

**Department of Electronics & Communication Engineering**  
**Course Outcomes (COs) for Academic Year: 2025-26**

YEAR: I

SEMESTER: II

REGULATION: R25

**Course : Ordinary Differential Equations and Vector Calculus**

**Code: 25MA201BS/ C120**

CO1	<b>Identify</b> whether the given differential equation of first order is exact or not
CO2	<b>Solve</b> higher differential equation and apply the concept of differential equation to real world problems
CO3	<b>Use</b> the Laplace transforms techniques for solving ODE's.
CO4	<b>Find</b> the physical quantities involved in engineering field related to the vector valued functions.
CO5	<b>Evaluate</b> the line, surface and volume integrals and converting them from one to another.

**Course : Engineering Chemistry**

**Code: 25CH202BS/ C121**

CO1	<b>Interpret</b> the various parameters of water, problems caused by hard water in the industry and also able to <b>identify</b> suitable method for treatment of water.
CO2	<b>Acquire</b> basic knowledge of electrodes and electrochemical processes and their importance to corrosion and its control methods.
CO3	<b>Perceive</b> the significance and practical applications of batteries and various energy sources, enhancing their potential as future engineers and entrepreneurs.
CO4	<b>Classify</b> and characterize different polymers and apply its knowledge to select suitable materials for specific applications.
CO5	<b>Identify</b> the use of functional materials in modern devices and also apply the principles of spectroscopic techniques in analyzing various applications.

**Course : Python Programming**

**Code: 25CS203ES/ C122**

CO1	<b>Write</b> Python Programs using variables, operators, expressions, and control structures.
CO2	<b>Implement</b> Python programs using built-in data structures like lists, tuples, sets, and dictionaries
CO3	<b>Apply</b> modular and object-oriented programming principles in Python.
CO4	<b>Handle</b> files, exceptions, and apply Python libraries for problem-solving
CO5	<b>Develop</b> small-scale applications in Python for automation and data manipulation.

**Course: Network Analysis and Synthesis**

**Code: 25EE204ES/ C123**

CO1	<b>Identify</b> the behaviour of Electric and Magnetic Networks.
CO2	<b>Analyze</b> the transient and steady-state responses of combined passive elements.
CO3	<b>Examine</b> Two-port Network using various parameters.
CO4	<b>Construct</b> various Filter Networks and Attenuators.
CO5	<b>Inspect</b> transfer functions of passive elements for network synthesis.

**Course: Data Structures****Code: 25CS205ES/ C124**

CO1	<b>Understand</b> and implement basic linear data structures like linked lists, stacks, and queues.
CO2	<b>Construct</b> and manipulate various trees, including binary search and balanced trees, applying traversal and balancing techniques.
CO3	<b>Analyze</b> and implement multi-way search trees and heaps, applying efficient search algorithms.
CO4	<b>Represent</b> graphs, perform graph traversals, and apply advanced sorting algorithms.
CO5	<b>Implement</b> hashing techniques, handle collisions, and understand file organization and indexing methods.

**Course : Engineering Chemistry Laboratory****Code: 25CH206BS/ C125**

CO1	<b>Estimate</b> the amount of substance by applying potentiometry, pH metry and conductometry.
CO2	<b>Analyse</b> the parameters such as hardness in water and estimate the corrosion rate of metals.
CO3	<b>Evaluate</b> the linear relationship between absorbance and concentration to verify the Beer-Lambert's law.
CO4	<b>Identify</b> the importance of polymers by synthesizing them.
CO5	<b>Build</b> their thinking abilities and skills using virtual labs.

**Course : Data Structures Laboratory****Code: : 25CH206BS / C126**

CO1	<b>Implement</b> and manipulate various types of linked lists with fundamental operations.
CO2	<b>Design</b> and develop stack and queue data structures using arrays and abstract data types.
CO3	<b>Apply</b> and implement different sorting algorithms to organize data in ascending order.
CO4	<b>Construct</b> and traverse complex tree data structures including Binary Search Trees, B- Trees, B+ Trees, AVL Trees, and Red-Black Trees.
CO5	<b>Implement</b> graph traversal algorithms and various hashing functions for efficient data searching and storage.

**Course : Applied Python Programming Laboratory****Code: 25EC208ES/ C127**

CO1	<b>Outline</b> the fundamental Concepts and illustrate the basic programs.
CO2	<b>Develop</b> python codes for different applications
CO3	<b>Utilize</b> Raspberry Pi to implement basic applications

**Course : Engineering Workshop****Code: 25ME209ES/ C128**

CO1	Understanding basic manufacturing processes and operations
CO2	Use hand tools and equipment safely and efficiently.
CO3	Performing basic operations in various trades like carpentry, fitting, welding, etc.
CO4	Interpreting workshop drawings.
CO5	Develop team work, time management, and quality awareness in a workshop environment.

**Course : Electrical Engineering Laboratory****Code: 25EC210ES/ C127**

CO1	Verify the basic DC Electrical circuits through different experiments.
CO2	Analyze the transient responses of R, L and C circuits for different input conditions.
CO3	Evaluate the performance calculations of Transformer through suitable testing methods.
CO4	Acknowledge the principles of operation and the main features of electric machines and their applications.
CO5	Acquire skills in using electrical measuring devices.

**Department of Electronics & Communication Engineering**  
**Academic Year: 2025-26**

**YEAR: II**

**SEMESTER: II**

**REGULATION: R22**

**Course: Numerical Methods and Complex Variables**

**Code: 22MA401BS/ C220**

CO1	<b>Express</b> any periodic function in terms of sine and cosine .
CO2	<b>Find</b> the root of a given polynomial and transcendental equations.
CO3	<b>Estimate</b> the value for the given data using interpolation, Find the numerical solutions for a given first order ODE'S.
CO4	<b>Analyze</b> the complex function with reference to their analyticity, integration using cauchy's integral and residue theorems.
CO5	Taylor's and laurent's series expansions in complex function.

**Course : Electromagnetic Fields and Transmission Lines**

**Code: 22EC401PC/ C221**

CO1	<b>Understand</b> the basic laws and equations related to electrostatic fields
CO2	<b>Demonstrate</b> the concepts and laws related to magnetostatic fields
CO3	<b>Apply</b> the Maxwell's equations in different conditions
CO4	<b>Explain</b> the characteristics of EM waves in different medium
CO5	<b>Analyze</b> transmission lines and its characteristics

**Course : Analog and Digital Communications**

**Code:22EC402PC/ C222**

CO1	<b>Understand</b> the concepts of Amplitude modulation, demodulation techniques
CO2	<b>Analyze</b> different types of Angle Modulation techniques for a given set of parameters
CO3	<b>Identify</b> the transmitter and receiver types required for a given application.
CO4	<b>Describe</b> the different Pulse modulation techniques.
CO5	<b>Analyze</b> digital modulation and demodulation techniques, calculate the performance of receivers.

**Course : Linear and Digital IC Applications**

**Code:22EC403PC / C223**

CO1	<b>Understand</b> and design various applications of operational amplifier using IC-741
CO2	<b>Design</b> the applications of Timer IC-555, Voltage regulator-IC565 & PLL-IC566
CO3	<b>Illustrate</b> the types of analog to digital and digital to analog converters.
CO4	<b>Examine</b> various families of ICs and applications of combinational circuits.
CO5	<b>Analyze</b> various families of ICs and applications of sequential circuits.

**Course: Electronic Circuit Analysis****Code:22EC404PC/ C224**

CO1	<b>Design</b> the power amplifiers
CO2	<b>Design</b> the tuned amplifiers and analyze its frequency response
CO3	<b>Design</b> Multivibrators and sweep circuits for various applications.
CO4	<b>Compare</b> the various time base generators
CO5	<b>Build</b> the concepts of Synchronization frequency division sampling gates

**Course: Analog and Digital Communications Laboratory****Code:22EC405PC/ C225**

CO1	<b>Design</b> and implement various Analog and Pulse modulation and demodulation Techniques and observe the time and frequency domain characteristics.
CO2	<b>Attain</b> the knowledge about AM, FM Transmitters and Receivers.
CO3	<b>Design</b> and implement various Digital modulation and demodulation Techniques and observe the waveforms of these modulated Signals practically.

**Course: Linear and Digital IC Applications Laboratory****Code:22EC406PC/ C226**

CO1	<b>Perform</b> the design of various applications of operational amplifier using IC-741.
CO2	<b>Execute</b> the various applications of Timer using IC-555 and Voltage regulators using IC-565.
CO3	<b>Design</b> the various logic circuits using digital ICs.

**Course: Electronic Circuit Analysis Laboratory****Code:22EC407PC/ C227**

CO1	<b>Design</b> various power amplifiers for various applications
CO2	<b>Analyze</b> the Frequency Response of Tuned Amplifiers
CO3	<b>Design</b> the Multivibrator circuits
CO4	<b>Design</b> Sweep circuits for various applications
CO5	<b>Simulate</b> the Electronic circuits using multisim software

**Course: Real Time Project/ Field Based Project****Code: 22EC408PC / C228**

CO1	<b>Analyze, formulate, and implement</b> the proposed method in domains of VLSI, Image & Signal Processing, Communication, and Embedded systems that find a solution to the society and environment
CO2	<b>Demonstrate</b> effectively the engineering principles used in their project individually and as a team
CO3	<b>Structure</b> future work to promote life-long learning in the context of technological adaptation

**Department of Electronics & Communication Engineering**

**Course Outcomes (COs) for Academic Year: 2025-26**

**YEAR: III**

**SEMESTER: II**

**REGULATION: R22**

**Course: Digital Signal Processing**

**Code: 22EC601PC/ C320**

CO1	<b>Classify</b> the Continuous time and Discrete time signals and systems.
CO2	<b>Illustrate</b> discrete time domain and frequency domain of signals.
CO3	<b>Design</b> of Digital IIR filters from Analog Filters
CO4	<b>Design</b> of FIR filters using Fourier method and Windowing techniques
CO5	<b>Realize</b> the Digital filters in various forms.

**Course: CMOS VLSI Design**

**Code: 22EC602PC/ C321**

CO1	<b>Interpret</b> various fabrication steps involved in IC technology with their properties.
CO2	<b>Describe</b> the design rules for layout of CMOS logic circuits using stick diagrams.
CO3	<b>Explain</b> transistor level implementation of various gate level circuits.
CO4	<b>Analyze</b> the data path sub-systems and various forms of memories.
CO5	<b>Develop</b> programmable logic devices along with CMOS testing.

**Course: Business Economics & Financial Analysis**

**Code: 22SM603MS/ C322**

CO1	<b>Understand</b> the various forms of business.
CO2	<b>Describe</b> the concepts of economics & importance of economics.
CO3	<b>Adapt</b> the demand, supply, production, cost, market structure, pricing concepts.
CO4	<b>Calculate</b> the process of accounting and prepare accounting statements.
CO5	<b>Analyze</b> the firm's financial position by comparing the financial statements of company.

**Course: Embedded System Design**

**Code: 22EC613PE/ C325**

CO1	<b>Illustrate</b> the fundamentals of Embedded Systems
CO2	<b>Analyze</b> the embedded systems core and its communication Interfaces
CO3	<b>Develop</b> Embedded Firmware design approaches
CO4	<b>Summarize</b> the concepts of RTOS
CO5	<b>Discuss</b> the task communication and synchronization techniques

**Course : Fundamentals of Artificial Intelligence**

**Code: 22AM611OE / C320**

CO1	<b>Explain</b> the Fundamental Concepts, History, Ethics and Intelligent Agent Models in AI
CO2	<b>Apply</b> Uninformed and Informed Search Strategies to Solve Computational Problems Effectively
CO3	<b>Construct</b> Logical Representations and Perform Inference In First-Order Logic

CO4	<b>Analyze</b> Uncertain Environments Using Probabilistic Models
CO5	<b>Implement</b> Machine Learning, NLP, and Computer Vision Techniques for Intelligent System Applications.

**Course: Digital Signal Processing Laboratory**

**Code: 22EC605PC/ C326**

CO1	<b>Understand</b> Basics of MATLAB syntax, functions and programming and find the generation Various Signals and Sequences in MATLAB, including the operations on Signals and Sequences
CO2	<b>Explain</b> the Convolution and Correlation between Signals and sequences, Verification of noise removal in a signal
CO3	<b>Analyze</b> the Fourier Transform of a given signal and plotting its magnitude and phase spectrum
CO4	<b>Remember</b> for impulse response of finite and infinite
CO5	<b>Construct</b> the multi rate signal processing and Identify Spectrograms and DTMF Filtering.

**Course: CMOS VLSI Design Laboratory**

**Code: 22EC606PC/ C327**

CO1	<b>Illustrate</b> HDL programs for combinational and sequential logics with simulations and synthesis
CO2	<b>Design</b> and analyze NMOS and CMOS logic circuits.
CO3	<b>Design</b> layouts for logic circuits and perform physical verification

**Course : Advanced English Communication Skills Laboratory**

**Code: 22EC606PC/ C328**

CO1	<b>Develops</b> confidence to use relevant vocabulary, using apt kinesics or body language in communication.
CO2	<b>Infer</b> the meaning of the text easily through comprehension techniques like, skimming, scanning and effective reading through proper vocabulary
CO3	<b>Analyze</b> the writing skills through letters, reports and resume writing from the text and use for all professional settings.
CO4	<b>Gather</b> ideas, information and organize them relevantly in making presentations.
CO5	<b>Self</b> assured to organize and deliver discussions, presentations and strategies to face the interviews effectively.

**Course : Intellectual Property Rights**

**Code: 22MC609IP/ C329**

CO1	<b>Distinguish</b> various forms of IPRs and explain them
CO2	<b>Recognize</b> criteria to fit one's own intellectual work in particular form of IPRs
CO3	<b>Apply</b> legal provisions to protect particular form of IPRs.
CO4	<b>Evaluate</b> new developments in IPR laws at national and international level

**Course: Industry Oriented Mini Project/ Internship**

**Code: 22EC607PC/ C32A**

CO1	<b>Apply</b> mathematical, scientific, and engineering principles to analyze and solve real engineering problems effectively.
CO2	<b>Utilize</b> current methodologies in various Electronics and Communication domains and propose advanced, innovative solutions to address pressing societal challenges
CO3	<b>Demonstrate</b> proficiency in implementing advanced techniques both independently and collaboratively while fostering a commitment to life-long learning and continuous adaptation to emerging technologies.

**Department of Electronics & Communication Engineering**

**Course Outcomes (COs) for Academic Year: 2025-26**

**YEAR: IV**

**SEMESTER: II**

**REGULATION: R21**

**Course : Wireless Sensor Networks**

**Code: 22EC823PE/ C422**

CO1	<b>Explain</b> various architectures of wireless sensor networks.
CO2	<b>Articulate</b> enabling technologies and challenges in wireless sensor networks.
CO3	<b>Determine</b> the performance of various routing and MAC protocols.
CO4	<b>Categorizing</b> various data gathering and data dissemination methods.
CO5	<b>Explain</b> gateway concepts and communication between wireless sensor networks and internet.

**Course : Introduction to Computer Networks**

**Code: 22CS832OE/ C420**

CO1	<b>Explain</b> Network Topologies and its Components used
CO2	<b>Illustrate</b> and compare different type of Networks Communication models with different types of communication types.
CO3	<b>Explain</b> different layers and its functions, protocols used in those layers and its applications.
CO4	<b>Choose</b> best routing algorithm for congestion free transmission.
CO5	<b>Illustrate</b> how communication occurs between two systems.

**Course : Machine learning**

**Code: 22EC813PE/ C420**

CO1	<b>Understand</b> fundamentals of artificial neural networks and supervised learning models.
CO2	<b>Analyze</b> unsupervised learning and associative memory neural network techniques.
CO3	<b>Apply</b> linear, probabilistic, and Bayesian models for regression and classification.
CO4	<b>Design</b> and evaluate kernel-based and sparse learning methods for complex problems.
CO5	<b>Interpret</b> graphical models for inference and decision-making applications.

**Course : Project Stage-II**

**Code: 22EC801PC/ C426**

CO1	<b>Analyze</b> , formulate, and implement a proposed methodology that finds a solution to the existing real-time engineering problems
CO2	<b>Demonstrate</b> effectively the engineering principles that solve Contemporary societal issues as an individual and a team
CO3	<b>Validate</b> the obtained results to promote life-long learning and sustainability

## Department of Electronics & Communication Engineering

### Course Outcomes(COs) for Academic Year: 2025-26

YEAR:I

SEMESTER:I

REGULATION: R25

Course: **Matrices and Calculus**

Code: **25MA101BS/C110**

CO1	<b>Write</b> the matrix representation of a set of linear equations and to analyse the solution of the system of equations
CO2	<b>Find</b> the Eigen values and Eigenvectors and reduce the quadratic form to canonical form using orthogonal transformations.
CO3	<b>Solve</b> the applications of the mean value theorems.
CO4	<b>Find</b> the extreme values of functions of two variables with/without constraints.
CO5	<b>Evaluate</b> the multiple integrals and apply the concept to find areas, volumes.

Course: **Advanced Engineering Physics**

Code: **25PH102BS/ C111**

CO1	<b>Analyze</b> crystal structures, identify defects, and apply XRD and SEM techniques for material characterization.
CO2	<b>Apply</b> quantum mechanical principles to explain particle behavior and energy band formation in solids.
CO3	<b>Classify</b> dielectric and magnetic materials and explain their properties, synthesis, and applications.
CO4	<b>Explain</b> the principles of lasers and fiber optics and their applications in communication and sensing.
CO5	<b>Understand</b> quantum computing concepts, Classical bits and qubits, Single and multiple qubits and quantum gates.

Course: **Engineering Drawing and Computer Aided Drafting**

Code: **25ME103ES/ C112**

CO1	<b>Understand</b> and apply the principles of orthographic and isometric projections.
CO2	<b>Create</b> sectional views and dimensioned drawings using BIS standards.
CO3	<b>Use</b> CAD software to generate 2D engineering drawings.
CO4	<b>Visualize</b> and construct solid models from 2D views.
CO5	<b>Interpret</b> and produce engineering drawings of mechanical components and assemblies.
CO6	<b>Demonstrate</b> drafting skills for practical and industrial applications.

Course: **English for Skill Enhancement**

Code: **25EN103HS/ C113**

CO1	<b>Demonstrate</b> effective English communication skills by using appropriate vocabulary.
CO2	<b>Strengthen</b> proficiency in English by applying correct grammar in writing and speaking.
CO3	<b>Build</b> comprehension skills to understand texts and respond confidently in Academic and Social contexts.
CO4	<b>Organize</b> ideas logically in writing paragraphs and essays, using connectives.
CO5	<b>Prepare</b> clear and organized technical reports suitable for various contexts.

**Course: Introduction to Electrical Engineering****Code: 25EC104ES/ C114**

CO1	<b>Understand</b> and analyze basic DC Electrical circuits.
CO2	<b>Formulate</b> and predict the basic AC circuits.
CO3	<b>Study</b> the working principle of Transformers.
CO4	<b>Study</b> and understand the working of Electrical Machines.
CO5	<b>Introduce</b> components of Low Voltage Electrical Installations.

**Course : Programming for Problem Solving****Code: 25CS105ES/ C115**

CO1	<b>Understand</b> the basics of C language to write and analyze simple programs.
CO2	<b>Apply</b> top-down design principles using functions and pointers to develop modular and reusable C programs
CO3	<b>Utilize</b> arrays and strings effectively in C programming for data storage.
CO4	<b>Implement</b> recursive solutions and work with user-defined data types for complex data management.
CO5	<b>Understand</b> file operations and apply fundamental searching and sorting algorithms to process data efficiently.

**Course: Advanced Engineering Physics Lab****Code: 25PH106BS/ C116**

CO1	<b>Demonstrate</b> working knowledge of laser systems and determine their characteristics.
CO2	<b>Demonstrate</b> working knowledge of optical fiber parameters through experimental study.
CO3	<b>Determine</b> key electrical, magnetic, and optical properties of semiconductors and other functional materials.
CO4	<b>Characterize</b> semiconductors using Hall effect and energy gap measurement techniques.
CO5	<b>Apply</b> scientific methods for accurate data collection, analysis, and technical report writing.

**Course: Programming for Problem Solving Lab****Code: 25CS107ES/C117**

CO1	<b>Demonstrate</b> understanding and application of fundamental C programming constructs.
CO2	<b>Develop</b> , trace, and analyze C programs using control structures.
CO3	<b>Decompose</b> complex problems into modular solutions using functions.
CO4	<b>Implement</b> string manipulation and file handling techniques.
CO5	<b>Apply</b> and evaluate searching and sorting algorithms.

**Course: English Language and Communication Skills Lab****Code: 25EN108HS/ C118**

CO1	<b>Apply</b> correct pronunciation to communicate well in personal and professional contexts.
CO2	<b>Create</b> opportunities to speak English for developing a clear and consistent accent
CO3	<b>Identify</b> and correct pronunciation errors to reduce mother tongue influence.
CO4	<b>Demonstrate</b> public speaking skills with clarity and confidence
CO5	<b>Develop</b> comprehension and use appropriate language for discussions and interviews.

**Department of Electronics & Communication Engineering**

**Course Outcomes (COs) for Academic Year: 2025-26**

**YEAR:II**

**SEMESTER:I**

**REGULATION: R22**

**Course : Analog Circuits**

**Code: 22EC301PC/C210**

CO1	<b>Analyze</b> the biasing techniques of transistors
CO2	<b>Extract</b> the equivalent models of transistors
CO3	<b>Design</b> multistage amplifiers and understand the concepts of Frequency Analysis of transistors
CO4	<b>Explain</b> the effect of negative feedback on various amplifier parameters.
CO5	<b>Analyze</b> oscillator circuits to generate audio and radio frequency signals.

**Course : Network analysis and Synthesis**

**Code:22EC302PC/C211**

CO1	<b>Understand</b> behavior of Electric & Magnetic Networks
CO2	<b>Analyze</b> the transient and steady-state responses of the RL, RC and RLC circuits
CO3	<b>Examine</b> various two port network parameters and its characteristics
CO4	<b>Construct</b> various filter networks and attenuators
CO5	<b>Inspect</b> transfer functions of passive elements for network synthesis

**Course: Digital Logic Design**

**Code:22EC303PC/ C212**

CO1	<b>Understand</b> number systems and Boolean functions for digital logic.
CO2	<b>Illustrate</b> the minimization of boolean functions and realization of logic families
CO3	<b>Design</b> various Combinational and Sequential logic Circuits
CO4	<b>Build</b> different type of Memories and State Machines.
CO5	<b>Examine</b> different types of Finite State Machines.

**Course: Signals and Systems**

**Code:22EC304PC/ C213**

CO1	<b>Interpret</b> any signal in terms of complete set of orthogonal functions and the types of signals
CO2	<b>Analyze</b> the Fourier spectrum using Fourier series and Fourier transforms
CO3	<b>Examine</b> an LTI system and its filter characteristics of a system.
CO4	<b>Analyze</b> Laplace Transforms and Z-Transforms
CO5	<b>Explain</b> the Sampling theorem and Correlation functions

**Course: Probability Theory and Stochastic Processes**

**Code:22EC305PC/ C214**

CO1	<b>Understand</b> the knowledge of Probability theory and random variables.
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CO2	<b>Illustrate</b> the concepts of single & multiple Random Variables.
CO3	<b>Identify</b> the concepts of Random Process and its Characteristics.
CO4	<b>Analyze</b> the various Spectral characteristics of Random Signals.
CO5	<b>Evaluate</b> the concepts of Noise in Communication systems.

**Course: Analog Circuits Laboratory**

**Code:22EC306PC/ C215**

CO1	<b>Determine</b> the Q point on the DC load line and stability factor for various biasing techniques of BJT
CO2	<b>Analyze</b> the Characteristics and Frequency response of various amplifiers
CO3	<b>Analyze</b> and Design negative Feedback amplifiers and Oscillators.

**Course: Digital logic Design Laboratory**

**Code:22EC307PC/ C216**

CO1	<b>Realize</b> and implementation of Boolean functions using digital logic IC's
CO2	<b>Implementation</b> of different combinational logic circuits using IC's
CO3	<b>Realize</b> and <b>implementation</b> of Asynchronous and Synchronous counters using Flip-Flop IC's

**Course: Basic Simulation Laboratory**

**Code:22EC308PC/ C217**

CO1	<b>Simulate</b> operations on various types of signals and sequences
CO2	<b>Analyze</b> signal characteristics in frequency domain and frequency response of an LTI system using Fourier transform
CO3	<b>Inspect</b> the stability of an LTI system using Laplace, Z-transforms and Determine convolution and correlation between signals and sequences

**Course: Constitution of India**

**Code:22MC309CI/ C218**

CO1	<b>Understand</b> the concept of Indian Constitution
CO2	<b>Outline</b> the fundamental rights and Fundamental Duties
CO3	<b>Analyze</b> the Directive Principles of State Policy
CO4	<b>Analyze</b> the distribution of powers between of Union and States
CO5	<b>Know</b> the Emergency Provision of Indian Constitution

**Department of Electronics & Communication Engineering**

**Course Outcomes (COs) for Academic Year: 2025-26**

**YEAR: III**

**SEMESTER: I**

**REGULATION: R22**

**Course: Microcontrollers and Applications**

**Code: 22EC501PC/ C310**

CO1	<b>Discuss</b> the internal architecture of 8086 microprocessor and 8051 Microcontroller.
CO2	<b>Illustrate</b> how to implement the I/O devices and memory interfaces to 8051 for various applications.
CO3	<b>Explain</b> various communication bus interfaces of microcontrollers.
CO4	<b>Describe</b> the Architecture and Instruction set of ARM Processor.
CO5	<b>Examine</b> the Architectures of Advanced ARM Processors.

**Course: IoT Architectures and Protocols**

**Code: 22EC502PC/ C311**

CO1	<b>Describe</b> IoT fundamentals, evolution, growth, and applications.
CO2	<b>Compare</b> M2M and IoT architectures and value chains.
CO3	<b>Identify</b> and explain IoT data link and network layer protocols.
CO4	<b>Use</b> transport and session layer protocols in IoT communication.
CO5	<b>Summarize</b> service layer protocols and security mechanisms in IoT.

**Course: Control Systems**

**Code: 22EC503PC/ C312**

CO1	<b>Examine</b> the mathematical model of physical systems
CO2	<b>Estimate</b> the system response & stability in Time domain
CO3	<b>Analyze</b> the system response & stability in Frequency domain
CO4	<b>Design</b> different types of controllers and compensators
CO5	<b>Analyze</b> linear time systems using state space representation

**Course: Antennas and Wave Propagation**

**Code: 22EC504PC/ C313**

CO1	<b>Examine</b> the fundamentals of antennas and thin linear wire antennas.
CO2	<b>Investigate</b> various types of antenna arrays for directivity and gain.
CO3	<b>Explain</b> the different methods to measure antenna gain.
CO4	<b>Characterize</b> various VHF, UHF and Microwave Antennas.
CO5	<b>Distinguish</b> various methods of wave propagation with related parameters.

**Course: Data Communications & Networks****Code: 22EC512PE/ C314**

CO1	<b>Discuss</b> the basics of Data Communication with its standard reference models.
CO2	<b>Examine</b> Error Control and Access control methods in Data Link Layer.
CO3	<b>Inspect</b> routing and addressing mechanisms in Network Layer.
CO4	<b>Distinguish</b> various types of Transport Layer Protocols.
CO5	<b>Explain</b> the functions of various Application Layer Protocols.

**Course: Microcontrollers Laboratory****Code: 22EC505PC/ C317**

CO1	<b>Develop</b> and execute 8086 and 8051 programs to perform various operations.
CO2	<b>Design</b> , interface, and program I/O devices.
CO3	Build and <b>evaluate</b> embedded applications on Cortex-M3 development boards

**Course: IoT Architectures and Protocols Laboratory****Code: 22EC506PC/ C318**

CO1	<b>Interface</b> various sensors with microcontrollers for data acquisition and transmission.
CO2	<b>Implement</b> IoT communication protocols and demonstrate remote control using cloud integration.
CO3	<b>Design</b> IoT-based systems and communication protocols.

**Course: Advanced Communication Laboratory****Code: 22EC507PC/ C319**

CO1	<b>Proficiently</b> utilize test and measurement equipment to characterize and analyze signals, antennas, and communication systems.
CO2	<b>Design</b> , implement, and analyze digital modulation and multiplexing techniques using software tools.
CO3	<b>Develop</b> and implement embedded systems for sensor data acquisition and wireless communication using UART and RIME protocols on an ICONT platform, demonstrating an understanding of sensor network principles.

## Department of Electronics & Communication Engineering

### Course Outcomes (COs) for Academic Year: 2025-26

YEAR: IV

SEMESTER: I

REGULATION: R22

#### Course: Microwave and Optical Communications

Code: 22EC701PC/C410

CO1	<b>Compare</b> O and M microwave tubes, their structures and principles of microwave power generation
CO2	<b>Explain</b> the principles of solid-state devices
CO3	<b>Identify</b> the waveguide components
CO4	<b>Analyse the microwave components by scattering parameters and verify it by measurements.</b>
CO5	<b>Classify</b> optical fibers on basis of core and cladding and analyse the link budget.

#### Course: Radar Systems

Code: 22EC711PE/ C411

CO1	<b>Discuss</b> the Radar fundamentals with its Range performance.
CO2	<b>Examine</b> the Doppler effect in CW and FM-CW Radars.
CO3	<b>Analyze</b> the Performance of MTI and Pulse Doppler Radars.
CO4	<b>Distinguish</b> various types of Tracking Radars.
CO5	<b>Inspect</b> the noise of Matched Filter in Radar receiver.

#### Course: Biomedical Instrumentation

Code: 22EC723PE/ C414

CO1	<b>Make</b> use of bio-systems and medical systems for an engineering perspective
CO2	<b>Identify</b> various techniques/Instruments for measuring physiological parameters
CO3	<b>Apply</b> the Categorize different EEG electrodes and their applications
CO4	<b>Explain</b> about various critical care equipment
CO5	<b>Elaborate</b> principles of medical imaging such as MRI,SPECT,PET,CT

#### Course: AI & Applications

Code: 22AM722OE/ C410

CO1	<b>Correlate</b> AI and solutions to modern problems
CO2	<b>Use</b> of AI in business applications
CO3	<b>Application</b> of AI in manufacturing automation
CO4	<b>Use</b> of AI in streaming of data and Network applications

**Course : Professional Practice, Law & Ethics****Code: 22SM702MS/ C417**

CO1	<b>Understand</b> Professional Ethics & Personal Ethics, code of Ethics, Conflict of Interest. Will able to learn the concept of professionalism, Whistle blowing and the brief introduction of GST
CO2	<b>Identify</b> various techniques/Instruments for measuring physiological parameters. Recognize the element of contract, unlawful and illegal agreement. Will analyze the remedies for breach of contract, sale of goods act 1930 and performance of contract of sales
CO3	<b>Illustrate</b> Arbitration, Conciliation and ADR different forms of laws and the dispute resolution board.; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality
CO4	<b>Enumerate</b> the concept of labor laws and other construction related laws and other different types of ACT (1946, 1947, 1923) and also); RERA Act 2017, NBC 2017
CO5	<b>Understand</b> IPR Copyright, Trademarks, Patents and Designs, Secrets, Piracy in Internet Remedies and procedures in India

**Course : Microwave and Optical Communications Lab****Code: 22EC705PC/ C418**

CO1	<b>Identify</b> and demonstrate the working of various microwave and optical components
CO2	<b>Analyze</b> Microwave Passive Devices by conducting experiments and measuring various parameters
CO3	<b>Analyze</b> the characteristics of Optical semiconductor Sources like LED, LASER Diode, by conducting experiments and measuring various parameters

**Course : Project Stage-I****Code: 22EC706PC/ C41B**

CO1	<b>Formulate</b> and apply mathematical, science, and engineering principles to solve real-time engineering problems
CO2	<b>Implement</b> the existing technique in domains of VLSI, Image & Signal Processing, Communication, and Embedded system using modern tools and technology
CO3	<b>Structure</b> future work to promote life-long learning in the context of technological adaptation