational-Soft Skill Development-V		NV	1	0	0	2
Total Credits				24 Credits			

SEMESTER-VI

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Embedded System		MC	3	3	0	0
2	Digital Switching and Computer Network		MC	3	3	0	0
3	VLSI Design		MC	3	3	0	0
4	Information Theory and Coding		ME	3	3	0	0
	Biomedical Electronics		ME				
	Introduction to MEMS		ME				
5	Slot for minor		NM	4	3	1	0
6	VLSI Design Lab		MC	1	0	0	2
7	Digital Switching and Computer Network Lab		MC	1	0	0	2
8	Minor Project/Mentor Seminar		NM	2	0	0	4
9	Vocational-Soft Skill Development-VI		NV	1	0	0	2
Total Credits				21 Credits			

FOURTH YEAR

SEMESTER-VII

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Law for Engineers		VAC	2	2	0	0
2	Wireless and Mobile Communication		ME	3	3	0	0
	Wavelet Transform						
	Satellite Communication						
3	Digital Image Processing		ME	3	3	0	0
	Mixed Signal Design						
4	Slot for minor		NM	4	3	0	2
5	Digital Image Processing Lab		ME	1	0	0	2
	Mixed Signal Design Lab						
6	Internship		INT	4	0	0	8
7	Project I		MC	4	0	0	8
Total Credits				21 Credits			

SEMESTER-VIII

Sl No	Course Title	Code	Type	Credit	Type		
					L	T	P
1	Fiber Optic Communication		ME	4	3	1	0
	Neural N/W						
	Smart Antenna						
2	Slot for minor		NM	4	3	1	0
3	Project II		MC	8	0	0	16
Total Credits				16 Credits			

COURSE CO-PO-PSO MAPPING

SEMESTER-I

COURSE 2 (Engineering Mathematics)

COURSE OUTCOMES:

CO1: Illustrate the concepts of determinants, matrices, and vector algebra to solve systems of linear equations.
CO2: Implement vector space principles and linear algebraic tools in various physical and computational problems.
CO3: Examine first- and second-order differential equations to solve them using appropriate analytical methods.
CO4: Detect singularities in the process of evaluation of complex integral in mathematical modeling and engineering applications.
CO5: Construct transformations of complex functions using conformal mapping and Mobius transformation for advanced problem.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2		2	1				1	2	1
CO2	3	3	3	3	2			1			1	2	3	2
CO3	2	3	2	1	3		1	1	2			1	2	2
CO4	3	2	3	2	1		2	1	1		1	2	3	1
CO5	3	3	3	2	2			1	2	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3 (Basic Electrical and Electronics Engineering)

COURSE OUTCOMES:

CO1: Define the fundamental components and laws of DC circuits, such as conductors, resistors, capacitors, inductors, Ohm's Law, and Kirchhoff's Laws.
CO2: Explain the behavior of intrinsic and extrinsic semiconductors, including charge carriers and operation of PN junctions.
CO3: Execute network theorems to analyze simple RLC circuits under steady-state conditions.
CO4: Integrate combinational logic circuits using minimization techniques and express logic functions in SOP and POS forms.
CO5: Design measurement and instrumentation setups to accurately measure AC voltage, current, and 3-phase power.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1	1	1	0	1	1	1	1
CO2	3	3	1	1	2	1	1	1	1	0	1	2	3	1
CO3	3	3	2	2	3	1	1	1	1	1	2	2	3	2
CO4	3	3	3	2	3	1	1	2	2	1	2	3	3	2
CO5	3	2	3	3	3	2	1	2	2	2	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4 (Engineering Graphics -I)

COURSE OUTCOMES:

CO1: Explain the ISO standards for technical drawing, including line types, paper sizes, layout, and various types of projections.
CO2: Apply various dimensioning techniques (chain, parallel, combined, coordinate) to represent the size and location of features on different mechanical parts.
CO3: Analyze and indicate different types of tolerances (linear, angular, geometrical, bilateral, unilateral) and fits on part drawings to define manufacturing requirements.
CO4: Draw standard engineering curves (conic sections) and represent different trade-related symbols for fasteners, welding, and electrical elements.
CO5: Prepare professional part drawings and freehand sketches of simple tools and objects following all standard conventions, sections, and assembly indications.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	-	-	1	-	-	-	1	-	1	1	1	-
CO2	3	2	2	-	1	-	-	-	1	-	1	2	2	1
CO3	3	3	3	1	-	1	-	1	2	1	1	2	3	1
CO4	3	-	2	-	-	-	-	-	1	-	1	1	1	-
CO5	3	2	3	1	2	1	-	2	3	2	2	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 5 (Programming for problem Solving using C)

COURSE OUTCOMES:

CO1: Explain the basic concepts of computer systems, hardware, software, and operating environments.
CO2: Apply fundamental programming constructs such as data types, operators, control structures, and functions to solve computational problems.
CO3: Analyze real-world problems and design appropriate algorithms and flowcharts for their solution.
CO4: Develop and debug simple programs using structured programming approaches in C.
CO5: Demonstrate problem-solving skills through modular programming and testing techniques for computational efficiency and correctness.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	2	-	-	-	-	-	-	2	1	-
CO2	3	3	2	-	3	-	-	-	-	-	1	3	2	1
CO3	3	3	2	2	2	1	-	-	-	-	2	3	2	1
CO4	3	2	2	3	3	-	-	1	1	-	2	3	3	1
CO5	3	3	3	2	3	1	-	2	2	2	3	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 7 (Basic Electrical and Electronics Engineering Lab)

COURSE OUTCOMES:

CO1: Identify basic electronic components and distinguish their configurations in series and parallel connections.
CO2: Verify Ohm's and Kirchhoff's laws through experimental analysis of electrical circuit.
CO3: Analyze the transient and steady-state response of RC, LC, and RLC circuits.
CO4: Examine and interpret the characteristics of PN junction diodes and demonstrate their practical applications.
CO5: Implement and evaluate basic logic functions and Boolean expressions using logic gates and digital trainer kits.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1	2	1	0	1	1	1	1
CO2	3	3	2	2	2	1	1	2	1	1	1	2	2	1
CO3	3	3	2	3	3	1	1	2	1	1	2	2	3	2
CO4	3	3	3	3	3	1	1	2	2	1	2	3	3	2
CO5	3	2	3	2	3	2	1	3	3	2	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 8 (Programming for problem Solving using C Lab)

COURSE OUTCOMES:

CO1: Explain the basic concepts of computer systems, hardware, software, and operating environments.
CO2: Apply fundamental programming constructs such as data types, operators, control structures, and functions to solve computational problems.
CO3: Analyze real-world problems and design appropriate algorithms and flowcharts for their solution.
CO4: Develop and debug simple programs using structured programming approaches in C.
CO5: Demonstrate problem-solving skills through modular programming and testing techniques for computational efficiency and correctness.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	2	-	-	-	-	-	-	2	1	-
CO2	3	3	2	-	3	-	-	-	-	-	1	3	2	1
CO3	3	3	2	2	2	1	-	-	-	-	2	3	2	1
CO4	3	2	2	3	3	-	-	1	1	-	2	3	3	1
CO5	3	3	3	2	3	1	-	2	2	2	3	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 9 (Communicative English I)

COURSE OUTCOMES:

CO1: Explain the fundamentals of communicative English and demonstrate an understanding of general communication skills.
CO2: Identify nuances in intonation and apply correct pronunciation techniques to enhance spoken communication.
CO3: Use essential grammatical structures and develop foundational language skills for accurate communication.
CO4: Build and employ an extensive English vocabulary to improve language proficiency and express ideas effectively.
CO5: Integrate grammar, pronunciation, and vocabulary skills to communicate confidently and appropriately across diverse contexts

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3		2	1				1	2	1
CO2	3	3	3	3	2		2	1			1	2	3	2
CO3	3	2	2	2	3		1	2	2	2		2	1	2
CO4	2	2	3	1	1		2	1	2		2	2	3	3
CO5	3	3	3	2	2			1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 11 (Vocational-Soft Skill Development-I)

COURSE OUTCOMES:

CO1: Build a strong foundation in essential English language skills and demonstrate effective communication across diverse contexts.
CO2: Apply English language skills in real-world academic and professional situations to enhance overall proficiency.
CO3: Acquire comprehensive knowledge of grammar and use grammatical rules and structures for accurate and effective communication.
CO4: Develop and refine listening skills to comprehend spoken English in varied contexts and interactions.
CO5: Expand and employ vocabulary to express ideas precisely and eloquently in both spoken and written communication.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3		2	1	2	3		1	2	1
CO2	3	2	2	3	2		2	2			1	2	3	2
CO3	2	2	3	2	3		1	2	2	2		3	2	1
CO4	3	3	3	3	3		2	1	2		2	2	3	3
CO5	3	3	3	2	2		1	1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

SEMESTER-II

COURSE 1 (Engineering Chemistry)

COURSE OUTCOMES:

CO1: Explain quantum, thermodynamic, and spectroscopic principles using models, diagrams, and conceptual reasoning.
CO2: Apply theoretical frameworks to solve problems in molecular, electronic, and structural chemistry.
CO3: Analyze atomic, molecular, and solid-state data to interpret structure-property-function relationships.
CO4: Evaluate stereochemical aspects of organic molecule in a three-dimensional space.
CO5: Predict different reaction pathways in designing drug molecules.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	1	-	1	2	1	-	2	2	2
CO2	3	3	3	1	2	-	-	-	-	1	1	3	2	1
CO3	3	3	2	2	1	-	-	-	-	2	1	2	3	2
CO4	2	3	3	2	3	1	-	-	1	1	1	3	1	2
CO5	3	3	3	3	3	1	-	-	2	1	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 2 (Numerical Analysis and Optimisation Techniques)

COURSE OUTCOMES:

CO1: Describe the fundamentals of numerical errors, approximation techniques, and interpolation methods.
CO2: Classify numerical methods to solve numerical integrals, linear algebraic systems and nonlinear equations.
CO3: Explain the numerical solutions of ordinary differential equations using various methods.
CO4: Formulate optimization problems, including linear programming and transportation problems and assignment problem.
CO5: Construct queuing models and apply them to analyze real-world systems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	2	2	2	3		1	2	1
CO2	3	3	2	3	2	3	2	3		1	1	2	3	2
CO3	3	2	3	2	2	3	1	2	2	2	3	3	1	2
CO4	3	3	3	3	3	1	2	1	2		2	3	3	3
CO5	2	3	3	2	2	2	1	1	1	1	1	1	3	1

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3 (Electronic Devices)

COURSE OUTCOMES:

CO1: Describe the characteristics and working principles of semiconductor devices, including PN junction diodes and bipolar junction transistors (BJTs).
CO2: Solve for voltages and currents in circuits containing semiconductor devices (like diodes, BJTs, and MOSFETs) under various biasing conditions.
CO3: Compare and contrast the performance characteristics of different transistor amplifier configurations, such as common-emitter and common-collector, including their frequency response.
CO4: Select and justify the selection of appropriate semiconductor devices for specific circuit applications based on their datasheets and operating parameters.
CO5: Design and prototype a functional electronic circuit, such as a rectifier, oscillator, amplifier or a simple voltage regulator that meets a given set of performance specifications.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1									1	2	1
CO2	3	2	1										3	
CO3	3	2	2	1								1	3	
CO4	2	3	2	1					1		1	2	3	2
CO5	3	3	3	2	2			1	1		1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4 (Engineering Graphics -II)

COURSE OUTCOMES:

CO1: Explain the principles of Orthographic Projection and the conventions of First Angle and Third Angle projection methods.
CO2: Draw the projections of points and straight lines in all possible orientations relative to the reference planes.
CO3: Construct the orthographic projections of plane figures and various solids (prisms, cones, pyramids) in simple and inclined positions.
CO4: Generate Isometric Views and Isometric Projections of standard 3D solids using appropriate scaling techniques.
CO5: Utilize fundamental AutoCAD commands to execute 2D drafting tasks, including orthographic and isometric projections of lines, planes, and solids.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	-	1	-	-	-	-	-	1	-	1	1	1	-
CO2	3	2	2	1	-	-	-	-	1	-	1	1	2	1
CO3	3	2	2	1	-	-	-	-	1	-	1	2	2	1
CO4	3	2	3	1	1	-	-	-	1	-	1	2	3	1
CO5	2	1	3	2	3	1	-	1	2	1	2	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 5 (Introduction to Python)

COURSE OUTCOMES:

CO1: Students will be able to recall and explain the fundamental concepts of Python programming, and R programming including data types, operators, expressions, and control structures.
CO2: Students will be able to implement Python programming constructs such as data structures, strings, regular expressions, and file handling to develop efficient computational solutions.
CO3: Students will be able to outline data representation, manipulation, and visualization through appropriate data structures and graphical tools.
CO4: Students will be able to construct interpret data using R by applying probability distributions, hypothesis testing, and related statistical methods on real-world datasets.
CO5: Students will be able to apprise linear regression models in R and Python, interpret model outputs, and assess relationships between variables to support data-driven decision-making.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	3			1		2	3	2	1
CO2	3	3	2	2	2	3			1		2	3	3	1
CO3	3	2	3	2	2	3					3	2	3	3
CO4	3	3	2	3	3	3	1	1	1		3	3	1	2
CO5	3	3	3	3	3	3	1	2	1		3	3	2	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 6 (Engineering Chemistry Lab)

COURSE OUTCOMES:

CO1: Explain separation mechanism in thin layer chromatography using polarity differences.
CO2: Apply conductometric methods to determine cell constant and solution conductance.
CO3: Analyze potentiometric data to interpret redox potentials and electrochemical behavior.
CO4: Evaluate surface tension and viscosity measurements in liquids.
CO5: Design synthetic route for polymer or drug using appropriate chemical reactions.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	1	-	1	2	1	-	2	2	2
CO2	3	2	3	3	2	-	-	-	-	1	1	3	2	1
CO3	2	3	3	2	1	-	-	-	-	2	1	2	3	2
CO4	3	3	2	2	1	1	-	-	2	1	1	3	1	2
CO5	3	3	3	2	2	2	-	-	3	1	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 7 (Numerical Analysis and Optimisation Techniques Lab)

COURSE OUTCOMES:

CO1: Describe numerical algorithm for solving mathematical problems involving interpolation, differentiation, and integration.
CO2: Classify numerical algorithms to solve systems of linear and nonlinear equations.
CO3: Assign programs to obtain numerical solutions of ordinary differential equations.
CO4: Formulate and solve optimization problems using Linear Programming techniques.
CO5: Construct optimization algorithms for unconstrained and constrained problems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	2	1	2	3	2	1	2	3
CO2	3	2	2	3	2	3	2	2	1		1	2	3	2
CO3	2	3	3	2	3	1	1	2	2	2		3	2	1
CO4	2	3	2	3	3		2	1	2	3	2	3	2	3
CO5	3	3	3	2	3	2	1	1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 8 (Electronic Devices Lab)

COURSE OUTCOMES:

CO1: Identify and describe the function, characteristics, and basic principles of common electronic devices such as diodes, BJTs, and MOSFETs.
CO2: Apply knowledge of electronic devices to build and test basic analog and digital circuits on a breadboard.
CO3: Analyze the performance of constructed circuits by measuring and interpreting various electrical parameters (voltage, current, frequency, etc.) using appropriate lab instruments like oscilloscopes, multimeters, and function generators.
CO4: Evaluate experimental results, compare them with theoretical values and expected behaviour, and troubleshoot discrepancies or faults in the circuits.
CO5: Design and develop a functional electronic circuit (e.g., a simple multivibrator, or an oscillator) for a specific application, integrating various components and skills learned during the course.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1					1				1	2	1
CO2	3	2	2					1			1		2	
CO3	3	2	2	1				1	1			1	3	1
CO4	3	3	2	1				1	1		1	2	2	1
CO5	3	3	3	2	2			1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 9 (Introduction to Python Lab)

COURSE OUTCOMES:

CO1: Students will be able to recall and explain the fundamental concepts of Python programming, and R programming including data types, operators, expressions, and control structures.
CO2: Students will be able to implement Python programming constructs such as data structures, strings, regular expressions, and file handling to develop efficient computational solutions.
CO3: Students will be able to outline data representation, manipulation, and visualization through appropriate data structures and graphical tools.
CO4: Students will be able to construct interpret data using R by applying probability distributions, hypothesis testing, and related statistical methods on real-world datasets.

CO5: Students will be able to apprise linear regression models in R and Python, interpret model outputs, and assess relationships between variables to support data-driven decision-making.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	3			1		2	3	2	1
CO2	3	3	2	2	2	3			1		2	3	3	1
CO3	3	2	3	2	2	3					3	2	3	3
CO4	3	3	2	3	3	3	1	1	1		3	3	1	2
CO5	3	3	3	3	3	3	1	2	1		3	3	2	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 10 (Communicative English II)

COURSE OUTCOMES:

CO1: Demonstrate an understanding of the communicative aspects of contemporary English language use in academic and professional contexts.
CO2: Develop and apply listening, speaking, reading, and writing skills for effective communication in professional environments.
CO3: Exhibit interpersonal communication competence and adapt interaction styles to diverse professional and social situations.
CO4: Apply critical thinking skills through practical exercises and analyze communicative situations effectively.
CO5: Employ problem-solving strategies and evaluate real-world scenarios using language-based activities and discussions.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3		2	1	2	3		1	2	1
CO2	3	2	2	3	2			2			1	2	3	2
CO3	2	2	3	2				1	2	2		3	2	1
CO4	3	3	3	3			2		2		2	2	3	3
CO5	3	3	3	2	2		1	1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 11 (Environmental Science)

COURSE OUTCOMES:

CO1: Construct the concept of Ecosystem and its importance on the development and well-being of human life on earth.
CO2: Execute the idea of biodiversity and relevant bio-geochemical phenomena and their impact on the sustainability of life.
CO3: Appraise the factors responsible for pollution as well as concomitant degradation of natural resources.
CO4: Reconstruct the way-outs to mitigate / moderate / minimize / combat with the effects of pollution and to achieve sustainable development goals (SDG).
CO5: Discuss Law and Order towards the protection and preservation of Ecosystem, Biodiversity and natural resources.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2			1				1	2	1
CO2	3	2	2	2				2			1	2	2	3
CO3	2	2	3	1	1			1	1			3	3	1
CO4	3	3	2	2	1			1	2		1	2	2	1
CO5	3	3	3	2	2			2	1	2	2	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 12 (Vocational-Soft Skill Development-II)

COURSE OUTCOMES:

CO1: Develop clear and concise spoken communication skills for diverse contexts and audiences, and demonstrate enhanced verbal expression and clarity.
CO2: Interpret and use body language and non-verbal cues effectively to communicate with confidence and impact.
CO3: Enhance active listening abilities and apply effective note-taking and attentiveness to improve comprehension and engagement.
CO4: Comprehend and analyze complex written materials to foster critical thinking and a deeper understanding of texts.
CO5: Develop and apply professional writing skills to produce clear, persuasive, and effective communication across formal and informal contexts.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3		2	1	2	3		1	2	1
CO2	3	3	2	3	2		1	2			1	2	3	2
CO3	3	2	3	2					2	2	2	3	1	1
CO4	2	3	2	3	2		2	3			2	2	3	2
CO5	3	3	3	2	2		1	1	1	1	1	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

SEMESTER-III

COURSE 1 (Digital System Design)

COURSE OUTCOMES:

CO1: Define the fundamental concepts, terminology, and laws of digital logic, such as Boolean algebra, logic gates, truth tables, and flip-flops.
CO2: Explain the operation of basic digital circuits (e.g., adders, multiplexers, decoders).
CO3: Solve problems by using acquired knowledge to simplify Boolean expressions (e.g., using K-maps) and build specific digital logic circuits in a given situation, such as a simulation environment or on a breadboard.
CO4: Differentiate between various design choices based on given criteria like speed or power consumption.
CO5: Design and develop an original digital circuit (e.g., a specific control system) that meets a set of given specifications, combining elements to form a new, functional whole.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1									1	2	1
CO2	3	1	1									1	2	
CO3	3	3	2										1	
CO4	3	3	2	1			1	1	1		1	2	2	1
CO5	3	3	3	2	2			1	1		1	2	2	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 2 (Signals & Systems)

COURSE OUTCOMES:

CO1: Define the basic concept of signals and systems.
CO2: Illustrate different types of signals and systems, their properties.
CO3: Prioritize different mathematical tools relating to various nonlinear transformations and the analysis of signals in the time/frequency domain.
CO4: Examine the basic formulation of state space analysis and relation with the conventional method.
CO5: Critique sampling theorem, reconstruction, aliasing and related implications.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	2	1	1	1	1	3	2	2	2
CO2	3	3	2	2	3	3	1	1	1	1	3	2	3	2
CO3	2	2	3	1	1	2	2	3	3	3	2	2	3	2
CO4	3	3	3	3	2	3	2	2	1	1	3	1	3	2
CO5	3	3	2	2	3	3	2	1	1	1	3	2	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3 (Network Theory)

COURSE OUTCOMES:

CO1: Explain the fundamental principles of network theorems and circuit analysis techniques for circuits.
CO2: Solve complex electrical networks using nodal analysis, mesh analysis, and Laplace transforms to determine circuit behavior.
CO3: Analyze the response of circuits with non-sinusoidal periodic inputs using Fourier series and transform methods.
CO4: Formulate the driving point and transfer functions of networks to characterize system behavior from pole-zero locations.
CO5: Design basic series/parallel resonant circuits and analog filters to meet specified frequency response requirements.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3		2	1	2	3		3	2	2
CO2	3	3	2	3			1	2			1	2	3	2
CO3	2	2	3	2					2	1		3	2	1
CO4	2	3	2	3								2	3	2
CO5	3	3	3	2	2		1	1	1	1	1	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4 (Probability Theory and Stochastic Processes)

COURSE OUTCOMES:

CO1: Describe the fundamental concepts of probability theory.
CO2: Utilize probability distributions to study real-world phenomena.
CO3: Examine the behaviour of stochastic processes.
CO4: Monitor the nature of Markov chains.
CO5: Formulate stochastic models to study Brownian motion.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	3	2			2				3	2	1
CO2	3	2	3	1	3			1			1	2	2	2
CO3	3	3	2	1	3			2	1			2	3	1
CO4	2	3	3	1	3			2	2		1	2	2	1
CO5	3	3	2	3	2			1	1	2	2	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 5 (Data Structures & Algorithms)

COURSE OUTCOMES:

CO1: Explain the fundamental concepts of algorithms and the time complexity of the algorithms.
CO2: Utilize linear and non-linear data structures with their standard operations in relevant applications.

CO3: Compare various sorting and searching techniques based on their underlying principles and time complexities.
CO4: Select suitable data structures for solving problems based on their application requirements and performance characteristics.
CO5: Design efficient solutions for real-world problems using appropriate data structures and algorithms.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	-	-	-	-	-	1	3	2	1
CO2	3	3	2	2	2	-	-	1	1	-	2	3	3	2
CO3	3	3	2	2	2	-	-	1	1	-	2	3	3	2
CO4	3	3	3	2	3	-	-	1	1	1	3	3	3	3
CO5	3	3	3	3	3	-	-	2	1	2	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 6 (Digital System Design Lab)

COURSE OUTCOMES:

CO1: Describe the operation and truth tables of basic logic gates.
CO2: Implement and verify different combinational circuits (like adders, subtractors, multiplexers, and decoders) using hardware.
CO3: Analyze the behaviour and troubleshoot errors in designed circuits.
CO4: Evaluate different design choices for a digital circuit based on given performance criteria (e.g., speed, power consumption, or cost).
CO5: Design and develop an original digital circuit (e.g., a specific control system) that meets a set of given specifications, combining elements to form a new, functional whole.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1					1	1		1	1	2	1
CO2	3	1	2					1	1				1	
CO3	2	2	2	1	1			1	1		1	2	2	2
CO4	2	2	2	1	1							2	2	2
CO5	3	3	3	2	2				1		1	1	2	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 7 (Signals & Systems Lab)

COURSE OUTCOMES:

CO1: Explain the basics operation of MATLAB.
CO2: Analysis of the time domain and frequency domain signals.
CO3: Implement the concept of Fourier series and Fourier transforms.
CO4: Find out the stability of system using pole-zero diagrams and bode diagram.
CO5: Design frequency response of the system.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	3	3	2	1	1	1	1	3	3	2	2
CO2	3	2	3	2	2	2	1	1	1	1	2	2	1	2
CO3	2	3	3	1	1	3	2	3	3	3	3	3	3	3
CO4	3	2	2	3	3	2	2	2	1	1	3	3	3	2
CO5	3	3	2	2	3	3	2	1	1	1	3	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 8 (Data Structures & Algorithms Lab)

COURSE OUTCOMES:

CO1: Explain the fundamental concepts of algorithms and the time complexity of the algorithms.
CO2: Utilize linear and non-linear data structures with their standard operations in relevant applications.
CO3: Compare various sorting and searching techniques based on their underlying principles and time complexities.
CO4: Select suitable data structures for solving problems based on their application requirements and performance characteristics.
CO5: Design efficient solutions for real-world problems using appropriate data structures and algorithms.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	-	1	-	-	-	-	-	1	3	2	1
CO2	3	3	2	2	2	-	-	1	1	-	2	3	3	2
CO3	3	3	2	2	2	-	-	1	1	-	2	3	3	2
CO4	3	3	3	2	3	-	-	1	1	1	3	3	3	3
CO5	3	3	3	3	3	-	-	2	1	2	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 11 (Vocational-Soft Skill Development-III)

COURSE OUTCOMES:

CO1: Develop logical reasoning abilities and apply them to enhance problem-solving and decision-making across various contexts.
CO2: Master principles and techniques of written communication to produce clear, concise, and impactful documents.
CO3: Cultivate essential professional skills and demonstrate competence required for success in diverse workplace environments.
CO4: Apply workplace etiquette and demonstrate professionalism to navigate organizational settings with confidence and respect.
CO5: Enhance networking abilities to build and sustain productive professional relationships.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3		2	1	2	3		1	2	1
CO2	3	3	2	3	2		2				1	2	3	2
CO3	2	2	2	2	2				2	2		3		1
CO4	3	2	2	3	3			1	2		2		3	3
CO5	3	3	3	2	3		1	1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

SEMESTER-IV

COURSE 1 (Analog Electronics)

COURSE OUTCOMES:

CO1: Explain the operation of different components of various analog circuits.
CO2: Apply different ICs (741) for general purpose and special purpose (555, 565, 78XX, 79XX etc.) application.
CO3: Analyze frequency response, feedback effects, and multistage amplifier performance.
CO4: Evaluate operational amplifier-based linear and non-linear applications with respect to design requirements.
CO5: Compare the performance between different oscillators and amplifiers.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3										1	1		
CO2	3	2	2								1	2	2	
CO3	3	3		2							2	2	3	
CO4	3	3	2	2							2	2	3	
CO5	3	3		2							2	2	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 2 (Analog Communication)

COURSE OUTCOMES:

CO1: Explain the basic components of analog communication systems.
CO2: Demonstrate various methods for analog transmission and detection in time domain and frequency domain.
CO3: Calculate efficiency, BW and power requirement for different analog modulation schemes.
CO4: Compare the performance of analog communication systems in presence of noise, calculation of SNR, Noise Figure and Figure of Merit.
CO5: Design a complete block diagram for a basic analog communication system for a given set of specifications.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	-	1	1	1	-	2	1	1
CO2	3	3	2	2	2	-	-	-	-	1	1	2	2	1
CO3	3	3	2	2	2	-	-	-	-	1	1	3	2	2
CO4	3	2	3	2	3	1	-	-	1	1	1	3	3	2
CO5	3	3	3	3	3	1	-	-	1	1	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3 (Microprocessor and Microcontroller)

COURSE OUTCOMES:

CO1: Explain the architecture and functional organization of microcomputer systems, including the Intel 8085 microprocessor and its interfacing with memory and I/O devices.
CO2: Implement and execute assembly language programs using the 8085 instruction set, addressing modes, stacks, and subroutines to perform arithmetic, logic, and control operations.
CO3: Examine and integrate interrupt handling mechanisms, counters, and timers to generate precise time delays and test real-time events in microprocessor systems.
CO4: Design and compile peripheral devices such as A/D and D/A converters, serial and parallel I/O modules, and communication systems with microprocessors and microcontrollers.
CO5: Compare and program the 8051 microcontroller for embedded applications by utilizing its architecture, instruction set, timers, interrupts, and interfacing capabilities.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	1	1	-							1	1		1
CO2	3	3	2	1							1	2	2	1
CO3	3	3	2	2							-	2		
CO4	3	3	3	2							-	1	1	
CO5	3	3	2	2							1	1	2	1

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4 (Computer Organisation and Architecture)

COURSE OUTCOMES:

CO1: Recall basic concepts of computer system architecture, including CPU organization.
CO2: Explain the role of hardware-software interaction in instruction execution, CPU design approaches.
CO3: Apply principles of instruction execution, CPU pipeline design, memory interfacing, and I/O processing to model the working of a basic computer system.
CO4: Analyze various architectural strategies such as instruction set selection, RISC vs. CISC, pipeline execution, memory interleaving.
CO5: Evaluate the efficiency and performance of computer system architectures by considering instruction design, CPU pipelines.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	-	-	-	-	-	-	-	-	1	-
CO2	-	3	2	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	1	-	-	-	-	-	-	-	-	-	1	-
CO4	2	2	3	1	-	-	-	-	-	-	-	-	2	-
CO5	1	1	3	3	1	-	-	-	-	-	-	-	1	-

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 5 (Data Base Management System (DBMS))

COURSE OUTCOMES:

CO1: Students will be able to Define fundamental concepts of Database Management Systems and explain various database models, architectures, and components of DBMS.
CO2: Students will be able to Implement Entity-Relationship (ER) modeling and relational schema concepts to design and represent databases that satisfy given organizational requirements.
CO3: Students will be able to Examine relational database structures using relational algebra, calculus, and normalization techniques to identify and resolve data redundancy and anomalies.
CO4: Students will be able to Detect database design alternatives and indexing strategies using B-trees and B+ trees to enhance performance and data retrieval efficiency.
CO5: Students will be able to Generate transaction management and concurrency control mechanisms ensuring serializability, recoverability, and consistency in database systems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	2	-	-	-	-	-	1	3	2	1
CO2	3	3	3	-	2	-	-	-	-	-	1	3	3	2
CO3	3	3	2	-	3	-	-	-	-	-	1	3	3	1
CO4	3	2	3	2	-	-	-	-	-	-	1	3	3	2
CO5	3	3	3	-	3	-	-	-	-	2	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 6 (Analog Electronics Lab)

COURSE OUTCOMES:

CO1: Explain the operational characteristics of fundamental analog circuits, including rectifiers, amplifiers, and oscillators.
CO2: Implement various analog electronic circuits, such as voltage regulators and power amplifiers, using discrete components.
CO3: Test the performance of diode and transistor circuits by measuring their static characteristics and dynamic parameters.
CO4: Compare experimentally measured data against theoretical values to validate the performance of designed analog circuits.
CO5: Design BJT and MOSFET-based amplifiers and oscillators to achieve specified frequency response and output characteristics.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3							1			1	1		
CO2	3		2		3			2	2		1	2	3	
CO3	2	2		3	3			2	2		1	2	3	
CO4	2	3		3	3			2	2		1	2	3	2
CO5	3	3	3	3	3			2	2		2	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 7 (Analog Communication Lab)

COURSE OUTCOMES:

CO1: Verify the working of different modulation techniques and spectrum analyzer.
CO2: Analyze the operation of different modulation techniques for given input data.
CO3: Construct various receiver circuits.
CO4: Analyze receiver characteristics.
CO5: Design the different communication circuits and verify the working of the circuits.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	-	1	-	1	1	2	1	1
CO2	3	2	1	1	1	-	-	2	-	1	1	2	2	1
CO3	3	3	2	1	1	-	-	2	-	1	1	3	2	1
CO4	3	2	3	2	2	1	-	2	-	1	1	3	3	1
CO5	3	3	3	3	3	1	-	2	-	1	2	3	3	1

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 8 (Microprocessor and Microcontroller Lab)

COURSE OUTCOMES:

CO1: Understand the fundamentals of assembly level programming of microprocessors and microcontroller.
CO2: Apply standard microprocessor real time interfaces including GPIO, serial ports, digital-to-analog converters and analog-to-digital converters.
CO3: Demonstrate interactions between software and hardware.
CO4: Analyze abstract problems and apply a combination of hardware and software to address the problem.
CO5: Use standard test and measurement equipment to evaluate digital interfaces.

APPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	-	1							2	1	1
CO2	3	3	2	1	2				1			2	2	2
CO3	3	2	2	1	2				2	1		2	1	1
CO4	2	3	3	2	2				2	1		1	1	1
CO5	2	2	2	2	2				2	1	1	1	2	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 9 (Computer Architecture Lab)

COURSE OUTCOMES:

CO1: Recall basic concepts of computer system architecture, including CPU organization.
CO2: Explain the role of hardware-software interaction in instruction execution, CPU design approaches.
CO3: Apply principles of instruction execution, CPU pipeline design, memory interfacing, and I/O processing to model the working of a basic computer system.
CO4: Analyze various architectural strategies such as instruction set selection, RISC vs. CISC, pipeline execution, memory interleaving.
CO5: Evaluate the efficiency and performance of computer system architectures by considering instruction design, CPU pipelines.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	-	-	-	-	-	-	-	-	1	-
CO2	-	3	2	2	-	-	-	-	-	-	-	-	-	-
CO3	2	3	1	-	-	-	-	-	-	-	-	-	1	-
CO4	2	2	3	1	-	-	-	-	-	-	-	-	2	-
CO5	1	1	3	3	1	-	-	-	-	-	-	-	1	-

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 10 (Data Base Management System (DBMS) Lab)

COURSE OUTCOMES:

CO1: Students will be able to Define fundamental concepts of Database Management Systems and explain various database models, architectures, and components of DBMS.
CO2: Students will be able to Implement Entity-Relationship (ER) modeling and relational schema concepts to design and represent databases that satisfy given organizational requirements.
CO3: Students will be able to Examine relational database structures using relational algebra, calculus, and normalization techniques to identify and resolve data redundancy and anomalies.
CO4: Students will be able to Detect database design alternatives and indexing strategies using B-trees and B+ trees to enhance performance and data retrieval efficiency.
CO5: Students will be able to Generate transaction management and concurrency control mechanisms ensuring serializability, recoverability, and consistency in database systems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	-	-	2	-	-	-	-	-	1	3	2	1
CO2	3	3	3	-	2	-	-	-	-	-	1	3	3	2
CO3	3	3	2	-	3	-	-	-	-	-	1	3	3	1
CO4	3	2	3	2	-	-	-	-	-	-	1	3	3	2
CO5	3	3	3	-	3	-	-	-	-	2	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 12 (Vocational-Soft Skill Development-IV)

COURSE OUTCOMES:

CO1: Enhance quantitative reasoning abilities and apply mathematical concepts to solve problems effectively.
CO2: Develop verbal and analytical reasoning skills to interpret, analyze, and evaluate information logically.
CO3: Acquire proficiency in aptitude and reasoning across diverse test sections to perform effectively in competitive examinations.
CO4: Improve presentation and public speaking skills to communicate ideas clearly, confidently, and persuasively.
CO5: Cultivate a professional demeanour and demonstrate workplace-appropriate behaviour and appearance conducive to career success.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3		2	1	2	3		1	2	1
CO2	3	3	2	3	2		2	2	1	1	1	2	3	2
CO3	3	2	2	2	2		1	1	2	2		3		1
CO4	2	3	3	3	3		2	1	2	2	2		3	3
CO5	3	3	3	3	2		1	1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

SEMESTER-V

COURSE 1 (Digital Signal Processing)

COURSE OUTCOMES:

CO1: Define the discrete systems in time domain.
CO2: Illustrate sampling and reconstruction of signals.
CO3: Prioritize various mathematical tools associated with nonlinear transformation to analyze the signals in the frequency domain.
CO4: Critique different types of digital filters for various applications.
CO5: Examine spectrum estimation of deterministic and random signals and design multi rate systems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	1	1	1	1	3	3	2	2
CO2	3	3	2	3	3	2	1	1	1	1	3	3	3	2
CO3	2	2	3	1	1	2	2	3	3	3	2	2	1	2
CO4	3	3	3	3	3	3	2	2	1	1	3	3	3	2
CO5	3	3	2	2	3	3	2	1	1	1	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 2 (Electromagnetic Theory)

COURSE OUTCOMES:

CO1: Explain the fundamental laws of electromagnetics, vector calculus, and plane wave propagation in different media.
CO2: Apply transmission line concepts and Smith chart techniques to solve impedance matching and power transfer problems.
CO3: Analyze wave propagation characteristics in guided structures such as parallel plane and rectangular waveguides.
CO4: Evaluate electromagnetic interference and compatibility issues in practical electronic and communication systems.
CO5: Design basic antenna structures and predict their radiation parameters for efficient communication.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	-	-	-	-	-	-	-	3	3	3
CO2	3	3	3	1	-	-	-	-	-	-	-	3	3	3
CO3	3	3	3	1	-	-	1	-	-	-	-	3	3	3
CO4	3	3	3	1	-	-	1	-	-	-	-	3	3	3
CO5	3	3	3	1	-	-	1	-	-	-	-	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3 (Control System)

COURSE OUTCOMES:

CO1: Define different ways of system representations such as Transfer function representation.
CO2: Illustrate system performance using time domain analysis and methods for improving it.
CO3: Check the system performance using frequency domain analysis and techniques for improving the performance.
CO4: Differentiate various controllers and compensators to improve system performance.
CO5: Verify the system dynamic response by explaining the different ways of state space representations and the performance indices for optimal control problems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	2	1	1	1	1	3	3	2	2
CO2	3	3	2	3	3	2	1	1	3	1	3	2	1	2
CO3	3	2	3	1	1	2	2	3	1	3	2	3	3	2
CO4	2	3	2	3	3	3	2	2	1	1	3	3	3	3
CO5	3	3	2	2	3	3	2	1	1	1	3	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4 (Digital Communication)

COURSE OUTCOMES:

CO1: Describe basic components of Digital Communication Systems.
CO2: Compare different error detecting and error correction codes like block codes, cyclic codes and convolution codes.
CO3: Design optimum receiver for Digital Modulation techniques.
CO4: Analyze the error performance of Digital Modulation Techniques.
CO5: Define spread spectrum and its types.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2		-	1						1	2	1	1
CO2	3	3	2	2	2						1	2	2	1
CO3	3	2	3	2	2			1	1		2	2	2	2
CO4	2	3	2	2	3			1	1		2	2	2	2
CO5	2	2	1	2	2			1			1	1	2	1

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 5 (Microwave Theory and Technique)

COURSE OUTCOMES:

CO1: Explain the principles of microwave transmission, waveguides, and network parameters.
CO2: Apply the characteristics of passive and active microwave devices in circuit and system implementations.
CO3: Analyze the design and performance of microwave filters, amplifiers, oscillators, and antennas.
CO4: Evaluate microwave measurement techniques and system applications such as radar and satellite communication.
CO5: Design modern microwave subsystems and integrated circuits for advanced engineering applications.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	3							3	3	2
CO2	1	2	3	2	2							1	2	3
CO3	2	3	2	1	1							2	3	2
CO4	3	2	1		1							3	2	1
CO5	2	2	3	1								2	2	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 7 (Digital Signal Processing Lab)

COURSE OUTCOMES:

CO1: Examine the frequency response and impulse response of discrete-time LTI systems.
CO2: Interpret discrete-time signals using DFT.
CO3: Apply FFT algorithms for various signal processing operations.
CO4: Analyse IIR and FIR digital filters.
CO5: Design IIR and FIR digital filters for real time DSP applications.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	3	2	1	1	3	1	1	3	3	2
CO2	3	3	2	2	3	2	1	1	2	1	2	3	3	2
CO3	3	3	3	2	3	2	1	1	2	1	2	3	3	2
CO4	3	3	3	2	3	2	1	1	2	1	2	3	3	3
CO5	3	3	3	3	3	2	1	1	2	1	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 8 (Digital Communication Lab)

COURSE OUTCOMES:

CO1: Apply the concepts of probability theory for random variables and random process for digital communication.
CO2: Evaluation of PSDs and Pulse shaping theory for digital communication.
CO3: Evaluation of PSDs and Pulse shaping theory for digital communication.
CO4: Analyze the theory of Matched filter and spread spectrum for digital wireless transmission.
CO5: Apply the concept of information theory for data transmission.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2		-	2						1	2	1	1
CO2	3	3	2	2	2						1	2	2	1
CO3	3	3	3	2	2				1		2	2	2	2
CO4	3	3	3	2	3			1	1		2	2	2	2
CO5	3	2	2	2	2			1	1		1	2	2	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 10 (Vocational-Soft Skill Development-V)

COURSE OUTCOMES:

CO1: Equip students with skills to perform effectively in various aptitude, logic, and reasoning tests.
CO2: Familiarize students with test formats and question types to improve accuracy and performance.
CO3: Prepare students for group discussions and provide structured practice opportunities to enhance participation and communication.
CO4: Develop the ability to create and deliver effective business presentations with clarity and impact.
CO5: Enhance logical and analytical reasoning skills to analyze and solve complex problems efficiently.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	2	1	2	3	2	1	2	1
CO2	3	3	3	3	2	1	2	2	1	1	1	2	3	2
CO3	2	3	2	3	2	2	1	1	2	2		3		1
CO4	3	2	3	3	3	2	2	1	2	2	2		3	3
CO5	3	3	3	3	2	3	1	1	1	1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

SEMESTER-VI

COURSE 1 (Embedded System)

COURSE OUTCOMES:

CO1: Describe the fundamental concepts, classifications, and characteristics of embedded systems distinguishing them from general-purpose computing systems.
CO2: Implement basic programs and interfacing routines using 8-bit microcontrollers to perform control and monitoring operations.
CO3: Analyze the architecture and performance trade-offs among different embedded hardware platforms such as ASIC, DSP, FPGA, and ARM-based systems.
CO4: Evaluate design choices in hardware–software co-design and real-time operating system (RTOS) integration for reliable embedded applications.
CO5: Design a functional embedded solution by integrating microcontroller architecture, peripheral interfacing, and cloud or IoT connectivity.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	1	-	-	1	-	1	1	1	1
CO2	3	2	2	-	3	-	-	2	-	-	2	2	3	2
CO3	3	3	2	2	2	1	-	-	-	-	2	3	2	2
CO4	3	3	3	2	2	2	2	2	2	2	2	3	2	2
CO5	3	3	3	3	3	2	1	3	2	3	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 2 (Digital Switching and Computer Network)

COURSE OUTCOMES:

CO1: Explain the fundamental concepts of telecommunication systems, switching techniques, and traffic engineering parameters such as Grade of Service and blocking probability.
CO2: Describe and compare the functions of various layers in network architectures, particularly the OSI and TCP/IP models.
CO3: Analyze data link and network layer operations including framing, error control, addressing, and routing algorithms in both wired and wireless environments.
CO4: Demonstrate the working principles of transport and application layer protocols and evaluate their roles in reliable data communication.
CO5: Apply basic cryptographic techniques and assess the effectiveness of network security mechanisms such as firewalls, VPNs, and authentication systems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	2	1	1	2	1	2	2	1	1
CO2	3	3	2	2	2	2	1	2	2	1	2	2	2	1
CO3	3	3	2	3	3	2	1	2	2	1	2	3	3	2
CO4	3	3	3	3	3	2	1	2	3	2	2	3	3	3
CO5	3	3	3	3	3	3	2	3	3	3	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3 (VLSI Design)

COURSE OUTCOMES:

CO1: Explain the levels of abstraction, design challenges, and CAD tool flow in modern VLSI system design.
CO2: Analyze MOSFET operation, derive its I–V characteristics, and design layouts using design rules and stick diagrams.
CO3: Evaluate the performance of CMOS inverters in terms of propagation delay, noise margin, and power dissipation.
CO4: Design and analyze combinational CMOS logic circuits using various logic styles such as pseudo-NMOS, pass-transistor, and dynamic logic.
CO5: Design sequential CMOS circuits, memory elements, and understand ASIC architectures and design methodologies.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	1	-	1	2	1	1
CO2	3	2	2	-	3	-	-	-	-	-	2	2	3	2
CO3	3	3	2	2	2	-	-	-	-	-	2	3	3	2
CO4	3	3	2	3	2	1	1	-	-	-	2	3	3	3
CO5	3	3	3	2	3	1	1	2	2	2	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4A (Information Theory and Coding)

COURSE OUTCOMES:

CO1: Illustrate about concept of mutual information and entropy in information theory.
CO2: Explain about various data compression codes.
CO3: Describe and formulate the various error correcting codes used for reliable transfer of data.
CO4: Clarify and examine the decoding techniques.
CO5: Implement and analyse some of the cryptographic algorithms used in information theory.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	3	1	3	2							1	2	1
CO2	3	2	1	2	2		2						2	
CO3	2	3	2	3	3							1	3	1
CO4	1	1	2	3	2		2	3				2	2	1
CO5	1	1	3	1	1	2	3	1	2	1	2	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4B (Biomedical Electronics)

COURSE OUTCOMES:

CO1: Explain the fundamental concepts of human physiology relevant to biomedical measurements.
CO2: Classify and describe various biomedical transducers and electrodes used for physiological signal acquisition.
CO3: Analyze the operation of biopotential amplifiers and measurement systems for ECG, EMG, EEG, and other signals.
CO4: Evaluate biomedical instrumentation techniques.
CO5: Design and assess biomedical aids and prosthetic devices ensuring compliance with safety standards.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	-	2	-	-	-	-	-	2	2	3	2
CO2	2	2	3	2	3	-	-	-	-	-	2	3	2	3
CO3	2	3	2	-	3	-	2	-	-	-	3	2	3	2
CO4	3	2	3	-	2	1	-	-	-	-	2	2	3	3
CO5	3	3	3	2	3	-	2	2	2	2	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 4C (Introduction to MEMS)

COURSE OUTCOMES:

CO1: Define the basic properties of semiconductors and solid mechanics to fabricate MEMS devices.
CO2: Utilize the rudiments of Micro fabrication techniques.
CO3: Distinguish various types of sensors and actuators.
CO4: Verify the concept relating to different materials used for MEMS.
CO5: Implement various applications of MEMS.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	2	1	3	2	3	3	3	3	3	3	3
CO2	3	2	1	1	2	2	1	2	2	1	2	2	2	1
CO3	3	3	2	3	3	2	1	2	2	1	2	3	3	2
CO4	2	2	3	3	3	2	1	2	2	2	2	3	3	3
CO5	3	3	3	3	3	2	2	1	3	1	2	2	1	1

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 6 (VLSI Design Lab)

COURSE OUTCOMES:

CO1: Explain the fundamental principles of CMOS logic gate operation and identify key design parameters influencing circuit performance.
CO2: Implement basic digital circuits such as inverters, NAND, NOR, and arithmetic units using Tanner S-Edit schematic design environment.

CO3: Analyze circuit behavior through simulation to evaluate timing, power, and functional correctness of CMOS logic gates.
CO4: Develop and verify CMOS layouts using Tanner L-Edit, ensuring design rule check (DRC) and layout-versus-schematic (LVS) compliance.
CO5: Design and simulate simple digital arithmetic circuits using hardware description languages like VHDL and Verilog to validate logic functionality.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	2	-	3	-	-	-	-	-	2	2	3	2
CO2	3	2	2	-	3	-	-	-	-	-	2	2	3	2
CO3	3	2	3	-	3	-	-	-	-	-	2	2	3	3
CO4	3	3	3	2	3	-	2	-	-	-	2	3	3	3
CO5	3	3	3	2	3	1	2	2	2	2	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 7 (Digital Switching and Computer Network Lab)

COURSE OUTCOMES:

CO1: Demonstrate the working principles of switching and telecommunication systems.
CO2: Configure basic network topologies and communication layers using simulation tools.
CO3: Implement and analyze data link and network layer protocols for reliable communication.
CO4: Develop simple client-server applications and observe protocol behaviors using packet analyzers.
CO5: Apply fundamental security mechanisms to protect network communication.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	2	2	1	2	2	1	2	2	1	1
CO2	3	3	2	2	3	2	1	2	2	1	2	3	3	1
CO3	3	3	2	3	3	2	1	2	2	1	2	3	3	2
CO4	3	3	3	3	3	2	1	3	3	2	2	3	3	3
CO5	3	3	3	3	3	3	2	3	3	3	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 9 (Vocational-Soft Skill Development-VI)

COURSE OUTCOMES:

CO1: Equip participants with essential skills in aptitude, logic, and reasoning to perform effectively in professional settings.
CO2: Practice creating and delivering impactful business presentations to communicate ideas clearly and persuasively.
CO3: Engage in mock group discussions to refine communication, collaboration, and teamwork skills.
CO4: Gain a comprehensive understanding of corporate and social etiquette and apply it appropriately in professional interactions.
CO5: Develop strong logical and analytical reasoning skills to analyze problems and implement effective solutions.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	3	2	3	2	2	1		3	2	1	2	1
CO2	3	3	3	3	2	1	2	2		1	1	2	3	2
CO3	2	3	2	3	2	2	1					3	2	2
CO4	3	2	3	3	3	2	2						3	3
CO5	3	3	3	3	2	3	1			1	1	1	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

SEMESTER-VII

COURSE 2A (Wireless and Mobile Communication)

COURSE OUTCOMES:

CO1: Explain the fundamental principles of cellular communication, including frequency reuse, handoff, interference management, and GSM system architecture and operations.
CO2: Analyze and compare multiple access techniques (FDMA, TDMA, CDMA) in terms of spectral efficiency, advantages, disadvantages, and application areas.
CO3: Evaluate radio propagation characteristics and develop link budgets using large-scale and small-scale fading models for different wireless environments.
CO4: Apply techniques such as equalization and diversity to mitigate multipath fading and improve wireless communication performance.
CO5: Examine the architectures, protocols, and evolution of modern cellular standards including IS-95, CDMA2000, UMTS, LTE, and 5G technologies.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2		-	2						1	2	1	1
CO2	3	3	2	2	2						1	2	2	1
CO3	3	3	3	2	2				1		2	2	2	2
CO4	3	3	3	2	3			1	1		2	2	2	2
CO5	3	2	2	2	2			1	1		1	2	2	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 2B (Wavelet Transform)

COURSE OUTCOMES:

CO1: Explain the origin, development, and classification of wavelet transforms and their distinction from traditional Fourier analysis.
CO2: Apply Continuous Wavelet Transform (CWT) concepts to analyze non-stationary signals in the time–frequency domain, and interpret results using time–frequency resolution.
CO3: Demonstrate proficiency in Discrete Wavelet Transform (DWT) and Multiresolution Analysis (MRA) using orthogonal and biorthogonal wavelet bases, including Haar and Daubechies families.
CO4: Implement wavelet-based techniques for signal and image processing applications such as denoising, compression, edge detection, and feature extraction using appropriate software tools.
CO5: Explore advanced extensions beyond wavelets—such as ridgelets and curvelets—and analyze their significance in higher-dimensional data representation and modern image processing tasks.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	2	1	2	1	1	1		1		2	2	1
CO2	3	3	2	3	3	1	1	1		1		3	3	1
CO3	3	3	3	3	3	1	2	1		1	1	3	3	2
CO4	3	3	3	3	3	1	2	1	2	3	3	3	3	3
CO5	3	3	3	3	3	2	3	2	2	3	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 2C (Satellite Communication)

COURSE OUTCOMES:

CO1: Understand the principles, concepts and operation of communication satellite systems and explain the concepts of orbital mechanism.
CO2: Explain various multiple access techniques used in satellite systems.
CO3: Analyse link design, rain fading and losses.
CO4: Illustrate the importance of satellite transponders.
CO5: Apply working principles of transmitters, receivers and antennas.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	-	1	-	1	1	2	1	1
CO2	3	3	1	1	1	1	-	1	-	1	1	3	1	1
CO3	3	3	2	1	2	-	-	2	-	2	1	2	2	1
CO4	2	2	3	2	2	1	-	2	-	1	1	3	3	2
CO5	3	2	2	2	3	-	-	1	-	1	1	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3A (Digital Image Processing)

COURSE OUTCOMES:

CO1: Explain the fundamentals of digital image representation, sampling, and quantization processes for both monochrome and color images.
CO2: Apply various two-dimensional image transforms such as DFT, DCT, and Hadamard to analyze and process image data efficiently.
CO3: Analyze image enhancement and restoration techniques using spatial and frequency domain methods for noise reduction and quality improvement.
CO4: Evaluate image analysis operations including feature extraction, edge detection, segmentation, and classification for visual interpretation and pattern recognition.
CO5: Design and implement efficient image compression schemes using predictive, transform, and vector quantization techniques to optimize storage and transmission.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	1	-	1	2	1	1
CO2	3	2	2	-	3	-	-	-	-	-	2	3	3	2
CO3	3	3	2	2	2	1	-	-	-	-	2	3	3	2
CO4	3	3	2	3	2	2	-	-	-	-	2	3	3	2
CO5	3	3	3	2	3	2	-	2	2	2	2	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 3B (Mixed Signal Design)

COURSE OUTCOMES:

CO1: Explain the principles of mixed-signal circuit design, including performance measures and key building blocks such as comparators and switched-capacitor filters.
CO2: Apply design methodologies to develop and test sample-and-hold and trans-linear circuits using CMOS, bipolar, and BiCMOS technologies.
CO3: Analyze the architectures and performance trade-offs of Nyquist-rate ADCs and DACs including flash, pipelined, and successive-approximation converters.
CO4: Evaluate the design and dynamic behavior of phase-locked loops and frequency synthesizers, including all-digital PLL implementations.
CO5: Design robust mixed-signal subsystems considering analog layout mismatch, noise effects, and basic RF IC design principles.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3										1	2		
CO2	3	2	2		2						2	3	2	
CO3	3	3		2							2	3	3	
CO4	3	3		2							2	3	3	1
CO5	3	3	3	2	2						2	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 5A (Digital Image Processing Lab)

COURSE OUTCOMES:

CO1: Understand and utilize the MATLAB Image Processing Toolbox for performing basic image operations.
CO2: Apply image enhancement, filtering, and transformation techniques using MATLAB functions.
CO3: Analyze and interpret image data through histogram processing and feature extraction methods.
CO4: Design and implement MATLAB programs to solve real-world image processing problems.
CO5: Evaluate the performance and effectiveness of image processing algorithms for different applications.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	-	-	-	3	-	-	-	-	-	1	2	3	1
CO2	2	2	2	-	3	-	-	-	-	-	2	2	3	2
CO3	2	3	2	2	3	1	-	-	-	-	2	3	3	2
CO4	3	3	3	2	3	2	-	2	2	2	2	3	3	3
CO5	3	3	2	3	3	2	1	2	2	2	3	3	3	3

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 5B (Mixed Signal Design Lab)

COURSE OUTCOMES:

CO1: Explain the basic principles and performance parameters of mixed-signal circuits through simulation-based study..
CO2: Implement operational amplifiers, comparators, and sample-and-hold circuits using online or open-source EDA tools.
CO3: Analyze the working and performance of data converters such as DACs and ADCs through behavioral and circuit-level simulations.
CO4: Develop mixed-signal functional blocks including filters and PLLs to demonstrate analog–digital interaction.
CO5: Design and simulate an integrated mixed-signal subsystem applying appropriate modeling, analysis, and verification techniques using free simulation tools.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3				3			1			1	2	2	
CO2	3		2		3			2	2		1	2	3	
CO3	3	3		3	3			2	2		2	3	3	
CO4	3	2	3		3			2	2		2	3	3	1
CO5	3	3	3	3	3			2	2		2	3	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

SEMESTER-VIII

COURSE 1A (Fiber Optic Communication)

COURSE OUTCOMES:

CO1: Explain the fundamental principles of light propagation and modes in optical fibers.
CO2: Demonstrate the characteristics and performance of different optical fibers through analysis of dispersion, attenuation, and measurement techniques.
CO3: Analyze the operation and performance parameters of optical sources, detectors, and receiver systems used in fiber optic communication.
CO4: Evaluate optical link designs considering factors such as BER, power budget, and amplifier performance.
CO5: Design advanced fiber optic communication systems incorporating WDM/DWDM techniques and nonlinear optical effects for high-capacity transmission.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	1	-	1	1	2	1	1
CO2	3	3	1	2	3	-	-	2	-	1	1	3	2	1
CO3	3	2	1	1	2	1	-	2	-	2	1	2	1	1
CO4	2	2	3	3	2	1	-	1	-	1	2	3	2	2
CO5	3	3	2	1	1	-	-	1	-	1	1	2	3	1

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 1B (Neural N/W)

COURSE OUTCOMES:

CO1: Describe the basic concept of artificial neural networks concepts, various neural networks architectures.
CO2: Illustrate the knowledge of special types of artificial neural networks and the associated memory.
CO3: Sequence with fuzzy sets, defuzzification techniques and the associative architectures.
CO4: Critique about the concepts of training algorithm employed in fuzzy applications and artificial neural networks systems.
CO5: Compose different neural network and fuzzy based algorithms in diverse research areas to solve real-world problems.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	1	-	1	1	2	1	1
CO2	2	3	1	2	3	1	-	2	-	2	1	3	2	1
CO3	3	2	1	1	2	1	-	1	-	1	1	2	1	1
CO4	3	2	3	3	2	1	-	2	-	1	1	3	2	2
CO5	3	3	2	1	1	-	-	1	-	1	1	2	3	1

1. LOW 2. MODERATE 3. SUBSTANTIAL

COURSE 1C (Smart Antenna)

COURSE OUTCOMES:

CO1: Classify various types of smart antenna system and related properties.
CO2: Implement different estimation schemes and modelling approaches relating to smart antennas.
CO3: Prioritize antenna design software tools and come up with the design techniques with the required specifications.
CO4: Examine the algorithms relating to signal processing and the space-time channelling.
CO5: Critique various link operations, call processing, evolution of edge, enhancement on the data rates.

MAPPING OF COs WITH POs AND PSOs

COURSE OUTCOMES	PROGRAMME OUTCOMES											PROGRAMME SPECIFIC OUTCOMES		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	-	-	1	-	1	1	2	1	1
CO2	3	3	2	1	1	1	-	2	-	2	1	2	2	1
CO3	3	3	1	1	2	-	-	1	-	1	1	3	2	1
CO4	2	2	3	3	2	1	-	2	-	1	1	3	1	1
CO5	3	2	2	2	3	1	-	1	-	1	1	2	3	2

1. LOW 2. MODERATE 3. SUBSTANTIAL

Bloom's Taxonomy Verbs:

Remember (BT1)	Understand (BT2)	Apply (BT3)	Analyze (BT4)	Evaluate (BT5)	Create (BT6)
Cite	Add	Acquire	Analyze	Appraise	Abstract
Define	Approximate	Adapt	Audit	Assess	Animate
Describe	Articulate	Allocate	Blueprint	Compare	Arrange
Draw	Associate	Alphabetize	Breadboard	Conclude	Assemble
Enumerate	Characterize	Apply	Break down	Contrast	Budget
Identify	Clarify	Ascertain	Characterize	Counsel	Categorize
Index	Classify	Assign	Classify	Criticize	Code
Indicate	Compare	Attain	Compare	Critique	Combine
Label	Compute	Avoid	Confirm	Defend	Compile
List	Contrast	Back up	Contrast	Determine	Compose
Match	Convert	Calculate	Correlate	Discriminate	Construct
Meet	Defend	Capture	Detect	Estimate	Cope
Name	Describe	Change	Diagnose	Evaluate	Correspond
Outline	Detail	Classify	Diagram	Explain	Create
Point	Differentiate	Complete	Differentiate	Grade	Cultivate
Quote	Discuss	Compute	Discriminate	Hire	Debug
Read	Distinguish	Construct	Dissect	Interpret	Depict
Recall	Elaborate	Customize	Distinguish	Judge	Design
Recite	Estimate	Demonstrate	Document	Justify	Develop
Recognize	Example	Depreciate	Ensure	Measure	Devise
Record	Explain	Derive	Examine	Predict	Dictate
Repeat	Express	Determine	Explain	Prescribe	Enhance
Reproduce	Extend	Diminish	Explore	Rank	Explain
Review	Extrapolate	Discover	Figure out	Rate	Facilitate
Select	Factor	Draw	File	Recommend	Format
State	Generalize	Employ	Group	Release	Formulate
Study	Give	Examine	Identify	Select	Generalize
Tabulate	Infer	Exercise	Illustrate	Summarize	Generate
Trace	Interact	Explore	Infer	Support	Handle
Write	Interpolate	Expose	Interrupt	Test	Import
	Interpret	Express	Inventory	Validate	Improve
	Observe	Factor	Investigate	Verify	Incorporate
	Paraphrase	Figure	Layout		Integrate
	Picture graphically	Graph	Manage		Interface

	Predict	Handle	Maximize		Join
	Review	Illustrate	Minimize		Lecture
	Rewrite	Interconvert	Optimize		Model
	Subtract	Investigate	Order		Modify
	Summarize	Manipulate	Outline		Network
	Translate	Modify	Point out		Organize
	Visualize	Operate	Prioritize		Outline
		Personalize	Proofread		Overhaul
		Plot	Query		Plan
		Practice	Relate		Portray
		Predict	Select		Prepare
		Prepare	Separate		Prescribe
		Price	Subdivide		Produce
		Process	Train		Program
		Produce	Transform		Rearrange
		Project			Reconstruct
		Provide			Relate
		Relate			Reorganize
		Round off			Revise
		Sequence			Rewrite
		Show			Specify
		Simulate			Summarize
		Sketch			
		Solve			
		Subscribe			
		Tabulate			
		Transcribe			
		Translate			
		Use			